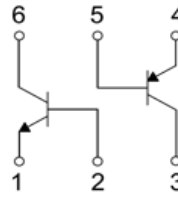


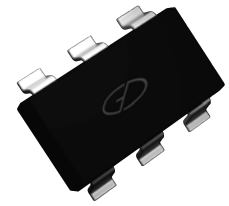
MMDT2227 Complementary NPN+PNP Transistor

Features

- Complementary pairs
- One 2222A-type NPN
- One 2907A-type PNP
- Epitaxial planar die construction
- Ideal for power amplification and switching



Schematic Diagram



SOT-363

NPN Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
Collect-Base Voltage	V_{CB0}	75	V
Collector-Emitter Voltage	V_{CE0}	40	V
Emitter-Base Voltage	V_{EB0}	6	V
Collector Current-Continuous	I_C	600	mA
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$

PNP Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
Collect-Base Voltage	V_{CB0}	-60	V
Collector-Emitter Voltage	V_{CE0}	-60	V
Emitter-Base Voltage	V_{EB0}	-5	V
Collector Current-Continuous	I_C	-600	mA
Collector Power Dissipation	P_C	200	mW
Junction Temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$

MMDT2227

Complementary NPN+PNP Transistor

NPN Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Max	Unit
Collector-base Breakdown Voltage	V _{(BR)CBO}	I _C =10μA, I _E =0	75	--	V
Collector-emitter Breakdown Voltage	V _{(BR)CEO}	I _C =10mA, I _B =0	40	--	V
Emitter-base Breakdown Voltage	V _{(BR)EBO}	I _E =10μA, 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 _{CB} =60V, I _{EB(off)} =3V	--	10	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} =3V, I _C =0	--	10	nA
DC Current Gain	h _{FE(1)*}	V _{CE} =10V, I _C =0.1mA	35	--	
	h _{FE(2)*}	V _{CE} =10V, I _C =1mA	50	--	
	h _{FE(3)*}	V _{CE} =10V, I _C =10mA	75	--	
	h _{FE(4)*}	V _{CE} =10V, I _C =150mA	100	300	
	h _{FE(5)*}	V _{CE} =10V, I _C =500mA	40	--	
	h _{FE(6)*}	V _{CE} =1V, I _C =150mA	35	--	
Collector-emitter Saturation Voltage	V _{CE(sat)1*}	I _C =150mA, I _B =15mA	--	0.3	V
	V _{CE(sat)2*}	I _C =500mA, I _B =50mA	--	1	V
Base-emitter Saturation Voltage	V _{BE(sat)1*}	I _C =150mA, I _B =15mA	0.6	1.2	V
	V _{BE(sat)2*}	I _C =500mA, I _B =50mA	--	2	V
Transition Frequency	f _T	V _{CE} =20V, I _C =20mA, f=100MHz	300	--	MHz
Output Capacity	C _{ob}	V _{CB} =10V, I _E =0, f=1MHz	--	8	pF
Input Capacity	C _{ib}	V _{EB} =0.5V, I _C =0, f=1MHz	--	25	pF
Noise Figure	NF	V _{CE} =10V, I _C =100μA, f=1KHz, R _S =1kΩ	--	4	dB

*pulse test

NPN Switching Characteristics

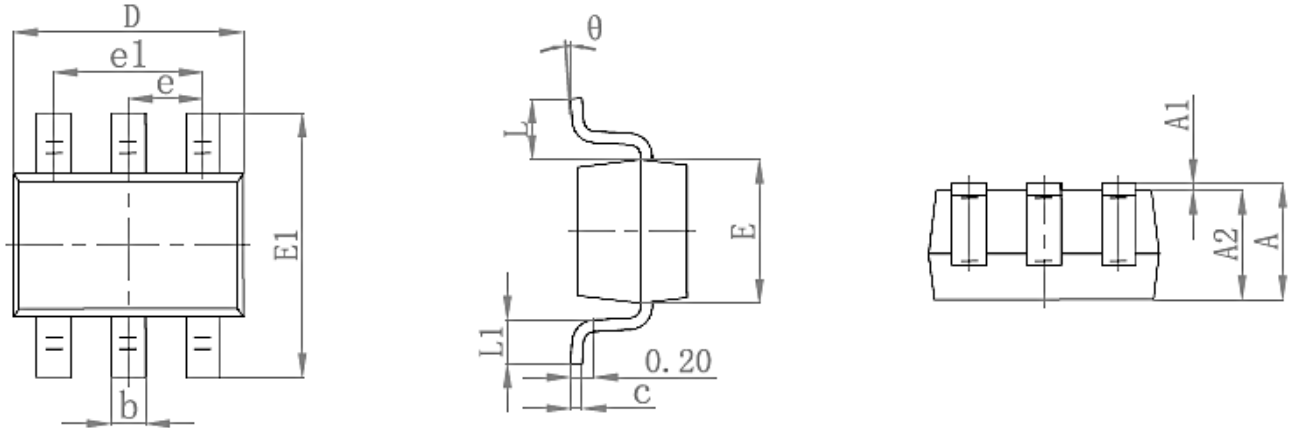
Parameter	Symbol	Test Condition	Min	Max	Unit
Delay Time	t _d	V _{CC} =30V, I _C =150mA, V _{BE(off)} =0.5V, I _{B1} =15mA	--	10	nS
Rise Time	t _r		--	25	nS
Storage Time	t _s		--	225	nS
Fall Time	t _f		--	60	nS

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

Parameter	Symbol	Test Conditions	Min	Max	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -10\mu\text{A}, I_E = 0$	-60	--	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -10\text{mA}, I_B = 0$	-60	--	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = -10\mu\text{A}, I_C = 0$	-5	--	V
Collector Cut-off Current	I_{CBO}	$V_{CB} = -50\text{V}, I_E = 0$	--	-10	nA
Collector Cut-off Current	I_{CEX}	$V_{CE} = -30\text{V}, V_{EB(off)} = -0.5\text{V}$	--	-50	nA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = -5\text{V}, I_C = 0$	--	-10	nA
DC Current Gain	$h_{FE(1)*}$	$V_{CE} = -10\text{V}, I_C = -0.1\text{mA}$	75	--	
	$h_{FE(2)*}$	$V_{CE} = -10\text{V}, I_C = -1\text{mA}$	100	--	
	$h_{FE(3)*}$	$V_{CE} = -10\text{V}, I_C = -10\text{mA}$	100	--	
	$h_{FE(4)*}$	$V_{CE} = -10\text{V}, I_C = -150\text{mA}$	100	300	
	$h_{FE(5)*}$	$V_{CE} = -10\text{V}, I_C = -500\text{mA}$	50	--	
Collector-Emitter Saturation Voltage	$V_{CE(sat)1*}$	$I_C = -150\text{mA}, I_B = -15\text{mA}$	--	-0.4	V
	$V_{CE(sat)2*}$	$I_C = -500\text{mA}, I_B = -50\text{mA}$	--	-1.6	V
Base-Emitter Saturation Voltage	$V_{BE(sat)1*}$	$I_C = -150\text{mA}, I_B = -15\text{mA}$	--	-1.3	V
	$V_{BE(sat)2*}$	$I_C = -500\text{mA}, I_B = -50\text{mA}$	--	-2.6	V
Transition Frequency	f_T	$V_{CE} = -20\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$	200	--	MHz
Output Capacitance	C_{ob}	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$	--	8	pF
Input Capacitance	C_{ib}	$V_{EB} = -2\text{V}, I_C = 0, f = 1\text{MHz}$	--	30	pF
Delay Time	t_d	$V_{CC} = -30\text{V}, I_C = -150\text{mA}, I_{B1} = -15\text{mA}$	--	10	nS
Rise Time	t_r		--	40	nS
Storage Time	t_s		--	225	nS
Fall Time	t_f		--	60	nS

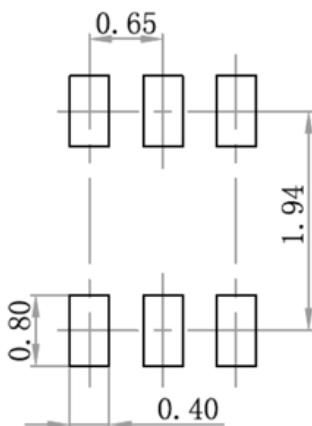
*pulse test

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
theta	0°	8°	0°	8°

Suggested Pad Layout



Note:

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

Marking and Ordering Information

Device	Package	Marking	Quantity	HSF Status
MMDT2227	SOT-363	K27	3000pcs / Reel	RoHS Compliant