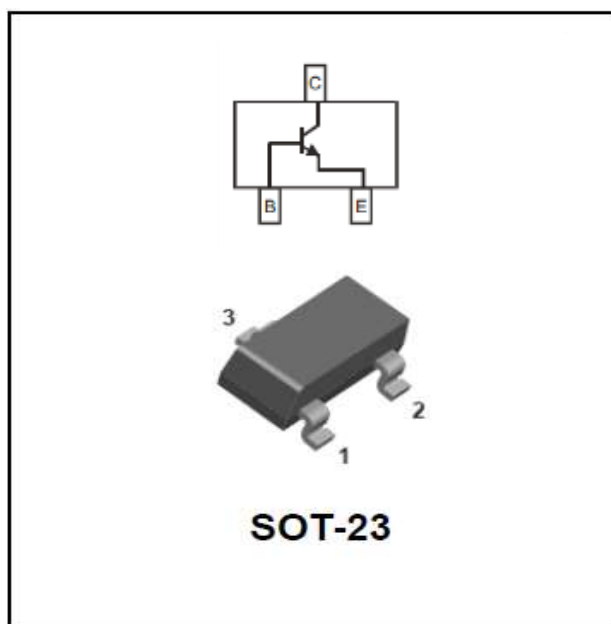


**NPN General Purpose Amplifier**

**Features**

- Epoxy meets UL-94 V-0 flammability rating
- Moisure Sensitivity Level 1
- Marking:1AM


**■Off Characteristics**

Item	Symbol	Unit	Conditions	Value
Collector-Emitter Voltage*	$V_{CEO}$	V	$I_C=1.0mA_{dc}$ , $I_B=0$	40
Collector-Base Voltage	$V_{CBO}$	V	$I_C=10\mu A_{dc}$ , $I_E=0$	60
Emitter-Base Voltage	$V_{EBO}$	V	$I_E=10\mu A_{dc}$ , $I_C=0$	6.0
Collector Current	$I_C$	mA		200
Collector Cutoff Current	$I_{CBO}$	nAdc	$V_{CB}=60V_{dc}$	50
Collector Cutoff Current	$I_{CEX}$	nAdc	$V_{CE}=30V_{dc}$	50
Power Dissipation	$P_D$	mW		350
Thermal Resistance Junction to Case	$R_{thJC}$	$^{\circ}C/W$		185
Thermal Resistance Junction to Ambient	$R_{thJA}$	$^{\circ}C/W$		357
Operation Junction Temperature	$T_J$	$^{\circ}C$		-55 to +150
Storage Temperature	$T_{STG}$	$^{\circ}C$		-55 to +150

\* Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

**■ On Characteristics**

Item	Symbol	Unit	Conditions	Min	Max
DC Current Gain	$h_{FE}$		$I_C=0.1\text{mA}$ dc, $V_{CE}=1.0\text{V}$ dc	40	
			$I_C=1.0\text{mA}$ dc, $V_{CE}=1.0\text{V}$ dc	70	
			$I_C=10\text{mA}$ dc, $V_{CE}=1.0\text{V}$ dc	100	300
			$I_C=50\text{mA}$ dc, $V_{CE}=1.0\text{V}$ dc	60	
			$I_C=100\text{mA}$ dc, $V_{CE}=1.0\text{V}$ dc	30	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Vdc	$I_C=10\text{mA}$ dc, $I_B=1.0\text{mA}$ dc		0.2
			$I_C=50\text{mA}$ dc, $I_B=5.0\text{mA}$ dc		0.3
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	Vdc	$I_C=10\text{mA}$ dc, $I_B=1.0\text{mA}$ dc	0.65	0.85
			$I_C=50\text{mA}$ dc, $I_B=5.0\text{mA}$ dc		0.95

**■ Small-signal Characteristics**

Item	Symbol	Unit	Conditions	Min	Max
Output Capacitance	$C_{obo}$	pF	$V_{CB}=5.0\text{V}$ dc, $f=1.0\text{MHz}$ , $I_E=0$		4
Input Capacitance	$C_{ibo}$	pF	$V_{EB}=0.5\text{V}$ dc, $f=1.0\text{MHz}$ , $I_C=0$		8
Current Gain-Bandwidth Product	$f_T$	MHz	$I_C=10\text{mA}$ dc, $V_{CE}=20\text{V}$ dc, $f=100\text{MHz}$	300	
Noise Figure	NF	dB	$V_{CE}=5.0\text{V}$ , $f=10\text{Hz}$ to $15.7\text{kHz}$ , $I_C=100\mu\text{A}$ , $R_S=1.0\text{k}\Omega$		5

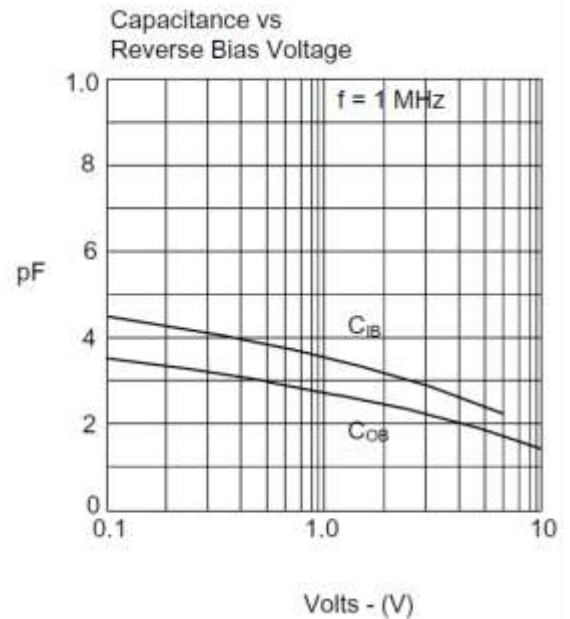
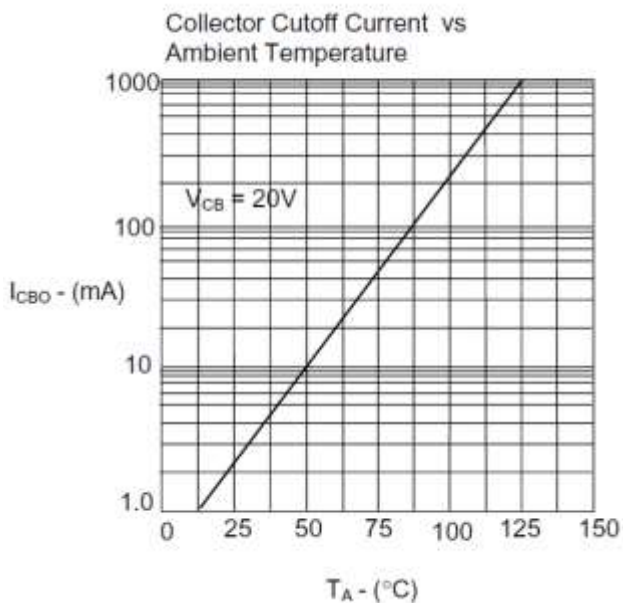
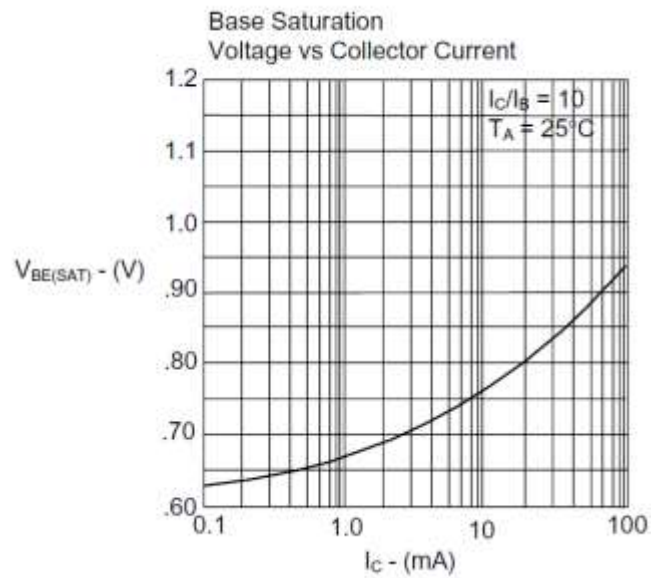
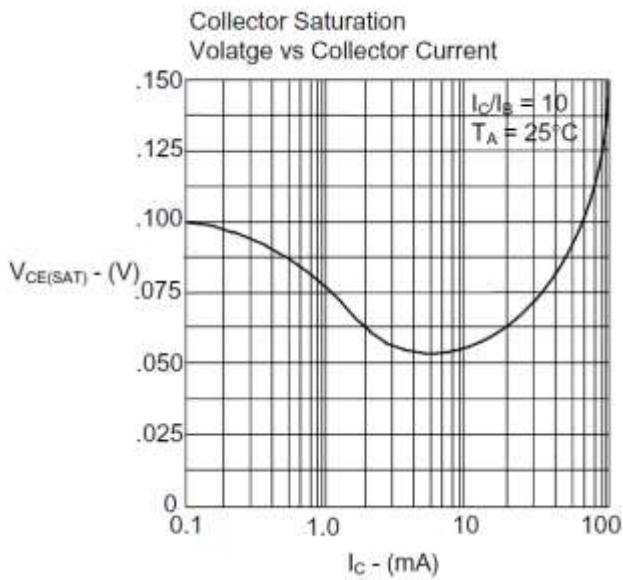
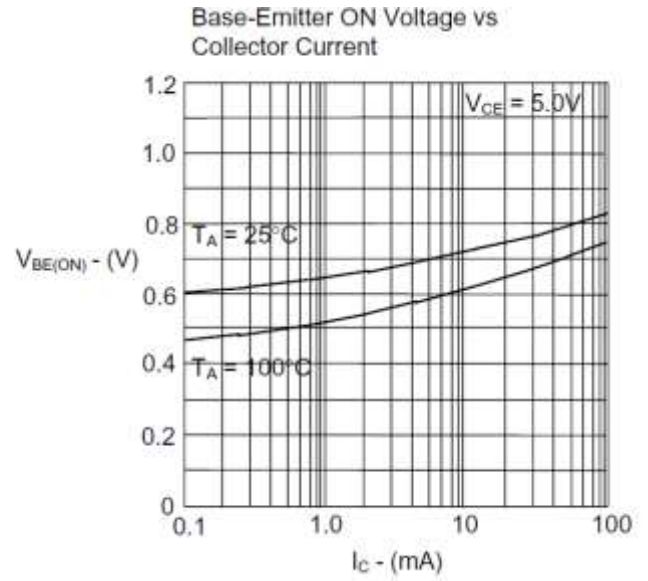
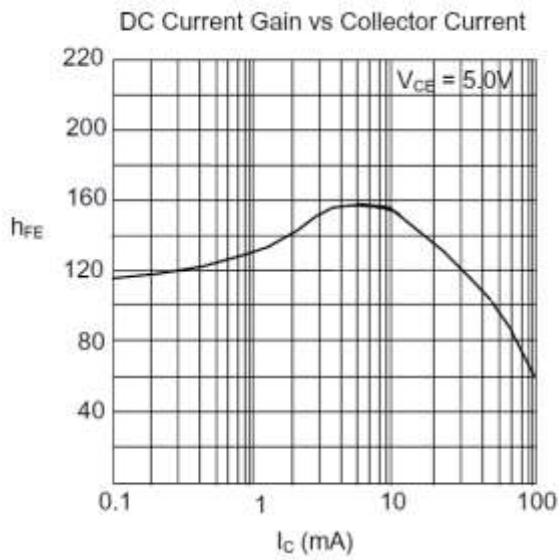
**■ Switching Characteristics**

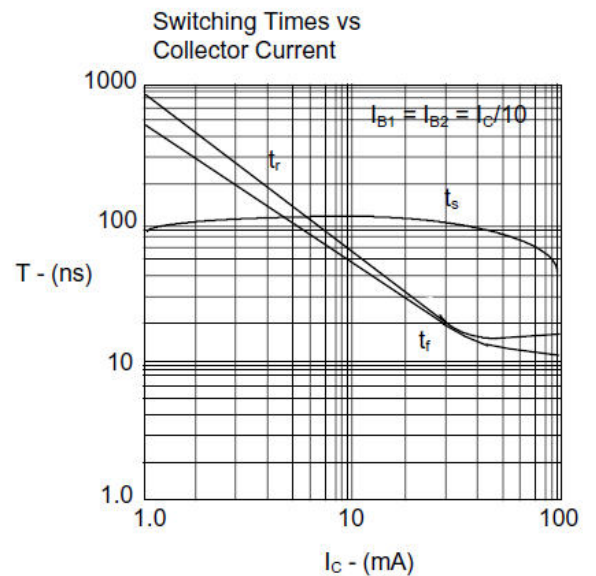
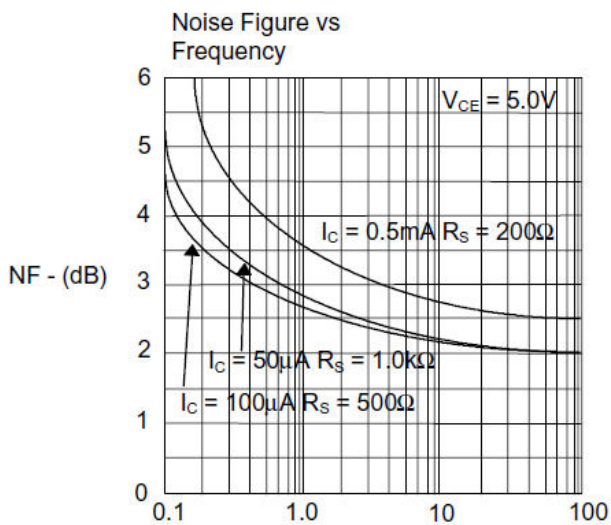
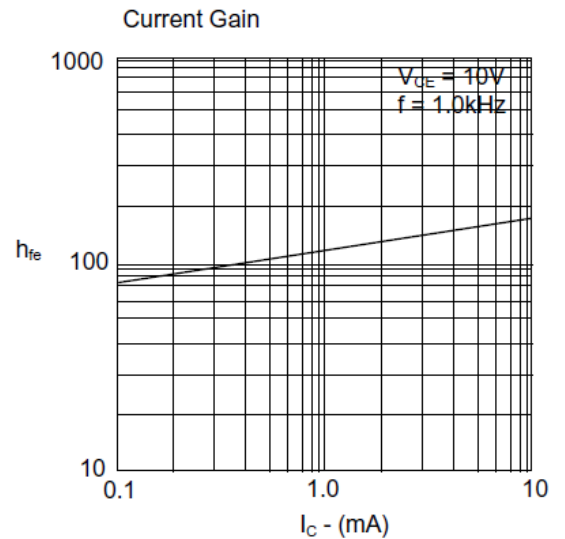
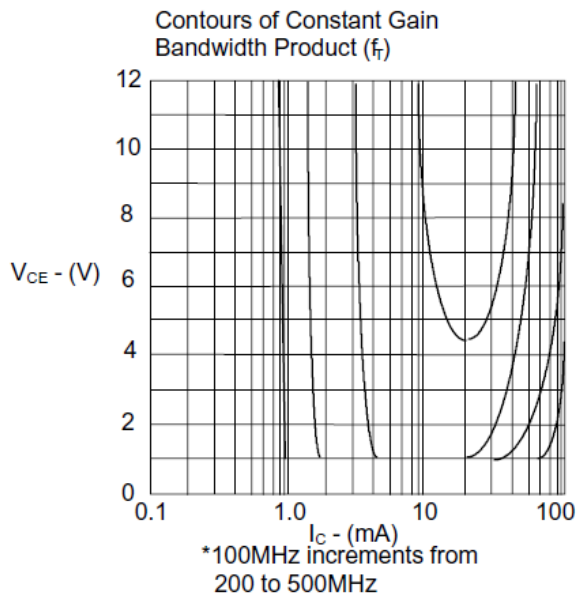
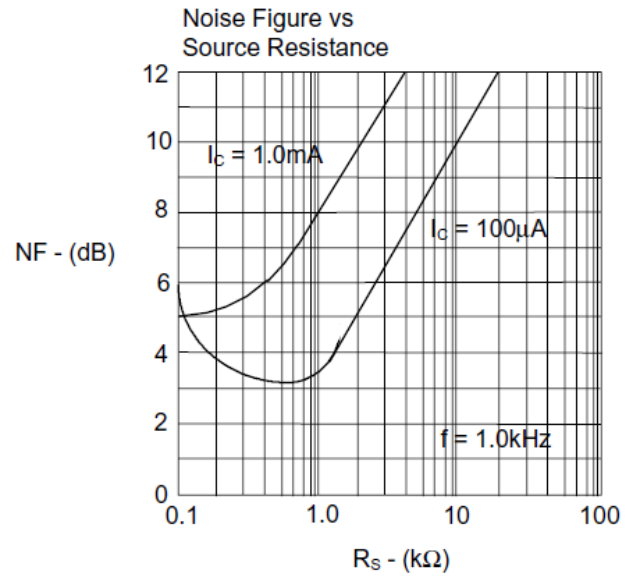
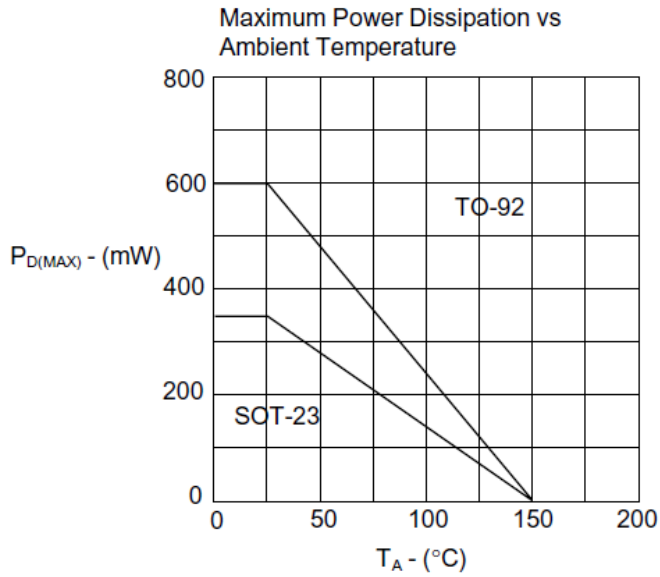
Item	Symbol	Unit	Conditions	Value
Delay Time	$t_d$	ns	$V_{CC}=3.0\text{V}$ dc, $V_{BE}=0.5\text{V}$ dc, $I_C=10\text{mA}$ dc, $I_{B1}=1.0\text{mA}$ dc	35
Rise Time	$t_r$	ns		35
Storage Time	$t_s$	ns	$V_{CC}=3.0\text{V}$ dc, $I_C=10\text{mA}$ dc, $I_{B1}=I_{B2}=1.0\text{mA}$ dc	200
Fall Time	$t_f$	ns		50

**■ Ordering Information (Example)**

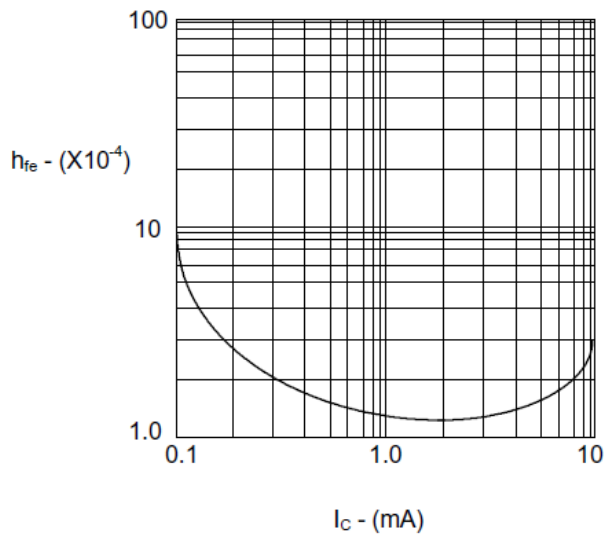
PREFERRED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
MMBT3904	F2	Approximate 0.008	3000	30000	120000	7" reel

■ Characteristics(Typical)

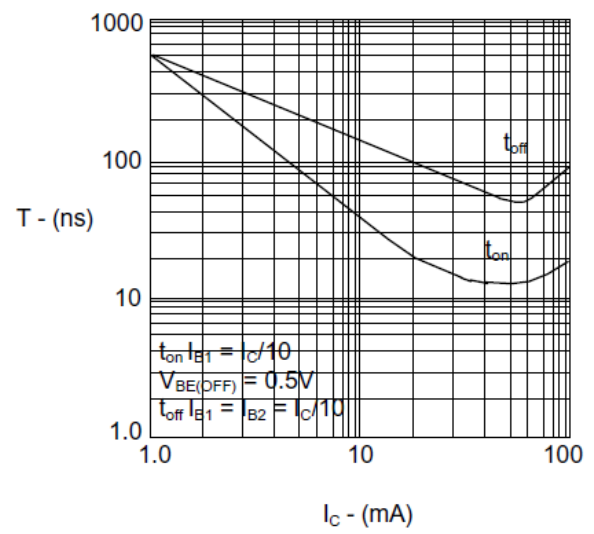




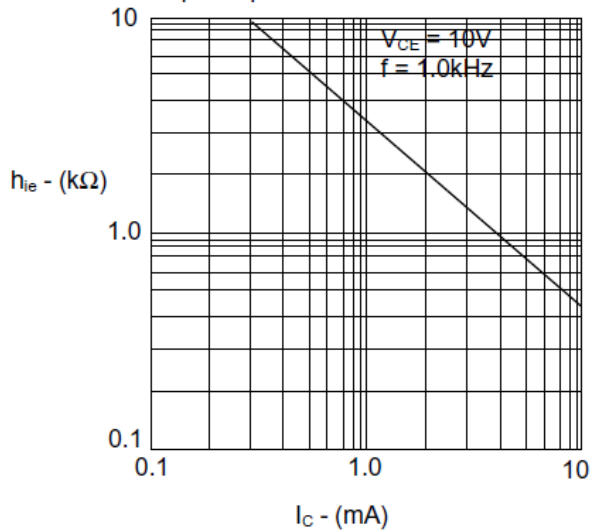
Voltage Feedback Ratio



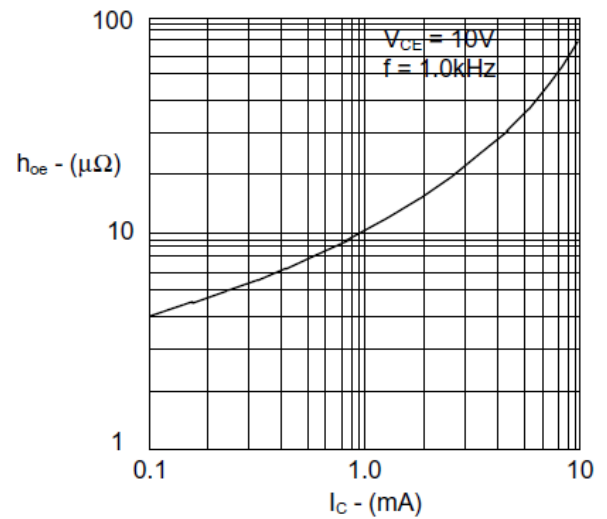
Turn On and Turn Off Times vs Collector Current



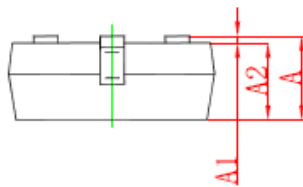
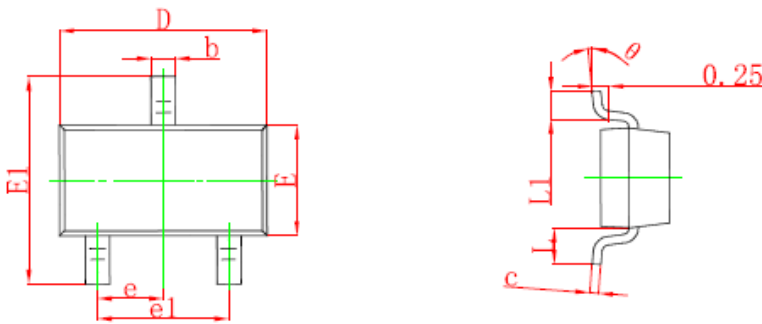
Input Impedance



Output Admittance

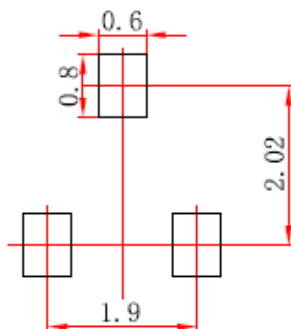


■ SOT 23 Package Outline Dimensions



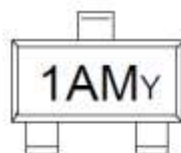
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

■ SOT-23 Suggested Pad Layout



Note:  
 1. Controlling dimension: In millimeters.  
 2. General tolerance: ± 0.05mm.  
 3. The pad layout is for reference purposes only.

■ Marking Information



1AM = Product Type Marking Code  
 Y = Date Code Marking

Date code Key (2 years a cycle)

Year	2011											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	J	O	L	C	K	B	P	D	M	E	G	F

Year	2012											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	W	N	Y	T	R	H	A	I	U	X	Z	S

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