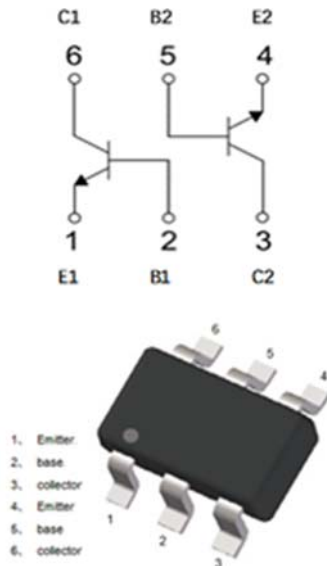


Dual NPN Small Signal Transistor



Features

- Moisture sensitivity level 1
- Halogen free and RoHS compliant
- Surface mount package ideally suited for automatic insertion

Application

- Signal amplification
- Switching circuit

Mechanical data

- **Package:** SOT-363S
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102C

■ Maximum Ratings ($T_a=25^\circ\text{C}$ Unless otherwise specified)

Item	Symbol	Unit	Conditions	Value
Device marking code				K1P
Collector-base voltage	V_{CBO}	V	$I_C = 10\mu\text{A}, I_E = 0$	75
Collector-emitter voltage	V_{CEO}	V	$I_C = 10\text{mA}, I_B = 0$	40
Emitter-base voltage	V_{EBO}	V	$I_E = 10\mu\text{A}, I_C = 0$	6
Collector current	I_C	mA		600
Power dissipation	P_D	mW		200
Operation junction temperature	T_J	$^\circ\text{C}$		-55 to +150
Storage temperature	T_{STG}	$^\circ\text{C}$		-55 to +150



MMDT2222AS

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■ Electrical Characteristics (T_a=25°C Unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	V _{(BR)CBO}	V	I _C =10μA, I _E =0	75		
Collector-emitter breakdown voltage	V _{(BR)CEO}	V	I _C =10mA, I _B =0	40		
Emitter-base breakdown voltage	V _{(BR)EBO}	V	I _E =10μA, I _C =0	6		
Collector cutoff current	I _{CBO}	nA	V _{CB} =60V, I _E =0			10
Collector cutoff current	I _{CEX}	nA	V _{CE} =60V, V _{EB(OFF)} =3V			10
Emitter cut-off current	I _{EBO}	nA	V _{EB} =3V, I _C =0			10
Base cutoff current	I _{CBL}	nA	V _{CE} =60V, V _{EB(OFF)} =3V			20
DC current gain	h _{FE1}		V _{CE} =10V, I _C =0.1mA	35		
	h _{FE2}		V _{CE} =10V, I _C =1mA	50		
	h _{FE3}		V _{CE} =10V, I _C =10mA	75		
	h _{FE4}		V _{CE} =10V, I _C =150mA	100		300
	h _{FE5}		V _{CE} =1V, I _C =150mA	35		
	h _{FE6}		V _{CE} =10V, I _C =500mA	40		
Collector-emitter saturation voltage	V _{CE(sat)1}	V	I _C =150mA, I _B =15mA			0.3
	V _{CE(sat)2}	V	I _C =500mA, I _B =50mA			1
Base-emitter saturation voltage	V _{BE(sat)1}	V	I _C =150mA, I _B =15mA			1.2
	V _{BE(sat)2}	V	I _C =500mA, I _B =50mA			2
Transition frequency	f _T	MHZ	V _{CE} =20V, I _C =20mA, f=100MHz	300		
Delay time	t _d	ns	V _{CC} =30V, I _C =150mA, V _{BE} =0.5V, I _{B1} =15mA			10
Rise time	t _r	ns				25
Storage time	t _s	ns	V _{CC} =30V, I _C =150mA, I _{B1} =-I _{B2} =5mA			225
Fall time	t _f	ns				60



■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient	$R_{\theta J-A}^{(1)}$	°C/W	625
Thermal resistance, junction-to-case	$R_{\theta J-C}^{(1)}$	°C/W	500

Note:

(1) Device mounted on PCB, single-sided copper, with standard footprint



■ Characteristics

Fig 1: Static Characteristics

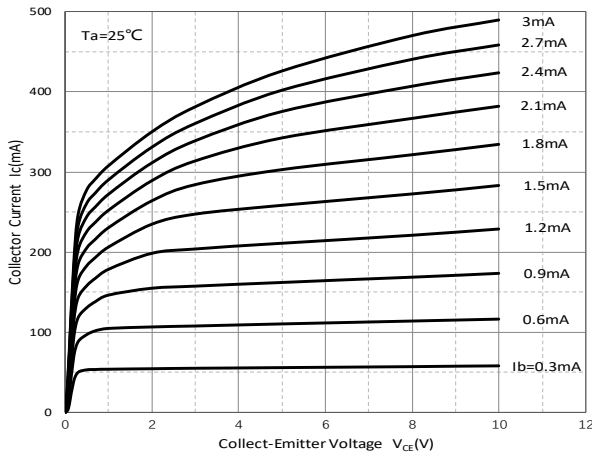


Fig 2: DC Current Gain

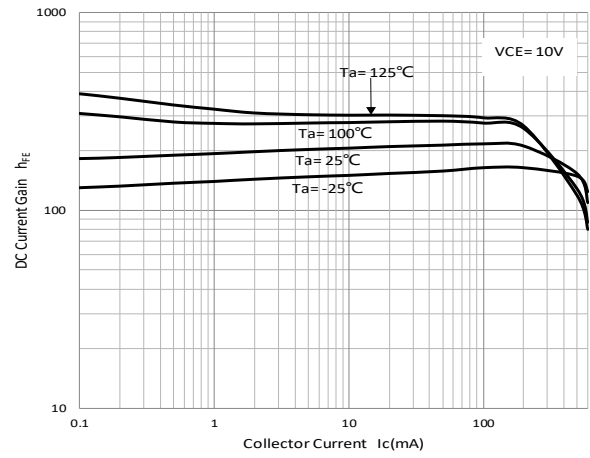


Fig 3: Collector-Emitter Saturation Voltage

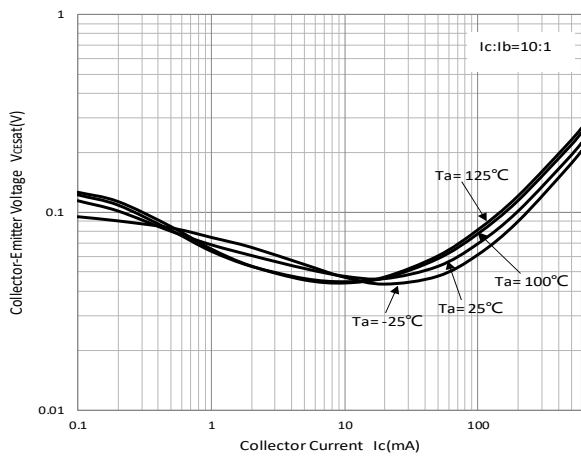


Fig 4: Base-Emitter Saturation Voltage

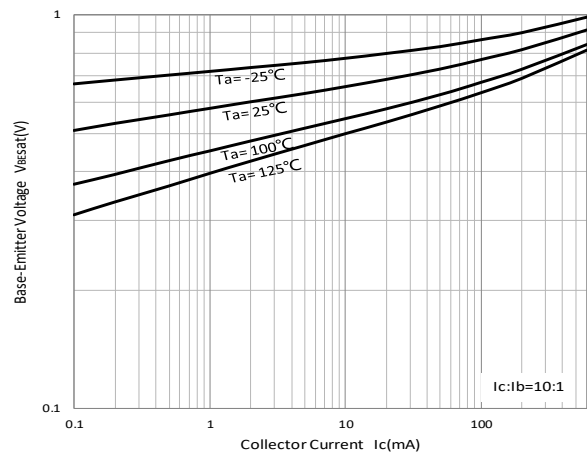


Fig 5: Base-Emitter On Voltage

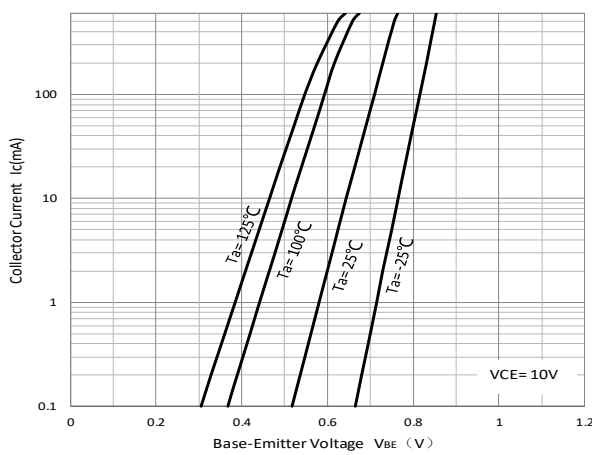


Fig 6: Cob/Cib-V_{CB}/V_{EB}

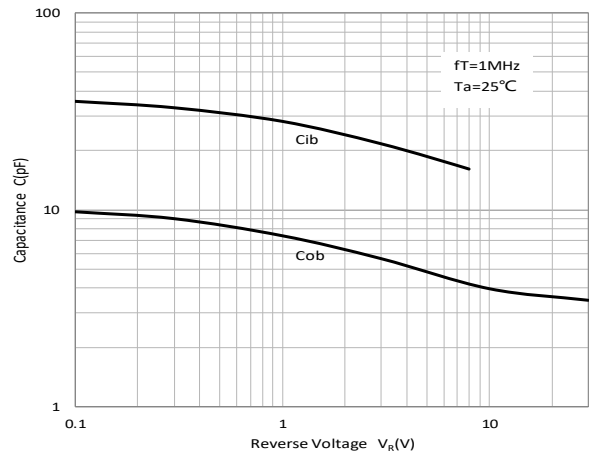
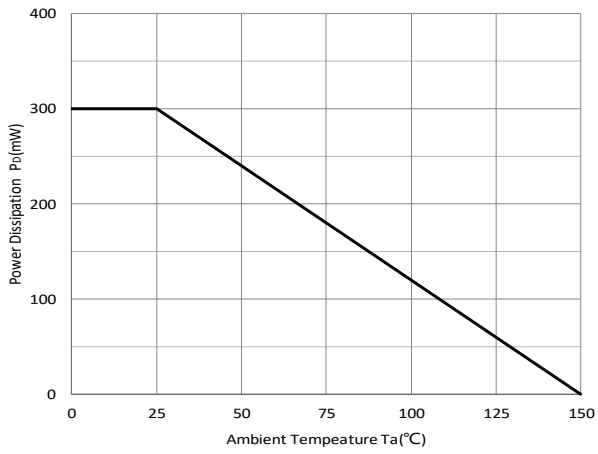




Fig 7: P_D-T_a Curve





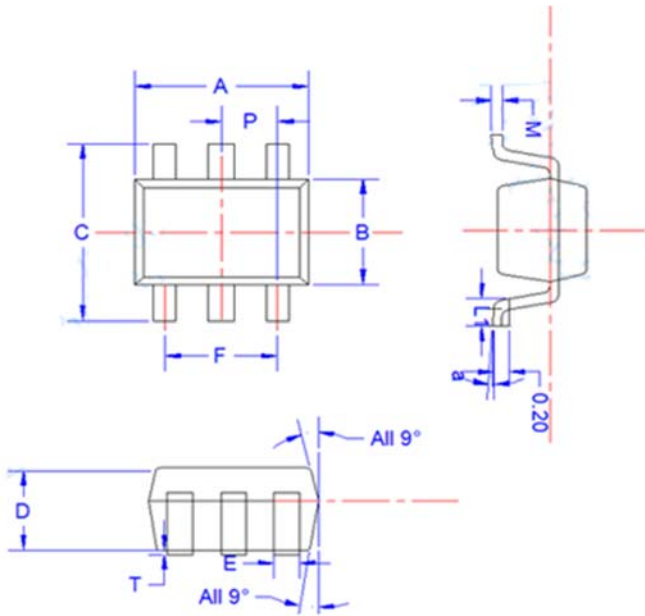
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Ordering Information

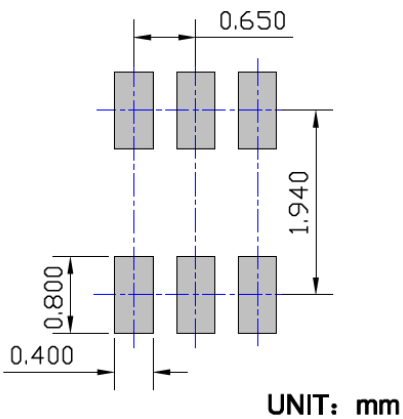
Preferred P/N	Packing Code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
MMDT2222AS	F2	Approximate 0.009	3000	30000	120000	7" reel
MMDT2222AS	F3	Approximate 0.009	10000	/	210000	7" reel

Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
E	0.15	0.25	0.35
B	1.15	1.25	1.35
C	2.00	2.10	2.20
P	0.650BSC		
A	1.80	2.00	2.20
T	0.00	0.05	0.100
D	0.90	0.95	1.00
L1	0.20	0.30	0.40
a	4°±4°		
M	0.10	0.15	0.25

Suggested Pad Layout





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