Preferred Device

General Purpose Transistor

NPN Silicon

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	40	Vdc
Collector-Base Voltage	V _{CBO}	60	Vdc
Emitter-Base Voltage	V _{EBO}	6.0	Vdc
Collector Current – Continuous	Ι _C	200	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 1) $T_A = 25^{\circ}C$	P _D	1.5 12	W mW/°C
Thermal Resistance Junction-to-Ambient (Note 1)	R_{\thetaJA}	83.3	°C/W
Thermal Resistance Junction-to-Lead #4	R_{\thetaJA}	35	°C/W
Junction and Storage Temperature Range	T _J , T _{stg}	–55 to +150	°C

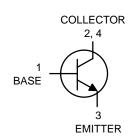
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

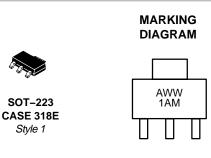
1. FR-4 with 1 oz and 713 mm² of copper area.



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1AM = Specific Device Code A = Assembly Location WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping [†]
PZT3904T1	SOT-223	1000 / Tape & Reel

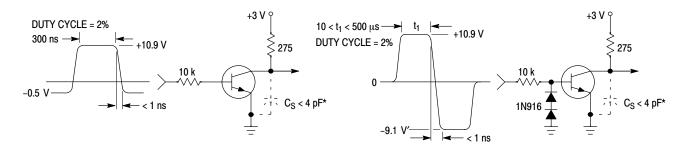
+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25° C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS (Note 2)		·			
Collector – Emitter Breakdown Voltage (Note 3) $(I_C = 1.0 \text{ mAdc}, I_B = 0)$		V _{(BR)CEO}	40	-	Vdc
Collector – Base Breakdown Voltage $(I_C = 10 \ \mu Adc, I_E = 0)$		V _{(BR)CBO}	60	-	
Emitter – Base Breakdown Voltage ($I_E = 10 \ \mu Adc, I_C = 0$)		V _{(BR)EBO}	6.0	-	
Base Cutoff Current (V _{CE} = 30 Vdc, V _{EB} = 3.0 Vdc)	= 30 Vdc, V _{EB} = 3.0 Vdc) r Cutoff Current I _{CEX} –		50	nAdc	
Collector Cutoff Current (V _{CE} = 30 Vdc, V _{EB} = 3.0 Vdc)			-	50	
ON CHARACTERISTICS (Note 3)		•	1		
$ \begin{array}{l} \text{DC Current Gain (Note 2)} \\ (I_{C} = 0.1 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 1.0 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 10 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 50 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \\ (I_{C} = 100 \text{ mAdc, } V_{CE} = 1.0 \text{ Vdc}) \end{array} $		H _{FE}	40 70 100 60 30	- - 300 - -	-
Collector – Emitter Saturation Voltage (Note 3) ($I_C = 10 \text{ mAdc}, I_B = 1.0 \text{ mAdc}$) ($I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$)		V _{CE(sat)}		0.2 0.3	Vdc
Base – Emitter Saturation Voltage (Note 3) ($I_C = 10 \text{ mAdc}, I_B = 1.0 \text{ mAdc}$) ($I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$)		V _{BE(sat)}	0.65 -	0.85 0.95	Vdc
SMALL-SIGNAL CHARACTERISTICS			•		•
Current-Gain – Bandwidth Product (I _C = 10 mAdc, V _{CE} = 20 Vdc, f = 100 MHz)		f _T	300	-	MHz
Output Capacitance ($V_{CB} = 5.0 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$)		C _{obo}	-	5.0	pF
Input Capacitance (V _{EB} = 0.5 Vdc, I _C = 0, f = 1.0 MHz)		C _{ibo}	-	8.0	
Input Impedance (V _{CE} = 10 Vdc, I _C = 1.0 mAdc, f = 1.0 kHz)		h _{ie}	1.0	10	kΩ
Voltage Feedback Ratio (V _{CE} = 10 Vdc, I _C = 1.0 mAdc, f = 1.0 kHz)		h _{re}	0.5	8.0	X 10 ⁻⁴
Small – Signal Current Gain ($V_{CE} = 10 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ kHz}$)		h _{fe}	100	400	-
Output Admittance ($V_{CE} = 10 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, f = 1.0 \text{ kHz}$)		h _{oe}	1.0	40	μmhos
Noise Figure (V _{CE} = 5.0 Vdc, I _C = 100 μ Adc, R _S = 1.0 kΩ, f = 1.0 kHz)		nF	-	5.0	dB
SWITCHING CHARACTERISTICS					
Delay Time	$(V_{CC} = 3.0 \text{ Vdc}, V_{BE} = -0.5 \text{ Vdc},$	t _d	-	35	ns
Rise Time	$I_{\rm C} = 10 \text{ mAdc}, I_{\rm B1} = 1.0 \text{ mAdc})$	t _r	-	35	1
Storage Time	(V _{CC} = 3.0 Vdc,	t _s	-	200	1
Fall Time	$I_{\rm C} = 10 \text{ mAdc}, I_{\rm B1} = I_{\rm B2} = 1.0 \text{ mAdc})$	t _f	-	50	

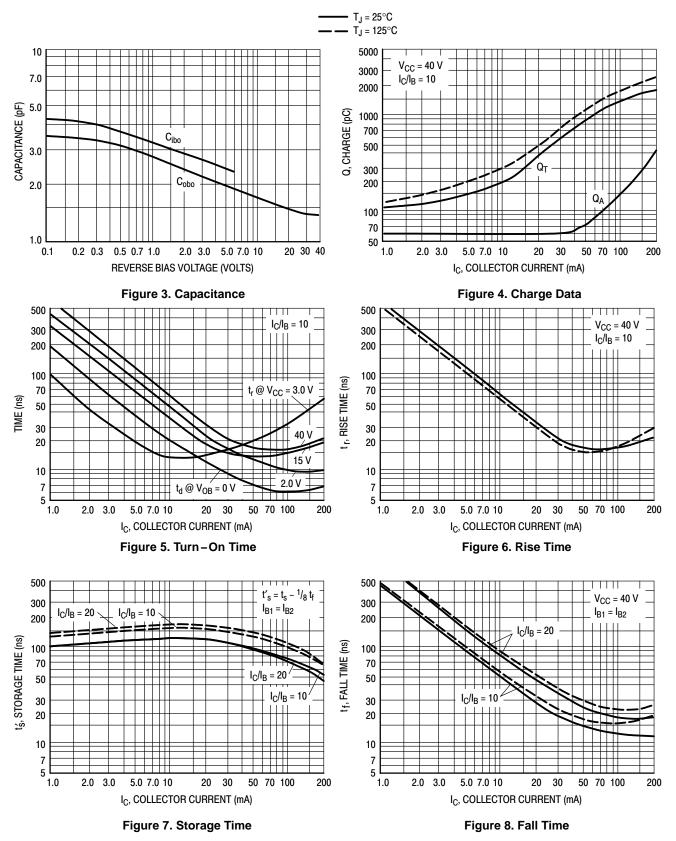
 $\begin{array}{ll} \text{2. FR-5} = 1.0 \times 0.75 \times 0.062 \text{ in.} \\ \text{3. Pulse Test: Pulse Width } \leq 300 \ \mu\text{s}, \ \text{Duty Cycle} \leq 2.0\%. \end{array}$



* Total shunt capacitance of test jig and connectors

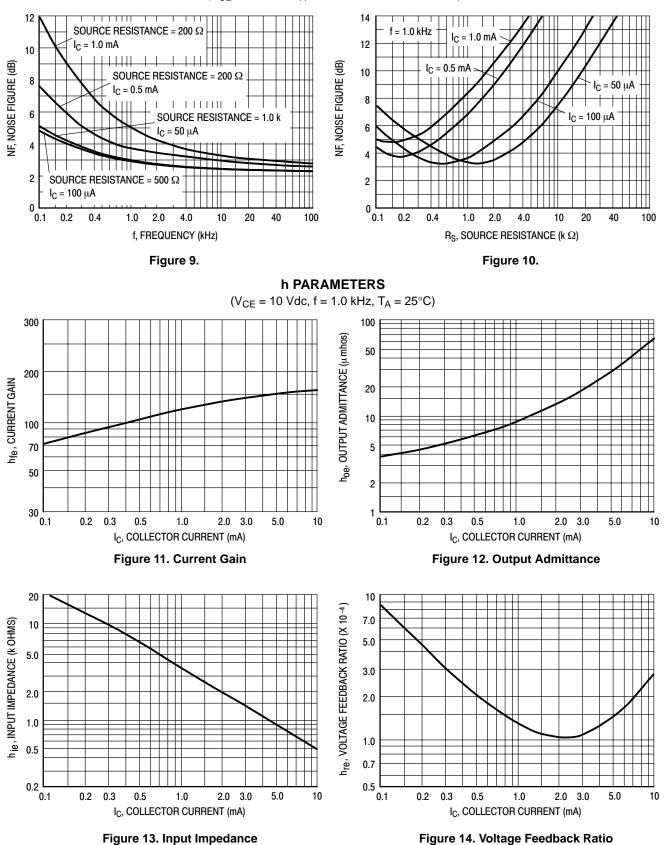
Figure 1. Delay and Rise Time Equivalent Test Circuit Figure 2. Storage and Fall Time Equivalent Test Circuit

TYPICAL TRANSIENT CHARACTERISTICS

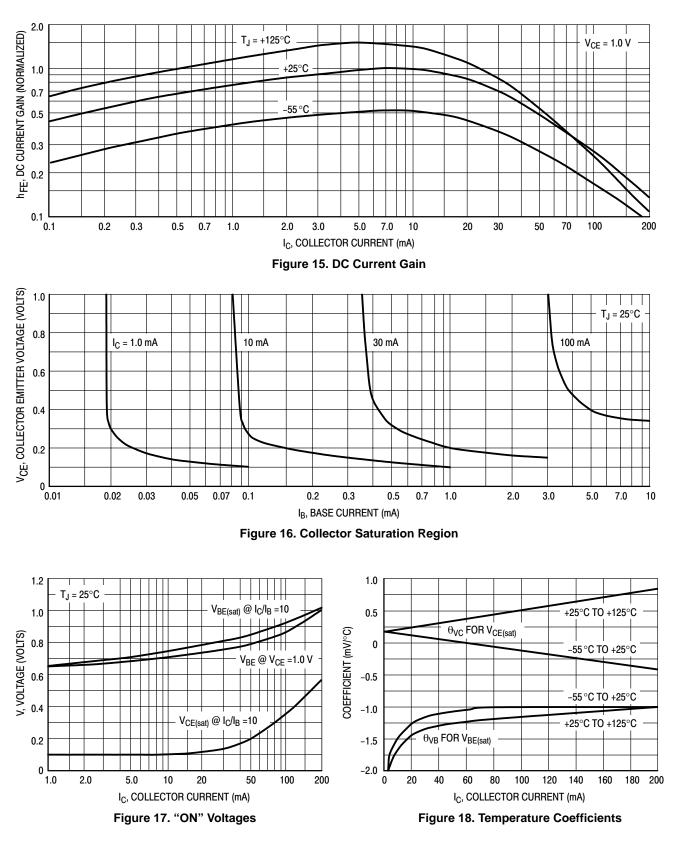


TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

 $(V_{CE} = 5.0 \text{ Vdc}, T_A = 25^{\circ}\text{C}, \text{ Bandwidth} = 1.0 \text{ Hz})$

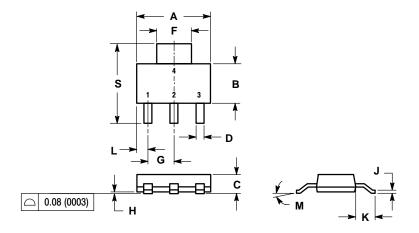


TYPICAL STATIC CHARACTERISTICS



PACKAGE DIMENSIONS

SOT-223 (TO-261) CASE 318E-04 ISSUE K

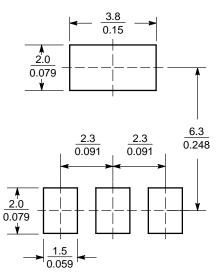


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI
Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.249	0.263	6.30	6.70
В	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
н	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
К	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
М	0 °	10 °	0 °	10 °
S	0.264	0.287	6.70	7.30

STYLE 1: PIN 1. BASE 2. COLLECTOR 3. EMITTER 4. COLLECTOR

SOLDERING FOOTPRINT



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