



MMDT3904

NPN EPITAXIAL SILICON TRANSISTOR

DUAL NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

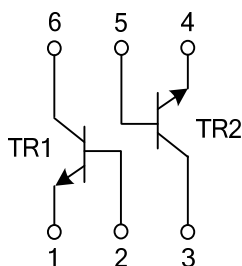
DESCRIPTION

The UTC **MMDT3904** is a dual NPN small signal surface mount transistor.

FEATURES

- * Suitable for Low Power Amplification and Switching
- * Epitaxial Planar Die Construction
- * Extremely-Small Surface Mount Package

EQUIVALENT CIRCUIT



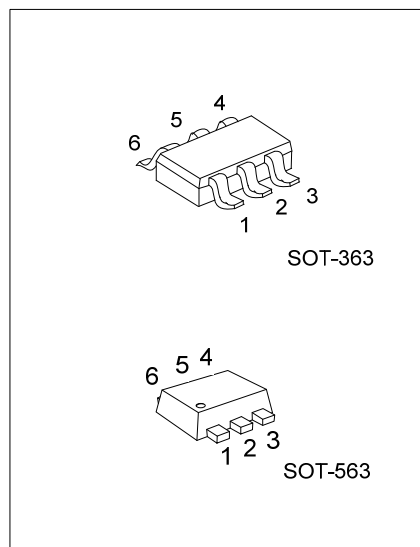
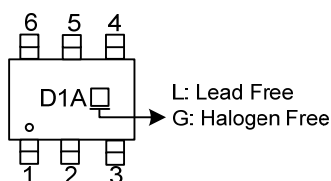
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
MMDT3904L-AL6-R	MMDT3904G-AL6-R	SOT-363	E1	B1	C2	E2	B2	C1	Tape Reel
MMDT3904L-AN6-R	MMDT3904G-AN6-R	SOT-563	E1	B1	C2	E2	B2	C1	Tape Reel

Note: Pin Assignment: E: Emitter B: Base C: Collector

<p>MMDT3904G-AL6-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>		<p>(1) R: Tape Reel</p> <p>(2) AL6: SOT-363, AN6: SOT-563</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	60	V
Collector-Emitter Voltage		V_{CEO}	40	V
Emitter-Base Voltage		V_{EBO}	6.0	V
Collector Current - Continuous		I_C	200	mA
Power Dissipation	SOT-363	P_D	200	mW
	SOT-563		150	mW
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-363	θ_{JA}	625	$^{\circ}\text{C/W}$
	SOT-563		833	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS (Note 1)						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu A, I_E = 0$	60			V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1.0mA, I_B = 0$	40			V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu A, I_C = 0$	6			V
Collector Cut-off Current	I_{CEX}	$V_{CE} = 30V, V_{EB(OFF)} = 3.0V$			50	nA
Base Cut-off Current	I_{BL}	$V_{CE} = 30V, V_{EB(OFF)} = 3.0V$			50	nA
ON CHARACTERISTICS (Note 1)						
DC Current Gain	h_{FE}	$I_C = 100\mu A, V_{CE} = 1.0V$	40			
		$I_C = 1.0mA, V_{CE} = 1.0V$	70			
		$I_C = 10mA, V_{CE} = 1.0V$	100		300	
		$I_C = 50mA, V_{CE} = 1.0V$	60			
		$I_C = 100mA, V_{CE} = 1.0V$	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10mA, I_B = 1.0mA$			0.20	V
		$I_C = 50mA, I_B = 5.0mA$			0.30	V
Base- Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10mA, I_B = 1.0mA$	0.65		0.85	V
		$I_C = 50mA, I_B = 5.0mA$			0.95	V
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{OB}	$V_{CB} = 5.0V, f = 1.0MHz, I_E = 0$			4.0	pF
Current Gain-Bandwidth Product	f_T	$V_{CE} = 20V, I_C = 10mA, f = 100MHz$	300			MHz
Turn On Time	t_{ON}	$V_{CC}=3V, V_{BE}=0.5V,$ $I_C=10mA, I_{B1}=1mA$			70	ns
Turn Off Time	t_{OFF}	$I_{B1}=1mA, I_{B2}=1mA$			250	ns

Note: Pulse test: $PW \leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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