Contents

IGBT Chips

	V_{CES}	I_C	
G-Series, Low $V_{CE(sat)}$ B2 Types	600 ...1200 V	7 ... 20 A	6
G-Series, Fast C2 Types	600 V	7 ... 20 A	6
S-Series, SCSOA Capability, Fast Types	600 V	10 ... 20 A	6
E-Series, Improved NPT^3 technology	1200 ... 1700 V	20 ... 150 A	7

MOSFET Chips

	V_{DSS}	$R_{DS(on)}$	
HiPerFET™ Power MOSFET	70 ...1200 V	0.005 ... 4.5 Ω	8-10
PolarHT/HV™ Power MOSFET	55 ... 600 V	0.015 ... 0.135 Ω	11
PolarHT/HV™ HiPerFET Power MOSFET	100 ... 600 V	0.0075 ... 0.74 Ω	12-14
N-Channel Depletion Mode MOSFET	500 ...1000 V	30 ... 110 Ω	15
P-Channel Power MOSFET	-100 ...-600 V	0.06 ... 1.2 Ω	15
Chip outlines			16-23

Bipolar Chips

	V_{RRM} / V_{DRM}	$I_{F(AV)M}$ / $I_{T(AV)M}$	
Rectifier Diodes	800 ... 2200 V	12 ... 788 A	24-25
FREDs	200 ... 1200 V	8 ... 244 A	26-28
Low Leakage FREDs	200 ... 1200 V	9 ... 148 A	29-30
SONIC-FRD™ Diodes	600 ... 1800 V	12 ... 150 A	31-32
GaAs Schottky Diodes	100 ... 300 V	3.5 ... 25 A	33-34
Schottky Diodes	8 ... 200 V	28 ... 145 A	35-38
Phase Control Thyristors	800 ... 2200 V	15 ... 540 A	39-40
Fast Rectifier Diodes	1600 ... 1800 V	10 ... 26 A	41

Direct Copper Bonded (DCB) Ceramic Substrates

Symbols and Definitions

C_{ies}	Input capacitance of IGBT
C_{iss}	Input capacitance of MOSFET
$-di/dt$	Rate of decrease of forward current
I_C	DC collector current
I_D	Drain current
I_F	Forward current of diode
$I_{F(AV)M}$	Maximum average forward current at specified T_h
I_{FSM}	Peak one cycle surge forward current
I_{GT}	Gate trigger current
I_R	Reverse current
I_{RM}	Maximum peak recovery current
I_T	Forward current of thyristor
$I_{T(AV)M}$	Maximum average on-state current of a thyristor at specified T_h
I_{TSM}	Maximum surge current of a thyristor
$R_{DS(on)}$	Static drain-source on-state resistance
R_{thjc}	Thermal resistance junction to case
r_T	Slope resistance of a thyristor or diode (for power loss calculations)
T_{case}	Case temperature
T_h	Heatsink temperature
t_{fi}	Current fall time with inductive load
T_j, $T_{(vj)}$	Junction temperature
T_{jm}, $T_{(vj)m}$	Maximum junction temperature
t_{rr}	Reverse recovery time of a diode
$V_{CE(sat)}$	Collector-emitter saturation voltage
V_{CES}	Maximum collector-emitter voltage
V_{DRM}	Maximum repetitive forward blocking voltage of thyristor
V_{DSS}	Drain-source break-down voltage
V_F	Forward voltage of diode
V_R	Reverse voltage
V_{RRM}	Maximum peak reverse voltage of thyristor or diode
V_T	On-state voltage of thyristor
V_{T0}	Threshold voltage of thyristors or diodes (for power loss calculation only)

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Nomenclature

IGBT and MOSFET Discrete

IXSD 40N60A	**(Example)**
IX	IXYS
	Die technology
E	NPT^3 IGBT
F	HiPerFET™ Power MOSFET
G	Fast IGBT
S	IGBT with SCSOA capability
T	Standard Power MOSFET
D	Unassembled chip (die)
40	Current rating, 40 = 40 A
N	N-channel type
P	P-channel type
60	Voltage class, 60 = 600 V
xx	
	MOSFET
A	Prime $R_{DS(on)}$ for standard MOSFET
Q	Low gate charge die
Q2	Low gate charge die, 2nd generation
P	PolarHT/HV Power MOSFET
L	Linear Mode MOSFET
	IGBT
--	No letter, low $V_{CE(sat)}$
A	Or A2, std speed type
B	Or B2, high speed type
C	Or C2, very high speed type

Diode and Thyristor Chips

C-DWEP 69-12	**(Diode Example)**
C	Package type
D	Chip function D = Silicon rectifier diode
W	Unassembled chip
EP	Process designator EP = Epitaxial rectifier diode N = Rectifier diode, cathode on top P = Rectifier diode, anode on top FN = Fast Rectifier diode, cathode on top FP = Fast Rectifier diode, anode on top
69	Current rating value of one chip in A
-12	Voltage class, 12 = 1200 V

W-CWP 55-12/18	**(Thyristor Example)**
W	Package type
C	Chip function C = Silicon phase control thyristor
W	Unassembled chip
P	Process designator P = Planar passivated chip cathode on top
55	Current rating value of one chip in A
12/18	Voltage class, 12/18 = 1200 up to 1800 V

General Informations for Chips

When mounting Power Semiconductor chips to a header, ceramic substrate or hybrid thick film circuit, the solder system and the chip attach process are very important to the reliability and performance of the final product. This brochure provides several guidelines that describe recommended chip attachment procedures. These methods have been used successfully for many years at IXYS.

Available Packaging Options

IXYS offers various options.
Please order from one of the following possibilities:

Packaging Options	Delivery form		
C-...*	Chips in tray (Waffle Pack);	Electrically tested	
T-...*	Chips in wafer, unsawed;	Bipolar = 5" (125 mm∅) wafer; or 6 " (150 mm∅)	Electrically tested, rejects are inked
W-...*	Chips in wafer on foil, sawed;	Bipolar = 5" (125 mm∅) wafer; or 6 " (150 mm∅)	Electrically tested, rejects are inked

...* must be amended by the exact chip type designation.

Package, Storage and Handling

Chips should be transported in their original containers. All chip transfer to other containers or for assembly should be done only with rubber-tipped vacuum pencils. Contact with human skin (or with a tool that has been touched by hand) leaves an oily residue that may adversely impact subsequent chip attach or reliability.

At temperatures below 104°F (40°C), there is no limitation on storage time for chips in sealed original packages. Chips removed from original packages should be assembled immediately. The wetting ability of the contact metallization with solder can be preserved by storage in a clean and dry nitrogen atmosphere.

The IGBT and MOSFET Chips are electrostatic discharge (ESD) sensitive. Normal ESD precautions for handling must be observed. Prior to chip attach, all testing and handling of the chips must be done at ESD safe work stations according to DIN IEC 47(CO) 701. Ionized air blowers are recommended for added ESD protection.

Contamination of the chips degrades the assembly results.Finger prints, dust or oily deposits on the surface of the chips have to be absolutely avoided.
Rough mechanical treatment can cause damage to the chip.

Electrical Tests

The electrical properties listed in the data sheet presume correctly assembled chips. Testing of **non-**assembled chips requires the following precautions:

- High currents have to be supplied homogeneously to the whole metallized contact area.
- Kelvin probes must be used to test voltages at high currents
- Applying the full specified blocking or reverse voltage may cause arcing across the glass passivated junction termination, because the electrical field on top of the passivation glass causes ionization of the surrounding air. This phenomenon can be avoided by using inert fluids or by increasing the pressure of the gas surrounding the chip to values above 30 psig (2 bars).

General Rules for Assembly

The linear thermal expansion coefficient of silicon is very small compared to usual contact metals. If a large area metallized silicon chip is directly soldered to a metal like copper, enormous shear stress is caused by temperature changes (e.g. when cooling down from the solder temperature or by heating during working conditions) which can disrupt the solder mountdown.

If it is found that larger chips are cracking during mountdown or in the application, then the use of a low thermal expansion coefficient buffer layer, e.g. tungsten, molybdenum or Trimetal®, for strain relief should be considered. An alternative solution is to soft-solder these larger chips to DCB ceramic substrates because of their matching thermal expansion coefficients.

Assembly Instructions

MOS/IGBT Chips

Recommended Solder System

IXYS recommends a soft solder chip attach using a solder composition of 92.5 % Pb, 5 % Sn and 2.5 % Ag. The maximum chip attach temperature is 460°C for MOSFET and 360°C for HiPerFET^{TM} and IGBT.

Wire Bonding

It is recommended to use wire of diameter not greater than 0.38 mm (0.015") for bonding to the source emitter and gate pads. Multiple wires should be used in place of thicker wire to handle high drain or emitter currents. See tables for number of recommended wire bonds. For smaller gate pads, 0.15 mm diameter wire is recommended.

Thermal Response Testing

To assure good chip attach processing, thermal response testing per MIL STD 750, Method 3161 or equivalent should be performed.

Bipolar Chips

Assembling

IXYS bipolar semiconductor chips have a soft-solderable, multi-layer metallization (Ti/Ni/Ag) on the bottom side and, on top, either the same metallization scheme or an alumunium layer sufficiently thick for ultrasonic bonding. Note that the last layer of metal for soldering is pure silver.

Regardless of their type all chips possess the same glass passivated junction termination system on top of the chip. For that reason they can be easily chip bonded or they can all be simply soldered to a flat contacting electrode in accordance to the General Rules on Page 3. All kinds of the usual soft solders with melting points below 660°F (350°C) can be used thanks to their pure silver top metal. Solders with high melting points are preferable due to their better power cycling capability, i.e. they are more resistant to thermal fatigue.

Soldering temperature should not exceed 750°F (400°C). The maximum temperature should not be applied for more than five minutes.

As already mentioned above the electrical properties quoted in the data sheets can only be obtained with properly assembled chips. This is only possible when all contact materials to be soldered together are well wetted and the solder is practically free of voids.

A simple means to achieve good solder connections is to use a belt furnace running with a process gas containing at least 10 % Hydrogen in Nitrogen.
Other approved methods are also allowed, provided that the above mentioned temperature-time-limits are not exceeded and temperature shocks above 930°F/min (500 K/min) are avoided.

We do not recommend the use of fluxes for soldering!

Ultrasonic Wire Bonding

Chips provided with a thick aluminium layer are designed for ultrasonic wire bonding. Wire diameters up to 500 µm can be used dependent on chip types. Setting wires in parallel and application of stitch bonding lead to surge current ratings comparable to soldered chips.

Coating

Although the chips are glass passivated, they must be protected against arcing and environmental influences. The coating material that is in contact with the chip surface must have the following properties:

- elasticity (to prevent mechanical stress)
- high purity, no contamination with alkali metals
- good adhesion to metals and glass passivation.

FRED, Rectifier Diode and Thyristor Chips in Planar Design

Fast Recovery Epitaxial Diodes (FRED)

Power switches (IGBT, MOSFET, BJT, GTO) for applications in electronics are only as good as their associated free-wheeling diodes. At increasing switching frequencies, the proper functioning and efficiency of the power switch, aside from conduction losses, is determined by the turn-off behavior of the diode (characterized by Q_{rr}, I_{RM} and t_{rr} - Fig. 1).

The reverse current characteristic following the peak reverse current I_{RM} is another very important property. The slope of the decaying reverse current di_{rr}/dt results from design parameters; technology and diffusion of the FRED chip Fig. 2. In a circuit this current slope, in conjunction with parasitic inductances (e.g. connecting leads) causes over-voltage spikes and high frequency interference voltages.The higher the di_{rr}/dt ("hard recovery" or "snap-off" behavior) the higher is the resulting additional stress for both the diode and the paralleled switch. A slow decay of the reverse current ("soft recovery" behavior), is the most desirable characteristic, and this is designed into all FRED. The wide range of available blocking voltages makes it possible to apply these FRED as output rectifiers in switch-mode power supplies (SMPS) as well as protective and free-wheeling diodes for power switches in inverters and welding power supplies.

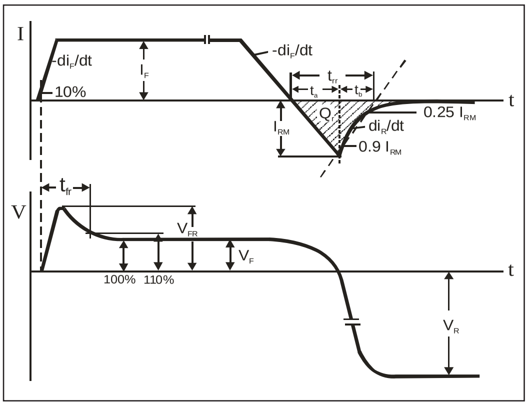


Fig. 1: Current and voltage during turn-on and turn-off switching of fast diodes

Rectifier Diode and Thyristor Chips

The figures 3 a-c show cross sectional views of the diode and thyristor chips in the passivation area. All diode and thyristor chips (DWN, DWFN, CWP) are fabricated using separation diffusion processes so that all junctions terminate on the topside of the chip. Now the entire bottom surfaces of all chips are available for soldering onto a DCB or other ceramic substrate without a molybdenum strain buffer. The elimination of the strain buffer and its solder joint reduces thermal resistance and increases blocking voltage stability. The junction termination areas are passivated with glass, whose thermal expansion coefficient matches that of silicon. All silicon chips increasingly use planar technology with guard rings and channel stoppers to reduce electric fields on the chip surface.
The contact areas of the chips have vapor deposited metal layers which contribute substantially to their high power cycle capability. All chips are processed on silicon wafers of 5" diameter and diced after a wafer sample test which auto-matically marks chips not meeting the electrical specification. The chip geometry is square or rectangular.

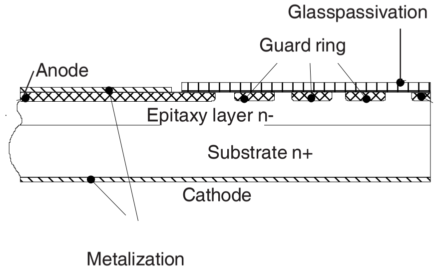


Fig. 2: Cross section of glassivated planar epitaxial diode chip (type DWEP)

Fig. 3a-c
Cross sections of Chips in the passivation area
a) Diode chip, type DWN, DWFN
b) Diode chip, type DWP, DWFP
c) Thyristor chip, type CWP

Fig. 3a)

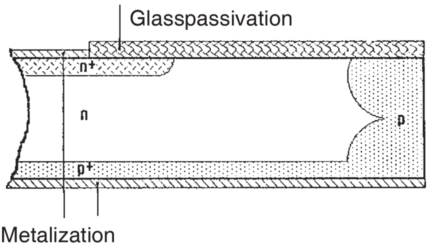


Fig. 3b)

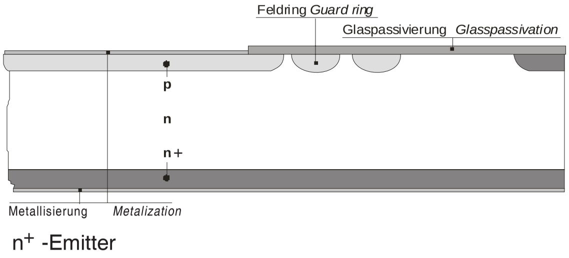
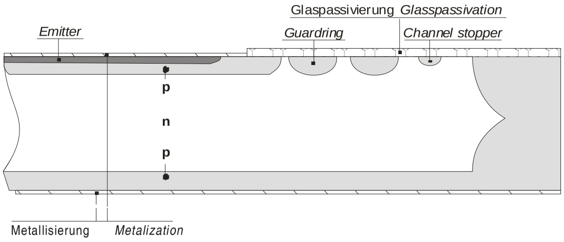


Fig. 3c)



Insulated Gate Bipolar Transistors

GenX3 IGBTs

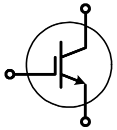
600V A3-Series

	Type T_{JM} = 150°C	V_{CES} V	$V_{CE(sat)}$ V	@ I_C A	Chip type	Chip Size dimensions mm	mils	Source bond wire recommended	Equivalent device data sheet
High Gain	**IXGD28N60A3-45**	600	1.5	20	IX45	5.00 x 4.00	197 x 157	10 mil x 3	IXGH28N60A3
	IXGD36N60A3-55		1.4	20	IX55	6.00 x 4.00	236 x 157	15 mil x 3	IXGH36N60A3
	IXGD48N60A3-56		1.3	20	IX56	6.20 x 5.20	244 x 205	15 mil x 3	IXGH48N60A3
	IXGD56N60A3-65		1.3	20	IX65	6.30 x 6.30	248 x 248	15 mil x 4	IXGH56N60A3
	IXGD64N60A3-75		1.3	20	IX75	6.86 x 6.86	270 x 270	15 mil x 3	IXGH64N60A3
	IXGD72N60A3-76		1.3	20	IX76	8.90 x 7.14	351 x 281	15 mil x 4	IXGH72N60A3
	IXGD90N60A3-85		1.3	20	IX85	12.17 x 7.14	479 x 281	12 mil x 4	IXGH90N60A3
	IXGD120N60A3-86		1.3	20	IX86	13.98 x 9.02	550 x 355	12 mil x 6	IXGK120N60A3
	IXGD360N60A3-97		1.3	20	IX97	15.81 x 12.5	622 x 492	15 mil x 6	IXGN360N60A3

600V B3-Series

Low Gain	**IXGD28N60B3-45**	600	1.8	20	IX45	5.00 x 4.00	197 x 157	10 mil x 3	IXGH28N60B3
	IXGD36N60B3-55	600	1.8	20	IX55	6.00 x 4.00	236 x 157	15 mil x 3	IXGH36N60B3
	IXGD48N60B3-56	600	1.6	20	IX56	6.20 x 5.20	244 x 205	15 mil x 3	IXGH48N60B3
	IXGD56N60B3-65	600	1.6	20	IX65	6.30 x 6.30	248 x 248	15 mil x 4	IXGH56N60B3
	IXGD64N60B3-75	600	1.6	20	IX75	6.86 x 6.86	270 x 270	15 mil x 3	IXGH64N60B3
	IXGD72N60B3-76	600	1.6	20	IX76	8.90 x 7.14	351 x 281	15 mil x 4	IXGH72N60B3
	IXGD90N60B3-85	600	1.6	20	IX85	12.17 x 7.14	479 x 281	12 mil x 4	IXGH90N60B3
	IXGD120N60B3-86	600	1.6	20	IX86	13.98 x 9.02	550 x 355	12 mil x 6	IXGK120N60B3
	IXGD200N60B3-97	600	1.6	20	IX97	15.81 x 12.5	622 x 492	15 mil x 6	IXGB200N60B3

Insulated Gate Bipolar Transistors



G-Series

	Type T_{JM} = 150°C	V_{CES}	$V_{CE(sat)}$	@ I_C	Chip type	Chip Size dimensions		Source bond wire recommended	Equivalent device data sheet
		V	V	A		mm	mils		
High Gain	**IXGD7N60B-2X**	600	2.2	7	IX2X	3.17 x 3.17	125 x 125	10 mil x 1	IXGP7N60B
	IXGD7N60C-2X		2.9	7	IX2X	3.17 x 3.17	125 x 125	12 mil x 1	IXGP7N60C
	IXGD16N60B2-3X		2.5	12	IX3X	4.39 x 3.60	173 x 142	12 mil x 1	IXGH16N60B2
	IXGD16N60C2-3X		3.0	12	IX3X	4.39 x 3.60	173 x 142	12 mil x 1	IXGH16N60C2
	IXGD30N60B2-4X		2.0	20	IX4X	5.65 x 4.70	222 x 185	10 mil x 2	IXGH30N60B2
	IXGD30N60C2-4X		2.7	20	IX4X	5.65 x 4.70	222 x 185	10 mil x 2	IXGH30N60C2
	IXGD40N60B2-5Y		1.8	20	IX5Y	6.59 x 6.59	259 x 259	12 mil x 3	IXGH40N60B2
	IXGD40N60C2-5Y		2.5	20	IX5Y	6.59 x 6.59	259 x 259	12 mil x 3	IXGH40N60C2
	IXGD50N60B2-62		2.0	20	IX62	8.65 x 6.52	341 x 257	12 mil x 4	IXGH50N60B2
	IXGD50N60C2-62		2.7	20	IX62	8.65 x 6.52	341 x 257	12 mil x 4	IXGH50N60C2
	IXGD60N60B2-7Y		1.8	20	IX7Y	8.89 x 7.16	350 x 282	12 mil x 4	IXGH60N60B2
	IXGD60N60C2-7Y		2.5	20	IX7Y	8.89 x 7.16	350 x 282	12 mil x 4	IXGH60N60C2
	IXGD120N60B-9X		1.6	20	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXGK120N60B
	IXGD120N60C2-9X		2.5	20	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXGK120N60C2
	IXGD200N60A2-9X		1.35	20	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXGN200N60A2
	IXGD20N120B-4Z	1200	3.4	20	IX4Z	4.30 x 5.20	169 x 205	10 mil x 2	IXGH20N120B
	IXGD28N120B-5Z		3.5	20	IX5Z	6.20 x 5.20	244 x 205	12 mil x 3	IXGH28N120B

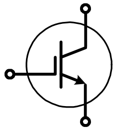
S-Series

Low Gain	**IXSD10N60B2-3Z**	600	2.7	10	IX3Z	3.60 x 3.60	142 x 142	12 mil x 1	IXSP10N60B2
	IXSD20N60B2-4Z		2.7	16	IX4Z	4.30 x 5.20	169 x 205	10 mil x 2	IXSH20N60B2
	IXSD30N60B2-5Z		2.5	20	IX5Z	6.20 x 5.20	244 x 205	12 mil x 3	IXSH30N60B2

Notes:

1. *Recommended Gate bond wire: 5 mil for chip 2X; 8 mil for chips 3X, 3Z., 4X, 5Y, 5Z, 7Y; 12 mil for chip 9X*
2. *Dice are tested to Vsat limits as indicated. Maximum current 20A is limited by test equipment.*
3. *Recommended die processing thermal budget 300 deg. C for 5 minutes; maximum temperature should not to exceed 360 deg. C*
4. *This table lists active chips only*

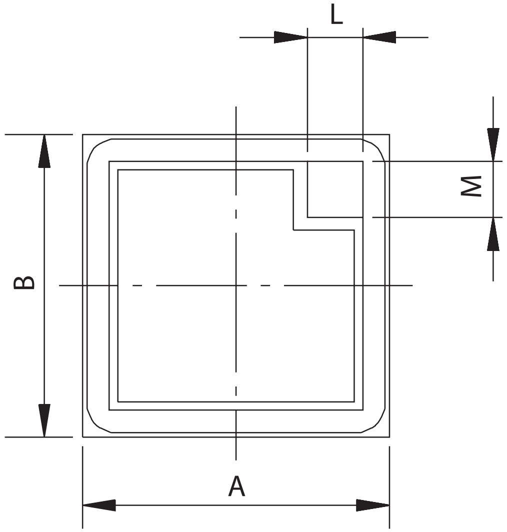
IGBT E-Series with improved NPT³ technology



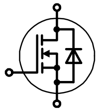
Type	V_{CES} V	T_{VJM} °C	Short Circuit Proof	I_C A	$V_{CE(sat)}$ T_{VJ} = 25°C typ. V	125°C typ. V	@I_C A	E_{on} Inductive Load T_{VJ} = 125 °C mJ	E_{off} mJ	@I_C A	$Q_{g(on)}$ nC	Internal Gate Resistance Ω	bondable	Dimensions A mm	B mm	L mm	M mm	Si thickn. mm
IXED15N120 ①	1200	150	•	20	2.80	2.75	20	2.8	1.8	20	100	tbd	•	5.7	4.6	1.1	1.1	130 ±20
IXED25N120			•	25	2.00	2.20	25	3.2	2.3	25	195	10	•	6.6	6.5	1.2	1.2	
IXED50N120			•	50	1.90	2.10	50	6.3	4.7	50	470	5	•	9.1	9.0	1.2	1.2	
IXED75N120			•	75	1.90	2.10	75	9.2	7.8	75	710	5	•	11.0	11.0	1.2	1.2	
IXED100N120			•	100	1.90	2.10	100	11.8	10.1	100	985	4	•	12.6	12.6	1.2	1.2	
IXED150N120			•	150	2.15	2.40	150	21.0	15.0	150	1110	3	•	12.0	12.0	1.2	1.2	
IXED75N170	1700		•	75	2.30	2.60	75	25.0	19.0	75	630	5	•	11.9	11.9	1.2	1.2	210 ±15
IXED100N170			•	100	2.30	2.60	100	32.0	27.0	100	880	4	•	13.6	13.6	1.2	1.2	
												Tolerance		±0.05	±0.05	±0.05	±0.05	

① Not for new design

- *NPT³ is an improved NPT design*
- *Square RBSOA*
- *Short circuit rated*
- *reduced V_{CEsat}*
- *reduced switching losses*
- *soft switching for good EMC behaviour*
- *optimized for switching frequencies from 10 kHz up to 25 kHz*



HiPerFET^{TM} Power MOSFET



Type	V_{DSS} max. V	$R_{DS(ON)}$ max. Ω	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
				mm	mils		
IXFD180N07-9X	70	0.007	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK180N07
IXFD340N07-9Y		0.005	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN340N07
IXFD180N085-9X	85	0.007	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK180N085
IXFD280N085-9Y		0.005	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN280N085
IXFD80N10Q-8X	100	0.018	IX8X	12.19 x 7.19	480 x 283	15 mil x 4	IXFH80N10Q
IXFD170N10-9X		0.011	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK170N10
IXFD230N10-9Y		0.007	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN230N10
IXFD88N20Q-82	200	0.035	IX82	12.17 x 7.14	479 x 281	15 mil x 4	IXFH88N20Q
IXFD120N20-9X		0.020	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK120N20
IXFD180N20-9Y		0.014	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN180N20
IXFD40N30Q-72	300	0.095	IX72	8.89 x 7.16	350 x 282	15 mil x 3	IXFH40N30Q
IXFD52N30Q-82		0.075	IX82	12.17 x 7.14	479 x 281	15 mil x 4	IXFH52N30Q
IXFD73N30Q-8Y		0.050	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK73N30Q
IXFD90N30-9X		0.040	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK90N30
IXFD130N30-9Y		0.028	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN130N30

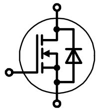
This table listgs active chips only. *Please contact factory for older designs.*

HiPerFET^{TM} Power MOSFETs

The **Hi**gh **Per**formance MOS**FET** family of Power MOSFETs is designed to provide superior dv/dt performance while eliminating the need for discrete, fast recovery "free wheeling diodes" in a broad range of power switching applications.

This class of Power MOSFET uses IXYS' HDMOS process, which improves the ruggedness of the MOSFET while reducing the reverse recovery time of the fast intrinsic diode to 250 ns or less at elevated (150°C) junction temperature. The performance of the fast intrinsic diode is comparable to discrete high voltage diodes and is tailored to minimize power dissipation and stress in the MOSFET.

HiPerFET™ Power MOSFET



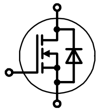
Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	Ω		mm	mils		
IXFD40N50Q-82	500	0.150	IX82	12.17 x 7.14	479 x 281	15 mil x 4	IXFH40N50Q
IXFD40N50Q2-84		0.150	IX84	12.17 x 7.14	479 x 281	15 mil x 4	IXFH40N50Q2
IXFD48N50Q-8Y		0.110	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK48N50Q
IXFD55N50-9X		0.100	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK55N50
IXFD66N50Q2-94		0.085	IX94	14.20 x 10.60	559 x 417	15 mil x 6	IXFK66N50Q2
IXFD80N50Q2-95		0.070	IX95	15.81 x 12.50	623 x 492	15 mil x 6	IXFB80N50Q2
IXFD80N50-9Y		0.060	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN80N50
IXFD23N60Q-72	600	0.350	IX72	8.89 x 7.16	350 x 282	15 mil x 3	IXFH23N60Q
IXFD30N60Q-82		0.250	IX82	12.17 x 7.14	479 x 281	15 mil x 4	IXFH30N60Q
IXFD36N60Q-8Y		0.170	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK36N60Q
IXFD44N60-9X		0.140	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK44N60
IXFD52N60Q2-94		0.130	IX94	14.20 x 10.60	559 x 417	15 mil x 6	IXFK52N60Q2
IXFD70N60Q2-95		0.090	IX95	15.81 x 12.50	623 x 492	15 mil x 6	IXFB70N60Q2
IXFD60N60-9Y		0.090	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN60N60

This table listgs active chips only. *Please contact factory for older designs.*

HiPerFET™s offer extended dv/dt ruggedness

The HiPerFET™ series of Power MOSFETs have an extended stress capability in applications where the intrinsic "free-wheeling diode" is used. Both static and dynamic dv/dt withstand capability have been improved to offer a significant margin of safety in high stress conditions found in many types of inductive load switching applications.

HiPerFET^{TM} Power MOSFET



Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	Ω		mm	mils		
IXFD23N80Q-82	800	0.440	IX82	12.17 x 7.14	479 x 281	15 mil x 4	IXFH23N80Q
IXFD27N80Q-8Y		0.350	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK27N80Q
IXFD34N80-9X		0.250	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK34N80
IXFD38N80Q2-94		0.250	IX94	14.20 x 10.60	559 x 417	15 mil x 6	IXFK38N80Q2
IXFD50N80Q2-95		0.170	IX95	15.81 x 12.50	623 x 492	15 mil x 6	IXFB50N80Q2
IXFD44N80-9Y		0.160	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN44N80
IXFD24N90Q-8Y	900	0.500	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK24N90Q
IXFD26N90-9X		0.330	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK26N90
IXFD39N90-9Y		0.220	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN39N90
IXFD6N100Q-5U	1000	2.000	IX5U	6.81 x 6.74	268 x 265	10 mil x 2	IXFH6N100Q
IXFD10N100-7Y		1.200	IX7Y	8.89 x 7.16	350 x 282	15 mil x 3	IXFH10N100
IXFD14N100Q2-7F		1.000	IX7F	8.89 x 7.16	350 x 282	12 mil x 4	IXFH14N100Q2
IXFD14N100-8X		0.750	IX8X	12.19 x 7.19	480 x 283	15 mil x 4	IXFH14N100
IXFD21N100Q-8Y		0.520	IX8Y	13.97 x 9.02	550 x 355	12 mil x 6	IXFK21N100Q
IXFD21N100F-8F		0.520	IX8F	13.97 x 9.02	550 x 355	12 mil x 6	IXFK21N100F
IXFD24N100-9X		0.420	IX9X	14.20 x 10.60	559 x 417	15 mil x 6	IXFK24N100
IXFD24N100F-9F		0.420	IX9F	14.20 x 10.60	559 x 417	15 mil x 6	IXFK24N100F
IXFD38N100Q2-95		0.280	IX95	15.81 x 12.50	623 x 492	15 mil x 6	IXFB38N100Q2
IXFD36N100-9Y		0.270	IX9Y	15.81 x 14.31	623 x 563	12 mil x 12	IXFN36N100
IXFD3N120-4U	1200	4.500	IX4U	5.77 x 4.96	227 x 195	12 mil x 1	IXFP3N120

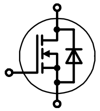
This table listgs active chips only. *Please contact factory for older designs.*

'Q - Class' and 'Q2 - Class' HiPerFET^{TM} MOSFETs for Lower Gate Charge and Faster Switching

New 'Q - class' HiPerFET MOSFETs (identified by the suffix letter Q) are the result of a revolutionary new chip design, which decreases the MOSFET's total gate charge Qg and the Miller capacitance Crss, while maintaining the ruggedness and fast switching intrinsic diode of the company's current HiPerFET product line. The result is a MOSFET with dramatically improved switching efficiencies and thus enabling higher frequency operation and smaller power supplies.

The newer 'Q2-Class' line combines the low gate charge advantages of Q-Class with a double-metal construction resulting in a new generation of MOSFETs with an intrinsic gate resistance an order of magnitude lower than conventional MOSFETs. The resulting reduction in switching losses allows large MOSFETs to operate up satisfactorily up to the multi-megahertz region.

PolarHT™ MOSFET



Type	**V_{DSS} max.** V	**$R_{DS(ON)}$ max.** mΩ	**Chip type**	**Chip Size dimensions** mm	mils	**Source - bond wire recommended**	**Equivalent device data sheet**
IXTD110N055P-5S	55	21	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 110N055P
IXTD75N10P-5S	100	31	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 75N10P
IXTD110N10P-6S		22	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXTQ 110N10P
IXTD140N10P-7S		20	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXTQ 140N10P
IXTD170N10P-8S		15	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXTQ 170N10P
IXTD200N10P-88		15	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXTK 200N10P
IXTD62N15P-5S	150	50	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 62N15P
IXTD96N15P-6S		30	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXTQ 96N15P
IXTD120N15P-7S		23	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXTQ 120N15P
IXTD150N15P-8S		21	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXTQ 150N15P
IXTD180N15P-88		20	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXTK 180N15P
IXTD50N20P-5S	200	75	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 50N20P
IXTD74N20P-6S		42	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXTQ 74N20P
IXTD96N20P-7S		30	IX7S	8.9 x 7.14	438 x 281	15 mil x 4	IXTQ 96N20P
IXTD120N20P-8S		28	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXTQ 120N20P4
IXTD140N20P-88		24	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXTK 140N20P
IXTD42N25P-5S	250	100	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 42N25P
IXTD64N25P-6S		60	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXTQ 64N25P
IXTD82N25P-7S		40	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXTQ 82N25P
IXTD100N25P-8S		34	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXTQ 100N25P
IXTD120N25P-88		30	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXTK 120N25P
IXTD36N30P-5S	300	135	IX5S	6.20 x 5.20	244 x 205	12 mil x 3	IXTP 36N30P
IXTD52N30P-6S		82	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXTQ 52N30P
IXTD69N30P-7S		60	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXTQ 69N30P
IXTD88N30P-8S		50	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXTQ 88N30P
IXTD102N30P-88		40	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXTK 102N30P

This table listgs active chips only. *Please contact factory for older designs.*

PolarHT™ MOSFETs for very low $R_{DS(on)}$

Polar^{HT} MOSFETs feature a proprietary cell design and processing that has resulted in a MOSFET with a 30% reduction in $R_{DS(on)}$ per unit area along with a decrease in gate charge. IXYS has also reduced the wafer thickness, which substantially reduces thermal resistance. The combination of lower $R_{DS(on)}$, lower gate charge and higher power dissipation capability has resulted in a new family of MOSFETs, which will increase the cost effectiveness in SMPS applications. IXYS will also introduce HiPerFET versions in which the t_{rr} of the body diode is reduced to make them suitable for phase-shift bridges, motor control and Uninterruptible Power Supply applications.

Polar HT™ HiPerFET Power MOSFET

Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	mΩ		mm	mils		
IXFD110N10P-6S	100	0.015	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXFH110N10P
IXFD140N10P-7S		0.011	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXFH140N10P
IXFD170N10P-8S		0.009	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXFH170N10P
IXFD200N10P-88		0.0075	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXFK200N10P
IXFD96N15P-6S	150	0.024	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXFH96N15P
IXFD120N15P-7S		0.017	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXFH120N15P
IXFD150N15P-8S		0.013	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXFH150N15P
IXFD180N15P-88		0.011	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXFK180N15P
IXFD74N20P-6S	200	0.034	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXFH74N20P
IXFD96N20P-7S		0.024	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXFH96N20P
IXFD120N20P-8S		0.022	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXFH120N20P
IXFD140N20P-88		0.018	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXFK140N20P
IXFD100N25P-8S	250	0.027	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXFH100N25P
IXFD120N25P-88		0.024	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXFK120N25P
IXFD52N30P-6S	300	0.066	IX6S	6.86 x 6.86	270 x 270	12 mil x 4	IXFH52N30P
IXFD69N30P-7S		0.049	IX7S	8.9 x 7.14	351 x 281	15 mil x 4	IXFH69N30P
IXFD88N30P-8S		0.04	IX8S	11.12 x 7.14	438 x 281	12 mil x 6	IXFH88N30P
IXFD102N30P-88		0.033	IX88	13.34 x 7.14	525 x 281	15 mil x 6	IXFK102N30P
IXFD12N50P-4J	500	0.5	IX4J	5.00 x 5.00	197 x 197	12 mil x 2	IXFP12N50P
IXFD16N50P-5J		0.4	IX5J	6.20 x 5.20	244 x 205	12 mil x 2	IXFP16N50P
IXFD22N50P-63		0.27	IX63	6.30 x 6.30	248 x 248	12 mil x 4	IXFH22N50P
IXFD26N50P-6J		0.23	IX6J	6.86 x 6.86	270 x 270	15 mil x 2	IXFH26N50P
IXFD30N50P-67		0.2	IX67	8.65 x 6.52	341 x 257	12 mil x 4	IXFH30N50P
IXFD36N50P-7J		0.17	IX7J	8.91 x 7.15	351 x 281	12 mil x 4	IXFH36N50P
IXFD44N50P-8J		0.14	IX8J	11.13 x 7.15	438 x 281	15 mil x 4	IXFH44N50P
IXFD64N50P-9J		0.085	IX9J	10.60 x 10.60	417 x 417	12 mil x 6	IXFK64N50P
IXFD80N50P-93		0.065	IX93	14.20 x 10.60	559 x 417	12 mil x 6	IXFK80N50P

This table listgs active chips only. *Please contact factory for older designs.*

Polar HV™ HiPerFET Power MOSFET

Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	mΩ		mm	mils		
IXFD10N60P-4J	600	0.74	IX4J	5.00 x 5.00	197 x 197	12 mil x 2	IXFP10N60P
IXFD14N60P-5J		0.55	IX5J	6.20 x 5.20	244 x 205	12 mil x 2	IXFH14N60P
IXFD18N60P-63		0.4	IX63	6.30 x 6.30	248 x 248	12 mil x 4	IXFH18N60P
IXFD22N60P-6J		0.33	IX6J	6.86 x 6.86	270 x 270	15 mil x 2	IXFH22N60P
IXFD26N60P-67		0.27	IX67	8.65 x 6.52	341 x 257	12 mil x 4	IXFH26N60P
IXFD30N60P-7J		0.24	IX7J	8.91 x 7.15	351 x 281	12 mil x 4	IXFH30N60P
IXFD36N60P-8J		0.19	IX8J	11.13 x 7.15	438 x 281	15 mil x 4	IXFH36N60P
IXFD48N60P-9J		0.14	IX9J	10.60 x 10.60	417 x 417	12 mil x 6	IXFK48N60P
IXFD64N60P-93		0.1	IX93	14.20 x 10.60	559 x 417	12 mil x 6	IXFK64N60P
IXFD7N80P-4J	800	1..44	IX4J	5.00 x 5.00	197 x 197	12 mil x 2	IXFP7N80P
IXFD10N80P-5J		1.1	IX5J	6.20 x 5.20	244 x 205	12 mil x 2	IXFP10N80P
IXFD12N80P-63		0.85	IX63	6.30 x 6.30	248 x 248	12 mil x 4	IXFH12N80P
IXFD14N80P-6J		0.72	IX6J	6.86 x 6.86	270 x 270	15 mil x 2	IXFH14N80P
IXFD16N80P-67		0.6	IX67	8.65 x 6.52	341 x 257	12 mil x 4	IXFH16N80P
IXFD20N80P-7J		0.5	IX7J	8.90 x 7.14	351 x 281	12 mil x 4	IXFH20N80P
IXFD24N80P-8J		0.4	IX8J	11.12 x 7.14	438 x 281	15 mil x 4	IXFH24N80P
IXFD32N80P-9J		0.27	IX9J	10.6 x 10.6	417 x 417	12 mil x 6	IXFN32N80P
IXFD44N80P-93		0.19	IX93	14.2 x 10.6	559 x 417	12 mil x 6	IXFN44N80P
IXFD60N80P-9S		0.14	IX9S	15.81 x 12.5	622 x 492	12 mil x 8	IXFN60N80P
IXFD15N100P-76	1000	0.76	IX76	8.90 x 7.14	351 x 281	15 mil x 4	IXFH15N100P
IXFD20N100P-85		0.57	IX85	12.17 x 7.14	479 x 281	12 mil x 4	IXFH20N100P
IXFD26N100P-86		0.39	IX86	13.98 x 9.02	550 x 355	12 mil x 6	IXFK26N100P
IXFD32N100P-96		0.32	IX96	14.2 x 10.6	559 x 417	15 mil x 6	IXFN32N100P
IXFD44N100P-97		0.22	IX97	15.81 x 12.5	622 x 492	15 mil x 6	IXFN44N100P
IXFD38N100P-99		0.21	IX99	15.81 x 14.31	622 x 563	15 mil x 6	IXFN38N100P
IXFD16N120P-85	1200	0.95	IX85	12.17 x 7.14	479 x 281	12 mil x 4	IXFH16N120P
IXFD20N120P-86		0.57	IX86	13.98 x 9.02	550 x 355	12 mil x 6	IXFN20N120P
IXFD26N120P-96		0.46	IX96	14.2 x 10.6	559 x 417	15 mil x 6	IXFN26N120P
IXFD30N120P-97		0.35	IX97	15.81 x 12.5	622 x 492	15 mil x 6	IXFB30N120P
IXFD32N120P-99		0.31	IX99	15.81 x 14.31	622 x 563	15 mil x 6	IXFN32N120P

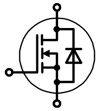
This table listgs active chips only. *Please contact factory for older designs.*

PolarHV™ Power MOSFET

Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	Ω		mm	mils		
IXTD1R6N50P-11	500	6	IX11	1.91 x 1.91	75 x 75	10 mil x 1	IXTP1R6N50P
IXTD2R4N50P-1J		3.5	IX1J	2.29 x 2.29	90 x 90	10 mil x 1	IXTP2R4N50P
IXTD3N50P-2J		2.5	IX2J	2.79 x 2.79	110 x 110	12 mil x 1	IXTP3N50P
IXTD5N50P-23		1.3	IX23	3.69 x 2.79	153 x 110	12 mil x 1	IXTP5N50P
IXTD6N50P-3J		1	IX3J	3.60 x 3.60	142 x 142	15 mil x 1	IXTP6N50P
IXTD8N50P-37		0.8	IX37	4.20 x 4.20	165 x 165	15 mil x 1	IXTP8N50P
IXTD12N50P-4J		0.5	IX4J	5.00 x 5.00	197 x 197	12 mil x 2	IXTP12N50P
IXTD16N50P-5J		0.4	IX5J	6.20 x 5.20	244 x 205	12 mil x 2	IXTP16N50P
IXTD22N50P-63		0.27	IX63	6.30 x 6.30	248 x 248	12 mil x 4	IXTQ22N50P
IXTD26N50P-6J		0.23	IX6J	6.86 x 6.86	270 x 270	15 mil x 2	IXTQ26N50P
IXTD30N50P-67		0.2	IX67	8.65 x 6.52	341 x 257	12 mil x 4	IXTQ30N50P
IXTD36N50P-7J		0.17	IX7J	8.91 x 7.15	351 x 281	12 mil x 4	IXTH36N50P
IXTD44N50P-8J		0.14	IX8J	11.13 x 7.15	438 x 281	15 mil x 4	IXTQ44N50P
IXTD1R4N60P-11	600	9	IX11	1.91 x 1.91	75 x 75	10 mil x 1	IXTP1R4N60P
IXTD2N60P-1J		4.7	IX1J	2.29 x 2.29	90 x 90	10 mil x 1	IXTP2N60P
IXTD3N60P-2J		2.8	IX2J	2.79 x 2.79	110 x 110	12 mil x 1	IXTP3N60P
IXTD4N60P-23		1.9	IX23	3.69 x 2.79	153 x 110	12 mil x 1	IXTP4N60P
IXTD5N60P-3J		1.6	IX3J	3.60 x 3.60	142 x 142	15 mil x 1	IXTP5N60P
IXTD7N60P-37		1.1	IX37	4.20 x 4.20	165 x 165	15 mil x 1	IXTP7N60P
IXTD10N60P-4J		10	IX4J	5.00 x 5.00	197 x 197	12 mil x 2	IXTP10N60P
IXTD14N60P-5J		0.55	IX5J	6.20 x 5.20	244 x 205	12 mil x 2	IXTQ14N60P
IXTD18N60P-63		0.42	IX63	6.30 x 6.30	248 x 248	12 mil x 4	IXTQ18N60P
IXTD22N60P-6J		0.35	IX6J	6.86 x 6.86	270 x 270	15 mil x 2	IXTQ22N60P
IXTD26N60P-67		0.23	IX67	8.65 x 6.52	341 x 257	12 mil x 4	IXTH26N60P
IXTD30N60P-7J		0.24	IX7J	8.91 x 7.15	351 x 281	12 mil x 4	IXTH30N60P
IXTD2N80P-2J	800	6	IX2J	2.79 x 2.79	110 x 110	12 mil x 1	IXTP2N80P
IXTD4N80P-3J		4	IX3J	3.60 x 3.60	142 x 142	15 mil x 1	IXTP4N80P
IXTD08N100P-1A	1000	20	IX1A	2.29 x 2.29	90 x 90	10 mil x 1	IXTP08N100P
IXTD1N100P-1C		15	IX1C	2.54 x 2.54	100 x 100	10 mil x 1	IXTP1N100P
IXTD1R4N100P-2A		11	IX2A	2.79 x 2.79	110 x 110	10 mil x 1	IXTP1R4N100P
IXTD2N100P-2C		7.5	IX2C	3.89 x 2.79	153 x 110	12 mil x 1	IXTP2N100P
IXTD3N100P-3C		4.8	IX3C	4.39 x 3.6	173 x 142	12 mil x 2	IXTP3N100P
IXTD06N120P-1A	1200	32	IX1A	2.29 x 2.29	90 x 90	10 mil x 1	IXTP06N120P
IXTD08N120P-1C		25	IX1C	2.54 x 2.54	100 x 100	10 mil x 1	IXTP08N120P
IXTD1N120P-2A		20	IX2A	2.79 x 2.79	110 x 110	10 mil x 1	IXTP1N120P
IXTD1R4N120P-2C		13	IX2C	3.89 x 2.79	153 x 110	12 mil x 1	IXTP1R4N120P
IXTD2R4N120P-3C		7.5	IX3C	4.39 x 3.6	173 x 142	12 mil x 2	IXTP2R4N120P

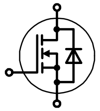
This table listgs active chips only. *Please contact factory for older designs.*

N-Channel Depletion Mode MOSFET



Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	Ω		mm	mils		
IXTD02N50D-1M	500	30	IX1M	1.96 x 1.68	77 x 66	3 mil x 1	IXTP02N50D
IXTD01N100D-1M	1000	110	IX1M	1.96 x 1.68	77 x 66	3 mil x 1	IXTP01N100D

P-Channel Power MOSFET



Type	V_{DSS} max.	$R_{DS(ON)}$ max.	Chip type	Chip Size dimensions		Source - bond wire recommended	Equivalent device data sheet
	V	Ω		mm	mils		
IXTD36P10-5B	100	0.08	IX5B	6.59 x 6.59	259 x 259	12 mil x 3	IXTH36P10
IXTD50P10-7B		0.06	IX7B	8.84 x 7.18	348 x 283	15 mil x 3	IXTH50P10
IXTD16P20-5B	200	0.22	IX5B	6.59 x 6.59	259 x 259	12 mil x 3	IXTH16P20
IXTD24P20-7B		0.16	IX7B	8.84 x 7.18	348 x 283	15 mil x 3	IXTH24P20
IXTD8P50-5B	500	1.20	IX5B	6.59 x 6.59	259 x 259	12 mil x 3	IXTH7P50
IXTD11P50-7B		0.75	IX7B	8.84 x 7.18	348 x 283	15 mil x 3	IXTH11P50
IXTD10P60-7B		1.05	IX7B	8.84 x 7.18	348 x 283	15 mil x 3	IXTH10P60

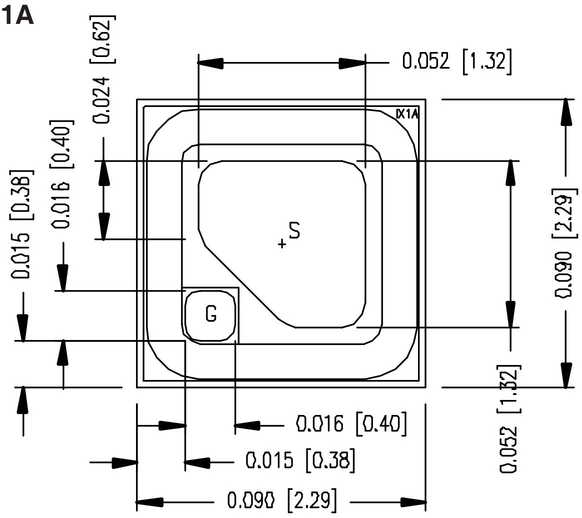
Depletion Mode MOSFETs

Depletion mode MOSFETs, unlike the regular enhancement type MOSFETs, requires a negative gate bias to turn it off. Consequently they remain on at or above zero gate bias voltage but otherwise have similar MOSFET characteristics. Their Rds(on) and breakdown voltage have a positive temperature coefficient, increasing the gate bias voltage increases the gate channel conductivity and so decreases Rds(on) to some extent and there is a usable intrinsic diode. IXYS Corporation's IXTP01N100D is a depletion mode MOSFET rated at $V_{DSS} = 1000$ Volts and $I_D = 100$ mA and its $R_{DS(on)} = 110$ Ohms at $V_{GS} = 0$ Volt. The other depletion mode MOSFET, IXTP02N05D, is rated at $V_{DSS} = 500$ Volts, $I_D = 200$ mA, while its $R_{DS(on)} = 30$ Ohms. The minimum required gate bias to turn them off is –5 Volts. They are both housed in TO-220 package and can dissipate 25 Watts at $T_C = 25^0$C.

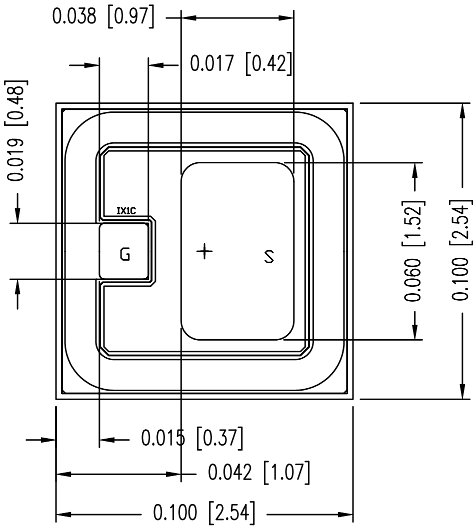
There are many applications in which IXTP01N100D and IXTP02N05D can be used: current regulators, off-line linear regulators, input transient voltage suppressors, input current inrush

Dimensions in inch and [mm] (1" = 25.4 mm)

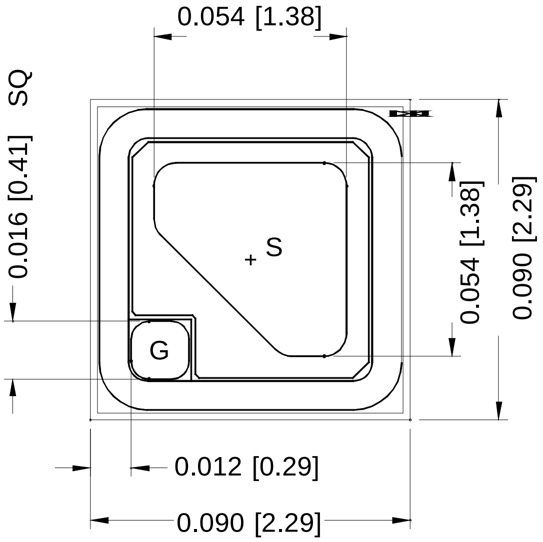
IX1A



IX1C



IX1J



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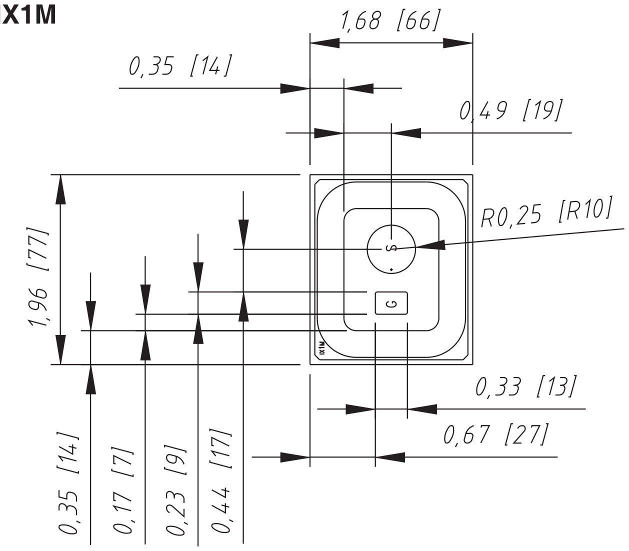

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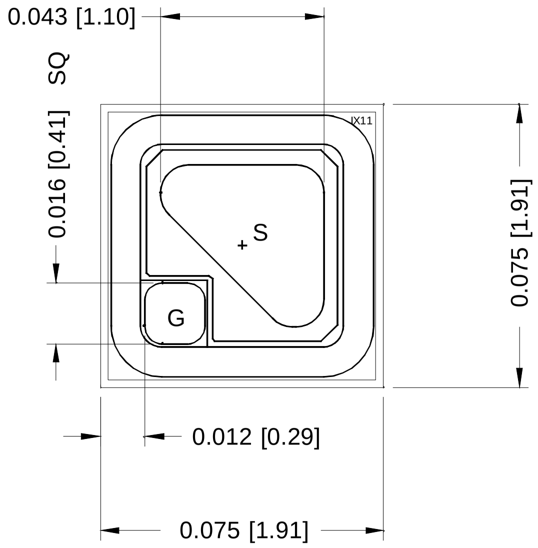
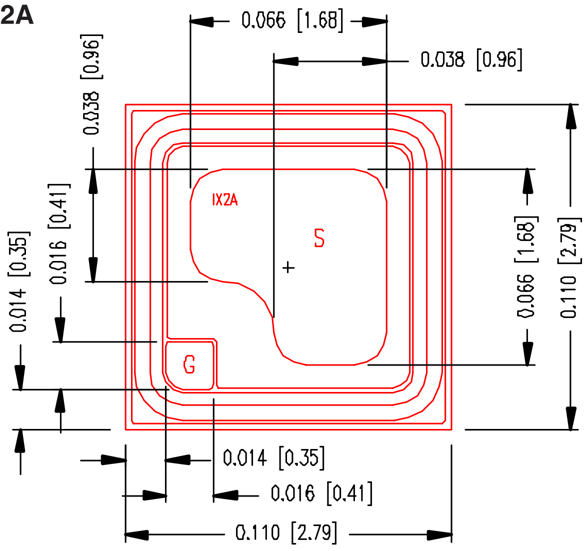
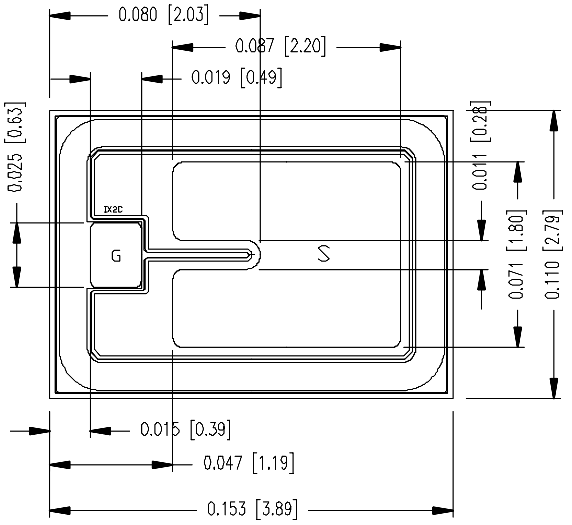


IX2A

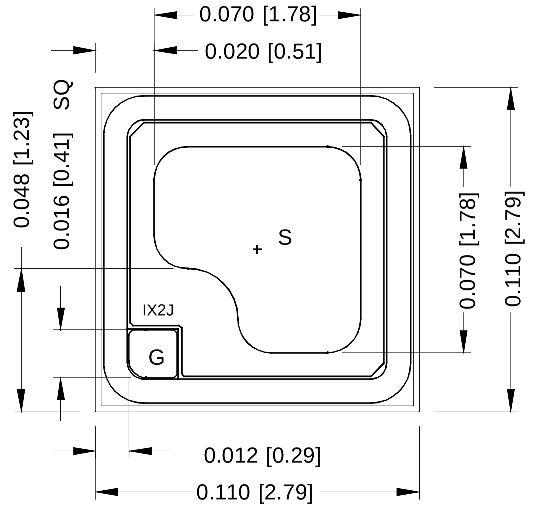


Dimensions in inch and [mm] (1" = 25.4 mm)

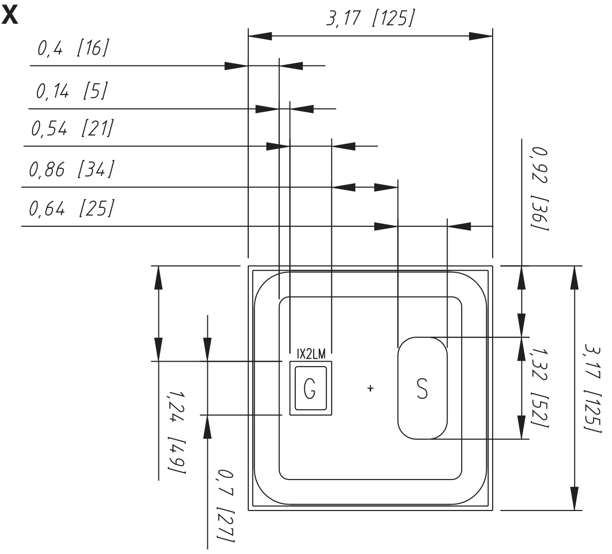
IX2C



IX2J



IX2X



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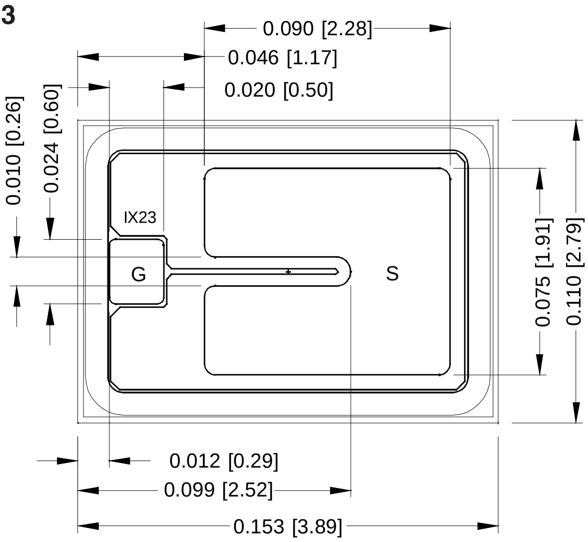
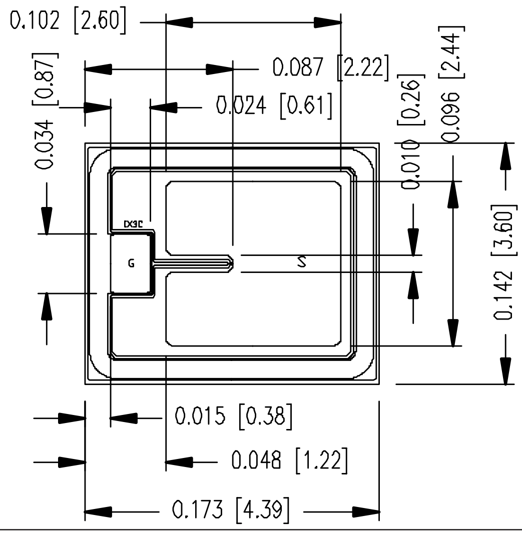
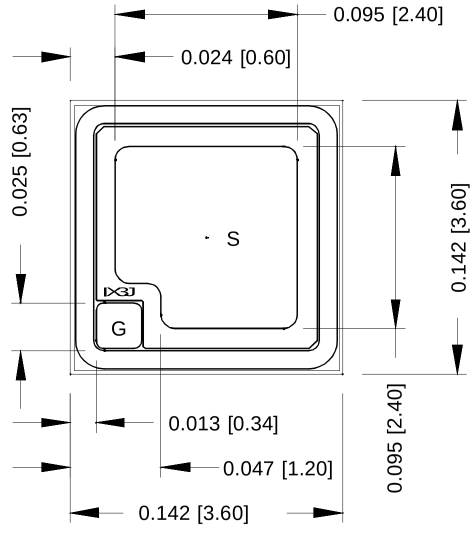


IX3C

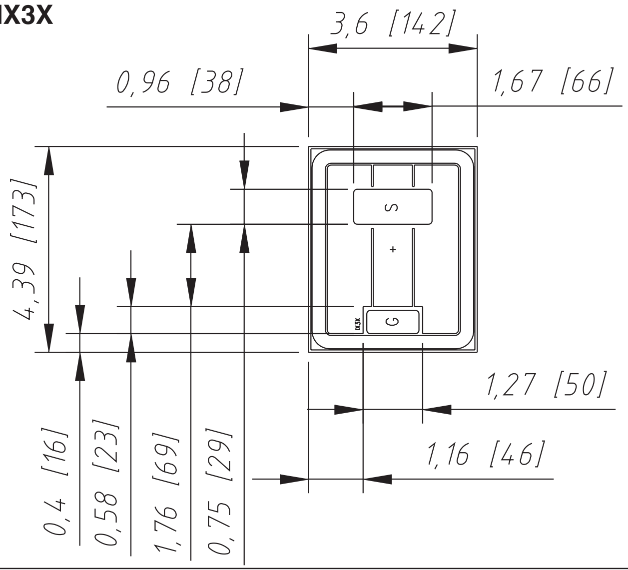


IX3J

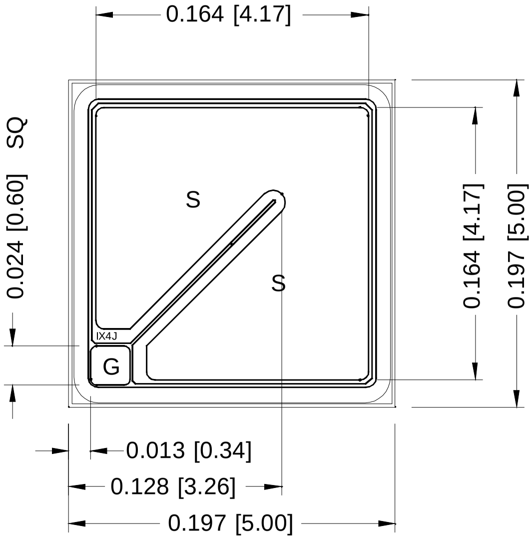


Dimensions in inch and [mm] (1" = 25.4 mm)

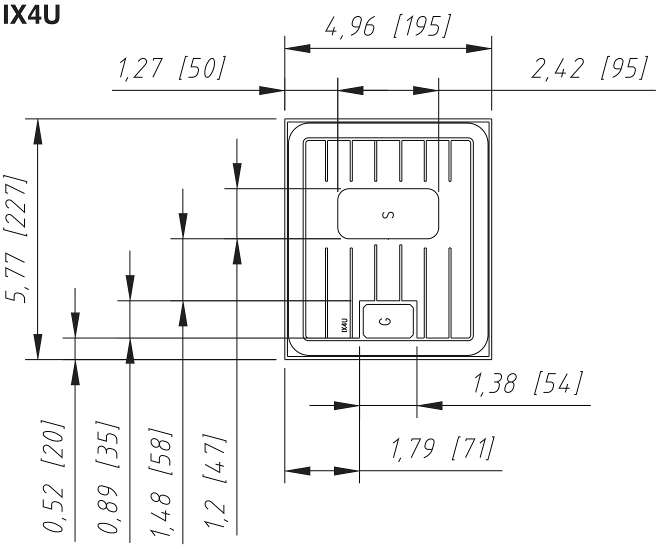
IX3X



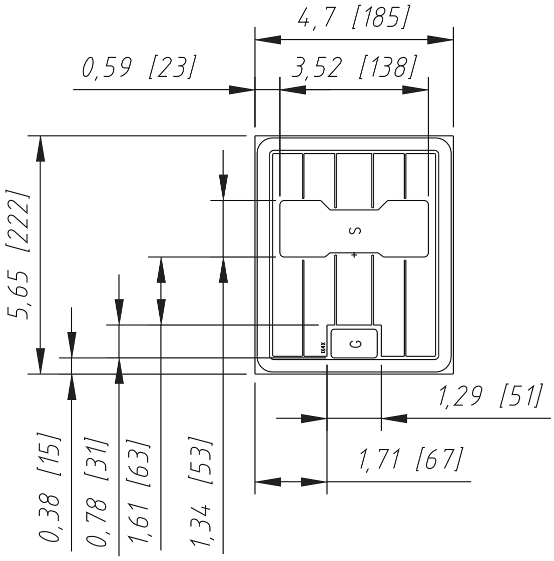
IX4J



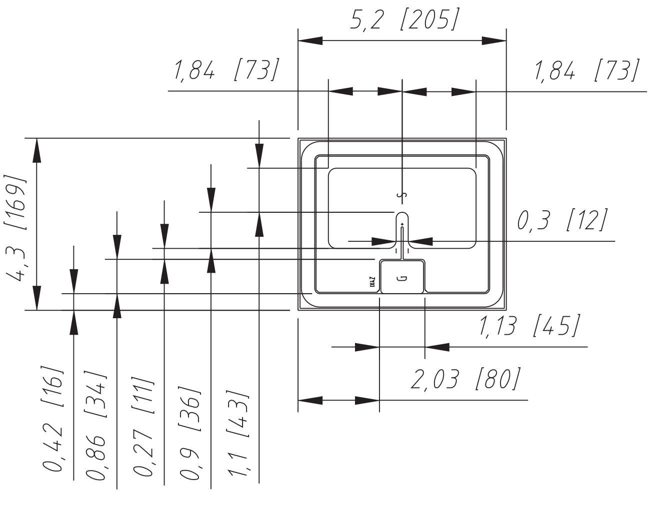
IX4U



IX4X



IX4Z



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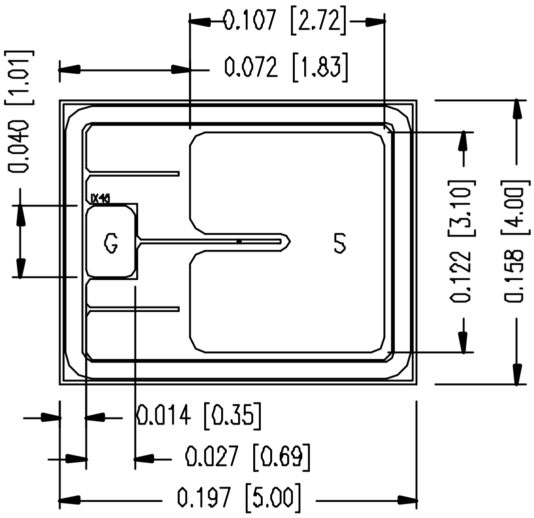
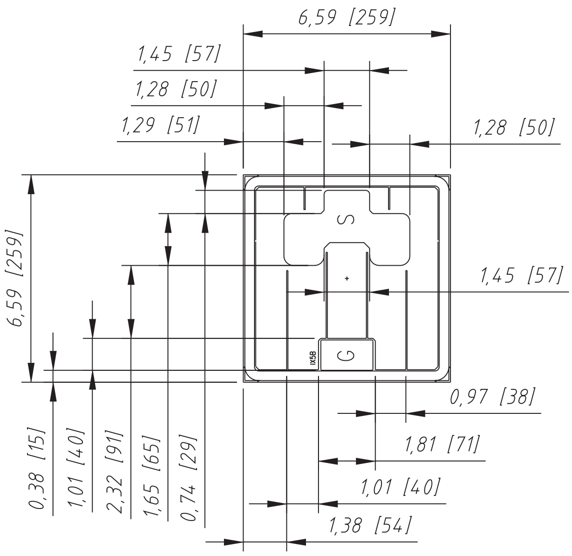
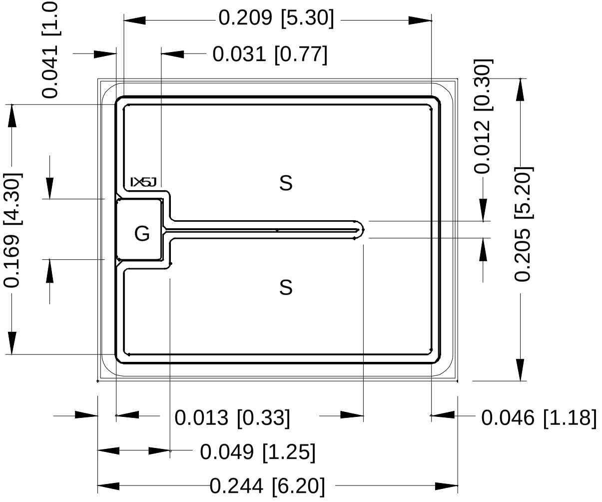


Dimensions in inch and [mm] (1" = 25.4 mm)

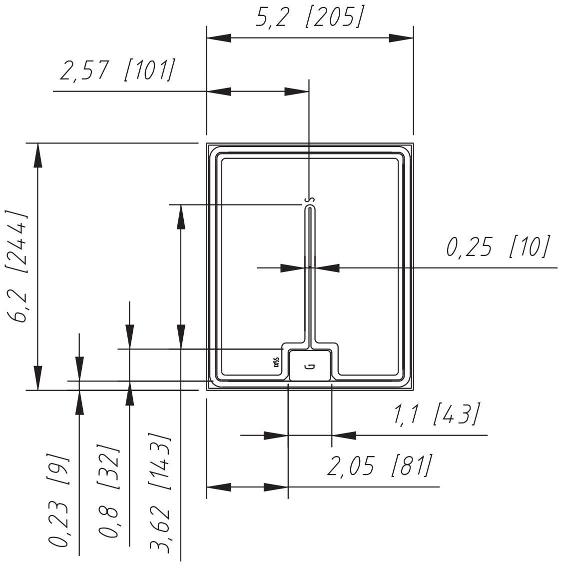
IX5B



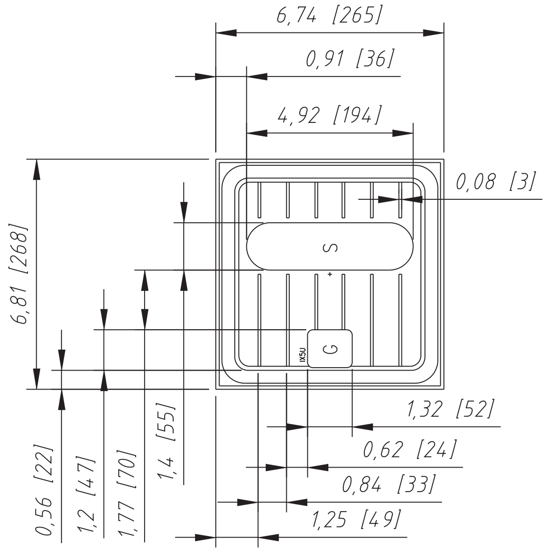
IX5J



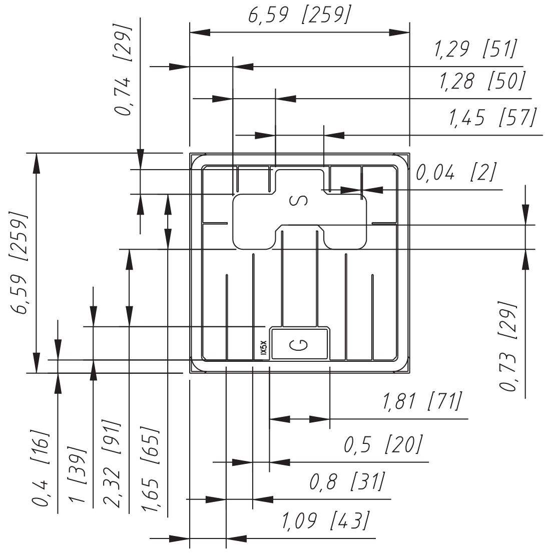
IX5S



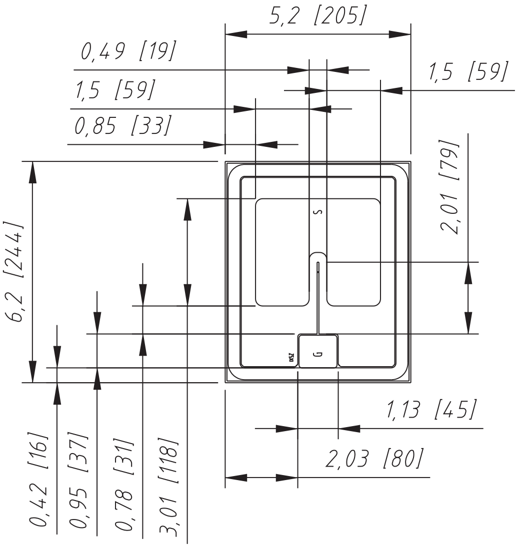
IX5U



IX5Y

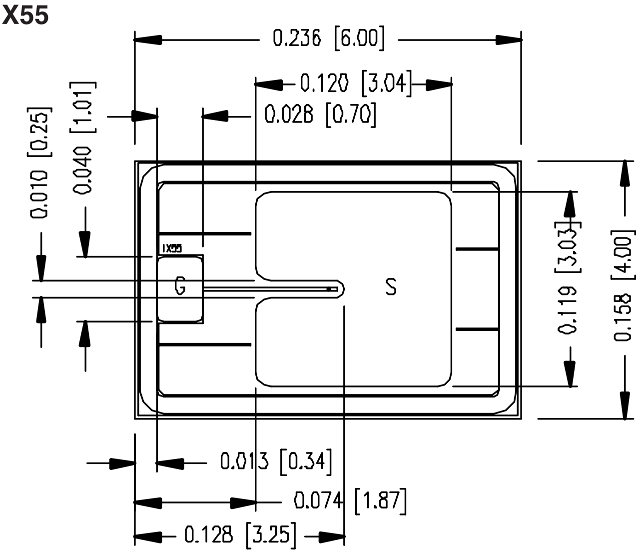


IX5Z



Dimensions in inch and [mm] (1" = 25.4 mm)

IX55



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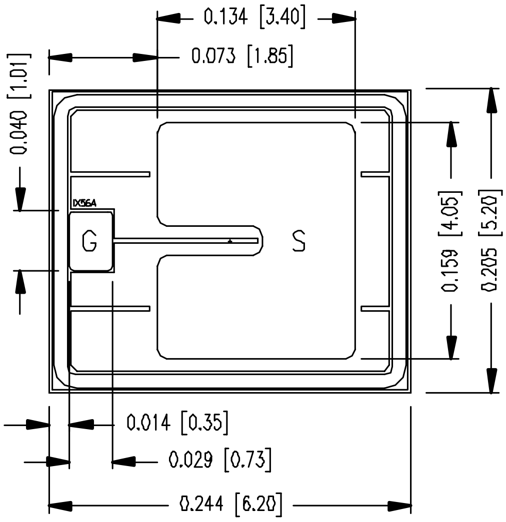
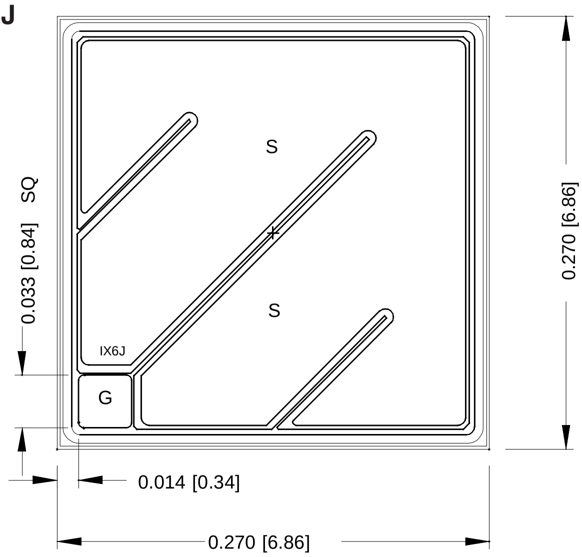
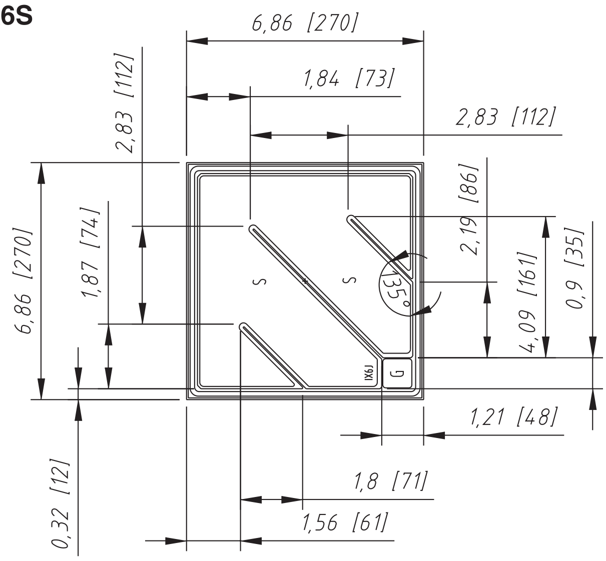


IX6J



IX6S



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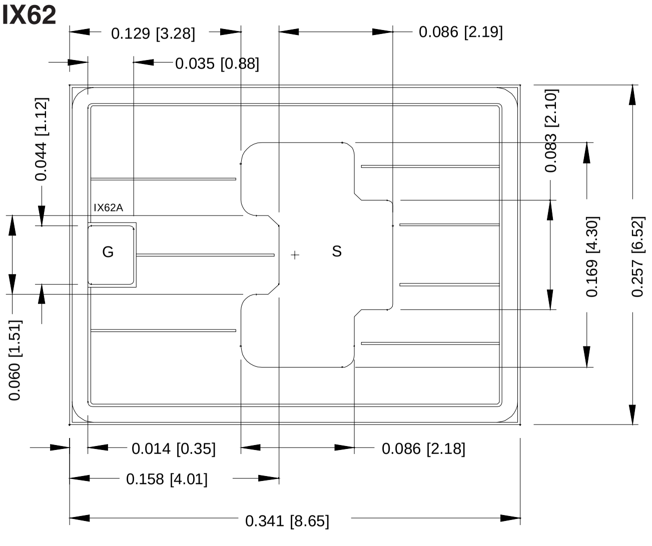

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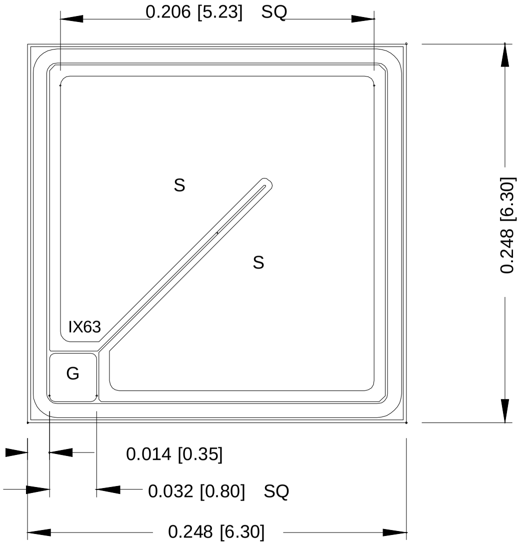
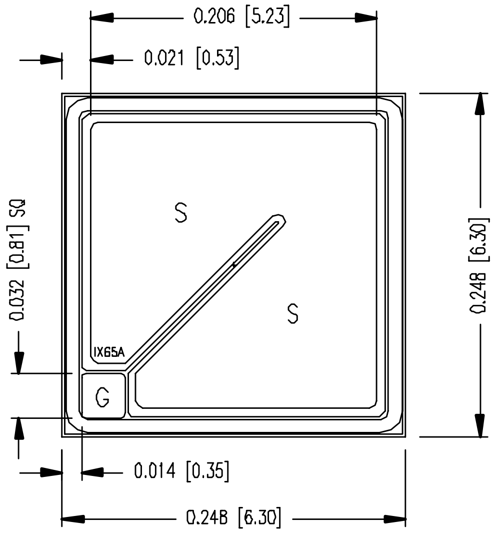


Dimensions in inch and [mm] (1" = 25.4 mm)

IX65



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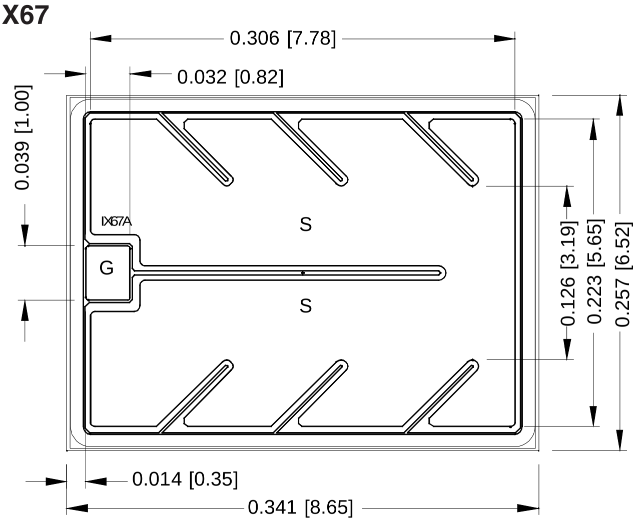
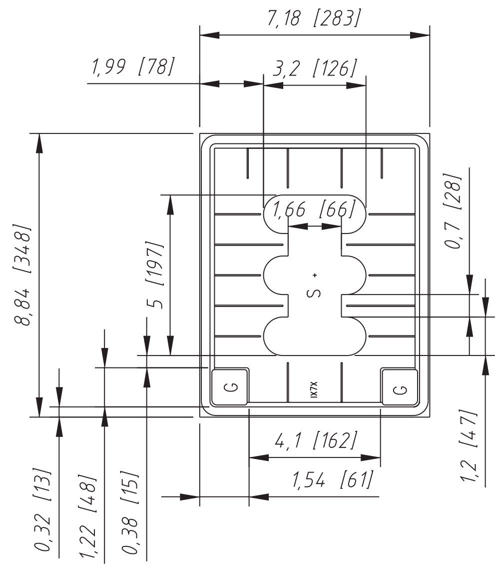
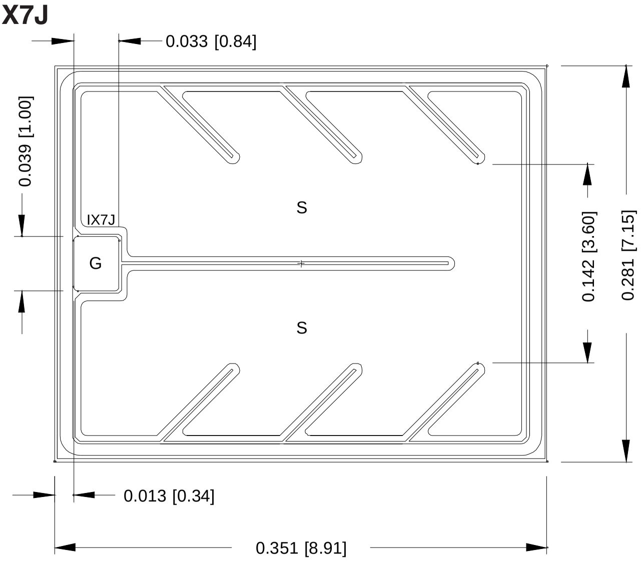


IX7B



IX7J



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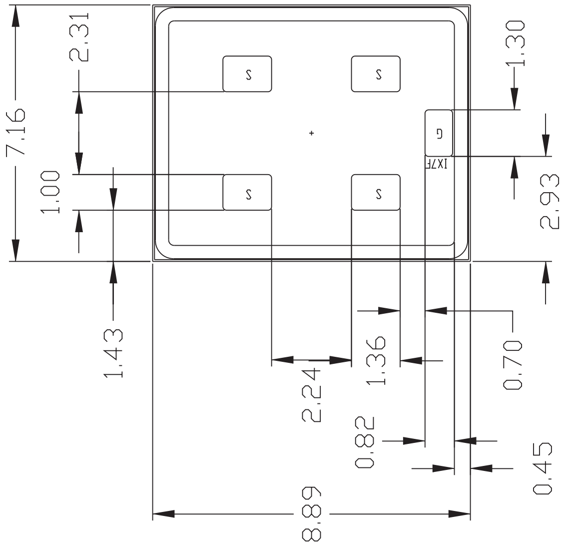
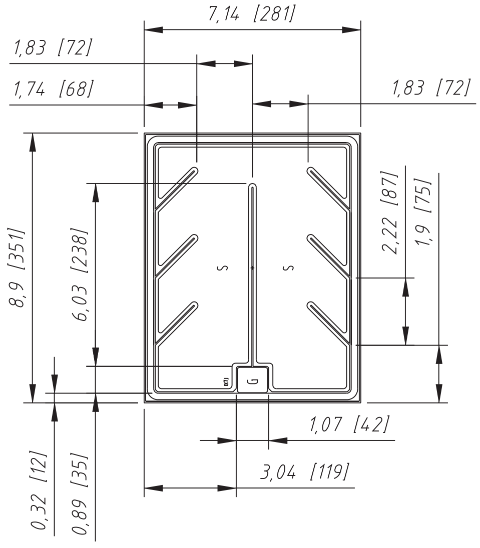
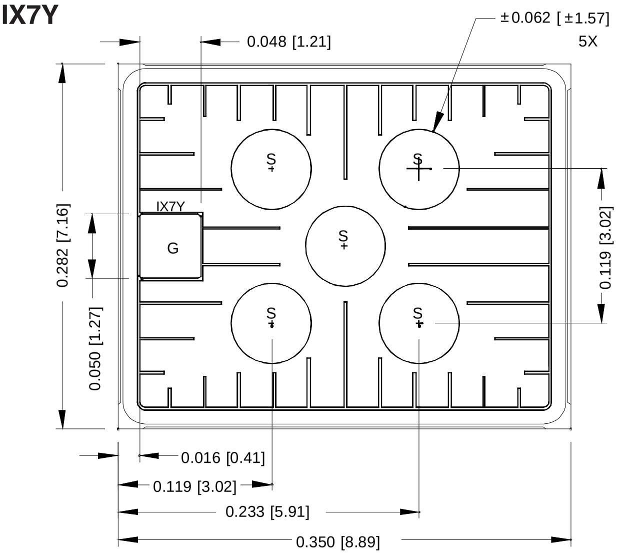


IX7S



Dimensions in inch and [mm] (1" = 25.4 mm)

IX7Y



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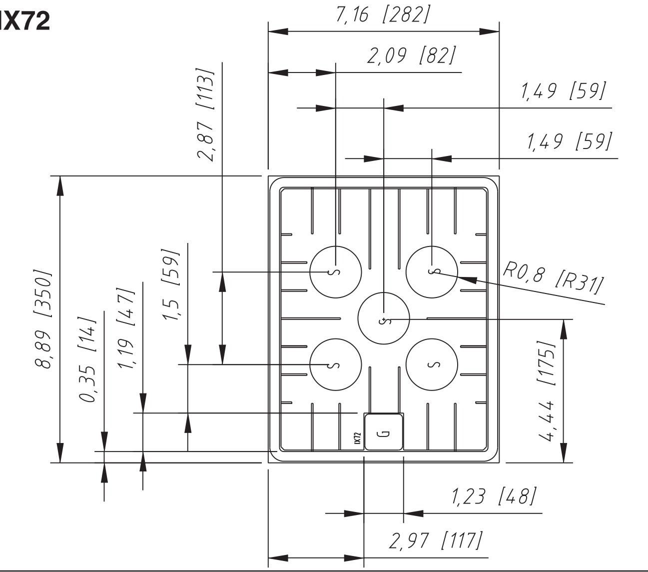

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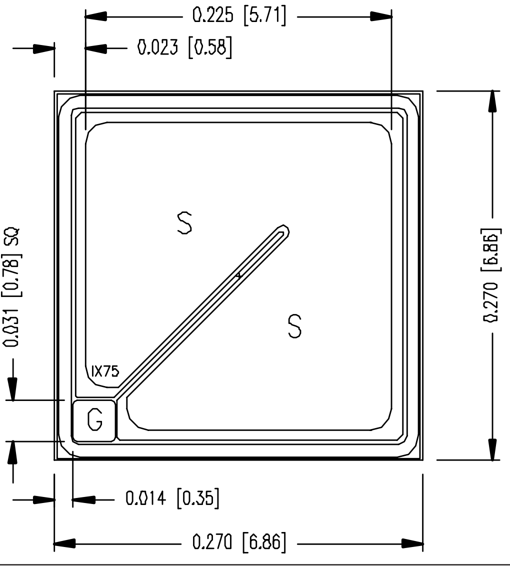
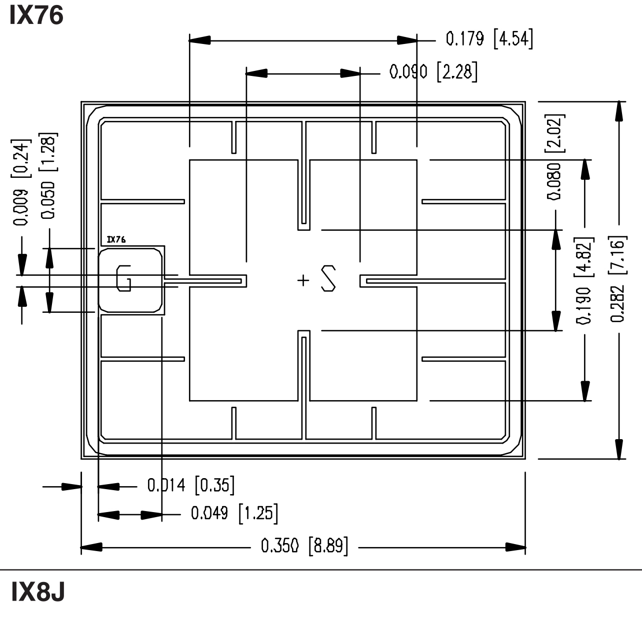
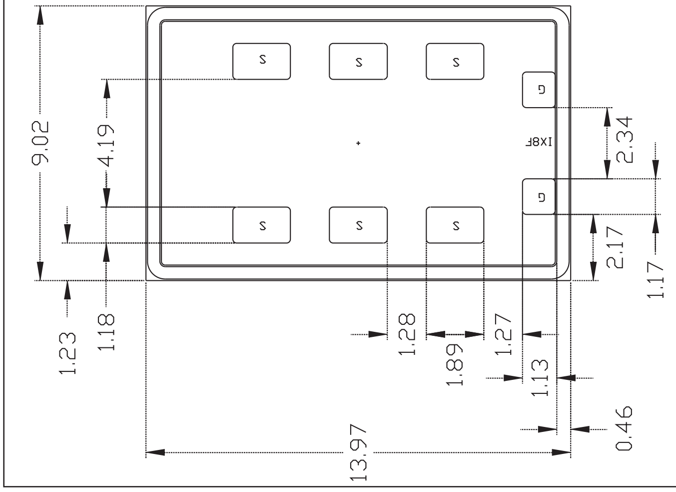


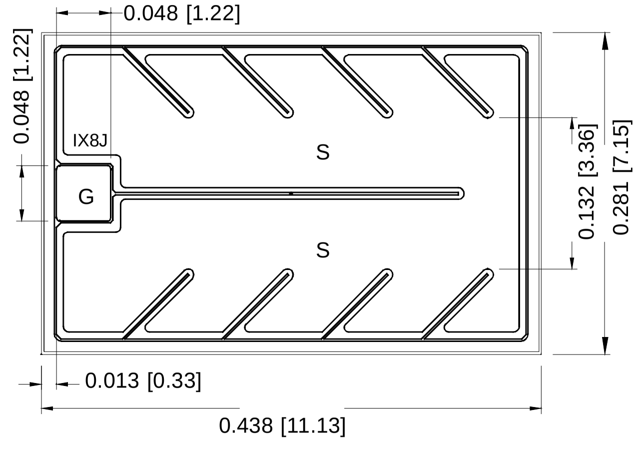
IX76



IX8F



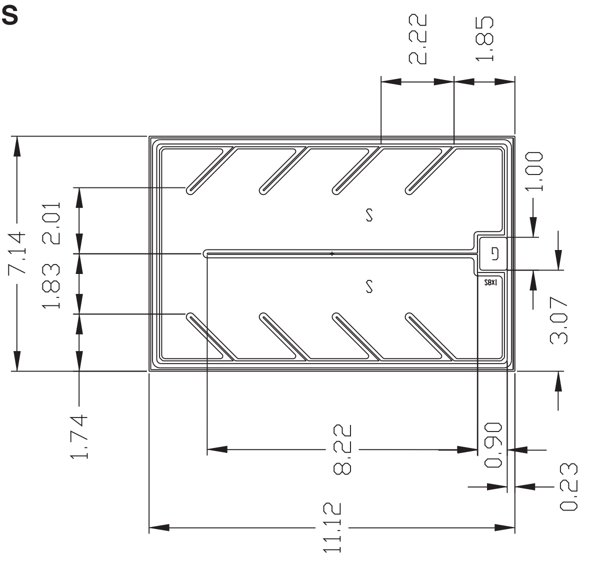
IX8J



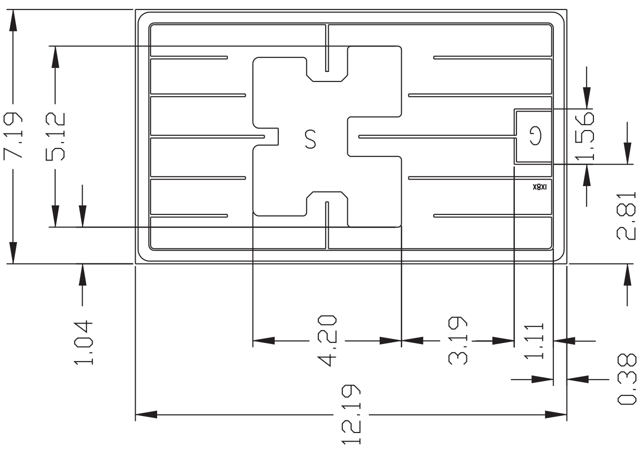
IXYS reserves the right to change limits, test conditions and dimensions

Dimensions in inch and [mm] (1" = 25.4 mm)

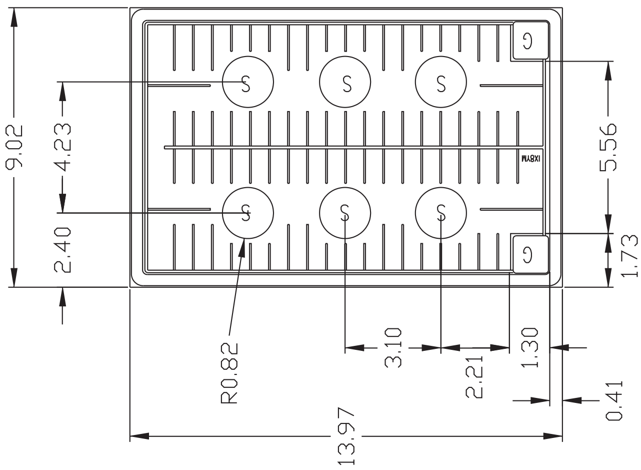
IX8S



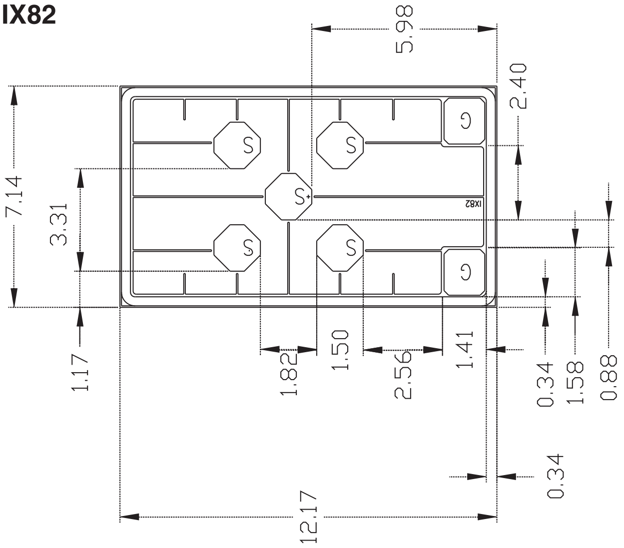
IX8X



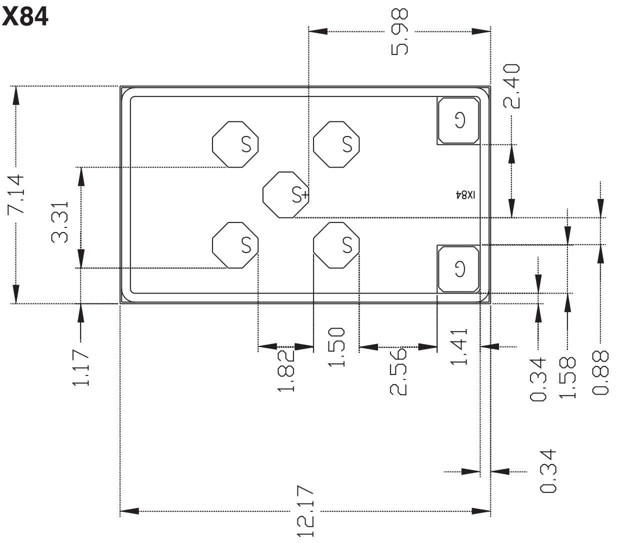
IX8Y



IX82



IX84



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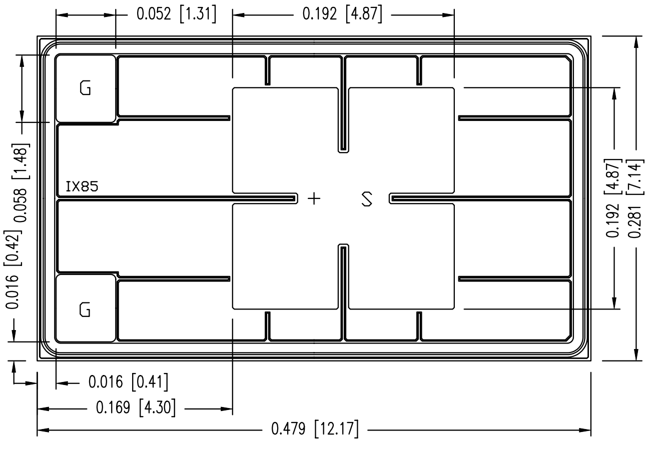
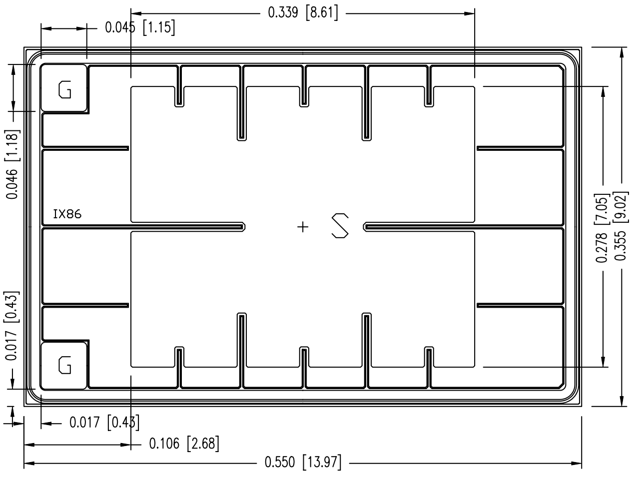


Dimensions in inch and [mm] (1" = 25.4 mm)

IX86



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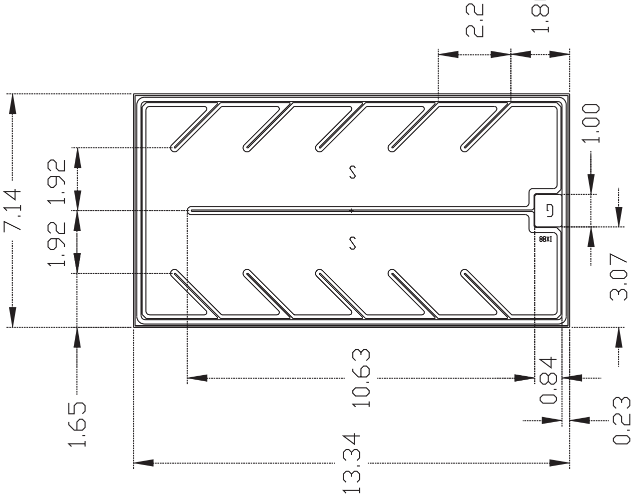
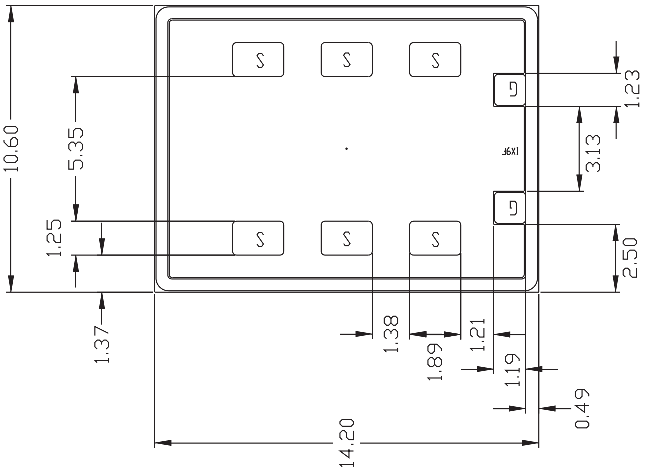
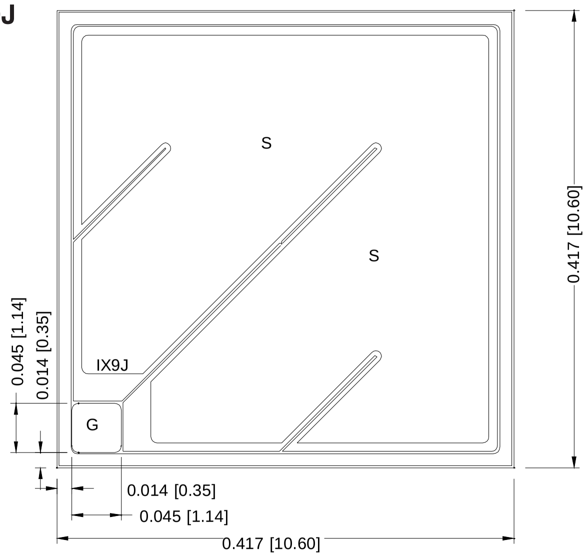


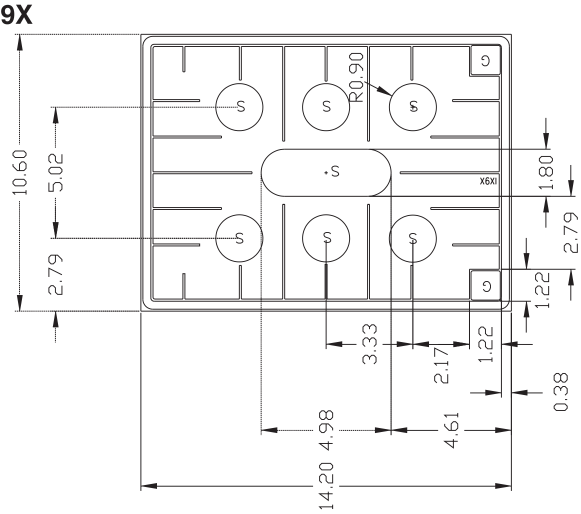
IX9F



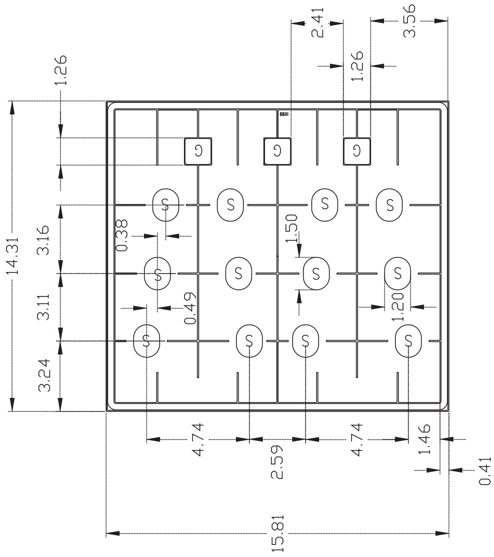
IX9J



IX9X

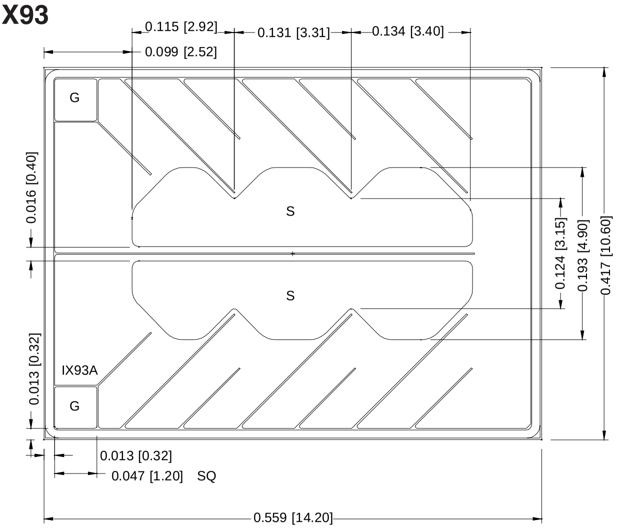


IX9Y

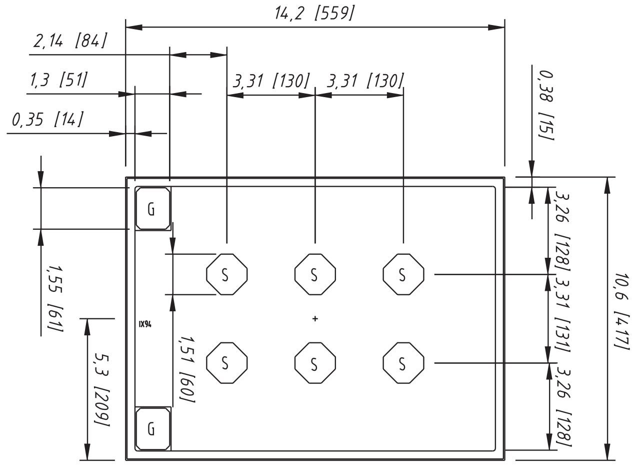


Dimensions in inch and [mm] (1" = 25.4 mm)

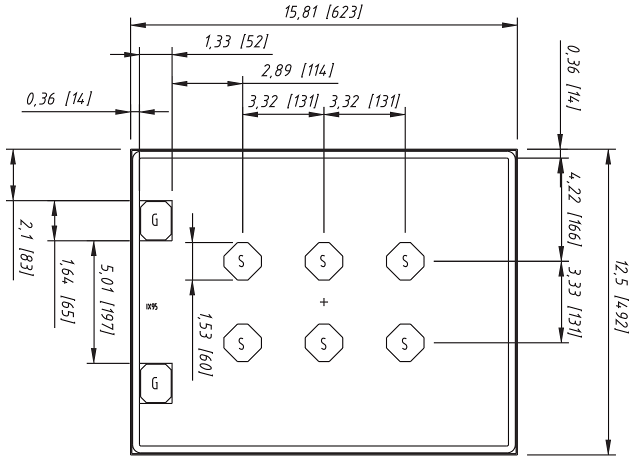
IX93



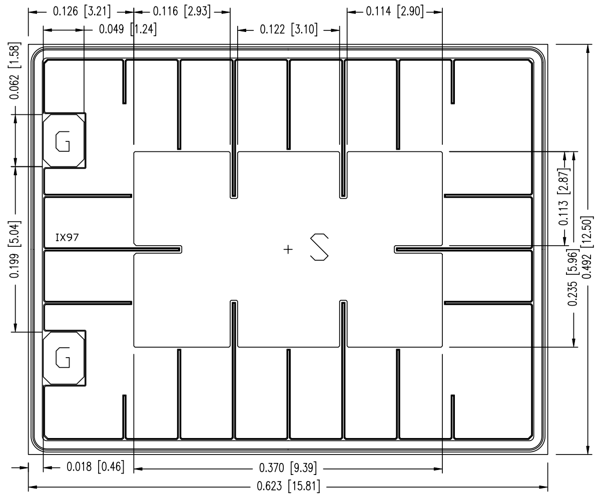
IX94



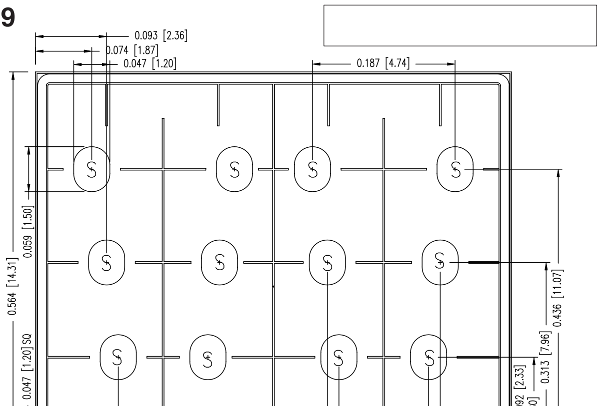
IX95



IX97



IX99



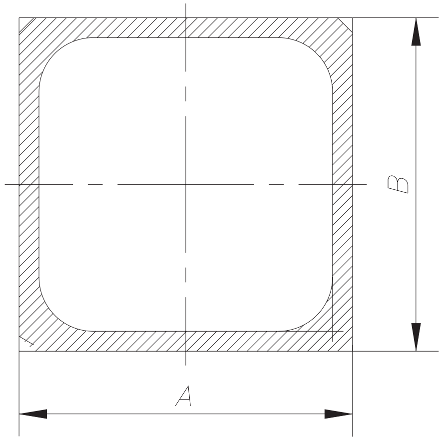
Rectifier Diodes

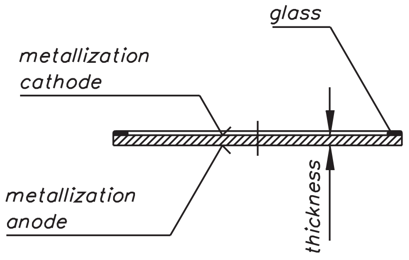
Type	V_{RRM} V	I_R V_{RRM} T_{VJM} typ. mA	T_{VJM} °C	$I_{F(AV)M}$ rect. d=0.5 T_C=100°C A	R_{thJC} ① typ. K/W	V_F T_{VJ} = 25°C V	V_F T_{VJ} = 125°C V	@I_F A	I_{FSM} A	Reverse Recovery I_{RM} 25°C; V_R=100V A	Reverse Recovery @I_F A	Reverse Recovery @-di/dt A/µs
DWN5	800 - 1200	0.7	150	12	2.80	1.14	1.05	7	140	tbd	tbd	tbd
DWP5		0.7		12	2.80	1.14	1.05	7	140	tbd	tbd	tbd
DWN2	1200 - 1800	0.7		12	2.80	1.13	1.05	7	150	tbd	tbd	tbd
DWN9		1.0		20	1.80	1.30	1.26	30	300	tbd	tbd	tbd
DWN17		1.5		31	1.10	1.36	1.35	50	320	tbd	tbd	tbd
DWP17		1.5		31	1.10	1.39	1.37	50	320	tbd	tbd	tbd
DWN21		3.0		42	0.90	1.35	1.33	80	500	tbd	tbd	tbd
DWP21		3.0		41	0.90	1.37	1.36	80	500	tbd	tbd	tbd
DWN35		1.5		59	0.65	1.25	1.20	80	630	11	50	0.64
DWP35		1.5		58	0.65	1.25	1.22	80	630	11	50	0.64
DWN50		2.0		78	0.50	1.33	1.31	150	900	12	50	1
DWP50		2.0		76	0.50	1.34	1.33	150	900	12	50	1
DWN75		2.0		115	0.33	1.27	1.23	200	1500	24	50	3
DWP75		2.0		118	0.35	1.28	1.25	200	1500	24	50	3
DWN110		3.5		253	0.16	1.18	1.12	300	3200	45	50	6
DWP110		3.5		253	0.16	1.19	1.12	300	3200	45	50	6
DWN340		15.0		416	0.10	0.93	1.09	300	5900	235	300	50
DWN108	1600 - 2200	3.5		253	0.16	1.19	1.12	300	3200	45	50	6
DWN347		20.0		788	0.05	1.10	1.01	600	10500	275	400	50

① *Mounted on DCB*

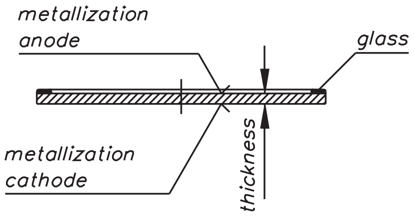
Rectifier Diodes

Type	solderable	bonderable	Chips per Wafer	Dimensions A mm	Dimensions B mm	Si-thickn. mm
DWN5		•	1123	4.40	2.10	0.265
DWP5		•	1123	4.40	2.10	0.265
DWN2	•	•	1204	2.95	2.95	0.265
DWN9	•	•	684	3.90	3.90	0.265
DWN17	•	•	518	4.45	4.45	0.265
DWP17	•	•	518	4.45	4.45	0.265
DWN21	•	•	346	5.40	5.40	0.265
DWP21	•	•	346	5.40	5.40	0.265
DWN35	•	•	259	6.20	6.20	0.265
DWP35	•	•	259	6.20	6.20	0.265
DWN50	•	•	198	7.10	7.10	0.265
DWP50	•	•	198	7.10	7.10	0.265
DWN75	•	•	125	8.70	8.70	0.265
DWP75	•	•	125	8.70	8.70	0.265
DWN110	•	•	58	12.30	12.30	0.265
DWP110	•	•	58	12.30	12.30	0.265
DWN340		•	32	16.20	16.20	0.265
DWN108	•	•	58	12.30	12.30	0.315
DWN347		•	16	25.30	18.50	0.315
Tolerance				-0.1	-0.1	±5%





DWN



DWP

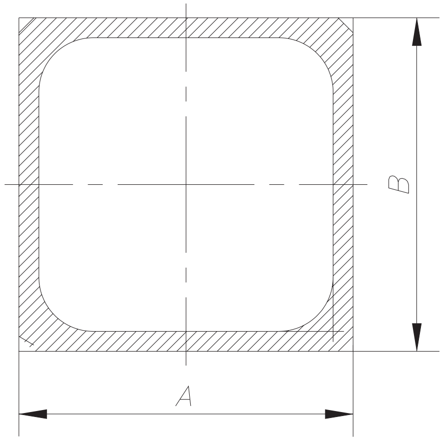
FRED - Fast Recovery Epitaxial Diodes

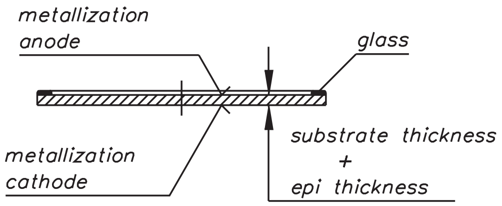
Type	V_{RRM}	I_R	T_{VJM}	$I_{F(AV)M}$	R_{thJC} ①	V_F				I_{FSM}	**Reverse Recovery**					
	V	0.8xV_{RRM} 125°C mA	°C	rect. d=0.5 T_C=100°C A	typ. K/W	T_{VJ} = 25°C V	V	@ °C	@I_F A	A	I_{RM} 25°C; V_R=100V A	@I_F A	@-di/dt A/µs	t_{rr} V_R=30V ns	@I_F A	@-di/dt A/µs
DWEP27-02	200	5.0	150	54	0.9	1.09	0.84	150	30	300	4	50	100	35	1	100
DWEP37-02		11.0		91	0.8	1.03	0.87	150	100	475	4	100	100	35	1	200
DWEP77-02		20.0		244	0.4	0.98	0.81	150	120	1200	7.5	100	200	tbd	1	350
DWEP8-06	600	1.5		tbd	2.5	1.65	1.48	150	8	50	5	12	100	35	1	50
DWEP12-06		1.5		8	2.5	1.45	1.31	150	8	100	5	25	100	35	1	50
DWEP15-06		3.0		12	1.6	1.65	1.48	150	16	100	5	25	100	35	1	50
DWEP23-06		7.0		30	0.9	1.53	1.33	150	30	250	5	50	100	35	1	100
DWEP25-06		7.0		30	0.9	1.53	1.38	150	43	300	5	50	100	35	1	100
DWEP35-06		14.0		60	0.8	1.73	1.48	150	70	550	5	100	100	35	1	200
DWEP55-06		17.0		80	0.7	1.58	1.38	125	75	600	5	100	100	35	1	200
DWEP75-06		20.0		162	0.4	1.31	1.12	125	75	1000	20	80	200	35	1	350
DWEP3-10	1000	2.0		tbd	2.5	2.65	2.09	150	6	40	7	12	100	35	1	50
DWEP10-10		4.0		12	1.6	2.65	2.09	150	12	75	5	25	100	35	1	50
DWEP18-10		7.0		30	0.9	2.43	2.04	150	30	200	7	50	100	35	1	100
DWEP20-10		7.0		30	0.9	2.35	1.99	150	36	200	7	50	100	35	1	100
DWEP30-10		14.0		60	0.8	2.24	1.79	150	60	500	7	100	100	35	1	200
DWEP50-10		17.0		82	0.7	2.12	1.68	125	50	500	6.1	50	120	35	1	200
DWEP70-10		20.0		129	0.4	1.89	1.57	125	75	800	14	80	200	35	1	350
DWEP6-12	1200	2.0		tbd	2.5	2.55	2.19	150	5	80	7	10	100	40	1	50
DWEP9-12		4.0		12	1.6	2.55	2.19	150	12	75	5	25	100	50	1	50
DWEP17-12		7.0		30	0.9	2.60	2.19	150	30	200	7	50	100	40	1	100
DWEP19-12		7.0		30	0.9	2.50	2.19	150	30	200	7	50	100	40	1	100
DWEP29-12		14.0		60	0.8	2.35	1.94	150	60	500	7	100	100	40	1	200
DWEP49-12		17.0		77	0.7	2.19	1.89	125	50	500	8.6	50	100	40	1	200
DWEP69-12		20.0		123	0.4	1.77	1.54	125	75	800	20	75	200	40	1	350

① *Mounted on DCB*

FRED - **F**ast **R**ecovery **E**pitaxial **D**iodes

Type	solderable	bonderable	Chips per Wafer	Dimensions		Si-thickn.
				A mm	B mm	mm
DWEP27-02		•	518	4.45	4.45	0.35
DWEP37-02		•	257	6.20	6.20	0.35
DWEP77-02	•	•	151	8.91	7.22	0.35
DWEP8-06		•	1612	3.60	1.80	0.35
DWEP12-06	•	•	1851	2.40	2.40	0.35
DWEP15-06	•	•	990	3.25	3.25	0.35
DWEP23-06	•	•	531	5.50	3.50	0.35
DWEP25-06	•	•	518	4.45	4.45	0.35
DWEP35-06	•	•	257	6.20	6.20	0.35
DWEP55-06		•	230	8.65	4.95	0.35
DWEP75-06	•	•	151	8.91	7.22	0.35
DWEP3-10		•	1612	3.60	1.80	0.35
DWEP10-10		•	990	3.25	3.25	0.35
DWEP18-10		•	531	5.50	3.50	0.35
DWEP20-10		•	518	4.45	4.45	0.35
DWEP30-10	•	•	257	6.20	6.20	0.35
DWEP50-10		•	230	8.65	4.95	0.35
DWEP70-10		•	151	8.91	7.22	0.35
DWEP6-12		•	1851	2.40	2.40	0.35
DWEP9-12	•	•	990	3.25	3.25	0.35
DWEP17-12	•	•	531	5.50	3.50	0.35
DWEP19-12	•	•	518	4.45	4.45	0.35
DWEP29-12	•	•	257	6.20	6.20	0.35
DWEP49-12	•	•	230	8.65	4.95	0.35
DWEP69-12	•	•	151	8.91	7.22	0.35
Tolerance				-0.1	-0.1	±5%





FRED - Fast Recovery Epitaxial Diodes with metal field plate

Type	V_{RRM} V	I_r RT uA	I_R at 150°C uA	V_F at RT V	V_F at 150°C V	@ I_F rated current A	I_{FSM} A	Reverse Recovery I_{RM} A	I_F A	t_{rr} ns	di/dt A/us	Status
DMLP04-03	300	1	150	1.25	0.95	10	100	3	10	35	200	Available
DMLP06-03		1	200	1.3	1.05	20	150	3	20	35	200	Available
DMLP10-03		1	250	1.28	0.95	30	300	3	30	35	200	Available
DMLP15-03		1	300	1.25	0.95	40	400	3	40	35	200	Available
DMLP20-03		1	350	1.28	0.95	60	550	3	60	35	200	Available
DMLP04-04	400	1	250	1.35	1	10	100	4	10	45	200	Available
DMLP06-04		1	300	1.35	1.09	15	150	3.5	20	45	200	Available
DMLP10-04		1	350	1.35	1	30	300	4	30	45	200	Available
DMLP15-04		1	400	1.35	1	40	400	4	40	45	200	Available
DMLP20-04		1	500	1.35	1	60	550	4	60	45	200	Available
DMLP23-06	600	tbd	tbd	tbd	tbd	30	tbd	tbd	30	tbd	tbd	Development

Type	solderable	bondable	Dimensions A mm	Dimensions B mm	Number of Chips per Wafer 6 "	Si thickness mm
DMLP04-03		•	2.1	2.1	3675	0.25
DMLP06-03		•	2.4	2.4	2700	0.25
DMLP10-03		•	3.3	3.3	1430	0.25
DMLP15-03		•	3.9	3.9	1020	0.25
DMLP20-03		•	4.45	4.45	780	0.25
DMLP04-04		•	2.1	2.1	3675	0.25
DMLP06-04		•	2.4	2.4	2700	0.25
DMLP10-04		•	3.3	3.3	1430	0.25
DMLP15-04		•	3.9	3.9	1020	0.25
DMLP20-04		•	4.45	4.45	780	0.25

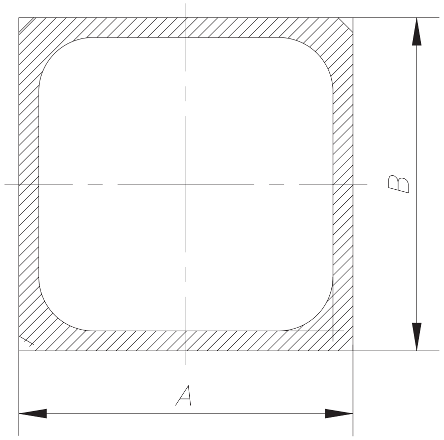
Low Leakage Fast Recovery Epitaxial Diodes

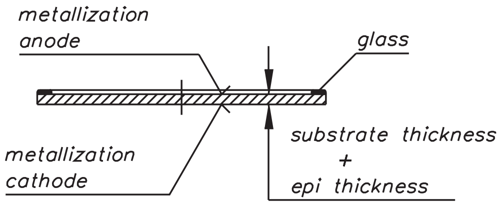
Type	V_{RRM}	I_R	T_{VJM}	$I_{F(AV)M}$	R_{thJC} ①	V_F			I_{FSM}	Reverse Recovery					
	V	V_{RRM} T_{VJM} mA	°C	rect. d=0.5 T_C=100°C A	typ. K/W	T_{VJ} = 25°C V	150°C V	@I_F A	A	I_{RM} 25°C; V_R=100V A	@I_F A	@-di/dt A/µs	t_{rr} V_R=30V typ. ns	@I_F A	@-di/dt A/µs
DWLP4-02	200	0.20	150	14	2.80	1.21	0.88	5	80	1.2	10	100	25	1	50
DWLP15-02		0.50		29	1.60	0.99	0.82	12	140	2.4	25	100	25	1	100
DWLP15-02B		0.50		25	1.60	1.13	0.84	12	140	1.1	25	100	25	1	100
DWLP25-02		0.20		46	0.90	1.10	0.85	30	325	2.0	50	100	25	1	200
DWLP4-03	300	0.20		13	2.80	1.63	1.07	5	40	1.4	10	100	30	1	50
DWLP8-03		0.25		15	2.50	1.45	1.01	6	60	1.0	12	100	30	1	50
DWLP15-03		0.50		25	1.60	1.44	1.02	12	110	1.4	25	100	30	1	100
DWLP15-03A		0.50		29	1.60	1.26	0.93	12	110	1.4	25	100	30	1	100
DWLP23-03		1.00		51	0.90	1.19	0.84	30	300	3.0	50	100	30	1	200
DWLP23-03A		1.00		41	0.90	1.49	1.07	30	300	1.9	50	100	25	1	200
DWLP55-03		2.50		72	0.65	1.42	0.99	60	600	2.8	130	100	30	1	300
DWLP75-03		4.00		117	0.40	1.43	0.95	100	1000	3.3	200	100	30	1	400
DWLP8-04	400	0.25		14	2.50	1.40	0.97	6	60	1.4	12	100	30	1	50
DWLP15-04		0.50		24	1.60	1.40	0.98	12	110	2.5	25	100	30	1	100
DWLP23-04		1.00		46	0.90	1.43	1.06	30	300	2.5	50	100	30	1	200
DWLP55-04		2.50		67	0.65	1.38	0.99	60	600	3.5	130	100	30	1	300
DWLP75-04		4.00		117	0.40	1.39	1.03	100	1000	4.0	200	100	30	1	400
DWLP150-04		8.50		148	0.35	1.38	1.12	300	1200	9.5	200	100	30	1	800
DWLP4-06	600	0.20		11	2.80	1.97	1.28	5	40	1.8	10	100	30	1	50
DWLP8-06A		0.25		12	2.50	1.75	1.22	6	50	2.6	12	100	35	1	50
DWLP8-06B		0.25		11	2.50	2.34	1.53	6	50	1.4	12	100	30	1	50
DWLP15-06A		0.50		21	1.60	1.87	1.23	12	110	2.9	25	100	35	1	100
DWLP15-06B		0.50		16	1.60	2.38	1.44	12	110	1.5	25	100	35	1	100
DWLP23-06A		1.00		40	0.90	1.54	1.17	30	250	3.5	50	100	35	1	200
DWLP23-06B		2.00		30	0.90	2.45	1.53	30	250	2.0	50	100	30	1	200
DWLP55-06		2.50		62	0.65	1.92	1.23	60	600	4.0	130	100	35	1	300
DWLP75-06		4.00		99	0.40	1.93	1.24	100	1000	4.5	200	100	35	1	400
DWLP1-12	1200	0.20		tbd	25.0	2.14	1.69	1	20	2.3	1	100	tbd	tbd	tbd
DWLP8-12		0.25		9	2.50	2.61	1.65	6	40	5.0	12	100	40	1	50
DWLP15-12		0.50		14	1.60	2.45	1.68	12	90	5.7	25	100	40	1	100
DWLP23-12		1.00		29	0.90	2.68	1.71	30	200	6.7	50	100	40	1	200
DWLP55-12		2.50		48	0.65	2.54	1.59	60	500	7.0	130	100	40	1	300
DWLP75-12		4.00		78	0.40	2.56	1.71	100	800	7.4	200	100	40	1	400

① *Mounted on DCB*

Low Leakage Fast Recovery Epitaxial Diodes

Type	solderable	bonderable	Chips per Wafer	Dimensions		Si-thickn.
				A mm	B mm	mm
DWLP4-02		•	1960	3.00	1.80	0.37
DWLP15-02		•	990	3.25	3.25	0.37
DWLP15-02B		•	990	3.25	3.25	0.37
DWLP25-02		•	518	4.45	4.45	0.37
DWLP4-03		•	1960	3.00	1.80	0.37
DWLP8-03		•	1612	3.60	1.80	0.37
DWLP15-03		•	990	3.25	3.25	0.37
DWLP15-03A		•	990	3.25	3.25	0.37
DWLP23-03		•	531	5.50	3.50	0.37
DWLP23-03A		•	531	5.50	3.50	0.37
DWLP55-03	•	•	230	8.65	4.95	0.37
DWLP75-03		•	151	8.91	7.22	0.37
DWLP8-04		•	1612	3.60	1.80	0.38
DWLP15-04		•	990	3.25	3.25	0.38
DWLP23-04		•	531	5.50	3.50	0.38
DWLP55-04	•	•	230	8.65	4.95	0.38
DWLP75-04	•	•	151	8.91	7.22	0.38
DWLP150-04	•	•	74	13.00	9.77	0.38
DWLP4-06		•	1960	3.00	1.80	0.40
DWLP8-06A		•	1612	3.60	1.80	0.40
DWLP8-06B		•	1612	3.60	1.80	0.40
DWLP15-06A		•	990	3.25	3.25	0.40
DWLP15-06B		•	990	3.25	3.25	0.40
DWLP23-06A		•	531	5.50	3.50	0.40
DWLP23-06B		•	531	5.50	3.50	0.40
DWLP55-06	•	•	230	8.65	4.95	0.40
DWLP75-06	•	•	151	8.91	7.22	0.40
DWLP1-12	•	•	4545	1.52	1.52	0.46
DWLP8-12		•	1612	3.60	1.80	0.46
DWLP15-12		•	990	3.25	3.25	0.46
DWLP23-12		•	531	5.50	3.50	0.46
DWLP55-12	•	•	230	8.65	4.95	0.46
DWLP75-12		•	151	8.91	7.22	0.46
Tolerance				-0.1	-0.1	±5%





SONIC diodes with glass passivation

Type	V_{RRM}	I_r RT	I_R at 125°C	V_F at RT	V_F at 150°C	@ I_F rated current	I_{FSM}	Reverse Recovery I_{RM}	I_F	t_{rr}	di/dt	Status
	V	uA	mA	V	V	A	A	A	A	ns	A/us	
DWHP0.5 slow	600	1	0.1	2	2.22	1.2	tbd	0.25	0.5	50	10	Available
DWHP0.5		1	0.1	3.5	3.55	1.2	tbd	0.2	0.5	30	10	Available
DWHP4		3	1	2.25	2.03	5	40	2	5	35	100	Available
DWHP10		5	1.5	2.38	2.14	10	80	4	10	35	200	Available
DWHP14		10	3.5	2.26	2.05	20	150	8	20	35	400	Available
DWHP16		10	3.5	2.26	2.05	20	150	8	20	35	400	Available
DWHP23		35	5	2.39	2.16	30	200	12	30	35	600	Available
DWHP56 slow		60	8	1.54	1.43	60	550	33	60	60	1200	Available
DWHP69 slow		100	12	1.55	1.45	100	750	55	100	60	2000	Available
DWHP150 slow		150	20	1.55	1.45	150	1400	82	150	60	3000	Available
DWHP200 slow		250	30	1.55	1.44	250	1950	140	250	60	5000	Available
DWHP56		125	12	2.18	1.95	60	400	24	60	35	1200	Development
DWHP69		200	20	2.2	1.97	100	500	40	100	35	2000	Development
DWHP150		325	30	2.16	1.93	150	800	60	150	35	3000	Development
DWHP200		500	45	2.24	2.01	250	1200	100	250	35	5000	Development
DWHP4	1200	10	1	2.45	2.18	5	35	4.2	5	75	150	Available
DWHP10		5	1.5	2.58	2.28	10	65	8.5	10	75	350	Available
DWHP14		10	3.5	2.45	2.01	20	135	19	20	75	750	Available
DWHP16		10	3.5	2.45	2.2	20	135	19	20	75	750	Available
DWHP23		50	5	2.59	2.29	30	180	25	30	75	1000	Available
DWHP56 slow		60	8	2.04	1.76	60	550	65	60	65	1800	Available
DWHP69 slow		100	12	2.04	1.83	100	750	100	100	100	2500	Available
DWHP150 slow		150	20	2.04	1.69	150	1400	150	150	150	4000	Available
DWHP56		125	12	2.42	2.14	60	430	51	60	75	2500	Available
DWHP69		200	20	2.44	2.16	100	930	83	100	75	4000	Available
DWHP150		325	30	2.4	2.13	150	1130	115	150	125	3500	Available
DWHP200		500	45	2.46	2.18	250	1800	170	250	125	6000	Available
DWHP6	1600-1800	5	0.15	2.61	2.61	2	25	1.6	2	150	20	Available
DWHP15		16	0.35	2.89	2.89	10	80	8.5	10	150	100	Available
DWHP25		42	1	2.65	2.65	20	200	16.5	20	150	200	Available
DWHP55		95	2	2.73	2.73	40	450	33	40	150	400	Available
DWHP68		200	4	2.71	2.71	60	650	50	60	150	600	Available
DWHP150		365	7.5	2.57	2.57	100	1100	125	150	150	1500	Available
DWHP200		550	11	2.63	2.63	150	1600	200	250	150	2500	Available
DWHP205	4000-4500	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	Development

SONIC diodes with glass passivation

Type	solderable	bondable	Dimensions A mm	Dimensions B mm	Number of Chips per Wafer	Si thickness mm
DWHP0.5-06		•	1	1	10777	0.2
DWHP4-06		•	3.6	1.8	1622	0.2
DWHP10-06		•	2.95	2.95	1204	0.2
DWHP14-06		•	4.8	3.3	657	0.2
DWHP16-06		•	3.95	3.95	668	0.2
DWHP23-06		•	5.5	3.5	532	0.2
DWHP56-06		•	8.65	4.95	231	0.2
DWHP69-06		•	8.91	7.22	152	0.2
DWHP150-06		•	11.4	9.4	88	0.2
DWHP200-06		•	12.4	12.4	59	0.2
DWHP4-12		•	3.6	1.8	1622	0.2
DWHP10-12		•	2.95	2.95	1204	0.2
DWHP14-12		•	4.8	3.3	657	0.2
DWHP16-12		•	3.95	3.95	668	0.2
DWHP23-12		•	5.5	3.5	532	0.2
DWHP56-12		•	8.65	4.95	231	0.2
DWHP69-12		•	8.91	7.22	152	0.2
DWHP150-12		•	11.4	9.4	88	0.2
DWHP200-12		•	12.4	12.4	59	0.2
DWHP6-16/18		•	2.4	2.4	1841	0.265
DWHP15-16/18		•	3.25	3.25	988	0.265
DWHP25-16/18		•	4.45	4.45	517	0.265
DWHP55-16/18		•	8.65	4.95	231	0.265
DWHP68-16/18		•	8.91	7.22	152	0.265
DWHP150-16/18		•	11.4	9.4	88	0.265
DWHP200-16/18		•	12.4	12.4	59	0.265
DWHP205-40/45		•	14.3	14.3	45	0.58

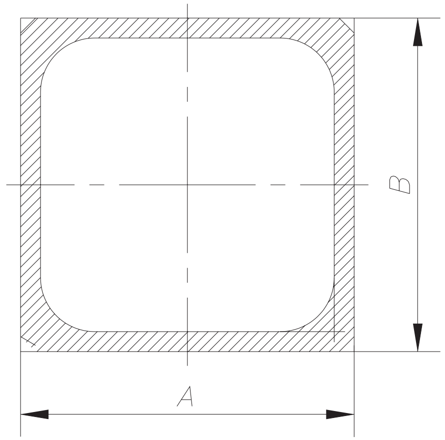
• - *Available on request*
• *solder temperature below 350 °C*

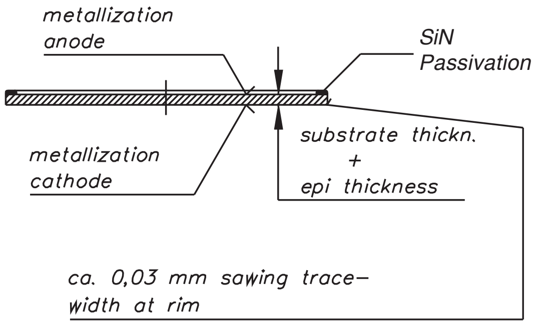
GaAs Schottky Diodes

Type	V_{RRM}	T_{VJM}	$I_{F(AV)M}$	R_{thJC}	V_F typ		$@I_F$	I_R typ	C_j	I_{FSM}
	V	°C	rect. d=0.5 T_C=90°C A	typ. K/W	T_{VJ} = 25°C V	125°C V	A	$@V_{RRM}$ 125°C µA	0.5 • V_{RRM} 125°C pF	A
DWGS04-01A	100	175	8.5	10.12	0.62	0.54	2.0	700	19.0	12.5
DWGS10-01C			25.0	5.20	0.99	0.94	10.0	< 10	19.0	80.0
DWGS04-018A	180		5.0	10.12	0.86	0.85	2.0	700	8.8	12.5
DWGS04-018C			8.4	10.12	1.25	1.02	4.0	< 10	8.8	32.0
DWGS10-018A			11.0	5.20	0.80	0.80	5.0	1300	22.0	30.0
DWGS10-018C			15.0	5.20	1.21	1.04	7.5	< 10	22.0	80.0
DWGS20-018A			17.0	3.70	0.80	0.80	7.5	2000	33.0	50.0
DWGS20-018C			23.0	3.70	1.24	1.07	20.0	< 10	33.0	120.0
DWGS04-025A	250		3.9	10.12	1.30	1.30	2.0	700	6.4	12.5
DWGS04-025C			7.8	10.12	1.26	1.05	4.0	< 10	6.4	32.0
DWGS10-025A			9.0	5.20	1.25	1.25	5.0	1300	18.0	30.0
DWGS10-025C			14.0	5.20	1.26	1.07	7.5	< 10	18.0	80.0
DWGS20-025A			13.0	3.70	1.25	1.25	7.5	2000	26.0	50.0
DWGS20-025C			20.0	3.70	1.24	1.10	20.0	< 10	26.0	120.0
DWGS04-03A	300		3.5	10.12	1.60	1.60	2.0	700	3.7	12.5
DWGS04-03C			6.0	10.12	1.51	1.10	4.0	< 10	3.7	32.0
DWGS10-03A			8.0	5.20	1.60	1.60	5.0	1300	9.0	30.0
DWGS10-03C			17.5	5.20	1.56	1.11	7.5	10	9.0	80.0
DWGS20-03C			25.0	3.70	1.56	1.14	20.0	15	14.0	120.0

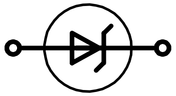
GaAs Schottky Diodes

Type	**bondable**	**Chips per Wafer**	**Dimensions**		**Wafer thickness**
			A mm	**B** mm	mm
DWGS04-01A	•	4060	1.30	1.30	0.45
DWGS10-01C	•	2126	2.10	1.60	
DWGS04-018A	•	4060	1.30	1.30	
DWGS04-018C	•	4060	1.30	1.30	
DWGS10-018A	•	2126	2.10	1.60	
DWGS10-018C	•	2126	2.10	1.60	
DWGS20-018A	•	1480	3.00	1.60	
DWGS20-018C	•	1480	3.00	1.60	
DWGS04-025A	•	4060	1.30	1.30	
DWGS04-025C	•	4060	1.30	1.30	
DWGS10-025A	•	2126	2.10	1.60	
DWGS10-025C	•	2126	2.10	1.60	
DWGS20-025A	•	1480	3.00	1.60	
DWGS20-025C	•	1480	3.00	1.60	
DWGS04-03A	•	4060	1.30	1.30	
DWGS04-03C	•	4060	1.30	1.30	
DWGS10-03A	•	2126	2.10	1.60	
DWGS10-03C	•	2126	2.10	1.60	
DWGS20-03C	•	1480	3.00	1.60	
Tolerance			-0 .1	-0.1	±10 %





Schottky Diodes

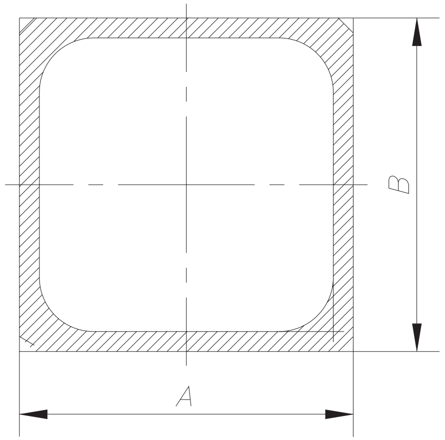


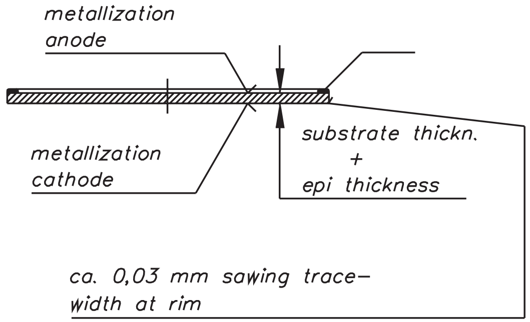
Type	V_{RRM}	I_R	@ T_{VJ}	T_{VJM}	I_{FAVM}	R_{thJC} ①	V_F			I_{FSM}	Reverse Recovery @ 25 °C			
		V_{RRM}			rect. d = 0,5 T_C = 125 °C	typ.	25 °C	T_{VJ}=125 °C	@ I_F		I_{RM} typ.	t_{rr} typ.	@ I_F	-di/dt
	V	mA	°C	°C	A	K/W	V	V	A	A	A	ns	A	A/us
DWS39-08D	8	1250	100	150	145	0.8	0.31	0.21	60	1000	tbd	tbd	50	200
DWS9-15B	15	100	100	150	tbd	1.7	0.39	0.27	10	160	tbd	tbd	10	200
DWS19-15B		200	100	150	65	1.4	0.39	0.27	20	350	tbd	tbd	20	200
DWS29-15B		350	100	150	98	1.1	0.39	0.27	40	660	tbd	tbd	40	200
DWS7-30B	30	40	100	150	tbd	1.7	0.43	0.34	10	140	tbd	tbd	10	200
DWS17-30B		80	100	150	tbd	1.4	0.43	0.34	20	330	2.4	tbd	20	200
DWS217-30B		140	100	150	65	1.2	0.43	0.34	28	420	5.5	tbd	28	200
DWS27-30B		150	100	150	82	1.1	0.43	0.34	40	520	tbd	tbd	40	200
DWS37-30B		250	100	150	102	0.8	0.43	0.34	60	800	tbd	tbd	50	200
DWS93-45B	45	35	100	150	tbd	tbd	0.48	0.43	7	tbd	tbd	tbd	7	200
DWS94-45A		1.8	125	175	tbd	tbd	0.66	0.54	7	tbd	tbd	tbd	7	200
DWS3-45B		40	100	150	28	1.7	0.48	0.43	10	160	tbd	tbd	10	200
DWS4-45A		2.5	125	175	32	1.7	0.66	0.53	10	140	tbd	tbd	10	200
DWS13-45B		100	100	150	42	1.4	0.48	0.43	20	320	1.4	tbd	20	200
DWS14-45A		5	125	175	47	1.4	0.66	0.53	20	280	1.5	tbd	20	200
DWS213-45B		140	100	150	tbd	1.2	0.48	0.43	28	tbd	tbd	tbd	28	200
DWS214-45A		7	125	175	tbd	1.2	0.66	0.54	28	tbd	tbd	tbd	28	200
DWS23-45B		200	100	150	63	1.1	0.48	0.43	40	640	2	tbd	40	200
DWS24-45A		10	125	175	68	1.1	0.66	0.54	40	550	2	tbd	40	200
DWS33-45B		250	100	150	89	0.8	0.48	0.43	60	900	2.6	tbd	50	200
DWS34-45A		10	125	175	95	0.8	0.66	0.54	60	800	2.5	tbd	50	200

① *Mounted on DCB*

Schottky Diodes

Type	solderable	bondable	Chips per Wafer 6 "	Dimensions		Si thickness mm
				A mm	B mm	
DWS39-08D	•		513	5.41	5.41	0.25
DWS9-15B		•	2783	2.4	2.4	0.25
DWS19-15B		•	1502	3.25	3.25	0.25
DWS29-15B		•	758	4.44	4.44	0.25
DWS7-30B		•	2783	2.4	2.4	0.25
DWS17-30B		•	1502	3.25	3.25	0.25
DWS217-30B		•	1000	4.45	3.25	0.25
DWS27-30B		•	758	4.44	4.44	0.25
DWS37-30B		•	513	5.41	5.41	0.25
DWS93-45B		•	4180	2	2	0.25
DWS94-45A		•	4180	2	2	0.25
DWS3-45B		•	2783	2.4	2.4	0.25
DWS4-45A		•	2783	2.4	2.4	0.25
DWS13-45B		•	1502	3.25	3.25	0.25
DWS14-45A		•	1502	3.25	3.25	0.25
DWS213-45B		•	1000	4.45	3.25	0.25
DWS214-45A		•	1000	4.45	3.25	0.25
DWS23-45B	•	•	758	4.44	4.44	0.25
DWS24-45A		•	758	4.44	4.44	0.25
DWS33-45B	•	•	513	5.41	5.41	0.25
DWS34-45A	•	•	513	5.41	5.41	0.25
Tolerance				-0.1	-0.1	5%





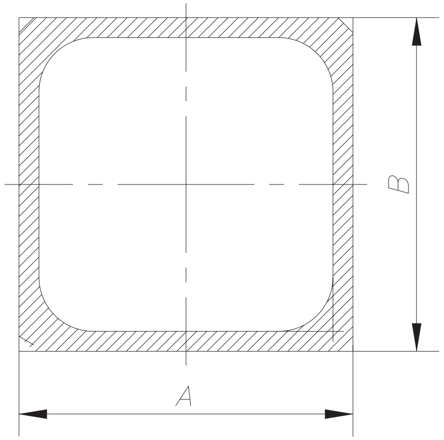
Schottky Diodes

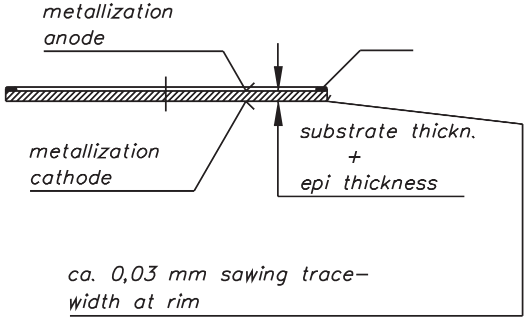
Type	V_{RRM}	I_R V_{RRM}	@ T_{VJ}	T_{VJM}	I_{FAVM} rect. d = 0,5 T_C = 125 °C	R_{thJC} ① typ.	V_F			I_{FSM}	Reverse Recovery @ 25 °C			
							25 °C	T_{VJ}=125 °C	@ I_F		I_{RM} typ.	t_{rr} typ.	@ I_F	-di/dt
	V	mA	°C	°C	A	K/W	V	V	A	A	A	ns	A	A/us
DWS95-60B	60	35	100	150	tbd	tbd	0.59	0.52	7	tbd	tbd	tbd	7	200
DWS96-60A		1.8	125	175	tbd	tbd	0.71	0.59	7	tbd	tbd	tbd	7	200
DWS5-60B		40	100	150	tbd	1.7	0.59	0.52	10	170	tbd	tbd	10	200
DWS6-60A		2.5	125	175	tbd	1.7	0.71	0.61	10	170	tbd	tbd	10	200
DWS15-60B		50	100	150	43	1.4	0.59	0.52	20	320	tbd	tbd	20	200
DWS16-60A		5	125	175	tbd	1.4	0.71	0.59	20	tbd	tbd	tbd	20	200
DWS25-60B		100	100	150	63	1.1	0.59	0.52	40	660	tbd	tbd	40	200
DWS26-60A		10	125	175	tbd	1.1	0.71	0.59	40	tbd	tbd	tbd	40	200
DWS35-60B		200	100	150	82	0.8	0.59	0.49	60	900	2.5	tbd	50	200
DWS25-80B	80	150	100	150	66	1.1	0.7	0.58	40	660	1.5	tbd	40	200
DWS36-80A		10	125	175	91	0.8	0.78	0.61	60	700	2	tbd	50	200
DWS92-100A	100	1.8	125	175	tbd	tbd	0.8	0.63	7	tbd	tbd	tbd	7	200
DWS2-100A		2.5	125	175	32	1.7	0.82	0.63	10	120	2	tbd	10	200
DWS12-100A		5	125	175	45	1.4	0.82	0.63	20	230	2.3	tbd	20	200
DWS212-100A		7	125	175	tbd	1.2	0.8	0.63	28	tbd	tbd	tbd	28	200
DWS22-100A		10	125	175	65	1.1	0.82	0.63	40	450	2.6	tbd	40	200
DWS32-100A		20	125	175	92	0.8	0.82	0.63	60	700	3.4	tbd	50	200
DWS91-150A	150	1.8	125	175	tbd	tbd	0.81	0.66	7	tbd	tbd	tbd	7	200
DWS1-150A		2.5	125	175	30	1.7	0.81	0.66	10	120	3	tbd	10	200
DWS11-150A		5	125	175	43	1.4	0.81	0.66	20	200	4	tbd	20	200
DWS211-150A		7	125	175	tbd	1.2	0.81	0.66	28	tbd	tbd	tbd	28	200
DWS21-150A		10	125	175	60	1.1	0.81	0.66	40	450	tbd	tbd	40	200
DWS31-150A		20	125	175	85	0.8	0.81	0.66	60	700	4.5	tbd	50	200
DWS1-180A	180	2.5	125	175	30	1.7	0.82	0.67	10	120	3.5	tbd	10	200
DWS1-200A	200	2.5	125	175	tbd	1.7	0.84	0.68	10	120	tbd	tbd	10	200
DWS20-200A		10	125	175	tbd	1.1	0.84	0.68	40	tbd	tbd	tbd	40	200
DWS30-200A		5	125	175	tbd	0.8	0.84	0.68	60	700	5	tbd	50	200

① *Mounted on DCB*

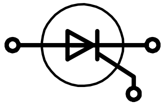
Schottky Diodes

Type	solderable	bondable	Chips per Wafer	Dimensions A mm	Dimensions B mm	Si thickness mm
DWS95-60B		•	4180	2	2	0.25
DWS96-60A		•	4180	2	2	0.25
DWS5-60B		•	2783	2.4	2.4	0.25
DWS6-60A		•	2783	2.4	2.4	0.25
DWS15-60B		•	1502	3.25	3.25	0.25
DWS16-60A		•	1502	3.25	3.25	0.25
DWS25-60B		•	758	4.44	4.44	0.25
DWS26-60A		•	758	4.44	4.44	0.25
DWS35-60B		•	513	5.41	5.41	0.25
DWS25-80B		•	758	4.44	4.44	0.25
DWS36-80A		•	513	5.41	5.41	0.25
DWS92-100A		•	4180	2	2	0.25
DWS2-100A		•	2783	2.4	2.4	0.25
DWS12-100A		•	1502	3.25	3.25	0.25
DWS212-100A		•	1000	4.45	3.25	0.25
DWS22-100A		•	758	4.44	4.44	0.25
DWS32-100A	•	•	513	5.41	5.41	0.25
DWS91-150A		•	4180	2	2	0.25
DWS1-150A		•	2783	2.4	2.4	0.25
DWS11-150A		•	1502	3.25	3.25	0.25
DWS211-150A		•	1000	4.45	3.25	0.25
DWS21-150A		•	758	4.44	4.44	0.25
DWS31-150A		•	513	5.41	5.41	0.25
DWS1-180A		•	2783	2.4	2.4	0.25
DWS1-200A		•	2783	2.4	2.4	0.25
DWS20-200A		•	758	4.44	4.44	0.25
DWS30-200A		•	513	5.41	5.41	0.25
Tolerance				-0.1	-0.1	5%





Phase Control Thyristors



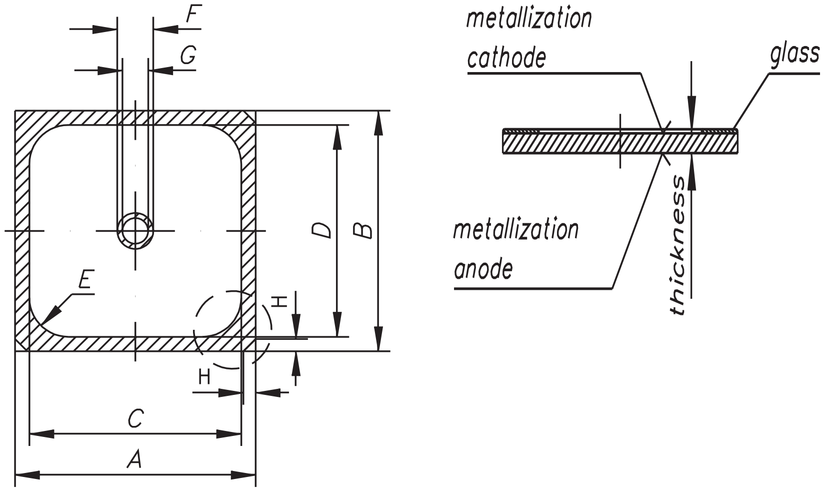
Type	V_{DRM} V_{RRM} V	I_R V_{RRM} T_{VJM} mA	T_{VJM} °C	$I_{F(AV)M}$ rect. d=0.5 T_C=100°C A	R_{thJC} ② max. K/W	V_T T_{VJ} = 25°C V	150°C typ. V	@I_F A	I_{TSM} non-rep. t_P=10ms A	t_q V_R = 100V, V_D = V_{DRM} t_P=200µs, di/dt = -10A/µs T_{VJ} = T_{VJM} µs	dv/dt V/µs	@I_T A	I_H R_{GK} =∞ V_D = 6V T_{VJ} = 25°C mA	I_L T_{VJ} = 25°C mA	@t_P µs
CWP7-CG	800 - 1200	5	125	15 ①	1.7	1.52	1.48	20	200	tbd	tbd	tbd	50	75	10
CWP8		4	150	tbd	1.7	1.50	1.46	44	300	60	20	16	40	100	10
CWP8-CG		4	150	tbd	1.7	1.50	1.46	44	300	60	20	16	80	100	10
CWP35		20	150	tbd	0.7	1.43	1.39	150	1050	100	10	50	80	100	10
CWP16-CG	1200 - 1600	8	150	25	1.2	1.37	1.33	45	400	150	10	11	100	150	10
CWP21-CG		12		61	1.1	1.53	1.49	80	520	150	20	15	100	150	10
CWP22-CG		12		36	0.9	1.53	1.49	80	520	150	15	20	100	450	10
CWP24		20		tbd	0.9	1.30	1.26	60	600	60	20	25	100	200	10
CWP25-CG		20		tbd	0.9	1.24	1.20	60	600	60	20	25	100	200	10
CWP41	1200 - 1800	20		125	0.5	1.50	1.46	200	1150	150	20	120	200	450	10
CWP50		20		tbd	0.6	1.35	1.31	200	1500	150	20	150	200	450	10
CWP55		20		tbd	0.5	1.26	1.22	200	1600	150	20	150	200	450	10
CWP71		20		tbd	0.4	1.31	1.27	300	2400	185	20	150	200	450	10
CWP130		30		204	0.2	1.19	1.15	350	4750	150	20	160	200	300	30
CWP180		40		372	0.2	1.20	1.16	450	5200	150	20	300	200	300	30
CWP341		40		tbd	0.2	1.19	1.15	600	7000	200	50	300	200	200	30
CWP347		60		540	0.1	1.15	1.11	600	9500	200	50	300	150	200	30
CWP69	1600 - 2200	20		tbd	0.2	1.52	1.48	300	1700	185	20	150	150	200	30
CWP339		40		tbd	0.2	1.24	1.20	300	6000	150	20	160	150	200	30
CWP345		60		520	0.1	1.31	1.27	600	8000	200	50	300	150	200	30

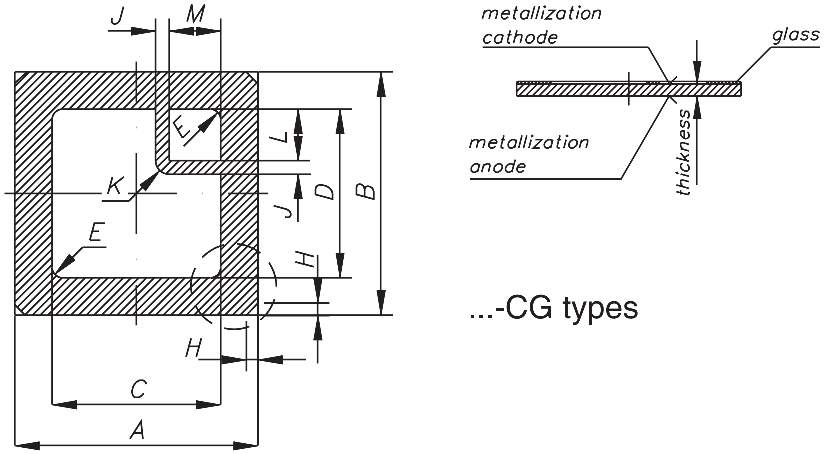
① *= 75°C*

② *Mounted on DCB*

Phase Control Thyristors

Type	solderable	bondable	Chips per Wafer	Dimensions							Si-thickn.
				A	B	F	G	Corner Gate J	L	M	
				mm	mm	mm	mm	mm	mm	mm	mm
CWP7-CG	•	•	518	4.45	4.45	-	-	0.2	1.0	1.5	0.38
CWP8	•	•	375	5.20	5.20	1.80	0.90	-	-	-	0.38
CWP8-CG	•	•	375	5.20	5.20	-	-	0.2	1.0	1.5	0.32
CWP35	•	•	125	8.70	8.70	1.80	1.00	-	-	-	0.38
CWP16-CG	•	•	239	6.50	6.50	-	-	0.2	1.5	1.5	0.38
CWP21-CG	•	•	196	7.10	7.10	-	-	0.2	1.5	1.5	0.38
CWP22-CG	•	•	196	7.10	7.10	-	-	0.2	1.5	1.5	0.38
CWP24	•	•	196	7.10	7.10	1.80	1.00	-	-	-	0.32
CWP25-CG	•	•	196	7.10	7.10	-	-	0.2	1.5	1.5	0.32
CWP41	•	•	94	10.00	10.00	2.30	1.50	-	-	-	0.38
CWP50	•	•	74	13.00	9.77	2.30	1.50	-	-	-	0.38
CWP55	•	•	58	12.30	12.30	2.30	1.50	-	-	-	0.38
CWP71	•	•	50	13.40	13.40	2.30	1.50	-	-	-	0.38
CWP130	•	•	29	19.05	15.40	3.46	2.50	-	-	-	0.38
CWP180	•	•	20	20.55	17.65	3.50	2.50	-	-	-	0.38
CWP341	•		16	25.30	18.50	3.50	2.50	-	-	-	0.38
CWP347	•		13	23.40	23.40	3.50	2.50	-	-	-	0.38
CWP69	•		50	13.40	13.40	2.30	1.50	-	-	-	0.46
CWP339	•		16	25.30	18.50	3.50	2.50	-	-	-	0.46
CWP345	•		13	23.40	23.40	3.50	2.50	-	-	-	0.46
Tolerance				-0.1	-0.1	-0.1	+0.1	-0.1	+0.1	+0.1	±5%





...-CG types

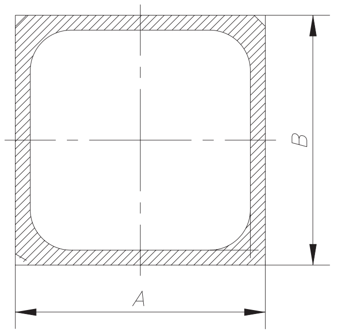
Fast Rectifier Diodes

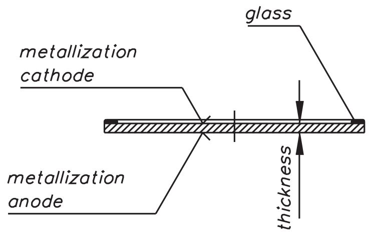
Type	V_{RRM}	I_R	T_{VJM}	$I_{F(AV)M}$	R_{thJC} ①	V_F		@I_F	I_{FSM}	Reverse Recovery					
	V	0.8xV_{RRM} T_{VJM} typ. mA	°C	rect. d=0.5 T_C=75°C A	typ. K/W	T_{VJ} = 25°C V	125°C V	A	A	I_{RM} 25°C A	@I_F A	@-di/dt A/µs	t_{rr} typ. µs	@I_F A	@-di/dt A/µs
DWFN2-16/18	1600 - 1800	2	125	10	2.9	1.79	tbd	10	75	tbd	tbd	tbd	1.5	4	5
DWFN9-16/18		4		16	1.6	1.98	tbd	30	160	tbd	tbd	tbd	1.5	8	5
DWFN17-16/18		5		17	1.3	1.89	tbd	55	300	tbd	tbd	tbd	1.5	10	10
DWFN21-16/18		8		23	0.9	1.98	tbd	70	400	tbd	tbd	tbd	1.5	15	15
DWFN35-16/18		10		26	0.7	1.88	tbd	80	500	tbd	tbd	tbd	1.5	25	25
DWFP17-13/18	1300-1800	5	125	17	1.3	2.10	tbd	55	300	tbd	tbd	tbd	1.5	10	10
DWFP68-16/18	1600-1800	5	125	48	0.4	tbd	tbd	70	500	45②	70	250	tbd	tbd	tbd

① *Mounted on DCB*

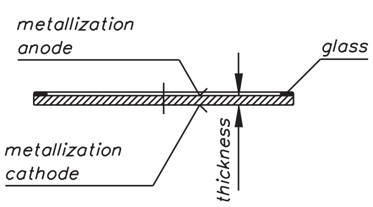
② *@125 °C* V_R *= 100V*

Type	solderable	bondable	Chips per Wafer	Dimensions		Si thickness
				A mm	B mm	mm
DWFN2-16/18		•	1205	2.95	2.95	0.265
DWFN9-16/18		•	685	3.90	3.90	0.265
DWFN17-16/18	•	•	518	4.45	4.45	0.265
DWFN21-16/18		•	346	5.40	5.40	0.265
DWFN35-16/18		•	260	6.20	6.20	0.265
DWFP17-13/18	•	•	518	4.45	4.45	0.265
DWFP68-16/18		•	152	8.91	7.22	0.265
Tolerance				-0.1	-0.1	±5%





DWFN



DWFP

What is DCB

DCB stands for **D**irect **C**opper **B**onding and denotes a process in which copper and a ceramic material are fused together, at high temperatures.

IXYS has developed this particular process in which two layers of copper are directly bonded to an aluminum-oxide or aluminum-nitride ceramic base. Since 1981 our power modules have been designed with DCB substrates. The DCB process yields a thin base and eliminates the need for thick, heavy copper bases that were used in the past. Because modules with DCB bases use fewer layers, they have much lower thermal resistance values and much better power cycling capabilities.

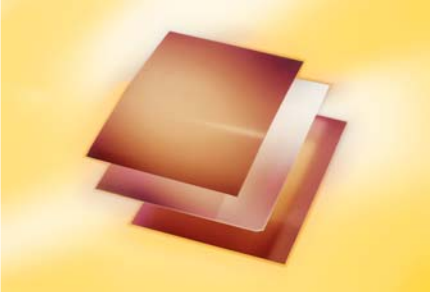
Our power technology allows us to produce DCB ceramic plates in large quantities. The dimensions of our standard sheet are 138 x 190.5 mm, (or 5,5“ x 7,5“).

Properties of DCB ceramic substrates:

- High mechanical strength and mechanically stability
- Good adhesion and corrosion resistance
- Excellent electrical insulation tested to 2.5 kV(RMS) for 1 minute or more
- Excellent thermal conductivity
- Superb thermal cycling stability
- Matched thermal expansion coefficient to that of silicon and GaAs
- Good heat spreading
- May be etched just like PC boards
- Environmentally friendly

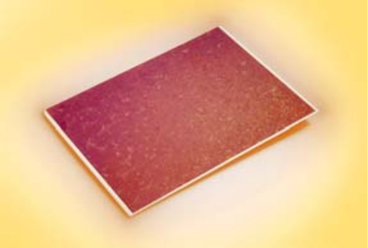
Advantages for the users:

- The 0.3 mm thick copper layer permits the copper pattern to handle high currents.
- The excellent thermal conductivity allows the possibility to place power semiconductor chips in very close proximity. This results in more power per unit of volume and improved reliability of a power system.
- Lighter base plate material than copper base plate.
- High voltage insulation at higher temperature.
- DCB is the basis for the „chip-on-board“ technology which is the packaging trend for the next generation integrated power modules.
- IXYS experience in using DCB in power modules. Wealth of application know-how and support.



Starting materials for DCB ceramic substrates are 0.3 mm thick copper foils, shown on both sides, top and bottom of the ceramic base plate.

Both sides of the finished DCB ceramic substrate are copper. Standard dimensions are **138 x 190.5 mm** (usable area is 130 x 180 mm). A finished DCB part is typically nickel plated.



DCB Data

Unclad aluminum oxide ceramic			
Al_2O_3 content		> 96	%
dimensions		138 x 190.5, 138 x 210, 115 x 165*	mm
usable area	max.	130 x 180, 107 x 156*	mm
thickness		1.00, 0.63, 0.38, 0.25	mm
arc through voltage		10	kV
thermal conductivity		> 24	W/m · K

Conduction layers - both sides			
copper thickness		0.3 ±0.015 (< 0.3 on request)	mm
conductor width	min.	0.3 ± 0.2	mm
conductor spacing	min.	0.4 ± 0.2	mm
spacing conductor/edge of ceramic	min.	0.35 ± 0.2	mm
surface finishes available		bare copper; nickel plated; nickel + gold plated	
peel-off resistance (DIN 532282)	min.	9	N/mm

DCB ceramic substrate			
application temperature range		-55...+850	°C
resistant to hydrogen	max. up to	400	°C
thermal expansion coefficient	typical	7.4 x 10^{-6}	K^{-1}
dimensions according			
to customer specific drawing			
DCB parts are available as:	• bonded plate • bonded and patterned plate • prelasered, unbroken plate • individuale substrates		
ALN - DCB on request			

* = (for 0.25 mm thk.)

US Patent # 6,798,060 "power device and direct aluminum bonded substrate“.