

**MMDT2907A**

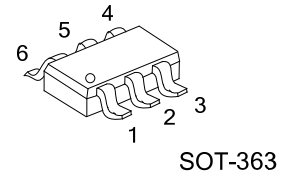
Preliminary

DUAL TRANSISTOR**NPN & PNP GENERAL
PURPOSE AMPLIFIER****DESCRIPTION**

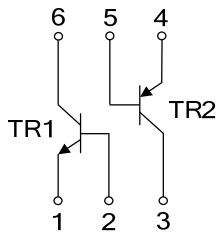
The UTC **MMDT2907A** is an NPN & PNP general purpose amplifier. it's suitable for a medium power amplifier and switch requiring collector currents up to 500mA.

FEATURES

- * Low $V_{CE(SAT)}$
- * High collector current gain under high collector current condition



SOT-363

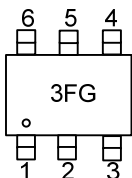
EQUIVALENT CIRCUIT**ORDERING INFORMATION**

Ordering Number	Package	Pin Assignment						Packing
		1	2	3	4	5	6	
MMDT2907AG-AL6-R	SOT-363	E1	B1	C2	E2	B2	C1	Tape Reel

MMDT2907AG-AL6-R

- (1) Packing Type
- (2) Package Type
- (3) Green Package

- (1) R: Tape Reel
- (2) AL6: SOT-363
- (3) G: Halogen Free and Lead Free

MARKING

■ **ABSOLUTE MAXIMUM RATINGS** ($T_A=25^{\circ}\text{C}$, unless otherwise noted) (Note 1, 2)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage	TR1	V_{CEO}	30	V
	TR2		-30	V
Collector-Base Voltage	TR1	V_{CBO}	60	V
	TR2		-60	V
Emitter-Base Voltage	TR1	V_{EBO}	5.0	V
	TR2		-5.0	V
Collector Current - Continuous	TR1	I_C	500	mA
	TR2		-500	mA
Total Device Dissipation		P_D	300	mW
Derate above 25°C			2.4	mW/ $^{\circ}\text{C}$
Junction Temperature		T_J	-55~+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. These ratings are limiting values above which the serviceability of any semiconductor device may be impaired

3. All voltages (V) and currents (A) are negative polarity for PNP transistors.

■ **THERMAL DATA** ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction to Ambient	θ_{JA}	415	$^{\circ}\text{C}/\text{W}$

■ **ELECTRICAL CHARACTERISTICS** ($T_A=25^{\circ}\text{C}$, unless otherwise noted) (Note 2)

TR1

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note 1)	$V_{(BR)CEO}$	$I_C=10\text{mA}$, $I_B=0$	30			V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}$, $I_E=0$	60			V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}$, $I_C=0$	5.0			V
Collector Cutoff Current	I_{CBO}	$V_{CB}=50\text{V}$, $I_E=0$			30	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=3.0\text{V}$, $I_C=0$			30	nA
ON CHARACTERISTICS						
DC Current Gain	h_{FE}	$I_C=1.0\text{mA}$, $V_{CE}=10\text{V}$	50			
		$I_C=10\text{mA}$, $V_{CE}=10\text{V}$	75			
		$I_C=150\text{mA}$, $V_{CE}=10\text{V}$ (Note 1)	100			
		$I_C=300\text{mA}$, $V_{CE}=10\text{V}$ (Note 1)	30			
Collector-Emitter Saturation Voltage (Note 1)	$V_{CE(sat)}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$			0.4	V
		$I_C=300\text{mA}$, $I_B=30\text{mA}$			1.4	V
Base-Emitter Saturation Voltage (Note 1)	$V_{BE(sat)}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$			1.3	V
SMALL SIGNAL CHARACTERISTICS						
Current Gain - Bandwidth Product	f_T	$I_C=50\text{mA}$, $V_{CE}=20\text{V}$, $f=100\text{MHz}$		250		MHz
Output Capacitance	C_{OBO}	$V_{CB}=10\text{V}$, $I_E=0$, $f=100\text{kHz}$		4.0		pF
Input Capacitance	C_{IBO}	$V_{EB}=2.0\text{V}$, $I_C=0$, $f=100\text{kHz}$		12		pF
Noise Figure	NF	$I_C=100\mu\text{A}$, $V_{CE}=10\text{V}$, $R_S=1.0\text{k}\Omega$, $f=1.0\text{kHz}$		2.0		dB

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING CHARACTERISTICS						
Turn-on Time	t_{ON}	$V_{CC}=30V, I_C=150mA, I_{B1}=15mA$		30		ns
Delay Time	t_D			8.0		ns
Rise Time	t_R			20		ns
Turn-off Time	t_{OFF}	$V_{CC}=6.0V, I_C=150mA, I_{B1}=I_{B2}=15mA$		80		ns
Storage Time	t_S			60		ns
Fall Time	t_F			20		ns

Notes: 1. Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycles $\leq$ 2.0%

2. All voltages (V) and currents (A) are negative polarity for PNP transistors.

TR2

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note 1)	$V_{(BR)CEO}$	$I_C=-10mA, I_B=0$	-30			V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-60			V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-5.0			V
Collector Cutoff Current	I_{CBO}	$V_{CB}=-50V, I_E=0$			-30	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=-3.0V, I_C=0$			-30	nA
ON CHARACTERISTICS						
DC Current Gain	h_{FE}	$I_C=-1.0mA, V_{CE}=-10V$	50			
		$I_C=-10mA, V_{CE}=-10V$	75			
		$I_C=-150mA, V_{CE}=-10V$ (Note 1)	100			
		$I_C=-300mA, V_{CE}=-10V$ (Note 1)	30			
Collector-Emitter Saturation Voltage (Note 1)	$V_{CE(sat)}$	$I_C=-150mA, I_B=-15mA$			-0.4	V
		$I_C=-300mA, I_B=-30mA$			-1.4	V
Base-Emitter Saturation Voltage (Note 1)	$V_{BE(sat)}$	$I_C=-150mA, I_B=-15mA$			-1.3	V
SMALL SIGNAL CHARACTERISTICS						
Current Gain - Bandwidth Product	f_T	$I_C=-50mA, V_{CE}=-20V, f=100MHz$		250		MHz
Output Capacitance	C_{OBO}	$V_{CB}=-10V, I_E=0, f=100kHz$		4.0		pF
Input Capacitance	C_{IBO}	$V_{EB}=-2.0V, I_C=0, f=100kHz$		12		pF
Noise Figure	NF	$I_C=-100\mu A, V_{CE}=-10V, R_S=1.0k\Omega, f=1.0kHz$		2.0		dB
SWITCHING CHARACTERISTICS						
Turn-on Time	t_{ON}	$V_{CC}=-30V, I_C=-150mA, I_{B1}=-15mA$		30		ns
Delay Time	t_D			8.0		ns
Rise Time	t_R			20		ns
Turn-off Time	t_{OFF}	$V_{CC}=6.0V, I_C=-150mA, I_{B1}=I_{B2}=-15mA$		80		ns
Storage Time	t_S			60		ns
Fall Time	t_F			20		ns

Notes: 1. Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycles $\leq$ 2.0%

2. All voltages (V) and currents (A) are negative polarity for PNP transistors.

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