

MMDT2227-HF (NPN+PNP)

RoHS Device
Halogen Free



Features

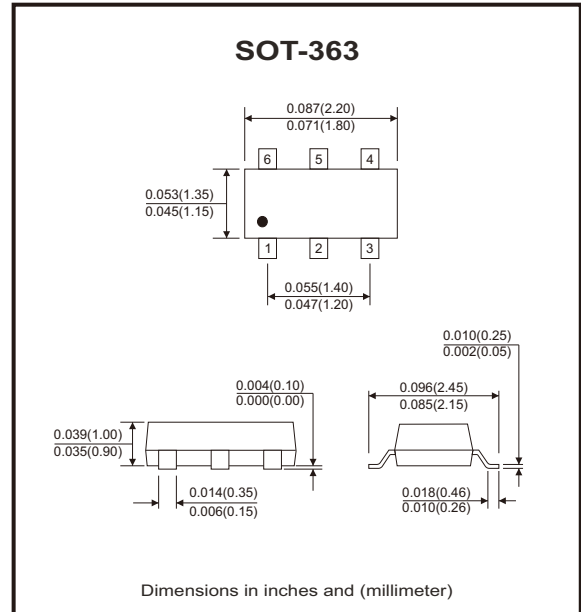
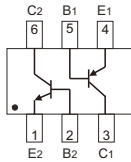
- Epoxy meets UL-94 V-0 flammability rating.
- Surface mount package ideally suited for automatic insertion.

Mechanical data

- Case: SOT-363, molded plastic.
- Terminals: Tin plated leads, solderable per J-STD-002 and JESD22-B102.
- Mounting position: Any.

Circuit Diagram

B :Base
E :Emitter
C :Collector



Maximum Ratings (Ta=25°C unless otherwise noted)

Parameter	Conditions	Symbol	PNP	NPN	Unit
Collector-base voltage	NPN @I _c = 10μA, I _E = 0 PNP @I _c = -10μA, I _E = 0	V _{CBO}	-60	75	V
Collector-emitter voltage	NPN @I _c = 10mA, I _B = 0 PNP @I _c = -10mA, I _B = 0	V _{CEO}	-60	40	V
Emitter-base voltage	NPN @I _E = 10μA, I _C = 0 PNP @I _E = -10μA, I _C = 0	V _{EBO}	-5	6	V
Collector current-continuous		I _C	-600	600	mA
Collector power dissipation		P _C	200		mW
Junction temperature		T _J	150		°C
Storage temperature range		T _{STG}	-55 to +150		°C

Electrical Characteristics of TR1 PNP Pin3, 4, 5 (Ta= 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	V_{CBO}	$I_C = -10\mu A, I_E = 0$	-60			V
Collector-emitter breakdown voltage	V_{CEO}	$I_C = -10mA, I_B = 0$	-60			V
Emitter-base breakdown voltage	V_{EBO}	$I_E = -10\mu A, I_C = 0$	-5			V
Collector cut-off current	I_{CBO}	$V_{CB} = -50V, I_E = 0$			-10	nA
Collector cut-off current	I_{CEX}	$V_{CE} = -30V, V_{EB(off)} = -0.5V$			-50	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = -5V, I_C = 0$			-10	nA
DC current gain	h_{FE}	$V_{CE} = -10V, I_C = -0.1mA$	75			
		$V_{CE} = -10V, I_C = -1mA$	100			
		$V_{CE} = -10V, I_C = -10mA$	100			
		$V_{CE} = -10V, I_C = -150mA$	100		300	
		$V_{CE} = -10V, I_C = -500mA$	50			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -150mA, I_B = -15mA$ $I_C = -500mA, I_B = -50mA$			-0.4 -1.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -150mA, I_B = -15mA$ $I_C = -500mA, I_B = -50mA$			-1.3 -2.6	V
Transition frequency	f_T	$V_{CE} = -20V, I_C = -50mA, f = 100MHz$	200			MHz
Delay time	t_d	$V_{CC} = -30V, I_C = -150mA$ $I_{B1} = -15mA$			10	ns
Rise time	t_r				40	
Storage time	t_s	$V_{CC} = -6V, I_C = -150mA$ $I_{B1} = -I_{B2} = -15mA$			225	ns
Fall time	t_f				60	

Electrical Characteristics of TR2 NPN Pin1, 2, 6 (Ta= 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	V_{CBO}	$I_C = 10\mu A, I_E = 0$	75			V
Collector-emitter breakdown voltage	V_{CEO}	$I_C = 10mA, I_B = 0$	40			V
Emitter-base breakdown voltage	V_{EBO}	$I_E = 10\mu A, I_C = 0$	6			V
Collector cut-off current	I_{CBO}	$V_{CB} = 60V, I_E = 0$			10	nA
Collector cut-off current	I_{CEX}	$V_{CE} = 60V, V_{EB(off)} = 3V$			10	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 3V, I_C = 0$			10	nA
Base cut-off current	I_{BL}	$V_{CE} = 60V, V_{EB(off)} = 3V$			20	nA
DC current gain	h_{FE}	$V_{CE} = 10V, I_C = 0.1mA$	35			
		$V_{CE} = 10V, I_C = 1mA$	50			
		$V_{CE} = 10V, I_C = 10mA$	75			
		$V_{CE} = 10V, I_C = 150mA$	100		300	
		$V_{CE} = 1V, I_C = 150mA$	35			
		$V_{CE} = 10V, I_C = 500mA$	40			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 150mA, I_B = 15mA$ $I_C = 500mA, I_B = 50mA$			0.3 1	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 150mA, I_B = 15mA$ $I_C = 500mA, I_B = 50mA$			1.2 2	V
Transition frequency	f_T	$V_{CE} = 20V, I_C = 20mA, f = 100MHz$	300			MHz
Delay time	t_d	$V_{CC} = 30V, I_C = 150mA$ $I_{B1} = 15mA, V_{EB(off)} = -0.5V$			10	ns
Rise time	t_r				25	
Storage time	t_s				225	
Fall time	t_f	$V_{CC} = 30V, I_C = 150mA$ $I_{B1} = -I_{B2} = 5mA$			60	ns

TR1 (PNP) Typical Rating and Characteristic Curves (MMDT2227-HF)

Fig.1 - Static Characteristic

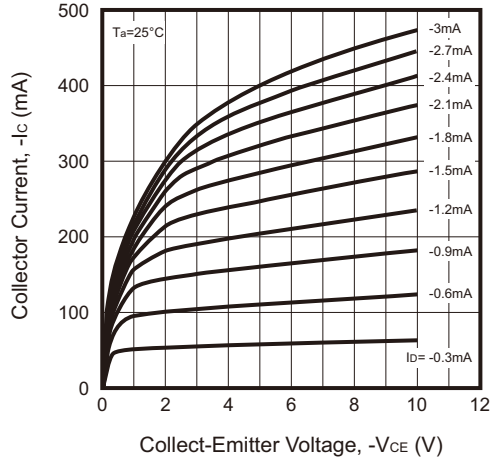


Fig.2 - DC Current Gain

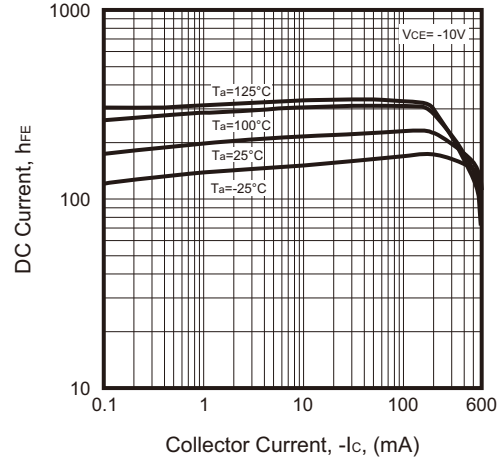


Fig.3 - Collector-Emmitter Saturation Voltage

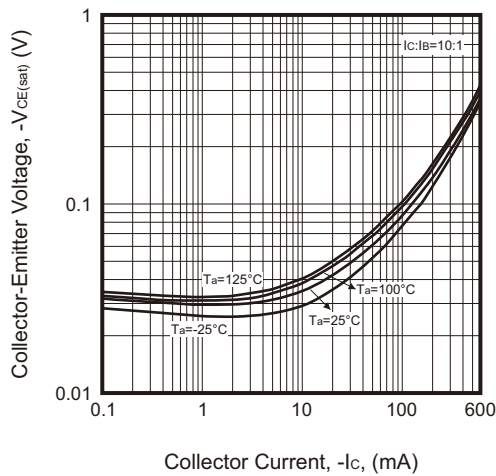


Fig.4 - Base-Emmitter Saturation Voltage

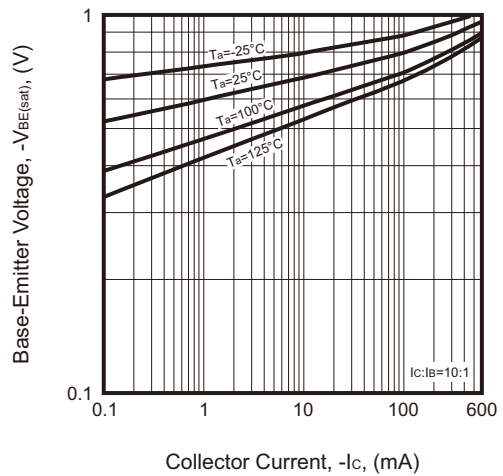


Fig.5 - Base-Emmitter on Voltage

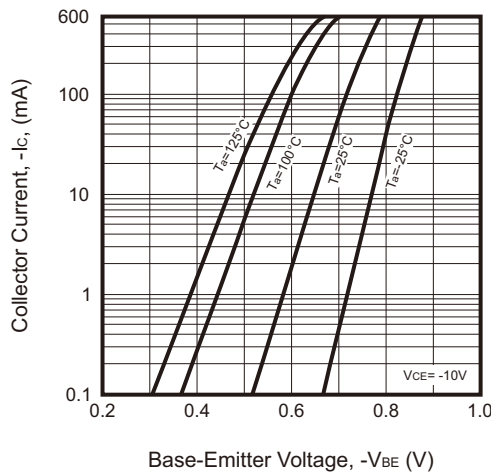
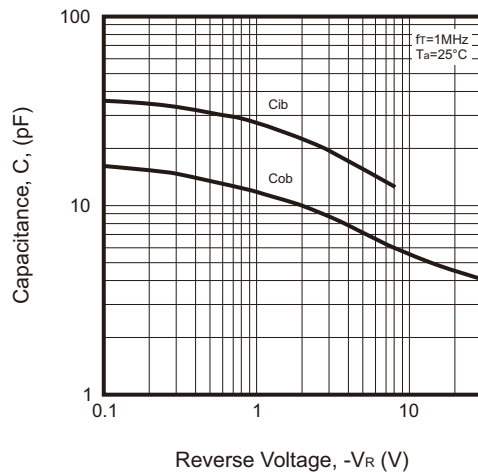


Fig.6 - Cob/Cib — V_{CB}/V_{EB}



TR2 (NPN) Typical Rating and Characteristic Curves (MMDT2227-HF)

Fig.7 - Static Characteristic

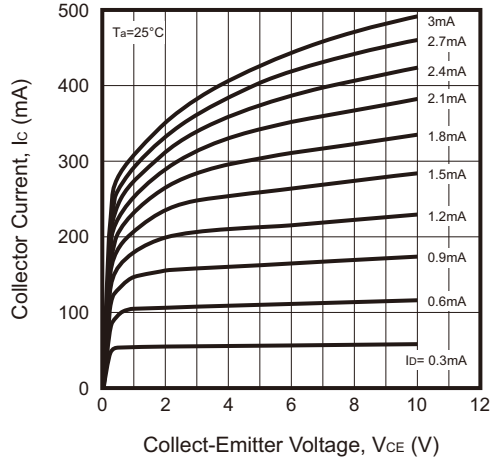


Fig.8 - DC Current Gain

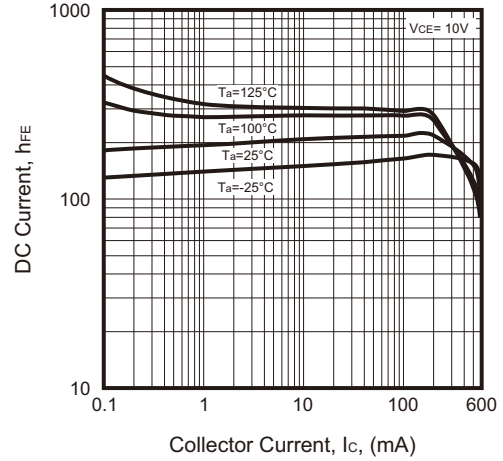


Fig.9 - Collector-Emmitter Saturation Voltage

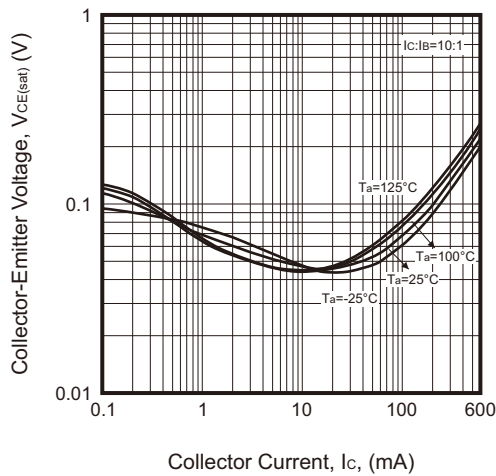


Fig.10 - Base-Emmitter Saturation Voltage

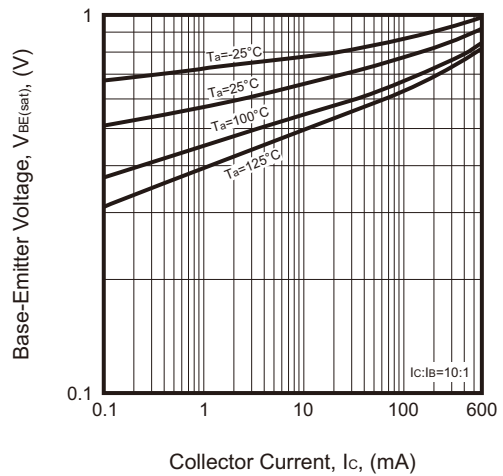


Fig.11 - Base-Emmitter on Voltage

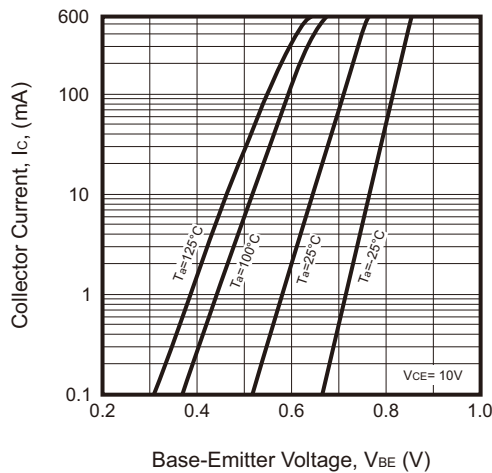
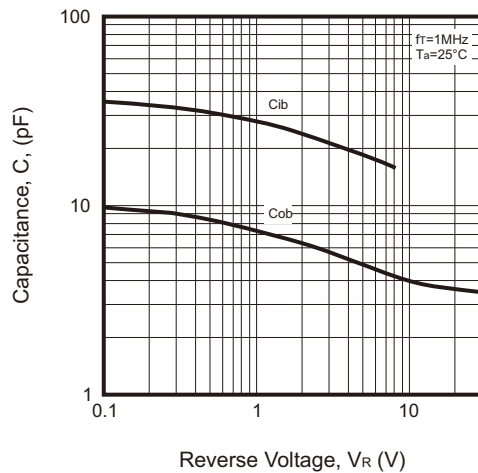
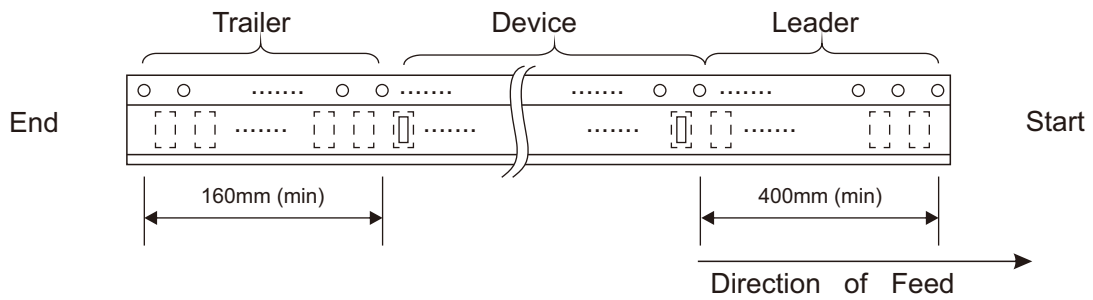
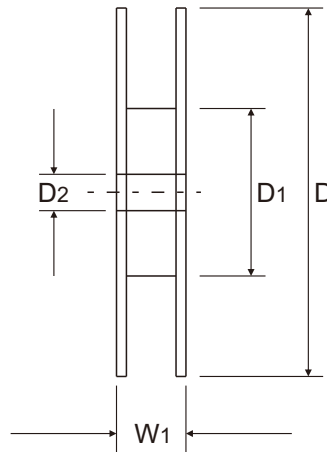
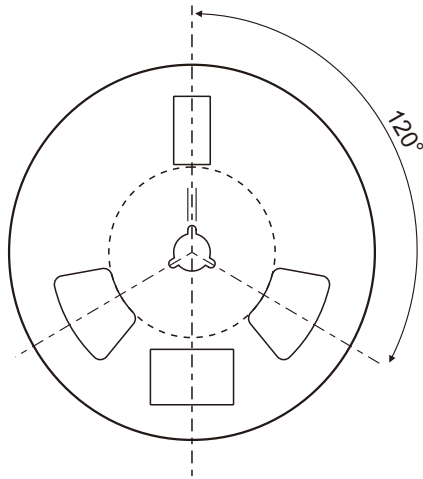
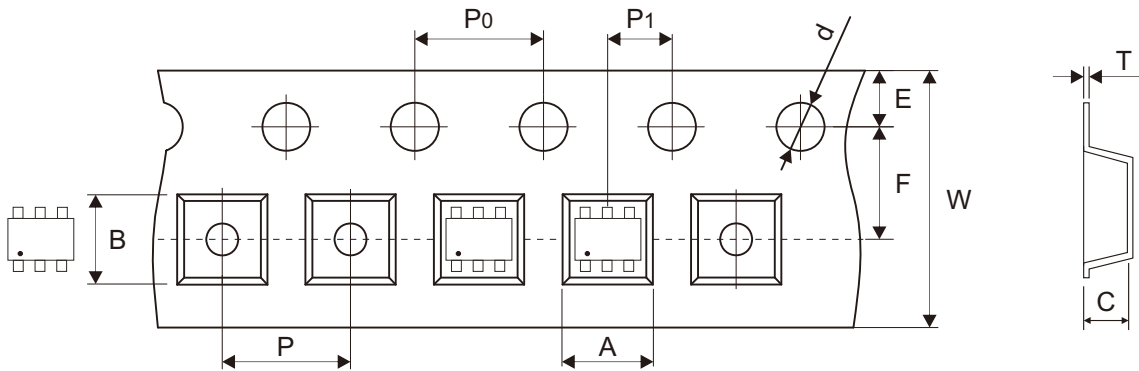


Fig.12 - Cob/Cib — VCB/VEB



Reel Taping Specification

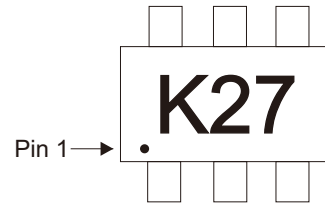


SOT-363	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	2.30 ± 0.10	2.55 ± 0.10	1.15 ± 0.10	1.55 ± 0.05	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.091 ± 0.004	0.100 ± 0.004	0.045 ± 0.004	0.061 ± 0.002	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-363	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.03	8.00 + 0.20 - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.008 ± 0.001	0.315 + 0.008 - 0.004	0.484 ± 0.039

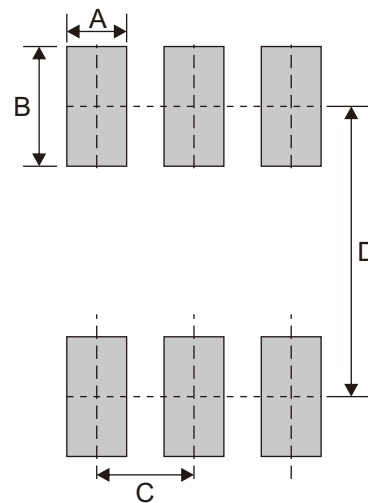
Marking Code

Part Number	Marking Code
MMDT2227-HF	K27



Suggested P.C.B. PAD Layout

SIZE	SOT-363	
	(mm)	(inch)
A	0.40	0.016
B	0.80	0.031
C	0.65	0.026
D	1.94	0.076



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-363	3,000	7