



## 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.

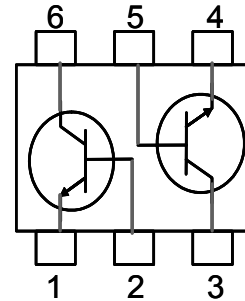
### FEATURES

- Electrically Isolated Dual NPN Switching Transistor
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std. . (Halogen Free)

### 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



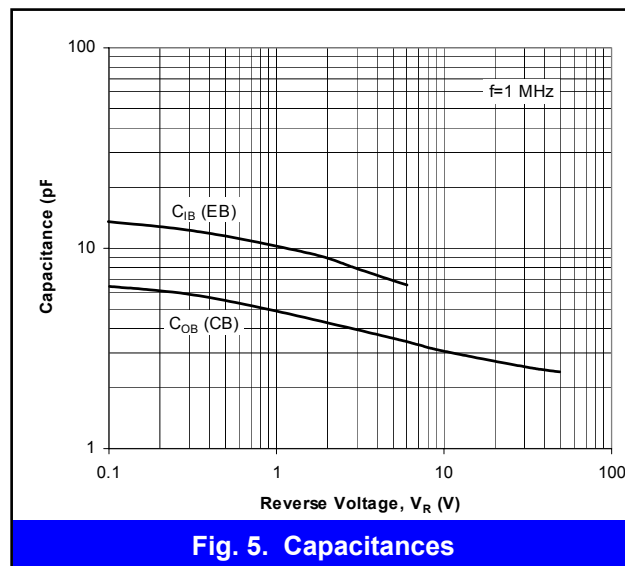
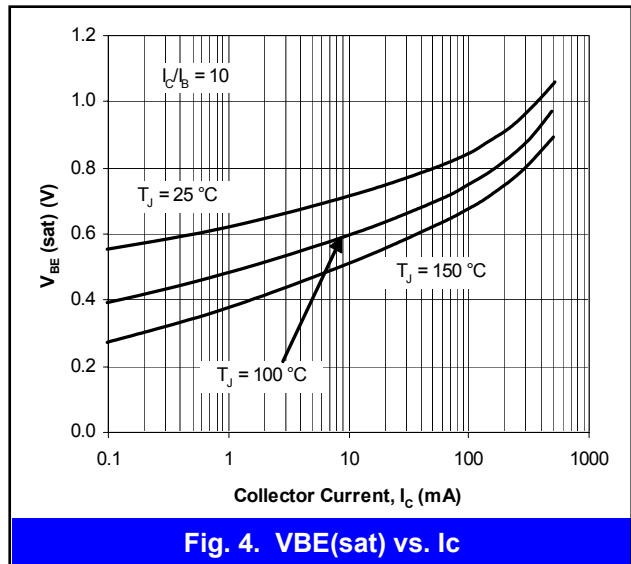
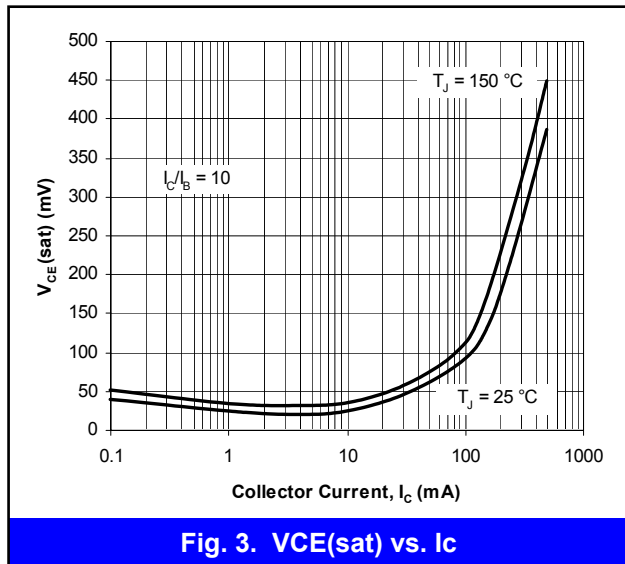
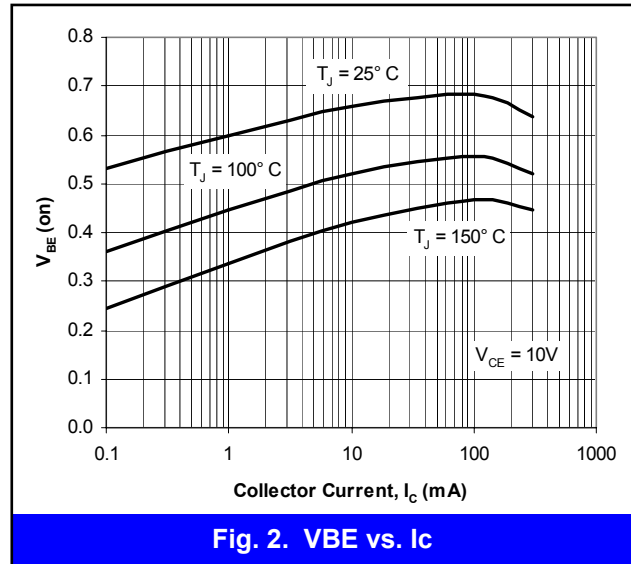
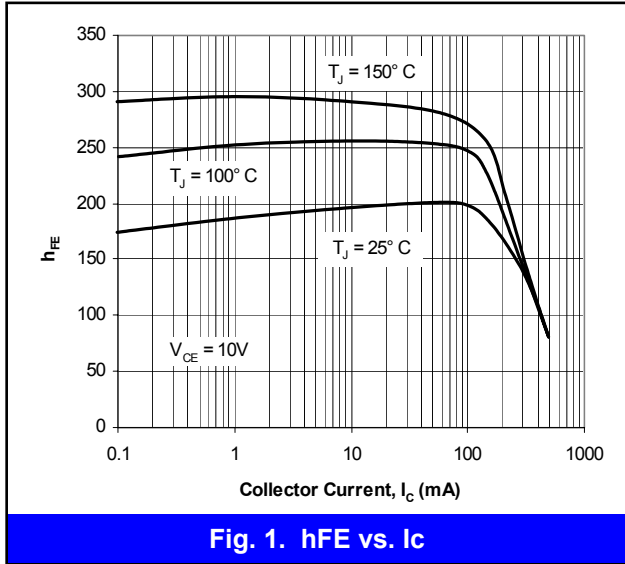
## ELECTRICAL CHARACTERISTICS (Each Transistor) $T_J = 25^\circ\text{C}$ Unless otherwise noted

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

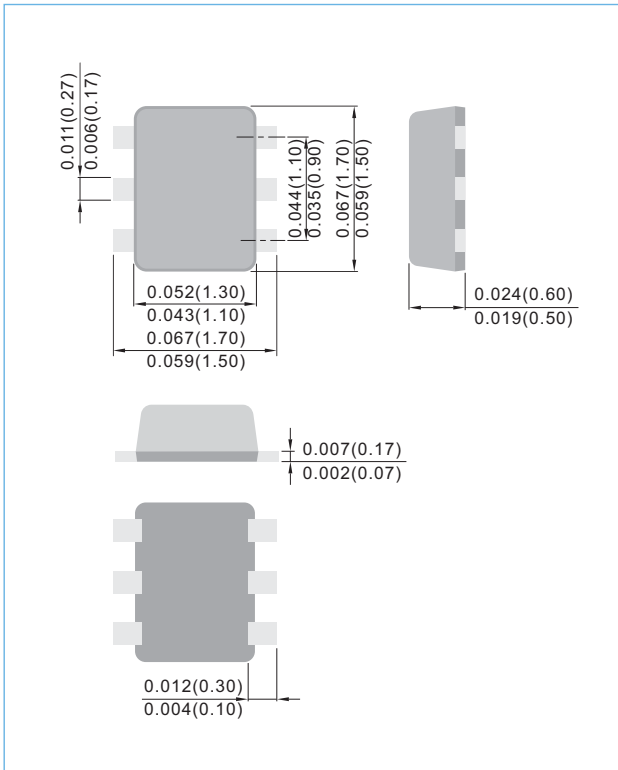




## PACKAGE LAYOUT AND SUGGESTED PAD DIMENSIONS

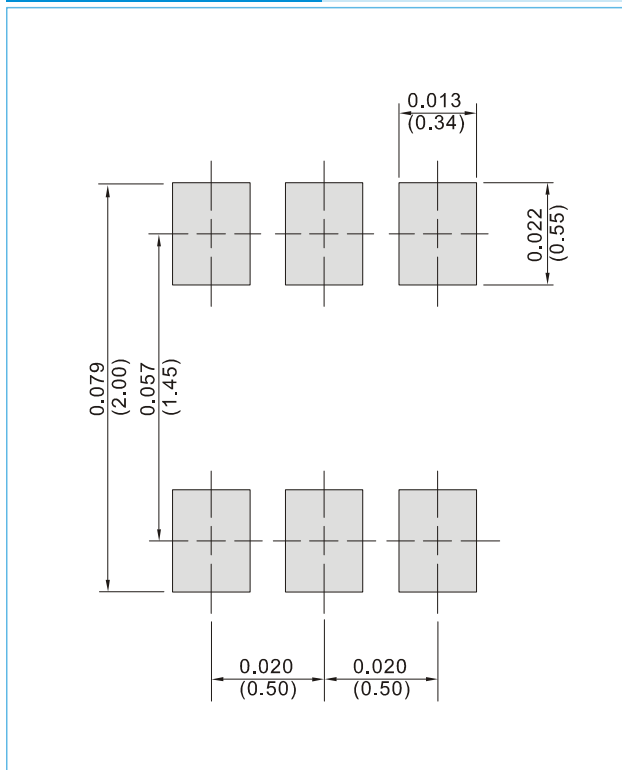
### SOT-563

Unit : inch(mm)



### SOT-563

Unit : inch(mm)



## ORDERING INFORMATION

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

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



# MMDT2222ATB6

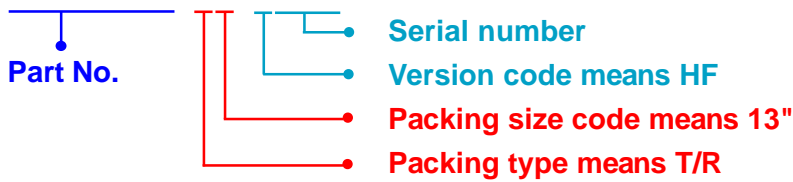
Part No\_packing code\_Version

MMDT2222ATB6\_R1\_00002

MMDT2222ATB6\_R2\_00002

For example :

**RB500V-40\_R2\_00001**



Packing Code <b>XX</b>				Version Code <b>XXXXX</b>		
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HF or RoHS	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>	<b>HF</b>	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	<b>RoHS</b>	<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>			



# MMDT222ATB6

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