



## 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.

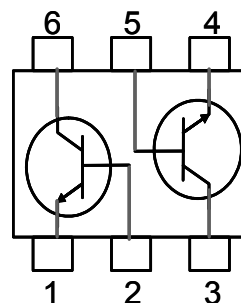
### FEATURES

- Electrically Isolated Dual NPN Switching Transistor
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### 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



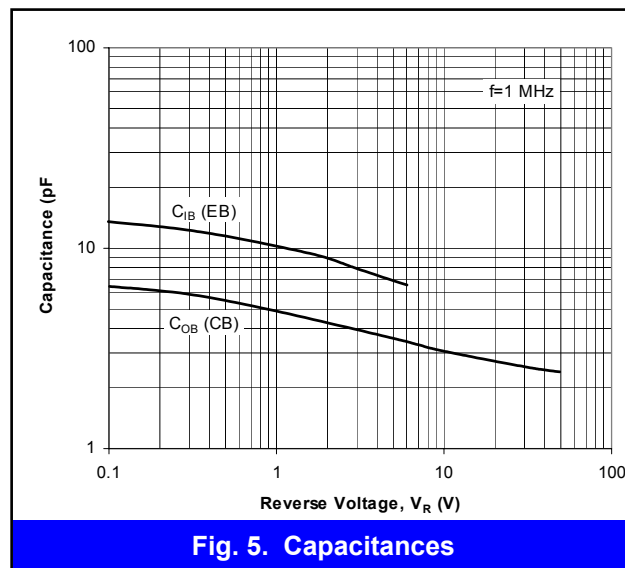
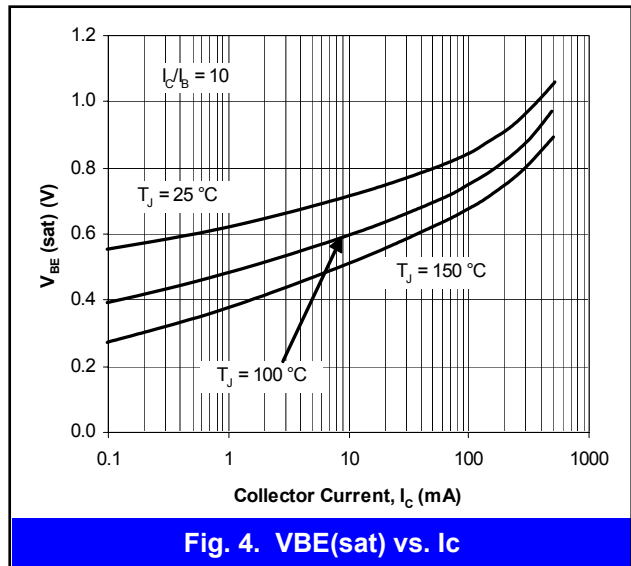
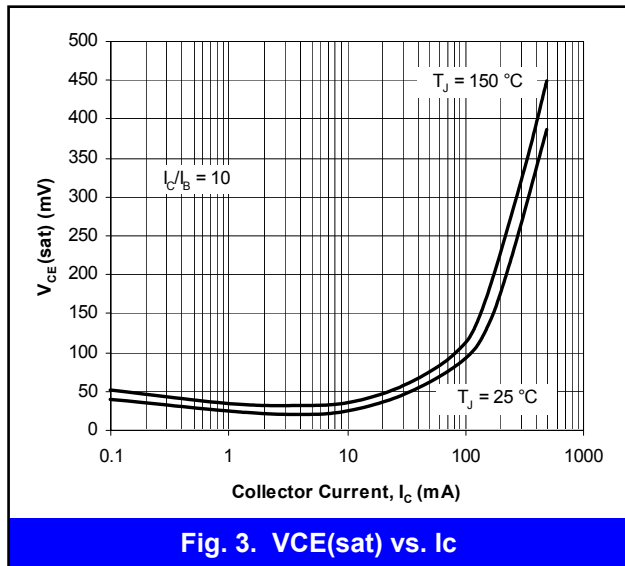
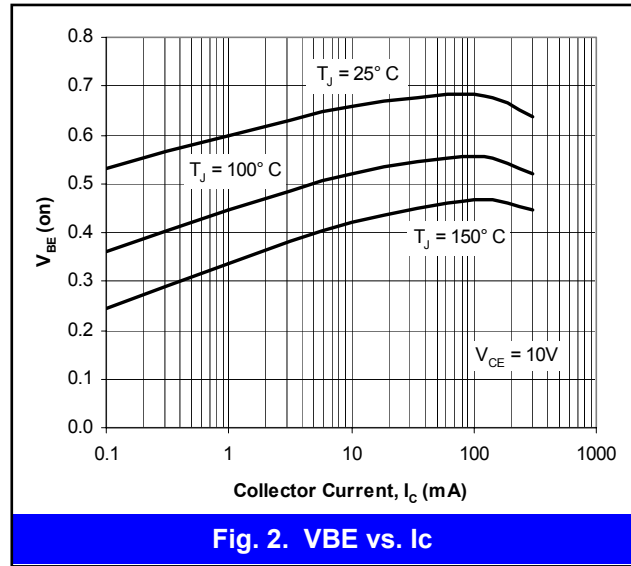
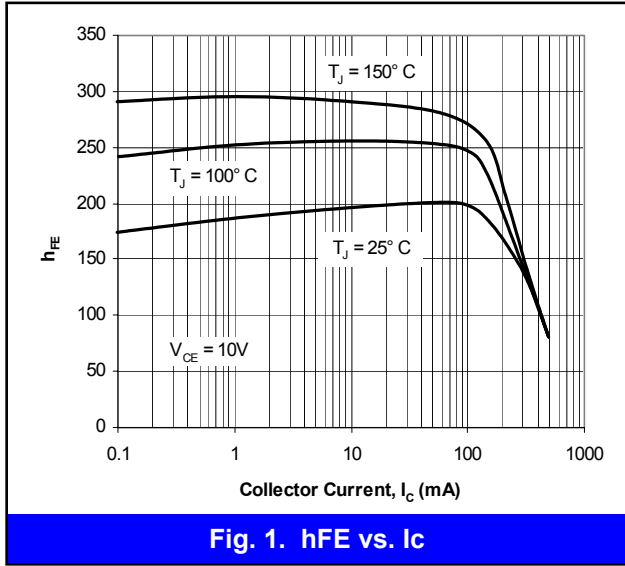
## ELECTRICAL CHARACTERISTICS (Each Transistor) $T_J = 25^\circ\text{C}$ Unless otherwise noted

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	V
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

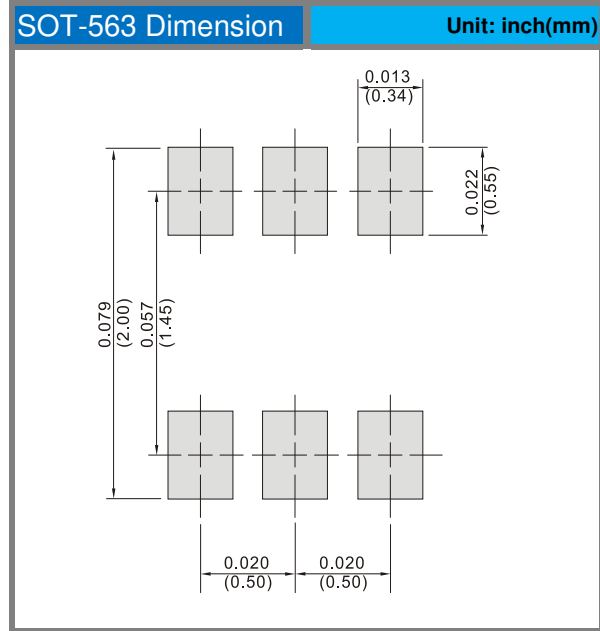
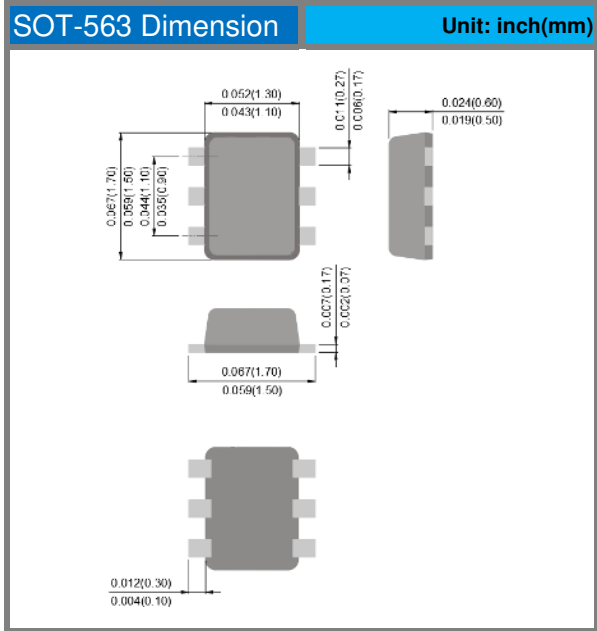


## CHARACTERISTICS CURVES (Each Transistor) $T_J = 25^\circ\text{C}$ Unless otherwise noted





## 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



# MMDT2222ATB6

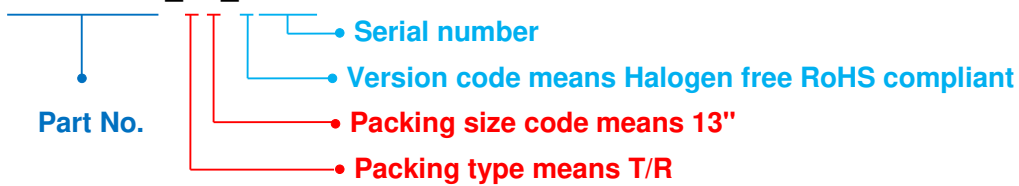
## Part No.\_packing code\_Version

MMDT2222ATB6 \_R1\_00001

MMDT2222ATB6 \_R2\_00001

For example :

RB500V-40 **R2** 00001



Packing Code <b>XX</b>				Version Code <b>X</b>		Serial number <b>XXXX</b>
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HSF Level	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	<b>A</b>	N/A	<b>0</b>	Halogen free RoHS compliant	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	RoHS compliant	<b>1</b>	serial number
Bulk Packing (B/P)	<b>B</b>	13"	<b>2</b>			
Tube Packing (T/P)	<b>T</b>	26mm	<b>X</b>			
Tape and Reel (Right Oriented) (TRR)	<b>S</b>	52mm	<b>Y</b>			
Tape and Reel (Left Oriented) (TRL)	<b>L</b>	PANASERT T/B CATHODE UP (PBCU)	<b>U</b>			
FORMING	<b>F</b>	PANASERT T/B CATHODE DOWN (PBCD)	<b>D</b>			



# MMDT2222ATB6

---

## Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Panjit International Inc..
- Panjit International Inc. reserves the rights to make changes of the content herein the document anytime without notification. Please refer to our website for the latest document.
- Panjit International Inc. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Panjit International Inc. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Panjit International Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panjit International Inc. for any damages resulting from such improper use or sale.
- Since Panjit uses lot number as the tracking base, please provide the lot number for tracking when complaining.