NPN Transistor Bare Die - 2N2222A

Rev 1.0
02/09/17

General purpose medium power amplifier or switch in bare die form
Complement PNP 2N2907A

Features:

- Collector current up to 600mA
- Low Leakage Current & Saturation Voltage
- Characterized at temperature extremes
- High Reliability Gold Back Metal
- High Reliability tested grades for Military + Space

Ordering Information:

The following part suffixes apply:

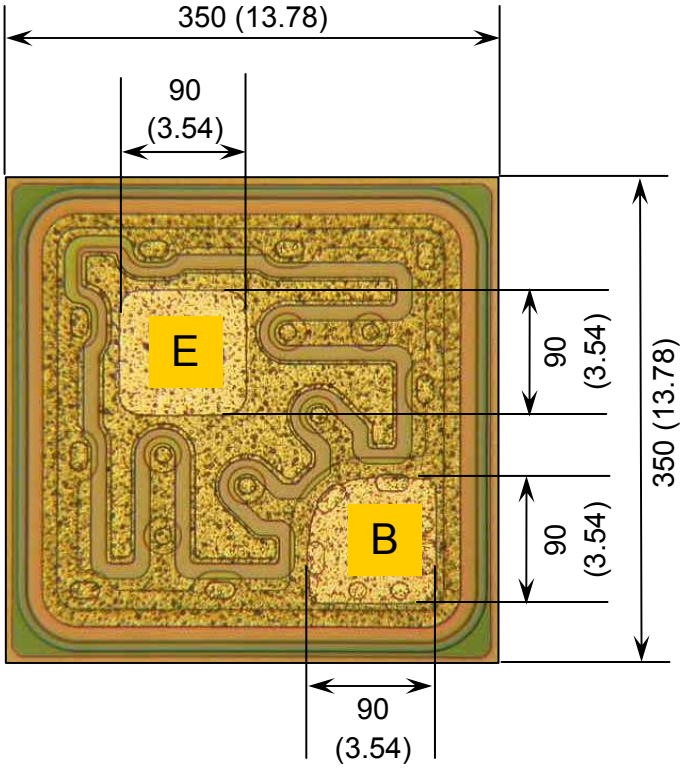
- No suffix - MIL-STD-750 /2072 Visual Inspection
- "**H**" - MIL-STD-750 /2072 Visual Inspection
  + MIL-PRF-38534 Class H LAT
- "**K**" - MIL-STD-750 /2072 Visual Inspection
  + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

www.siliconsupplies.com\quality\bare-die-lot-qualification

Die Dimensions in µm (mils)



E = EMITTER **B** = BASE

DIE BACK = COLLECTOR

Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – Specific request
- Unsawn Wafer – Specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

Mechanical Specification

Die Size (Excluding Saw Street)	350 x 350 13.78 x 13.78	µm mils
Base Pad Size Emitter Pad Size	90 x 90 3.54 x 3.54	µm mils
Die Thickness	180 (±20) 7.09 (±0.79)	µm mils
Top Metal Composition	Al - 1.3µm	
Back Metal Composition	AuAs – 0.9µm	

NPN Transistor Bare Die, 2N2222A

Rev 1.0
07/07/17

Absolute Maximum Ratings T_A = 25°C unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Junction Temperature	T_J	150	°C
Storage Temperature	T_{stg}	-55 to 150	°C

Electrical Characteristics T_A = 25°C unless otherwise stated

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 10µA	75	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 10mA	40	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E = 10µA	6	-	-	V
Collector Cut-off Current	I_{CEX}	V_{CE} = 60V, V_{EB} = 3V	-	-	10	nA
Collector Cut-off Current	I_{CBO}	V_{CB} = 60V	-	-	10	nA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 3V	-	-	100	nA
ON CHARACTERISTICS						
Forward-Current Transfer Ratio	h_{FE}	V_{CE} = 10V, I_C = 0.1mA	35	-	-	-
		V_{CE} = 10V, I_C = 1mA	50	-	-	-
		V_{CE} = 10V, I_C = 10mA	75	-	-	-
		V_{CE} = 10V, I_C = 150mA	100	-	300	-
		V_{CE} = 1V, I_C = 100mA	50	-	-	-
		V_{CE} = 10V, I_C = 500mA	40	-	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 150mA, I_B = 15mA	-	-	0.3	V
		I_C = 500mA, I_B = 50mA	-	-	1	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 150mA, I_B = 15mA	0.6	-	1.2	V
		I_C = 500mA, I_B = 50mA	-	-	2	V
SMALL SIGNAL CHARACTERISTICS[1]						
Transition Frequency	f_T	V_{CE} = 20V, I_E = -20mA	300	-	-	MHz
Output Capacitance	C_{obo}	V_{CB} = 10V, I_E = 0, f = 1MHz	-	-	8	pF
Input Capacitance	C_{ibo}	V_{EB} = 0.5V, I_C = 0, f = 1MHz	-	-	25	
SWITCHING CHARACTERISTICS[1]						
Delay Time	t_d	V_{CC} = 30V, I_E = -0.5mA I_C= 150mA, I_{B1}= 15mA	-	-	10	ns
Rise Time	t_r		-	-	25	
Storage Time	t_s	V_{CC} = 30V, I_C = 150mA I_{B1} = I_{B2} = 15mA	-	-	225	
Fall Time	t_f		-	-	60	

Note 1: Not production testing in die form, characterized by chip design and tested in package LAT.

Typical Electrical Characteristics

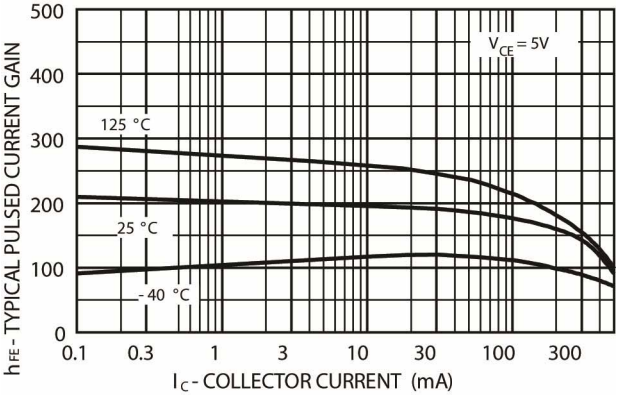


Fig 1 - Typical Pulsed Current Gain versus Collector Current

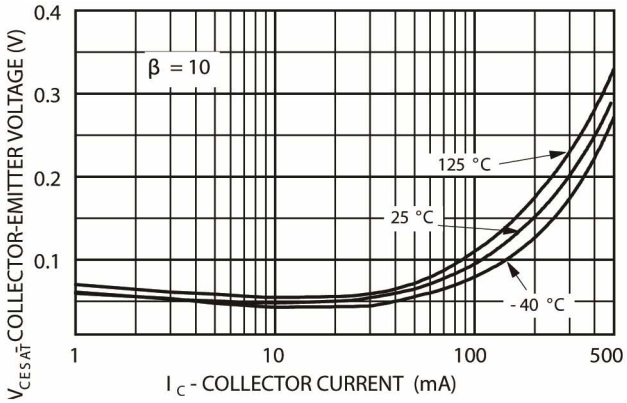


Fig 2 - Collector-Emitter Saturation Voltage versus Collector Current

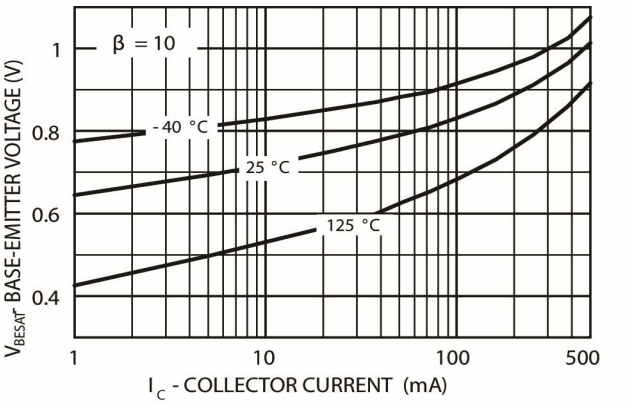


Fig 3 - Base-Emitter Saturation Voltage versus Collector Current

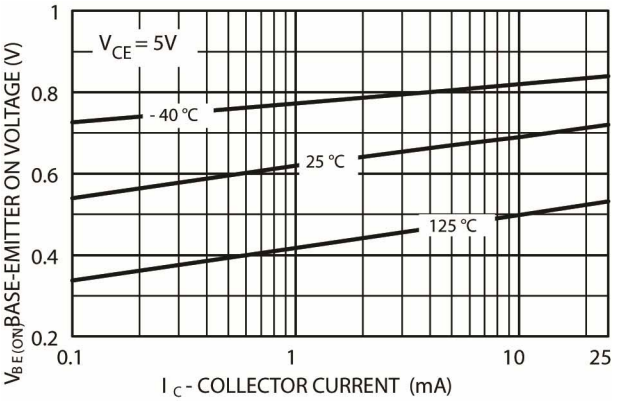


Fig 4 - Base-Emitter ON Voltage versus Collector Current

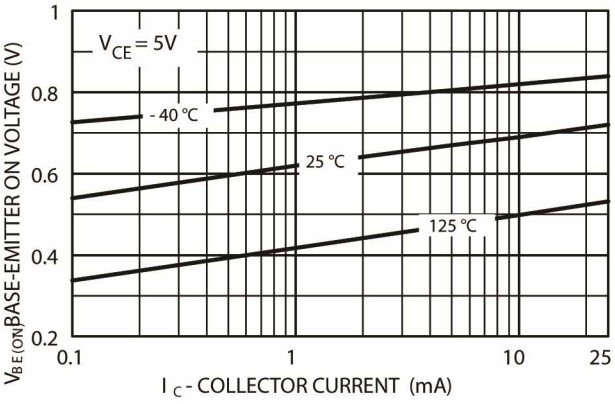


Fig 5 - Collector-Cut-off Current versus Ambient Temperature

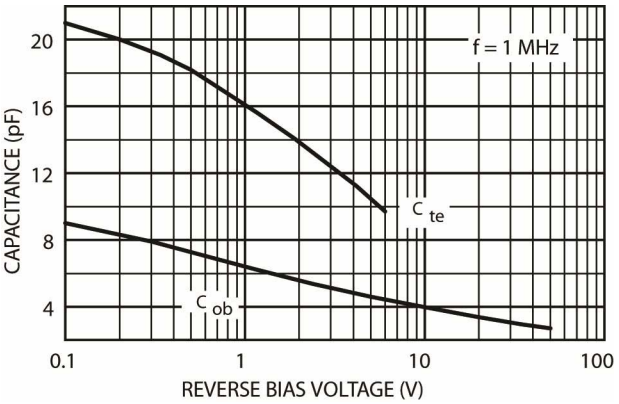


Fig 6 - Emitter Transition and Output Capacitance versus Reverse Bias Voltage

Typical Electrical Characteristics (Continued)

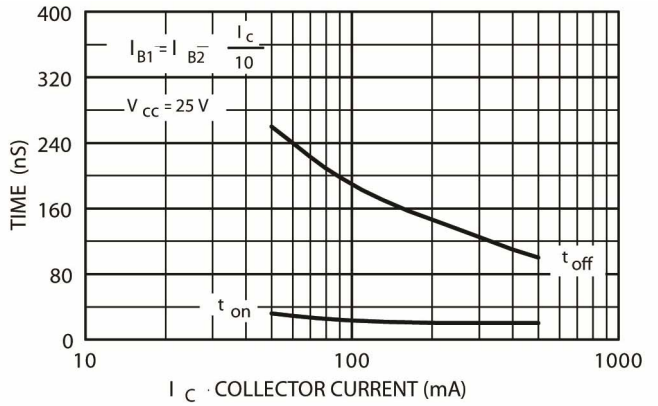


Fig 7 - Turn On and Turn Off Times versus Collector Current

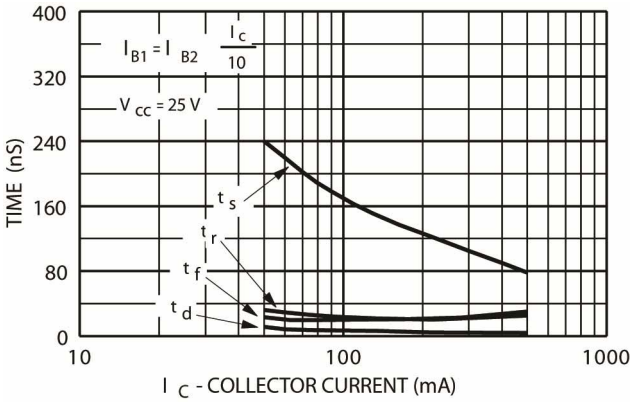


Fig 8 - Turn On and Turn Off Times versus Collector Current