BORN SEMICONDUCTOR

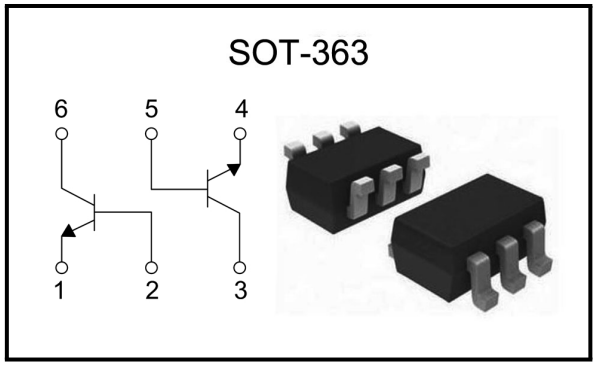
MMDT3904

NPN+NPN Plastic-Encapsulate Transistor

Features

- V_{CE}=40V
- I_C=0.2A
- f_T=300MHZ @V_{CE}=20V, I_C=10mA,f=100MHZ

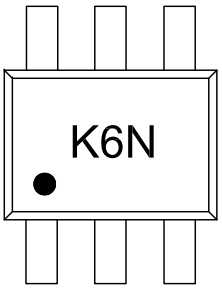
Package



General Description

- Ideal for low power amplification and switching
- Epitaxial planar die construction
- SOT-363 Plastic Package

Marking



Ordering information

Order code	Package	Marking	Base qty	Delivery mode
MMDT3904	SOT-363	K6N	3K	Tape and reel

Absolute Maximum Ratings @T_A=25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current	200	mA
P_C	Collector Power Dissipation	200	mW
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C

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Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=10μA, I_E=0	60	–	–	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=1mA,I_B=0	40	–	–	
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=10μA,I_C=0	5	–	–	
I_{CBO}	Collector cut-off current	V_{CB}=30V,I_E=0	–	–	0.05	uA
I_{EBO}	Emitter cut-off current	V_{EB}=5V,I_C=0	–	–	0.05	
I_{CEX}	Collector cut-off current	V_{CE}=30V,$V_{EB(off)}$=3V	–	–	0.05	
$h_{FE(1)}$	DC current gain	V_{CE}=1V,I_C=0.1mA	40	–	–	–
$h_{FE(2)}$		V_{CE}=1V,I_C=1mA	70	–	–	–
$h_{FE(3)}$		V_{CE}=1V,I_C=10mA	100	–	300	–
$h_{FE(4)}$		V_{CE}=1V,I_C=50mA	60	–	–	–
$h_{FE(5)}$		V_{CE}=1V,I_C=100mA	30	–	–	–
$V_{CE(sat)}$ [1]	Collector-emitter saturation voltage	I_C=10mA,I_B=1mA	–	–	0.2	V
$V_{CE(sat)}$ [2]		I_C=50mA,I_B=5mA	–	–	0.3	
$V_{BE(sat)}$ [1]	Base-emitter saturation voltage	I_C=10mA,I_B=1mA	0.65	–	0.85	V
$V_{BE(sat)}$ [2]		I_C=50mA,I_B=5mA	–	–	0.95	
f_T	Transition frequency	V_{CE}=20V,I_C=10mA,f=100MHz	300	–	–	MHz
C_{ob}	Collector output capacitance	V_{CB}=5V,I_E=0,f=1MHz	–	–	4	pF
N_F	Noise figure	V_{CE}=5V,I_C=0.1mA, f=1kHz,R_s=1KΩ	–	–	5	dB
t_d	Delay time	V_{CC}=3V, $V_{BE(off)}$=-0.5V, I_C=10mA,I_{B1}=-I_{B2}=1mA	–	–	35	nS
t_r	Rise time		–	–	35	
t_s	Storage time	V_{CC}=3V, I_C=10mA, I_{B1}=-I_{B2}=1mA	–	–	200	
t_f	Fall time		–	–	50	

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Typical Performance Characteristics(T_J = 25 °C, unless otherwise noted)

Figure 1 :Static Characteristics

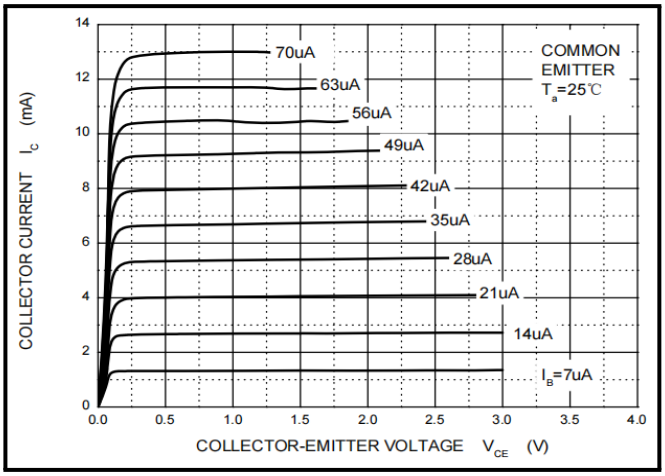


Figure 2 :h_{FE}—— I_C

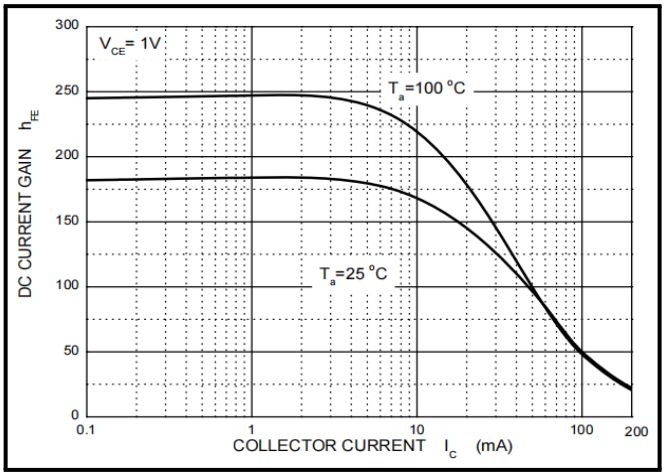


Figure 3 : $V_{BE(sat)}$—— I_C

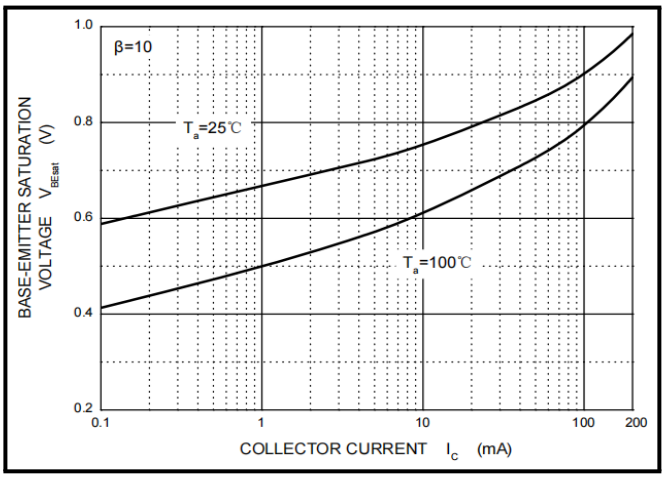


Figure 4 : $V_{CE(sat)}$—— I_C

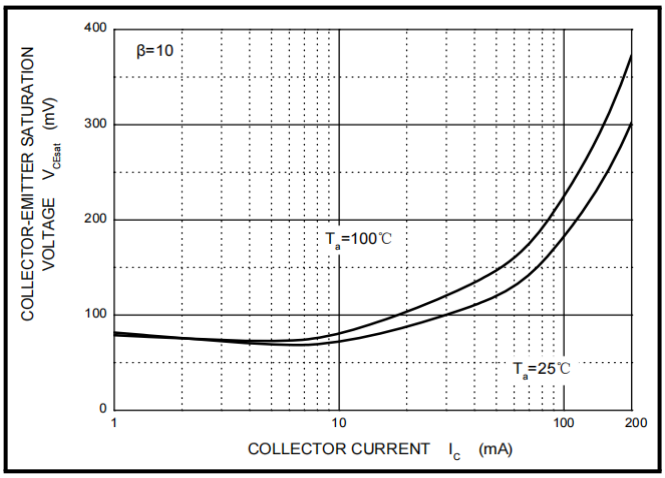


Figure 5 :I_C——V_{BE}

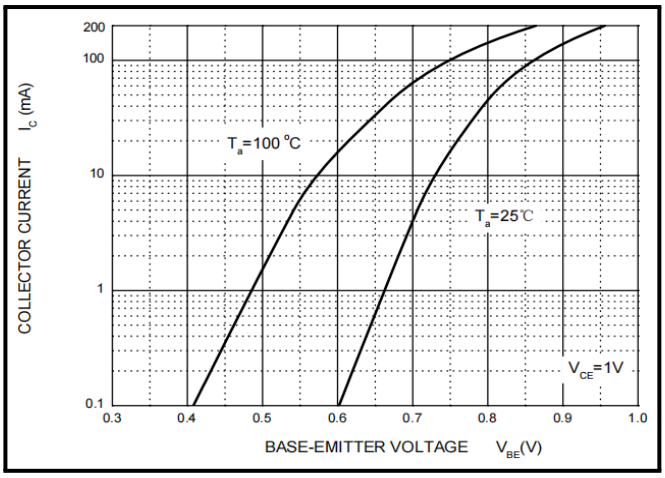
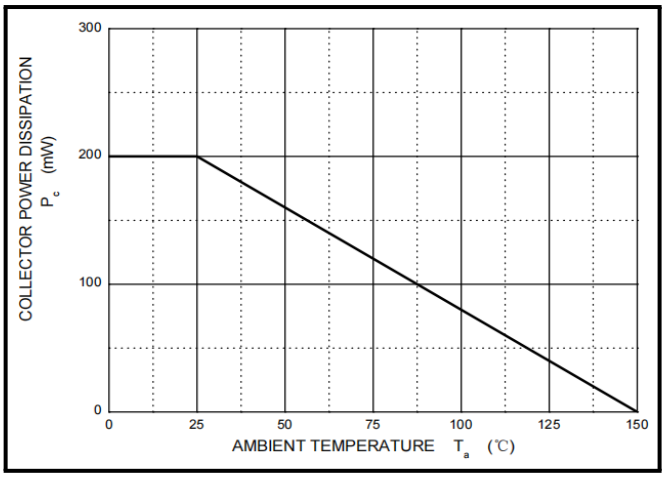


Figure 6 :P_C—— T_A

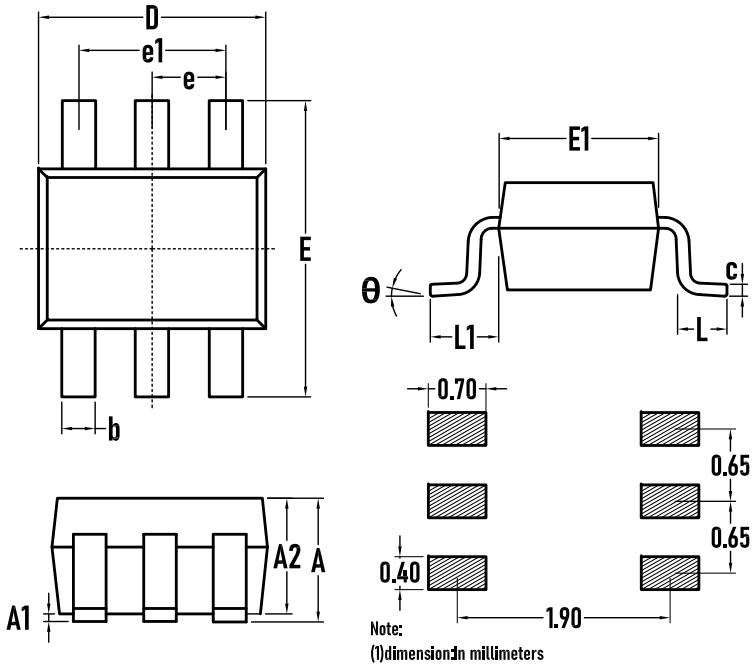


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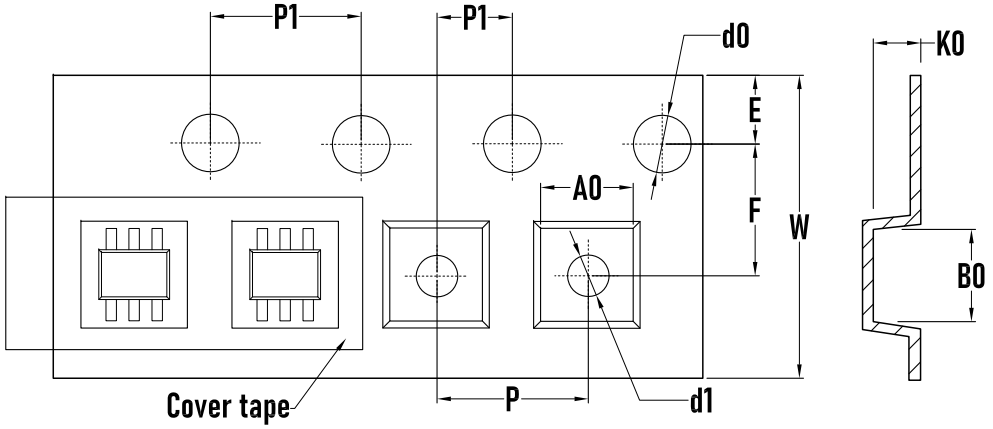
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Outline Drawing - SOT-363



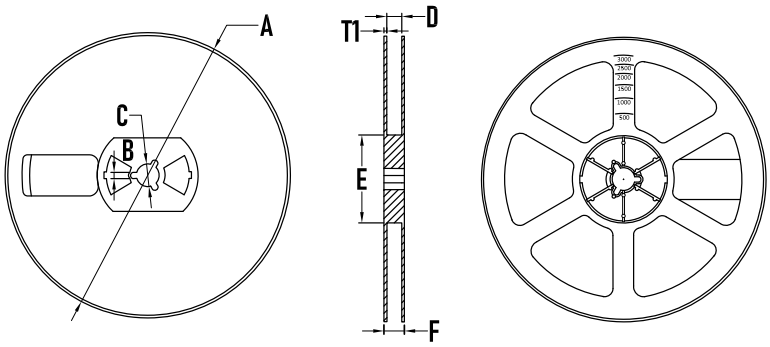
SYMBOL	MILLIMETER		
	MIN	TYP	MAX
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.15	0.25	0.35
C	0.08	0.12	0.15
D	2.00	2.10	2.20
E	2.15	2.30	2.45
E1	1.15	1.25	1.35
e	0.65(TYP)		
e1	1.20	1.30	1.40
L	0.26	0.36	0.46
L1	0.525(REF)		
θ	0°	4°	8°

Packaging Tape - SOT-363



SYMBOL	MILLIMETER
A0	2.25±0.1
B0	2.55±0.1
E	1.75±0.1
F	3.50±0.1
K0	1.20±0.1
P	4.00±0.1
P0	4.00±0.1
P1	2.00±0.1
W	8.00±0.2

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	2.7±0.2
C	13.5±0.2
D	9.6±0.3
E	54.5±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS

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