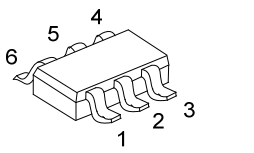
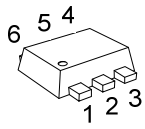
MMDT3904

NPN EPITAXIAL SILICON TRANSISTOR

DUAL NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR



SOT-363



SOT-563

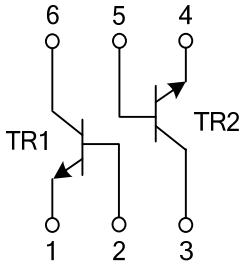
■ DESCRIPTION

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

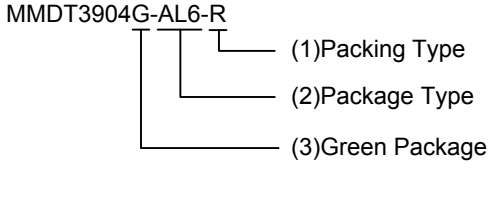
■ EQUIVALENT CIRCUIT



■ 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

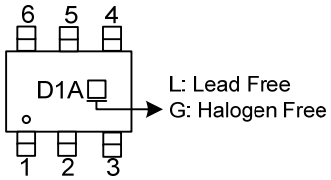


(1) R: Tape Reel

(2) AL6: SOT-363, AN6: SOT-563

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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	°C/W
	SOT-563		833	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A =25°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 = 10μA, 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 = 10μA, 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 = 100μA, 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=1_B2=1mA			250	ns

Note: Pulse test: PW ≤ 300μs, Duty Cycle ≤ 2.0%.