

isc Silicon NPN Transistor

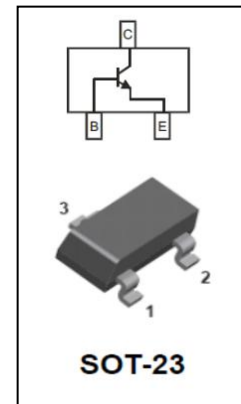
MMBT3904

DESCRIPTION

- Low Voltage Use
- Ultra Super Mini Mold Package
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

APPLICATIONS

- Telephony and professional communication equipment.

ABSOLUTE MAXIMUM RATINGS($T_a=25^{\circ}\text{C}$)

SYMBOL	PARAMETER	VALUE	UNIT
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current-Continuous	200	mA
P_C	Collector Power Dissipation @ $T_C=25^{\circ}\text{C}$	350	mW
T_J	Junction Temperature	-55~150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature Range	-55~150	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS

$T_c=25^{\circ}\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
I_{CBO}	Collector Cutoff Current	$V_{CE}=60\text{V}$		50	nA
I_{CEX}	Collector Cutoff Current	$V_{CE}=30\text{V}$		50	nA
h_{FE}	DC Current Gain	$I_C=0.1\text{mA}; V_{CE}=1\text{V}$	40		
		$I_C=1\text{mA}; V_{CE}=1\text{V}$	70		
		$I_C=10\text{mA}; V_{CE}=1\text{V}$	100	300	
		$I_C=50\text{mA}; V_{CE}=1\text{V}$	60		
		$I_C=100\text{mA}; V_{CE}=1\text{V}$	30		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=10\text{mA}; I_B=1\text{mA}$		0.2	V
		$I_C=50\text{mA}; I_B=5\text{mA}$		0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=10\text{mA}; I_B=1\text{mA}$	0.65	0.85	V
		$I_C=50\text{mA}; I_B=5\text{mA}$		0.95	V
f_T	Current Gain-Bandwidth Product	$I_C=10\text{mA}; V_{CE}=20\text{V}; f=100\text{MHz}$	300		MHz
NF	Noise Figure	$V_{CE}=5.0\text{V}; f=10\text{Hz to }15.7\text{kHz}; I_C=100\mu\text{A}; R_S=1.0\text{k}\Omega$		5	dB

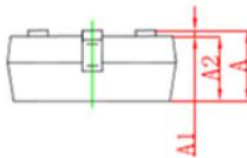
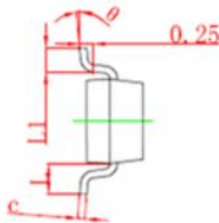
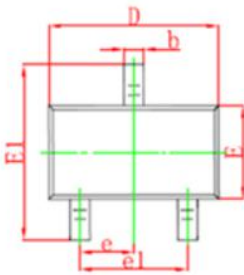
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SWITCHING CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
t_d	Delay Time	$V_{CC}=3.0V; V_{BE}=0.5V; I_C=10mA;$ $I_{B1}=1.0mA$	35	ns
t_r	Rise Time		35	ns
t_s	Storage Time	$V_{CC}=3.0V; I_C=10mA; I_{B1}=1.0mA$	200	ns
t_f	Fall Time		50	ns

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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