MMDT2227A

COMPLEMENTARY NPN / PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

VOLTAGE 60 Volt **POWER** 225 mW

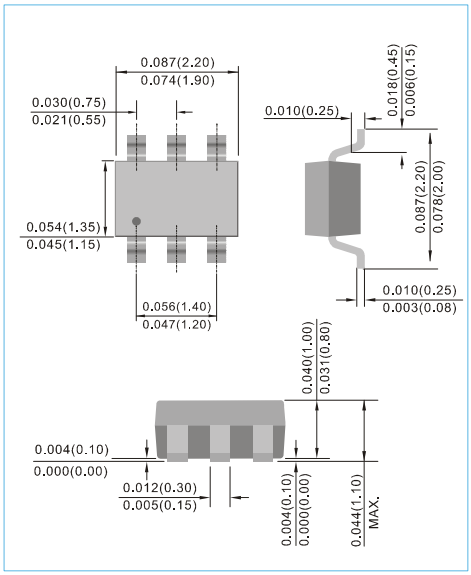
FEATURES

- Complementary Pair
- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- One MMDT2222A-Type NPN
  One MMDT2907A-Type PNP
- Ideal for Low Power Amplification and Switching
- Also Available in Lead Free Version
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Green molding compound as per IEC61249 Std. . (Halogen Free)

MECHANICAL DATA

- Case: SOT-363
- Terminals: Solderable per MIL-STD-750,Method 2026
- Approx Weight: 0.0002 ounces, 0.006 grams
- Device Marking : S0A

SOT-363 Unit : inch(mm)



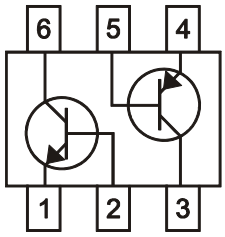


Fig.55(TOP VIEW)

Maximum Ratings MMDT2222A Section @ T_A=25°C unless otherwise specified

Characteristic	Symbol	MMDT2222A	Units
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	V
Collector Current-Continuous	I_C	600	mA
Power Dissipation	P_d	225	mW
Thermal Resistance, Junction to Ambient	$R_{\Theta JA}$	625	°C/W
Operation and Storage and Temperature Range	T_J,T_{STG}	-55 to +150	°C

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Maximum Ratings MMDT2907A Section @ T_A=25°C unless otherwise specified

Characteristic	Symbol	MMDT2907A	Units
Collector-Base Voltage	V_{CBO}	-60	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current-Continuous	I_C	-600	mA
Power Dissipation	P_d	200	mW
Thermal Resistance, Junction to Ambient	$R_{\Theta JA}$	625	°C/W
Operation and Storage and Temperature Range	T_J,T_{STG}	-55 to +150	°C

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Electrical Characteristics, MMDT222A Section @ T_A=25°C unless otherwise specified

Characteristic	Symbol	Min.	Max.	Unit	Test Condition
OFF CHARACTERISTICS(Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)}CBO$	75	-	V	I_C=-10μA,I_E=0
Collector-Emitter Breakdown Voltage	$V_{(BR)}CEO$	40	-	V	I_C=10mA,I_B=0
Emitter-Base Breakdown Voltage	$V_{(BR)}EBO$	6.0	-	V	I_E=-10μA,I_C=0
Collector Cutoff Current	I_{CBO}	-	10	nA μA	V_{CB}=60V,I_E=0 V_{CB}=60V,I_E=0,T_A=150°C
Collector Cutoff Current	I_{CEX}	-	10	nA	V_{CE}=60V,$V_{EB(OFF)}$=3.0V
Emitter Cutoff Current	I_{EBO}	-	100	nA	V_{EB}=3.0V,I_C=0
Base Cutoff Current	I_{BL}	-	20	nA	V_{CE}=60V,$V_{EB(OFF)}$=3.0V
ON CHARACTERISTICS(Note 2)					
DC Current Gain	h_{FE}	35 50 75 100 40 50 50	- - - 300 - - -	-	I_C=100μA,V_{CE}=10V I_C=1.0mA,V_{CE}=10V I_C=10mA,V_{CE}=10V I_C=150mA,V_{CE}=10V I_C=500mA,V_{CE}=10V I_C=10mA,V_{CE}=10V,T_A=-55°C I_C=150mA,V_{CE}=1.0V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	- -	0.3 1.0	V	I_C=150mA,I_B=15mA I_C=500mA,I_B=50mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.6 -	1.2 2.0	V	I_C=150mA,I_B=15mA I_C=500mA,I_B=50mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	-	8	pF	V_{CB}=10V,f=1.0MHz,I_E=0
Input Capacitance	C_{ibo}	-	25	pF	V_{EB}=0.5V,f=1.0MHz,I_C=0
Current Gain-Bandwidth Product	f_T	300	-	MHz	V_{CE}=-20V,I_C=20mA, f=100MHz
Noise Figure	NF	-	4.0	dB	V_{CE}=10V,I_C=100μA, R_S=1.0kΩ,f=1.0KHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d	-	10	ns	V_{CC}=30V,I_C=150mA, $V_{BE(OFF)}$=-0.5V,I_{B1}=15mA
Rise Time	t_r	-	25	ns	

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Electrical Characteristics, MMDT2907A Section @ T_A=25°C unless otherwise specified

Characteristic	Symbol	Min.	Max.	Unit	Test Condition
OFF CHARACTERISTICS(Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)}CBO$	-60	-	V	I_C=-10μA,I_E=0
Collector-Emitter Breakdown Voltage	$V_{(BR)}CEO$	-60	-	V	I_C=-10mA,I_B=0
Emitter-Base Breakdown Voltage	$V_{(BR)}EBO$	-5.0	-	V	I_E=-10μA,I_C=0
Collector Cutoff Current	I_{CBO}	-	-10	nA μA	V_{CB}=-50V,I_E=0 V_{CB}=-50V,I_E=0,T_A=125°C
Collector Cutoff Current	I_{CEX}	-	-50	nA	V_{CE}=-30V,$V_{EB(OFF)}$=-0.5V
Base Cutoff Current	I_{BL}	-	-50	nA	V_{CE}=-30V,$V_{EB(OFF)}$=-0.5V
ON CHARACTERISTICS(Note 2)					
DC Current Gain	h_{FE}	75 100 100 100 50	- - - 300 -	-	I_C=-100μA,V_{CE}=-10V I_C=-1.0mA,V_{CE}=-10V I_C=-10mA,V_{CE}=-10V I_C=-150mA,V_{CE}=-10V I_C=-500mA,V_{CE}=-10V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	-	-0.4 -1.6	V	I_C=-150mA,I_B=-15mA I_C=-500mA,I_B=-50mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	-	-1.3 -2.6	V	I_C=-150mA,I_B=-15mA I_C=-500mA,I_B=-50mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	-	8	pF	V_{CB}=-10V,f=1.0MHz,I_E=0
Input Capacitance	C_{ibo}	-	30	pF	V_{EB}=-2.0V,f=1.0MHz,I_C=0
Current Gain-Bandwidth Product	f_T	200	-	MHz	V_{CE}=-20V,I_C=-50mA, f=100MHz
SWITCHING CHARACTERISTICS					
Turn-On Time	t_{on}	-	45	ns	I_C=-150mA,V_{CC}=-30V, I_{B1}=-15mA
Delay Time	t_d	-	10	ns	V_{CC}=-30V,I_C=-150mA, I_{B1}=-15mA
Rise Time	t_r	-	40	ns	

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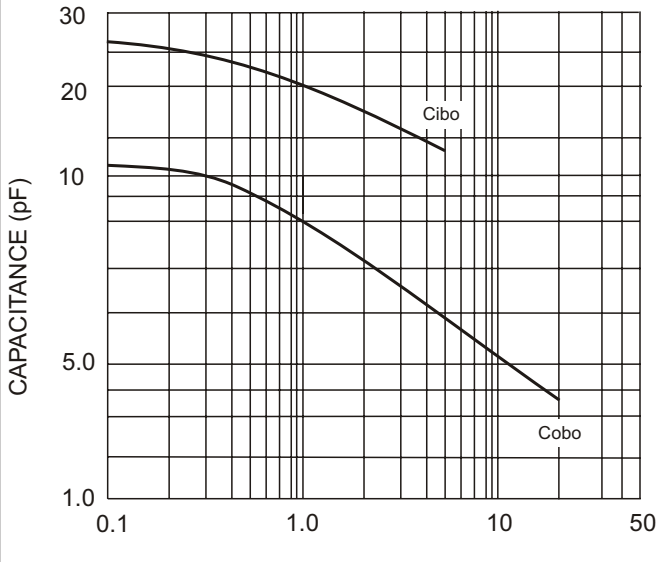

Fig. 1 (2222A) Typical Capacitance

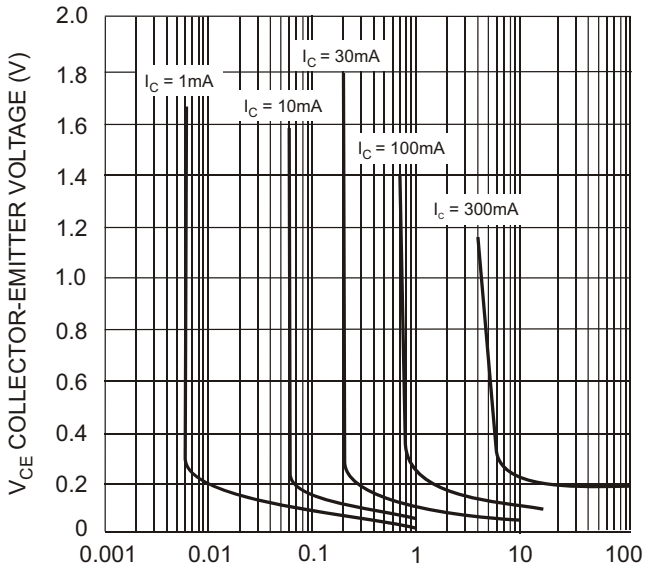

Fig. 2 (2222A) Typical Collector Saturation Region

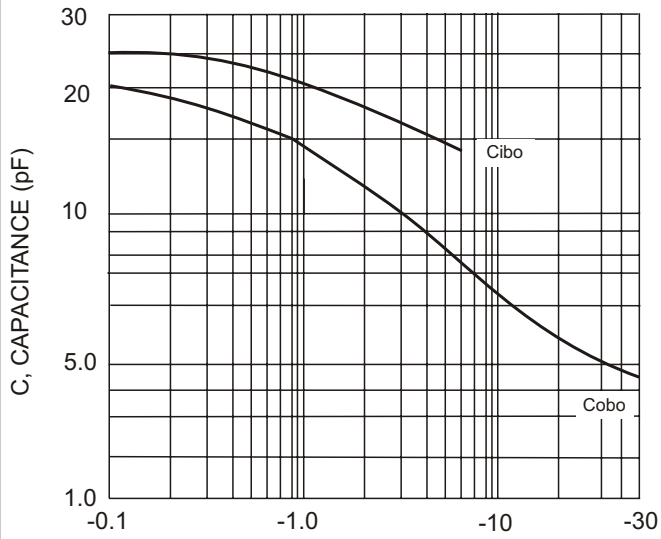

Fig. 3 (2907A) Typical Capacitance

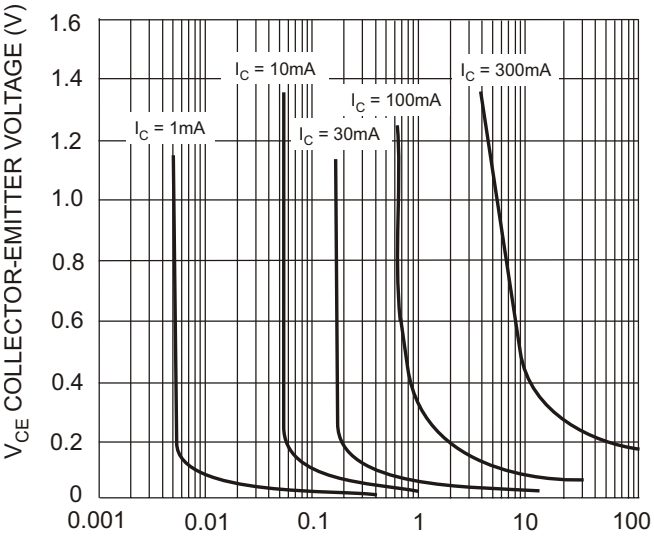

Fig. 4 (2907A) Typical Collector Saturation Region

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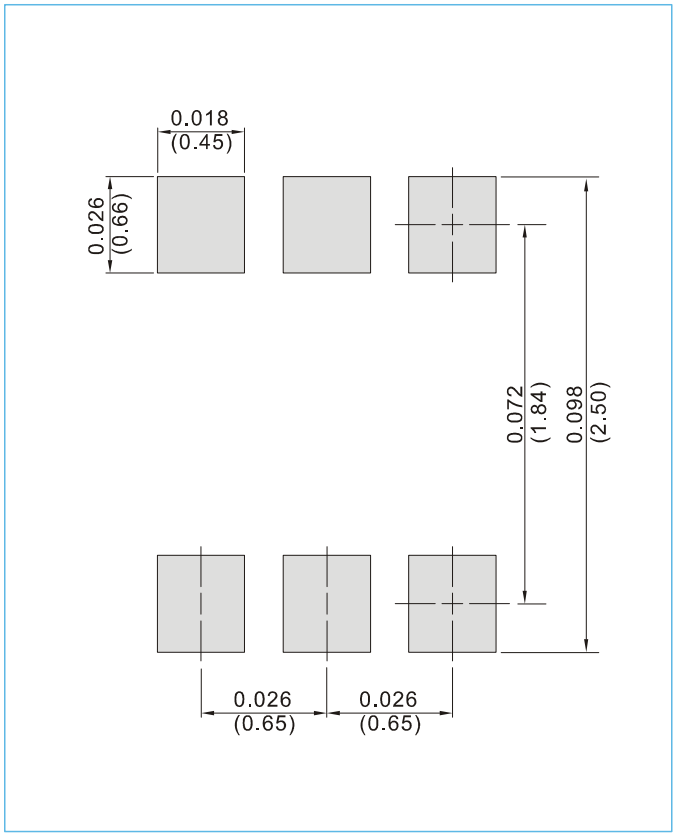
MOUNTING PAD LAYOUT

SOT-363 Unit : inch(mm)



ORDER INFORMATION

- Packing information

  T/R - 10K per 13" plastic Reel

  T/R - 3K per 7" plastic Reel

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Part No_packing code_Version

MMDT2227A_R1_00001
MMDT2227A_R2_00001

For example :

RB500V-40_R2_00001

Packing Code XX				Version Code XXXXX		
Packing type	1st Code	Packing size code	2nd Code	HF or RoHS	1st Code	2nd~5th Code
Tape and Ammunition Box (T/B)	A	N/A	0	HF	0	serial number
Tape and Reel (T/R)	R	7"	1	RoHS	1	serial number
Bulk Packing (B/P)	B	13"	2			
Tube Packing (T/P)	T	26mm	X			
Tape and Reel (Right Oriented) (TRR)	S	52mm	Y			
Tape and Reel (Left Oriented) (TRL)	L	PANASERT T/B CATHODE UP (PBCU)	U			
FORMING	F	PANASERT T/B CATHODE DOWN (PBCD)	D			

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