

MMDT2227A

COMPLEMENTARY NPN / PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

VOLTAGE	60 Volt	POWER	225 mW
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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)

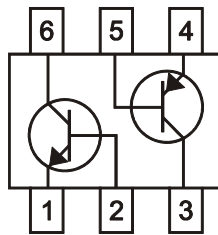
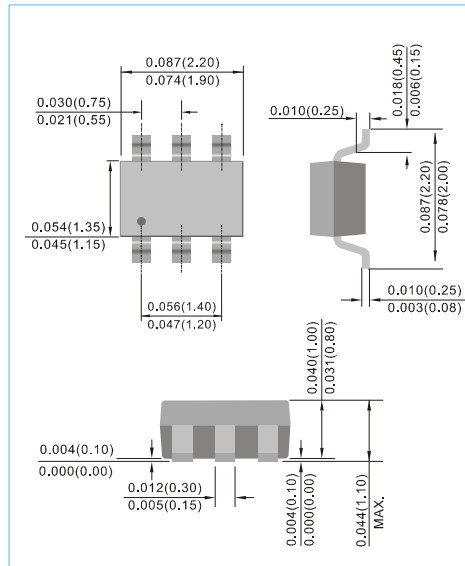


Fig.55(TOP VIEW)

Maximum Ratings MMDT2222A Section @ $T_A=25^{\circ}\text{C}$ unless otherwise specified

Characteristic	Symbol	MMDT2222A	Unit
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	$^{\circ}\text{C/W}$
Operation and Storage and Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

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Maximum Ratings MMDT2907A Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	MMDT2907A	Unit
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	$^\circ\text{C/W}$
Operation and Storage and Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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Electrical Characteristics, MMDT222A Section @ $T_A=25^{\circ}\text{C}$ unless otherwise specified

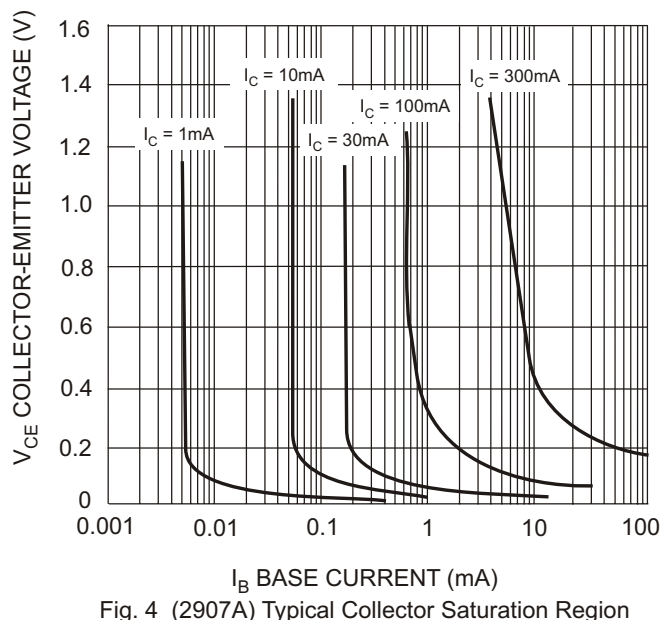
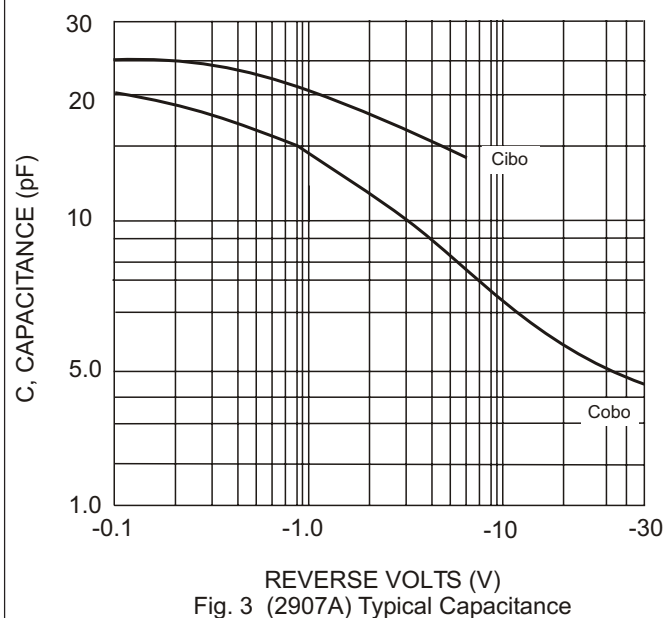
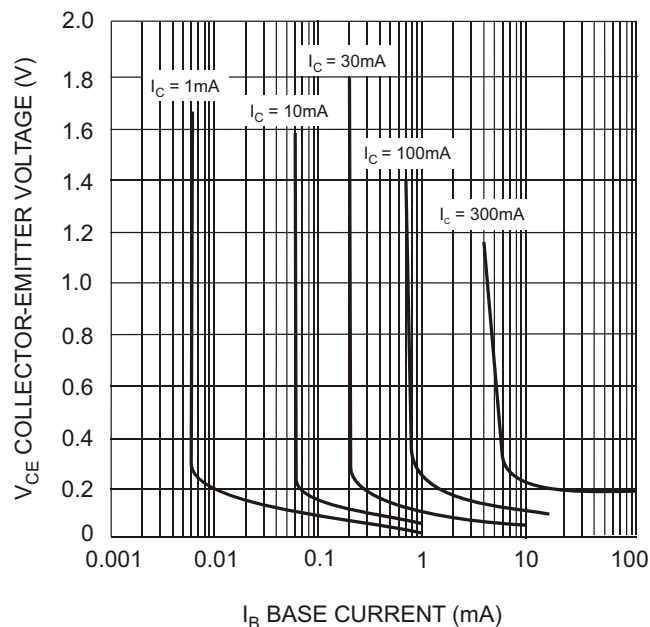
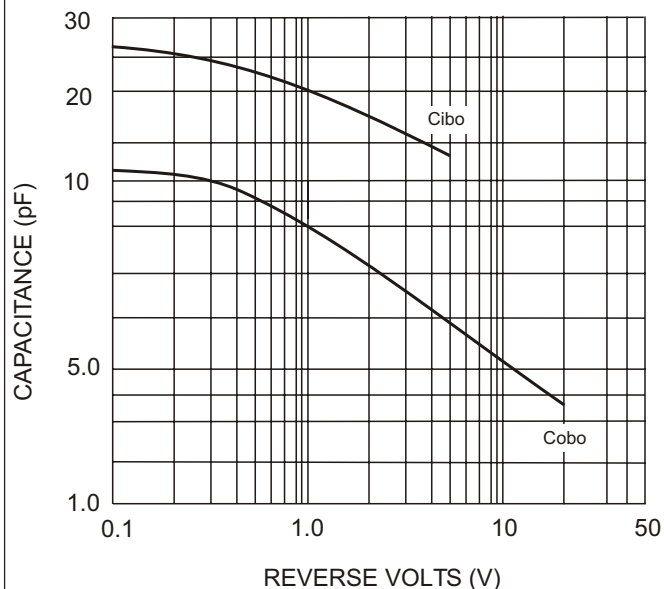
Characteristic	Symbol	Min.	Max.	Unit	Test Condition
OFF CHARACTERISTICS(Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)}CBO$	75	-	V	$I_C=-10\mu A, I_E=0$
Collector-Emitter Breakdown Voltage	$V_{(BR)}CEO$	40	-	V	$I_C=10mA, I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)}EBO$	6.0	-	V	$I_E=-10\mu A, I_C=0$
Collector Cutoff Current	I_{CBO}	-	10	nA μA	$V_{CB}=60V, I_E=0$ $V_{CB}=60V, I_E=0, T_A=150^{\circ}\text{C}$
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 - - -	-	$I_C=100\mu A, V_{CE}=10V$ $I_C=1.0mA, V_{CE}=10V$ $I_C=10mA, V_{CE}=10V$ $I_C=150mA, V_{CE}=10V$ $I_C=500mA, V_{CE}=10V$ $I_C=10mA, V_{CE}=10V, T_A=-55^{\circ}\text{C}$ $I_C=150mA, V_{CE}=1.0V$
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	$V_{CE}=10V, I_C=100\mu A$, $R_s=1.0k\Omega, f=1.0KHz$
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 @ $T_A=25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min.	Max.	Unit	Test Condition
OFF CHARACTERISTICS(Note 2)					
Collector-Base Breakdown Voltage	$V_{(BR)}CBO$	-60	-	V	$I_C=-10\mu A, I_E=0$
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	$I_E=-10\mu A, I_C=0$
Collector Cutoff Current	I_{CBO}	-	-10	nA μA	$V_{CB}=-50V, I_E=0$ $V_{CB}=-50V, I_E=0, T_A=125^\circ\text{C}$
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 -	-	$I_C=-100\mu A, V_{CE}=-10V$ $I_C=-1.0mA, V_{CE}=-10V$ $I_C=-10mA, V_{CE}=-10V$ $I_C=-150mA, V_{CE}=-10V$ $I_C=-500mA, V_{CE}=-10V$
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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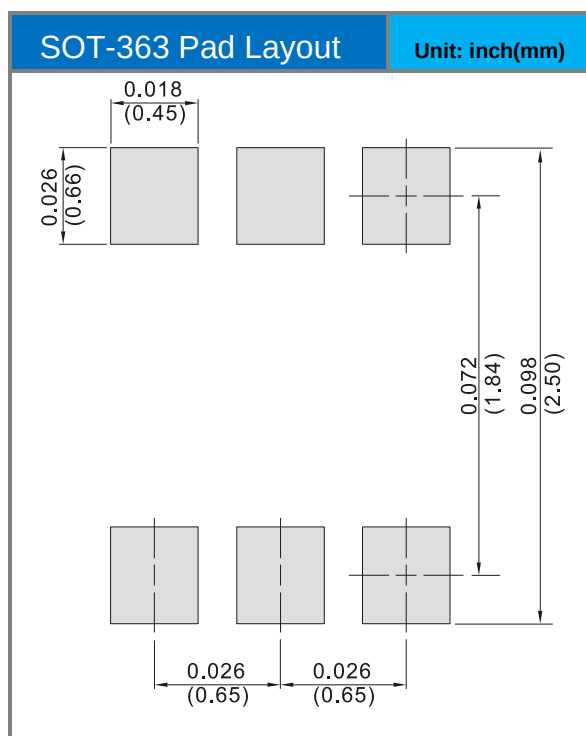


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Product and Packing Information

Part No.	Package Type	Packing Type	Marking
MMDT2227A	SOT-363	3K pcs / 7" reel	S0A
MMDT2227A	SOT-363	10K pcs / 13" reel	S0A

Mounting Pad Layout



MMDT2227A

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