



Micro Commercial Components

Micro Commercial Components  
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# MMDT4401

## NPN Plastic-Encapsulate Transistors

### Features

- Halogen free available upon request by adding suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Ultra-Small Surface Mount Package
- Epitaxial Planar Die Construction
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking:K2X

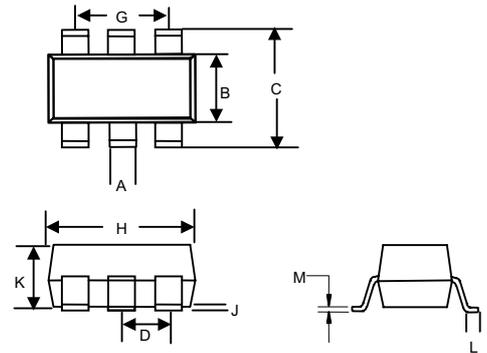
### Maximum Ratings @ 25°C Unless Otherwise Specified

Symbol	Rating	Rating(NPN)	Unit
$V_{CE0}$	Collector-Emitter Voltage	40	V
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current-Continuous	0.6	A
$P_C$	Collector Dissipation	0.2	W
$T_J$	Operating Junction Temperature	-55 to +150	°C
$T_{STG}$	Storage Temperature	-55 to +150	°C

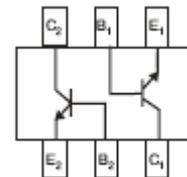
### Electrical Characteristics @ 25°C Unless Otherwise Specified

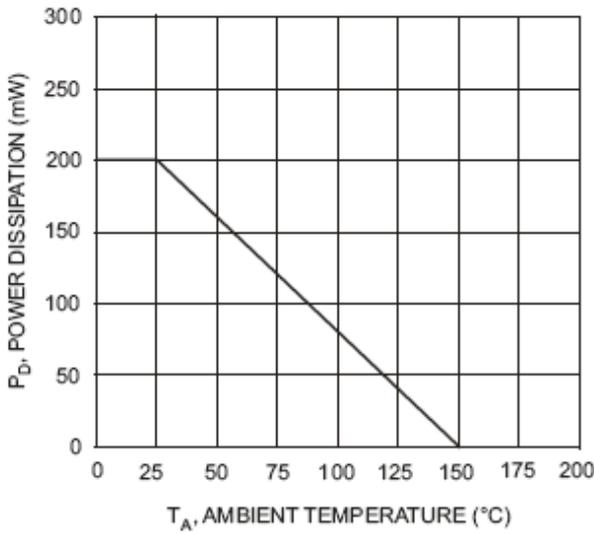
Symbol	Parameter	Min	Max	Units
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ( $I_C=1\text{mA}$ , $I_B=0$ )	40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=100\mu\text{A}$ , $I_E=0$ )	60	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage ( $I_E=100\mu\text{A}$ , $I_C=0$ )	6	---	Vdc
$I_{CBO}$	Collector Cutoff Current ( $V_{CB}=50\text{Vdc}$ , $I_E=0$ )	---	0.1	$\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current ( $V_{EB}=-5\text{Vdc}$ , $I_C=0$ )	---	0.1	$\mu\text{A}$
$h_{FE}$	DC Current Gain ( $I_C=0.1\text{mA}$ , $V_{CE}=1\text{Vdc}$ )	20	---	---
	( $I_C=1\text{mA}$ , $V_{CE}=1\text{Vdc}$ )	40	---	
	( $I_C=10\text{mA}$ , $V_{CE}=1\text{Vdc}$ )	80	---	
	( $I_C=150\text{mA}$ , $V_{CE}=1\text{Vdc}$ )	100	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=150\text{mA}$ , $I_B=15\text{mA}$ )	---	0.4	Vdc
	( $I_C=500\text{mA}$ , $I_B=50\text{mA}$ )	---	0.75	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=150\text{mA}$ , $I_B=15\text{mA}$ )	0.75	0.95	Vdc
	( $I_C=500\text{mA}$ , $I_B=15\text{mA}$ )	---	1.2	
$f_T$	Current Gain-Bandwidth Product ( $V_{CE}=10.0\text{Vdc}$ , $I_C=20\text{mA}$ , $f=100\text{MHz}$ )	250	---	MHz
$C_{ob}$	Output Capacitance ( $V_{CB}=5\text{Vdc}$ , $f=1.0\text{MHz}$ , $I_E=0$ )	---	6.5	pF
$t_d$	Delay Time	$V_{CC}=30\text{V}$ , $I_C=150\text{mA}$ ,		15 ns
$t_r$	Rise Time	$V_{BE}=2.00\text{V}$ , $I_{B1}=15.00\text{mA}$		20 ns
$t_s$	Storage Time	$V_{CC}=30\text{V}$ , $I_C=150\text{mA}$ ,		225 ns
$t_f$	Fall Time	$I_{B1}=-I_{B2}=15\text{mA}$		30 ns

### SOT-363

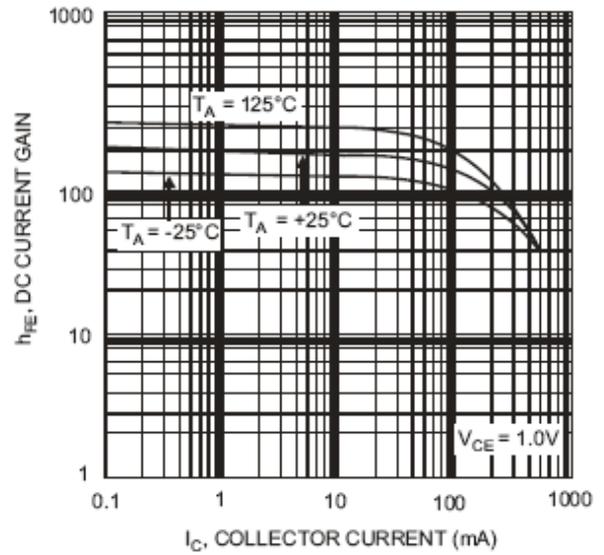


DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.006	.014	0.15	0.35	
B	.045	.053	1.15	1.35	
C	.085	.096	2.15	2.45	
D	.026		0.65Nominal		
G	.047	.055	1.20	1.40	
H	.071	.087	1.80	2.20	
J	---	.004	---	0.10	
K	.035	.043	0.90	1.10	
L	.010	.018	0.26	0.46	
M	.003	.006	0.08	0.15	





T<sub>A</sub>, AMBIENT TEMPERATURE (°C)  
Fig. 1 Max Power Dissipation vs Ambient Temperature



I<sub>C</sub>, COLLECTOR CURRENT (mA)  
Fig. 2 Typical DC Current Gain vs Collector Current

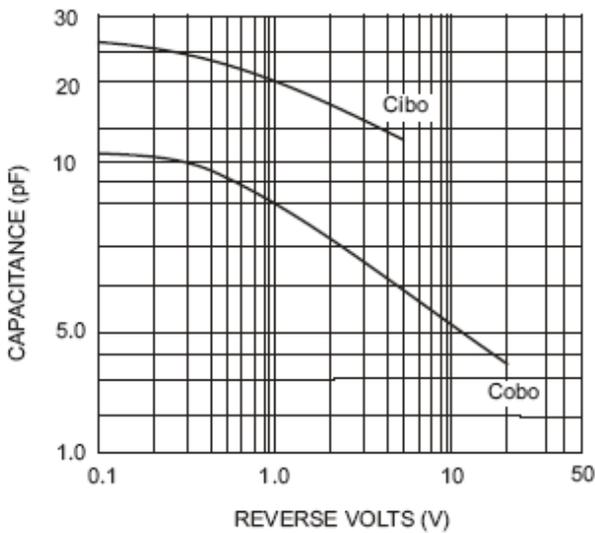
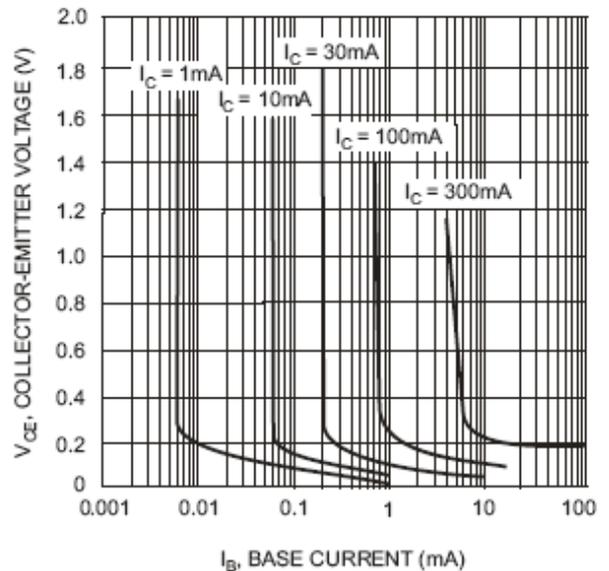


Fig. 3 Typical Capacitance



I<sub>B</sub>, BASE CURRENT (mA)  
Fig. 4 Typical Collector Saturation Region

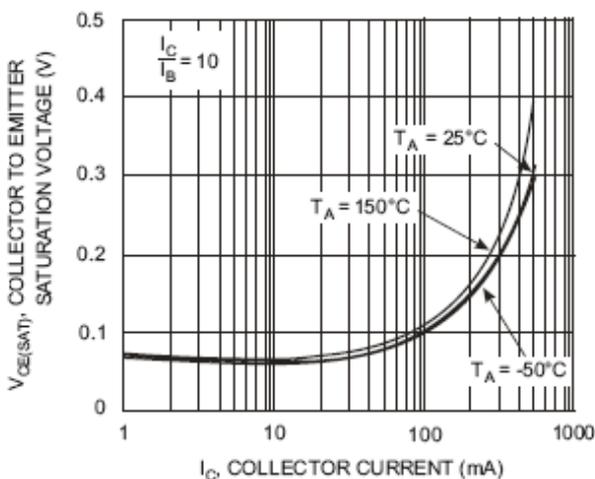


Fig. 5 Collector Emitter Saturation Voltage vs. Collector Current

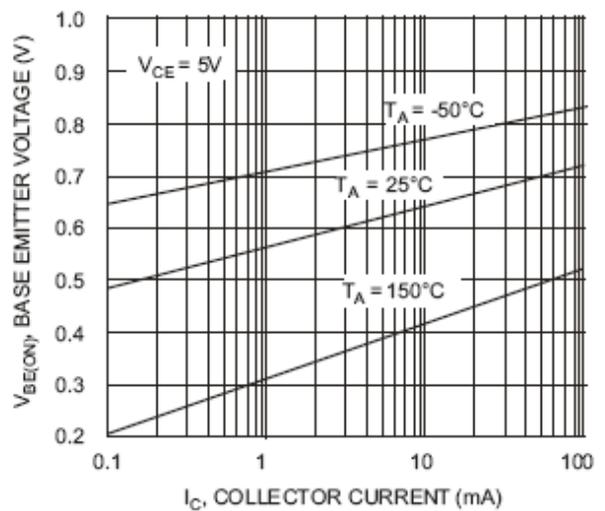


Fig. 6 Base Emitter Voltage vs. Collector Current



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### Ordering Information :

Device	Packing
Part Number-TP	Tape & Reel; 3 Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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