



MMDT3904

Preliminary **NPN EPITAXIAL SILICON TRANSISTOR**

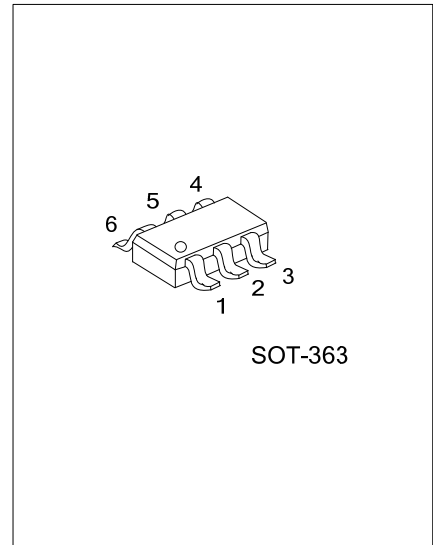
DUAL NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

■ 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

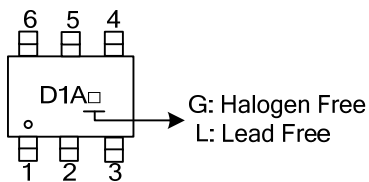


■ ORDERING INFORMATION

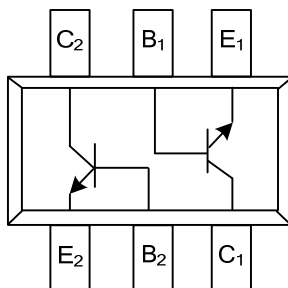
Ordering Number		Package	Packing
Lead Free	Halogen Free		
MMDT3904L-AL6-R	MMDT3904G-AL6-R	SOT-363	Tape Reel

<p>MMDT3904L-AL6-R</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p>	<p>(1) R: Tape Reel (2) TL6: SOT-363 (3) Halogen Free, L: Lead Free</p>
---	---

■ MARKING



■ PIN CONFIGURATION



■ 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	P _D	200	mW
Thermal Resistance, Junction to Ambient	θ _{JA}	625	°C/W
Junction Temperature	T _J	-55 ~ +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.

■ 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	5.0			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 _{OBO}	V _{CB} = 5.0V, f = 1.0MHz, I _E = 0			4.0	pF
Input Capacitance	C _{IBO}	V _{EB} = 0.5V, f = 1.0MHz, I _C = 0			8.0	pF
Input Impedance	h _{IE}	V _{CE} = 10V, I _C = 1.0mA, f = 1.0kHz	1.0		10	KΩ
Voltage Feedback Ratio	H _{RE}		0.5		8.0	× 10 ⁻⁴
Small Signal Current Gain	H _{FE}		100		400	
Output Admittance	H _{OE}		1.0		40	μS
Current Gain-Bandwidth Product	f _T	V _{CE} = 20V, I _C = 10mA, f = 100MHz	300			MHz
Noise Figure	NF	V _{CE} = 5.0V, I _C = 100μA, R _S = 1.0kΩ, f = 1.0kHz			5.0	dB
SWITCHING CHARACTERISTICS						
Delay Time	T _D	V _{CC} = 3.0V, I _C = 10mA,			35	ns
Rise Time	T _R	V _{BE(off)} = -0.5V, I _{B1} = 1.0mA			35	ns
Storage Time	T _S	V _{CC} = 3.0V, I _C = 10mA,			200	ns
Fall Time	T _F	I _{B1} = I _{B2} = 1.0mA			50	ns

Note: 1. Short duration test pulse used to minimize self-heating.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.