



## DUAL SURFACE MOUNT NPN TRANSISTORS

This device contains two electrically-isolated 2N2222A NPN transistors. The two transistors have well matched hFE and are encapsulated in an ultra-small SOT-563 package. This device is ideal for portable applications where board space is at a premium.

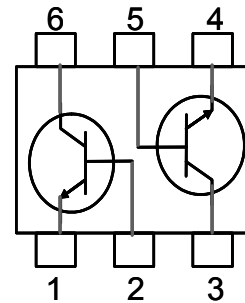
### FEATURES

- Electrically Isolated Dual NPN Switching Transistor
- In compliance with EU RoHS 2002/95/EC directives

### APPLICATIONS

- General Purpose Amplifier Applications
- Hand-Held Computers, PDAs

Device Marking Code: TU



### MAXIMUM RATINGS

$T_J = 25^{\circ}\text{C}$  Unless otherwise noted

Rating	Symbol	Value	Units
Collector-Base Voltage	$V_{CBO}$	75	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6.0	V
Collector Current	$I_C$	600	mA
Total Power Dissipation (Note 1)	$P_D$	200	mW
Operating Junction Temperature Range	$T_J$	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Units
Thermal Resistance, Junction to Ambient (Note 1)	$R_{thja}$	625	$^{\circ}\text{C}/\text{W}$

Note 1. FR-4 board 60 x 70 x 1mm with minimum recommended pad layout



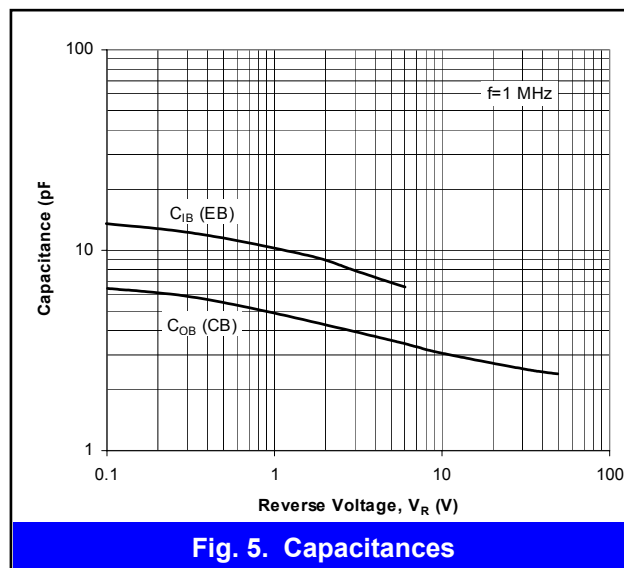
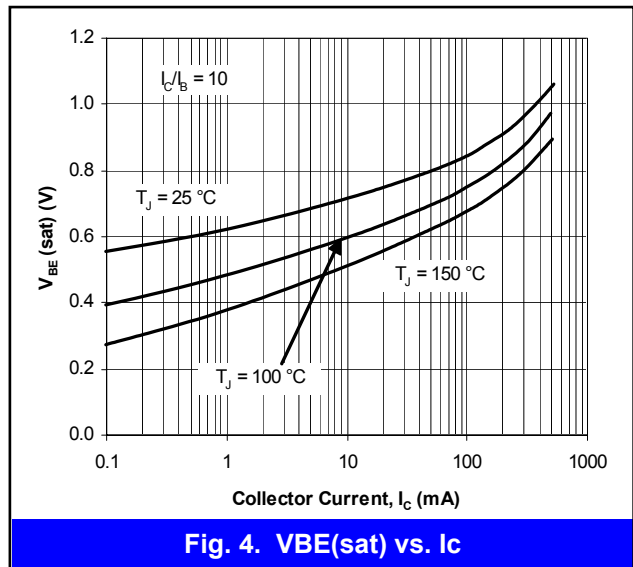
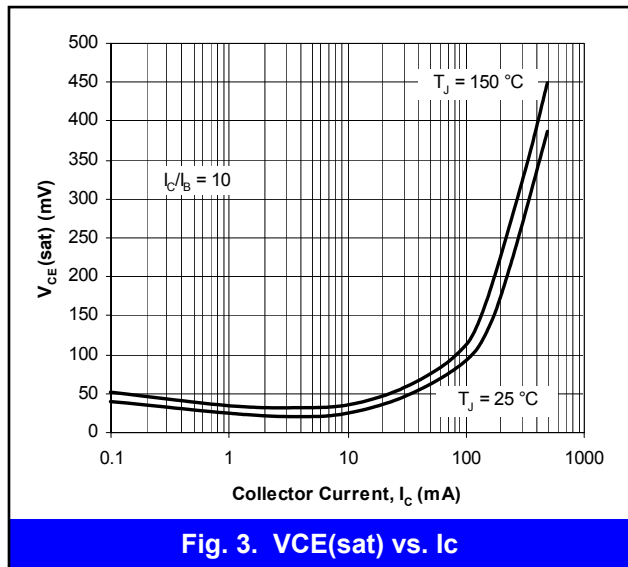
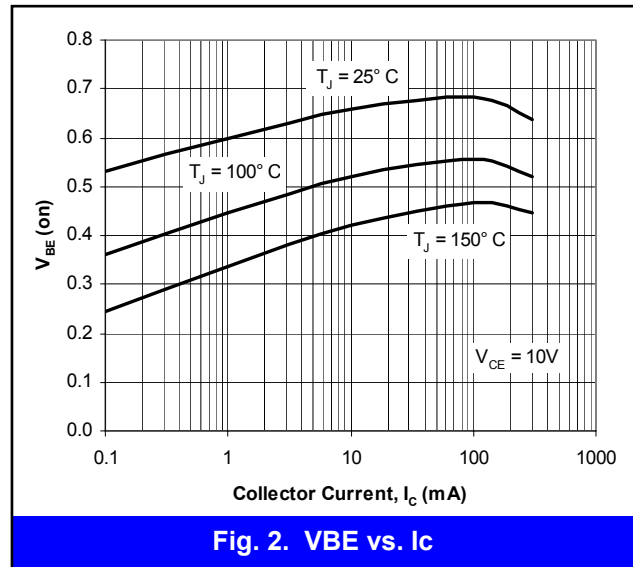
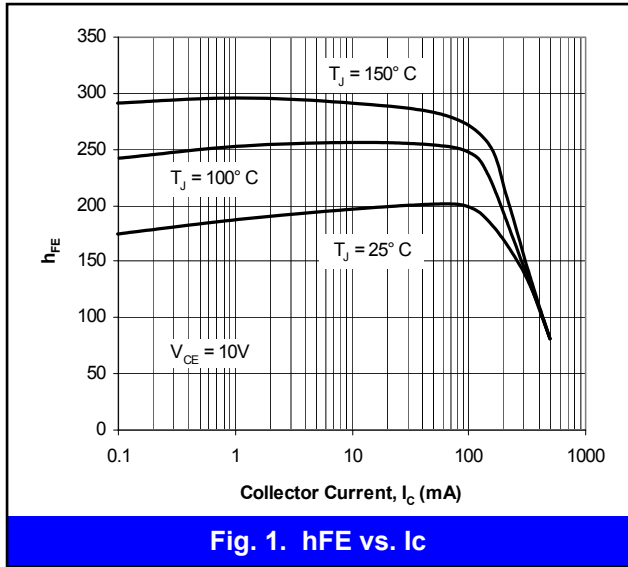
## ELECTRICAL CHARACTERISTICS (Each Transistor) $T_J = 25^\circ\text{C}$ Unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$	40	-	-	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$	75	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$	6.0	-	-	V
Collector Cutoff Current	$I_{CEX}$	$V_{CE} = 60\text{V}, V_{EB} = 3.0\text{V}$	-	-	10	nA
Base Cutoff Current	$I_{BL}$	$V_{CE} = 60\text{V}, V_{EB} = 3.0\text{V}$	-	-	20	nA
DC Current Gain (Note 2)	$h_{FE}$	$I_C = 0.1\text{mA}, V_{CE} = 10\text{V}$	35	-	-	
		$I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$	50	-	-	
		$I_C = 10\text{mA}, V_{CE} = 10\text{V}$	75	-	-	
		$I_C = 10\text{mA}, V_{CE} = 10\text{V}, T_J = -55^\circ\text{C}$	50	-	-	-
		$I_C = 150\text{mA}, V_{CE} = 10\text{V}$	100	-	300	
		$I_C = 500\text{mA}, V_{CE} = 10\text{V}$	40	-	-	
Collector-Emitter Saturation Voltage (Note 2)	$V_{CE(SAT)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}$	-	-	0.3	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$	-	-	1.0	V
Base-Emitter Saturation Voltage (Note 2)	$V_{BE(SAT)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}$	0.6	-	1.2	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}$	-	-	2.0	
Gain-Bandwidth Product	$f_T$	$V_{CE} = 20\text{V}, I_C = 20\text{mA}$ $f = 100\text{MHz}$	300	-	-	MHz
Collector-Base Capacitance	$C_{CBO}$	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$	-	-	8.0	pF
Emitter-Base Capacitance	$C_{EBO}$	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}$	-	-	25	pF
Delay Time	$t_d$	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	-	-	10	ns
Rise Time	$t_r$	$V_{BE(off)} = -0.5\text{V}, I_{B1} = 15\text{mA}$	-	-	25	ns
Storage Time	$t_s$	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$	-	-	225	ns
Fall Time	$t_f$	$I_{B1} = I_{B2} = 15\text{mA}$	-	-	60	ns

Note 2. Short duration test pulse used to minimize self-heating

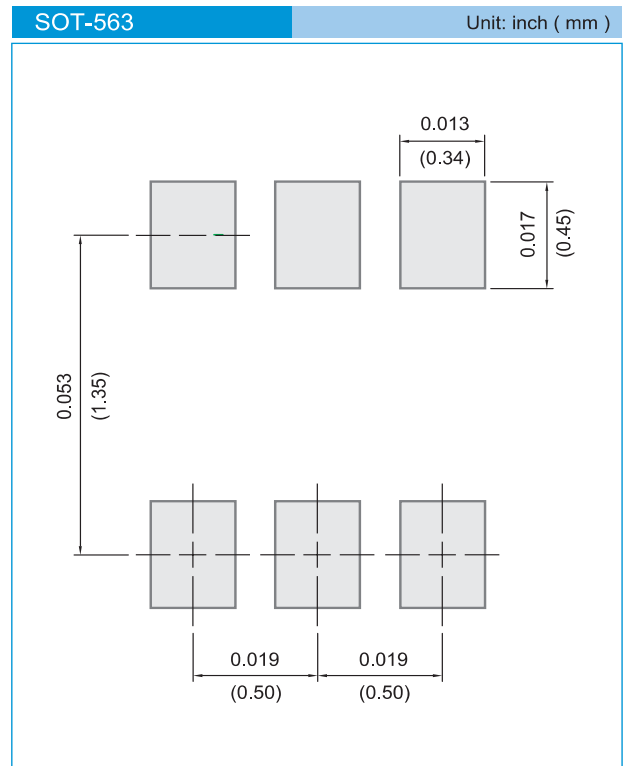
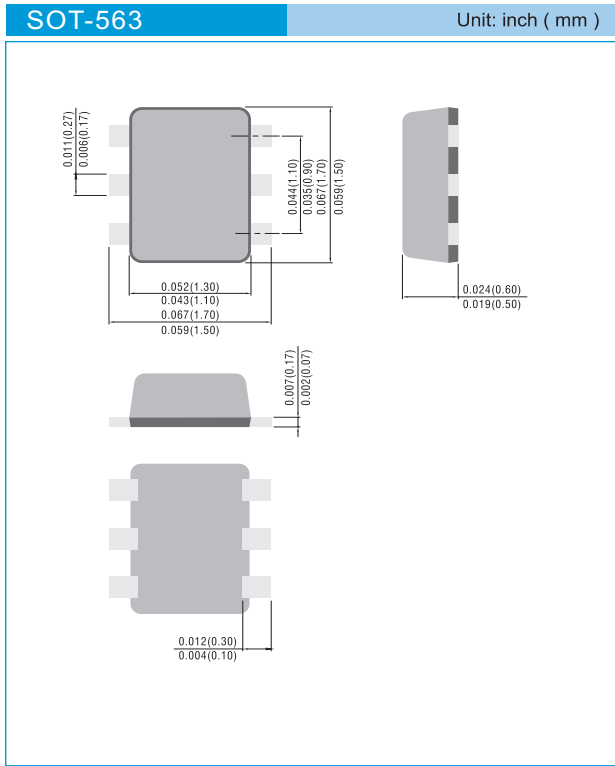


## CHARACTERISTICS CURVES (Each Transistor) $T_J = 25^\circ\text{C}$ Unless otherwise noted





## PACKAGE LAYOUT AND SUGGESTED PAD DIMENSIONS



## ORDERING INFORMATION

MMDT2222ATB6 T/R7 - 4,000 units per 7 inch reel

MMDT2222ATB6 T/R13 -10,000 units per 13 inch reel

## Copyright PanJit International, Inc 2009

The information presented in this document is believed to be accurate and reliable. The specifications and information herein are subject to change without notice. Pan Jit makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. Pan Jit products are not authorized for use in life support devices or systems. Pan Jit does not convey any license under its patent rights or rights of others.