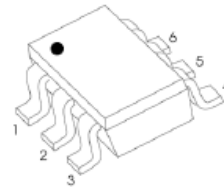




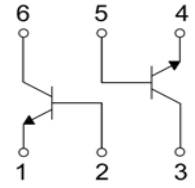
THE DATASHEET OF MMDT3904

Features

- Epoxy meets UL 94 V-0 flammability rating
- Lead free finish/RoHS compliant
- For switching and AF amplifier applications
- Rugged and reliable



SOT-363



Schematic Diagram

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current-Continuous	I_C	200	mA
Collector Power Dissipation	P_C	200	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Max	Unit
Collector-Base Breakdown Voltage	V_{CBO}	$I_C=10\mu\text{A}$, $I_E=0$	60	-	V
Collector-Emitter Breakdown Voltage	V_{CEO}	$I_C=1\text{mA}$, $I_B=0$	40	-	V
Emitter-Base Breakdown Voltage	V_{EBO}	$I_E=10\mu\text{A}$, $I_C=0$	5	-	V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=30\text{V}$, $I_E=0$	-	0.05	μA
Emitter Cut-Off Current	I_{EBO}	$V_{EB}=5\text{V}$, $I_C=0$	-	0.05	μA
Collector Cut-Off Current	I_{CEX}	$V_{CE}=30\text{V}$, $V_{BE(off)}=3\text{V}$	-	0.05	μA
DC Current Gain	$h_{FE(1)}$	$V_{CE}=1\text{V}$, $I_C=0.1\text{mA}$	40	-	-
	$h_{FE(2)}$	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$	70	-	-
	$h_{FE(3)}$	$V_{CE}=1\text{V}$, $I_C=10\text{mA}$	100	300	-
	$h_{FE(4)}$	$V_{CE}=1\text{V}$, $I_C=50\text{mA}$	60	-	-
	$h_{FE(5)}$	$V_{CE}=1\text{V}$, $I_C=100\text{mA}$	30	-	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$	-	0.2	V
	$V_{CE(sat)2}$	$I_C=50\text{mA}$, $I_B=5\text{mA}$	-	0.3	V
Base-Emitter Saturation Voltage	$V_{BE(sat)1}$	$I_C=10\text{mA}$, $I_B=1\text{mA}$	0.65	0.85	V
	$V_{BE(sat)2}$	$I_C=50\text{mA}$, $I_B=5\text{mA}$	-	0.95	V
Transition Frequency	f_T	$V_{CE}=20\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$	300	-	MHz
Collector Output Capacitance	C_{ob}	$V_{CB}=5\text{V}$, $I_E=0$, $f=1\text{MHz}$	-	4	pF
Noise Figure	N_F	$V_{CE}=5\text{V}$, $I_C=0.1\text{mA}$, $f=1\text{kHz}$, $R_S=1\text{K}\Omega$	-	5	dB
Delay Time	t_d	$V_{CC}=3\text{V}$, $V_{BE(off)}=-0.5\text{V}$, $I_C=10\text{mA}$, $I_{B1}=-I_{B2}=1\text{mA}$	-	35	nS
Rise Time	t_r		-	35	nS
Storage Time	t_s		-	200	nS
Fall Time	t_f	$V_{CC}=3\text{V}$, $I_C=10\text{mA}$, $I_{B1}=-I_{B2}=1\text{mA}$	-	50	nS

Typical Characteristic Curves

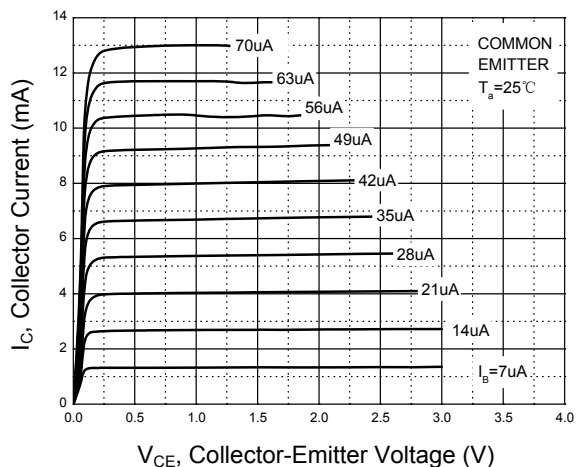


Figure 1. Static Characteristic

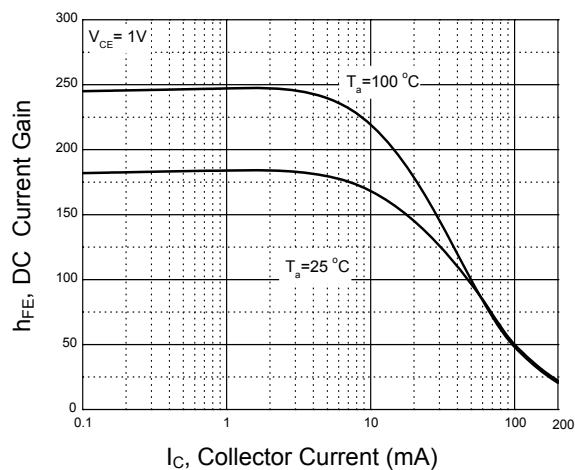


Figure 2. $h_{FE} - I_C$

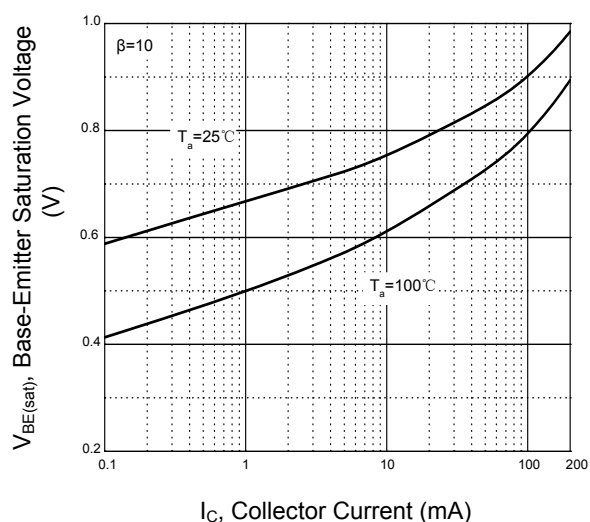


Figure 3. $V_{BE(sat)} - I_C$

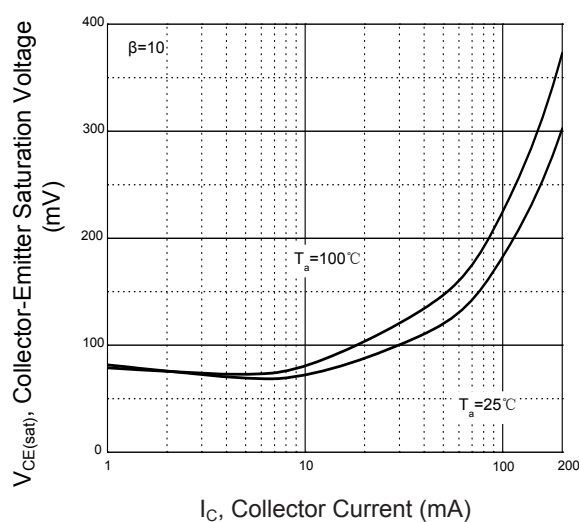


Figure 4. $V_{CE(sat)} - I_C$

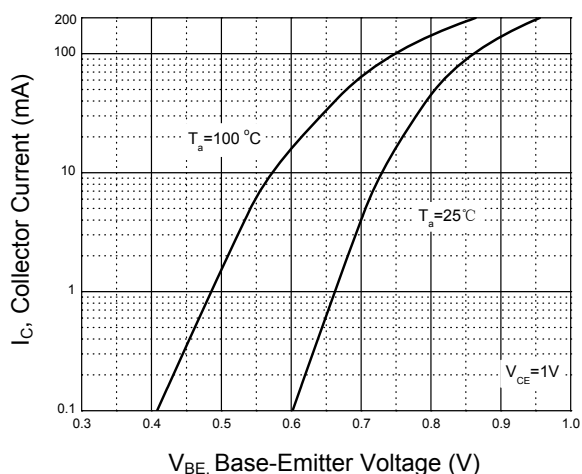


Figure 5. $I_C - V_{BE}$

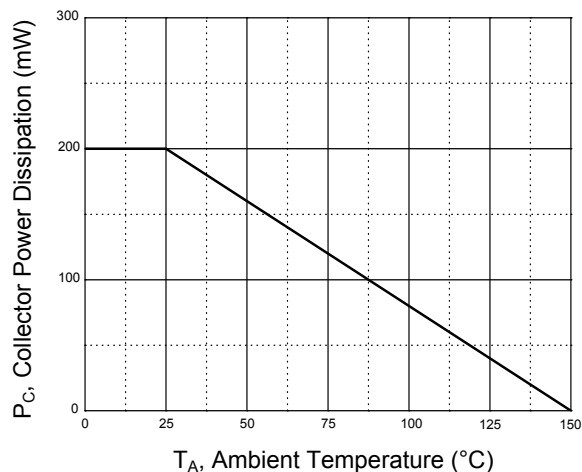
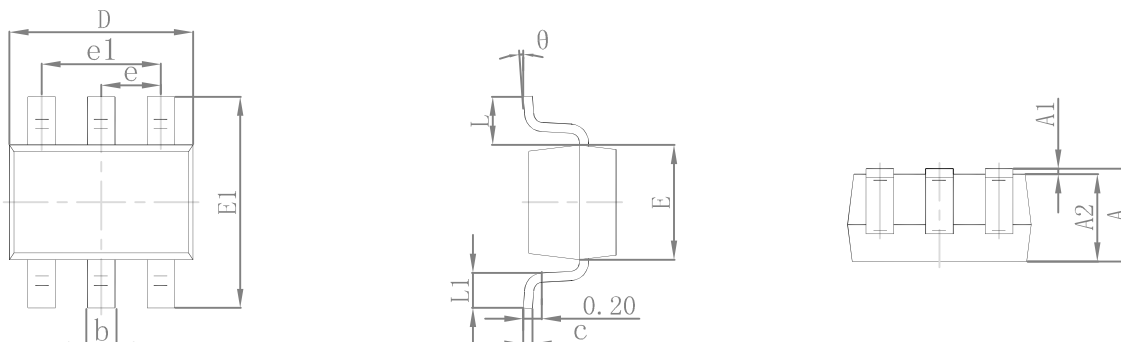


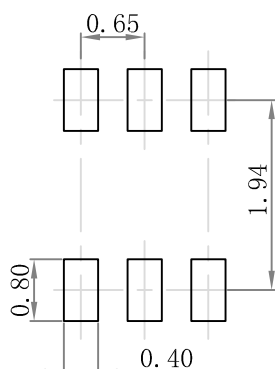
Figure 6. $P_C - T_A$

Package Outline Dimensions (SOT-363)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.100	0.150	0.004	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.400	0.085	0.094
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Recommended Pad Layout



Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

Ordering Information

Device	Package	Marking	Quantity	HSF Status
MMDT3904	SOT-363	K6N	3000pcs / Reel	RoHS Compliant

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