

General Purpose Transistor

PNP Silicon

PZT3906T1G

Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CEO}	-40	Vdc
Collector – Base Voltage	V_{CBO}	-40	Vdc
Emitter – Base Voltage	V_{EBO}	-5.0	Vdc
Collector Current – Continuous	I_C	-200	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$	P_D	1.5 12	W mW/ $^\circ\text{C}$
Thermal Resistance Junction-to-Ambient (Note 1)	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-to-Lead #4	$R_{\theta JA}$	35	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

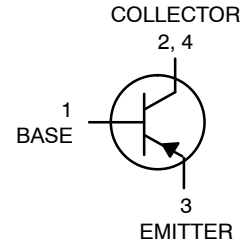
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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



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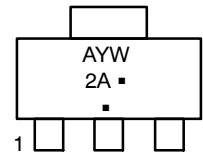
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MARKING DIAGRAM



**SOT-223
CASE 318E**



- 2A = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
PZT3906T1G	SOT-223 (Pb-Free)	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.

PZT3906T1G

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS (Note 2)

Collector – Emitter Breakdown Voltage (Note 2) (I _C = -1.0 mA _{dc} , I _B = 0)	V _{(BR)CEO}	-40	-	Vdc
Collector – Base Breakdown Voltage (I _C = -10 μA _{dc} , I _E = 0)	V _{(BR)CBO}	-40	-	
Emitter – Base Breakdown Voltage (I _E = -10 μA _{dc} , I _C = 0)	V _{(BR)EBO}	-5.0	-	
Base Cutoff Current (V _{CE} = -30 Vdc, V _{EB} = -3.0 Vdc)	I _{BL}	-	-50	nA _{dc}
Collector Cutoff Current (V _{CE} = -30 Vdc, V _{EB} = -3.0 Vdc)	I _{CEX}	-	-50	

ON CHARACTERISTICS (Note 2)

DC Current Gain (I _C = -0.1 mA _{dc} , V _{CE} = -1.0 Vdc) (I _C = -1.0 mA _{dc} , V _{CE} = -1.0 Vdc) (I _C = -10 mA _{dc} , V _{CE} = -1.0 Vdc) (I _C = -50 mA _{dc} , V _{CE} = -1.0 Vdc) (I _C = -100 mA _{dc} , V _{CE} = -1.0 Vdc)	H _{FE}	60 80 100 60 30	- - 300 - -	-
Collector – Emitter Saturation Voltage (I _C = -10 mA _{dc} , I _B = -1.0 mA _{dc}) (I _C = -50 mA _{dc} , I _B = -5.0 mA _{dc})	V _{CE(sat)}	- -	-0.25 -0.4	Vdc
Base – Emitter Saturation Voltage (I _C = -10 mA _{dc} , I _B = -1.0 mA _{dc}) (I _C = -50 mA _{dc} , I _B = -5.0 mA _{dc})	V _{BE(sat)}	-0.65 -	-0.85 -0.95	

SMALL-SIGNAL CHARACTERISTICS

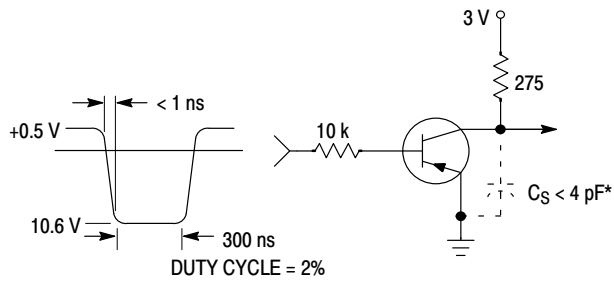
Current – Gain – Bandwidth Product (I _C = -10 mA _{dc} , V _{CE} = -20 Vdc, f = 100 MHz)	f _T	250	-	MHz
Output Capacitance (V _{CB} = -5.0 Vdc, I _E = 0, f = 1.0 MHz)	C _{obo}	-	4.5	pF
Input Capacitance (V _{EB} = -0.5 Vdc, I _C = 0, f = 1.0 MHz)	C _{ibo}	-	10	
Input Impedance (I _C = -1.0 mA _{dc} , V _{CE} = -10 Vdc, f = 1.0 kHz)	h _{ie}	2.0	12	kΩ
Voltage Feedback Ratio (I _C = -1.0 mA _{dc} , V _{CE} = -10 Vdc, f = 1.0 kHz)	h _{re}	0.1	10	X 10 ⁻⁴
Small – Signal Current Gain (I _C = -1.0 mA _{dc} , V _{CE} = -10 Vdc, f = 1.0 kHz)	h _{fe}	100	400	-
Output Admittance (I _C = -1.0 mA _{dc} , V _{CE} = -10 Vdc, f = 1.0 kHz)	h _{oe}	3.0	60	μmhos
Noise Figure (I _C = -100 μA _{dc} , V _{CE} = -5.0 Vdc, R _S = 1.0 kΩ, f = 1.0 kHz)	NF	-	4.0	dB

SWITCHING CHARACTERISTICS

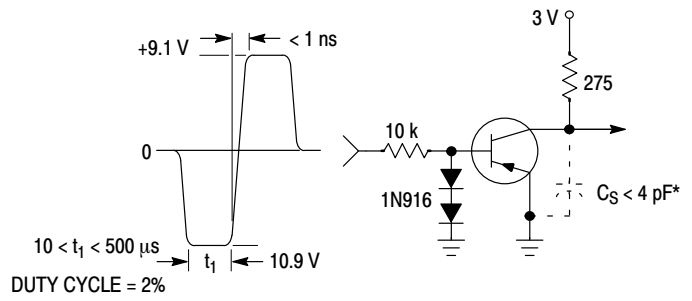
Delay Time	(V _{CC} = -3.0 Vdc, V _{BE} = 0.5 Vdc, I _C = -10 mA _{dc} , I _{B1} = -1.0 mA _{dc})	t _d	-	35	ns
Rise Time		t _r	-	35	
Storage Time	(V _{CC} = -3.0 Vdc, I _C = -10 mA _{dc} , I _{B1} = I _{B2} = -1.0 mA _{dc})	t _s	-	225	
Fall Time		t _f	-	75	

2. Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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**Figure 1. Delay and Rise Time
Equivalent Test Circuit**



**Figure 2. Storage and Fall Time
Equivalent Test Circuit**

* Total shunt capacitance of test jig and connectors

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TYPICAL TRANSIENT CHARACTERISTICS

— $T_J = 25^\circ\text{C}$
 - - - $T_J = 125^\circ\text{C}$

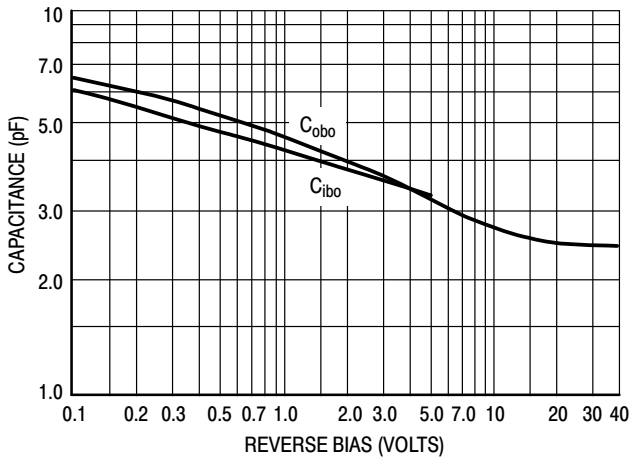


Figure 3. Capacitance

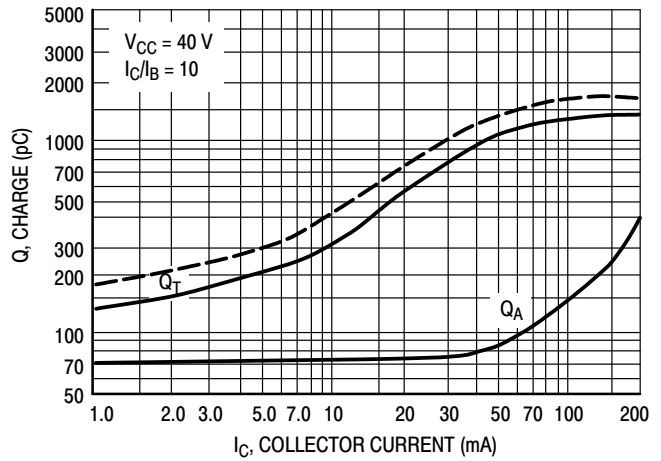


Figure 4. Charge Data

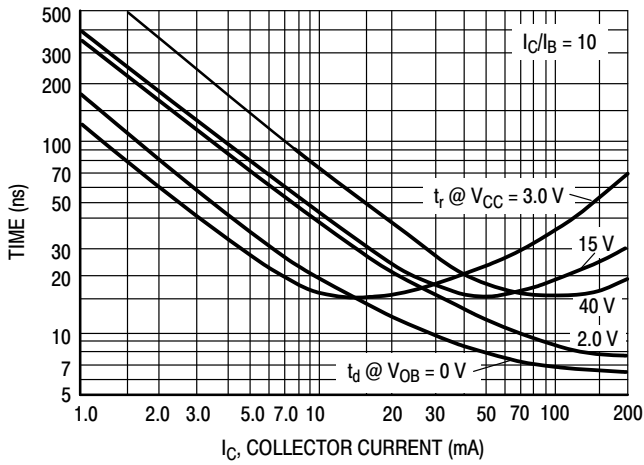


Figure 5. Turn-On Time

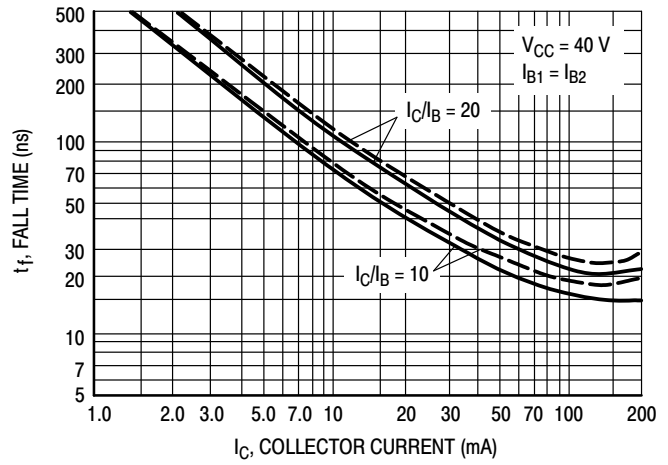


Figure 6. Fall Time

TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS NOISE FIGURE VARIATIONS

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

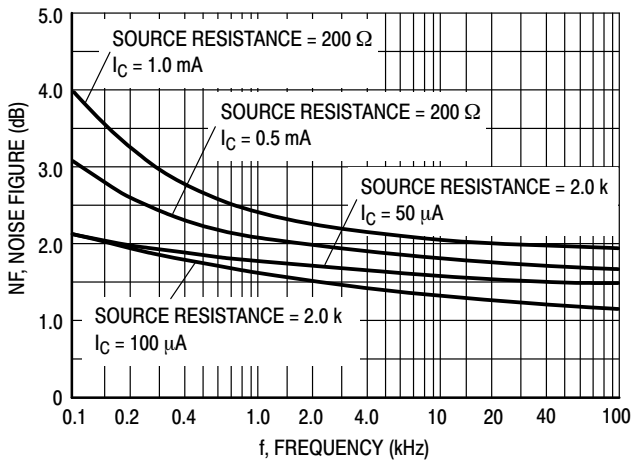


Figure 7.

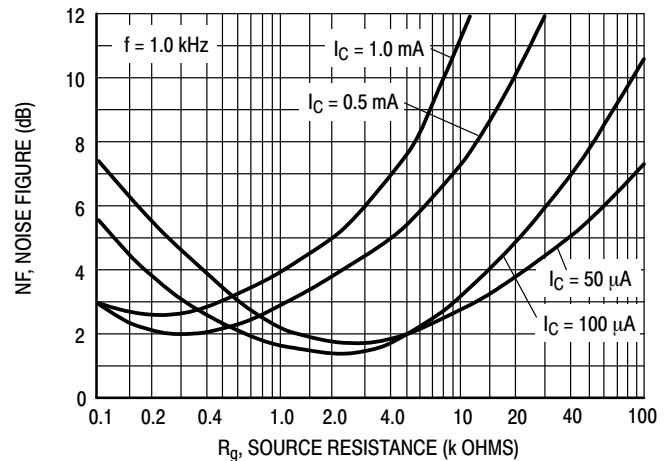


Figure 8.

PZT3906T1G

h PARAMETERS

($V_{CE} = -10$ Vdc, $f = 1.0$ kHz, $T_A = 25^\circ\text{C}$)

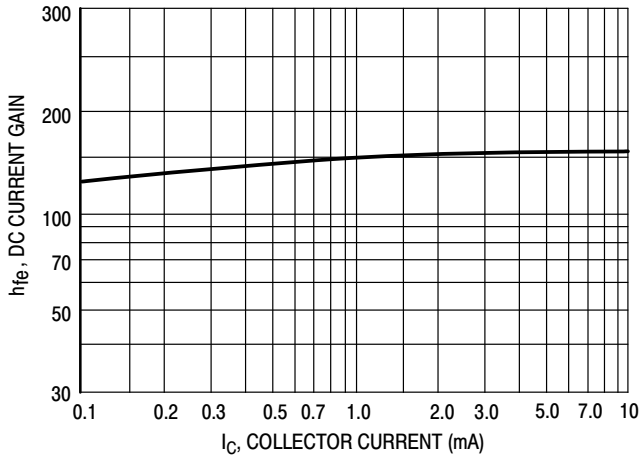


Figure 9. Current Gain

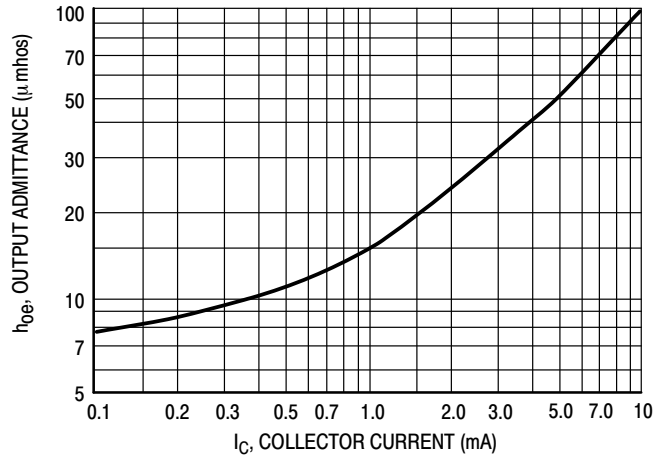


Figure 10. Output Admittance

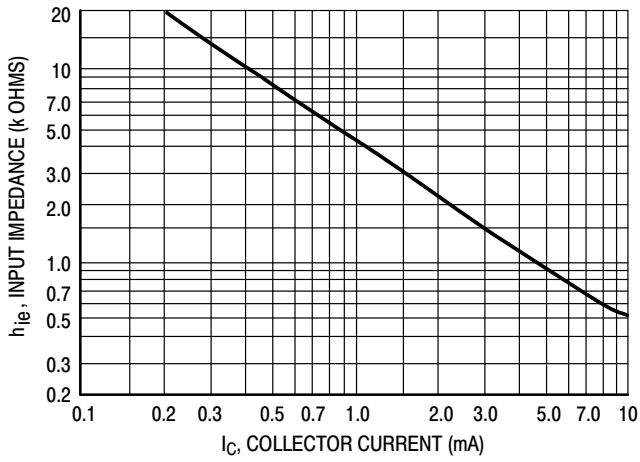


Figure 11. Input Impedance



Figure 12. Voltage Feedback Ratio

PZT3906T1G

TYPICAL STATIC CHARACTERISTICS

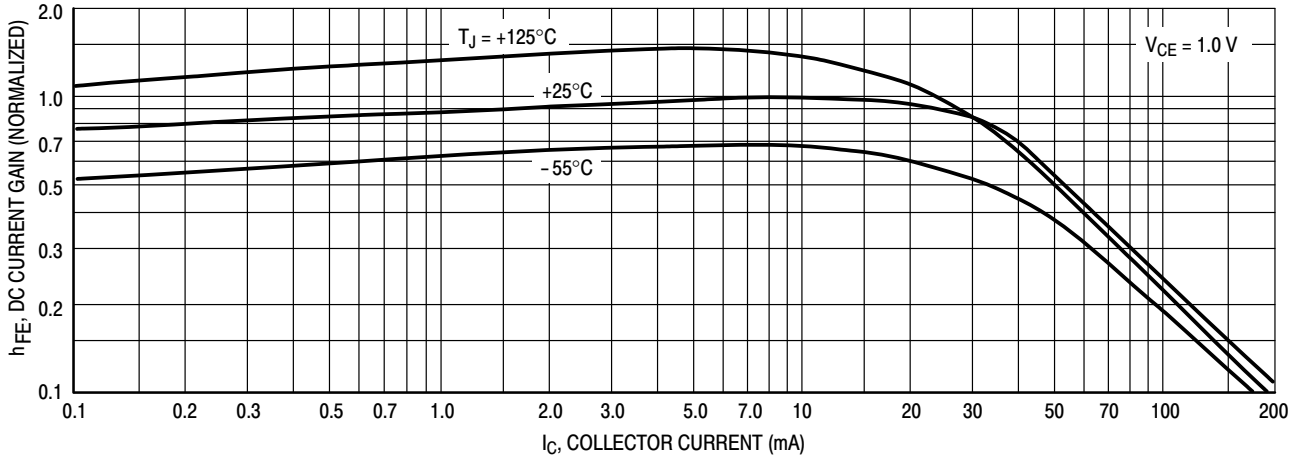


Figure 13. DC Current Gain

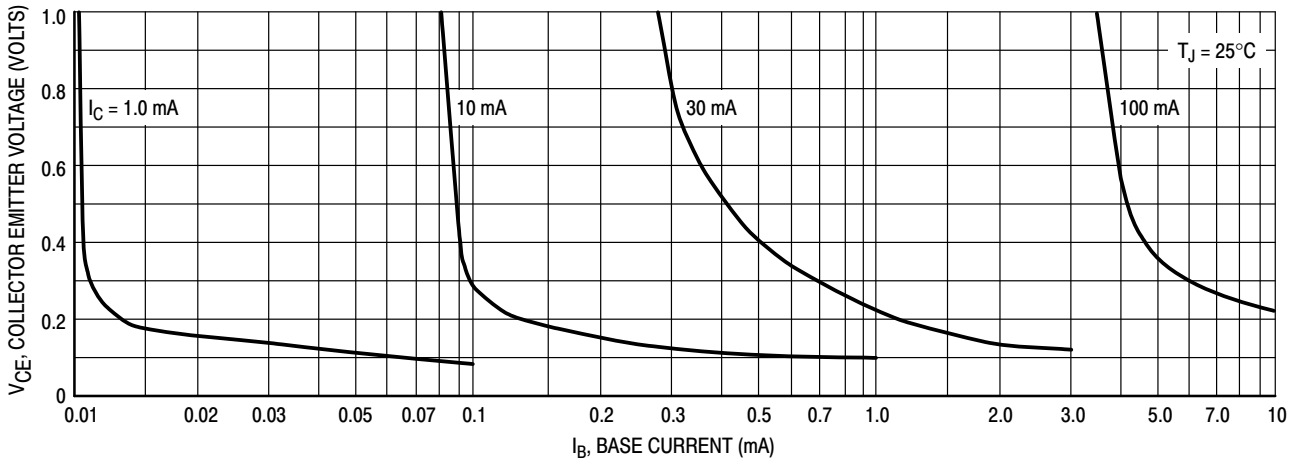


Figure 14. Collector Saturation Region

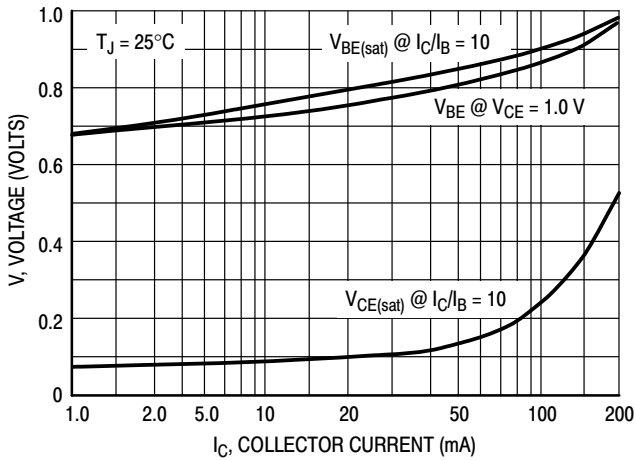


Figure 15. "ON" Voltages

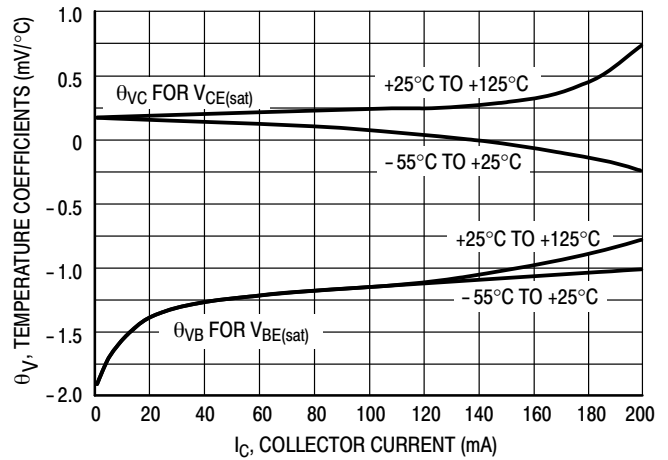


Figure 16. Temperature Coefficients

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

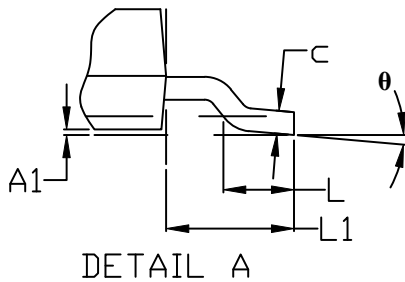
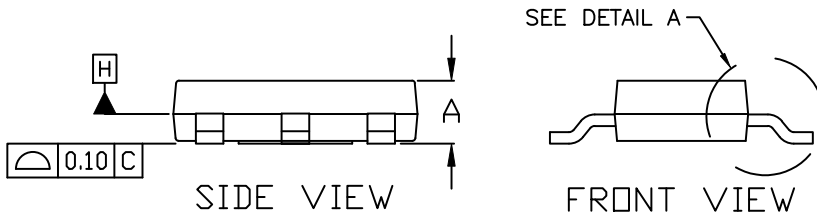
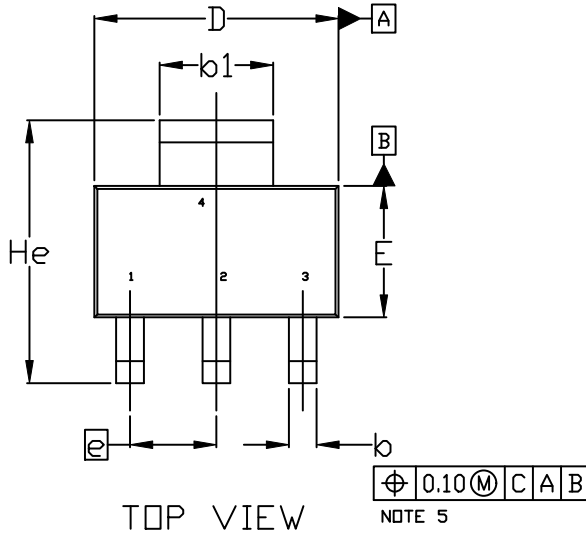
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SCALE 1:1

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

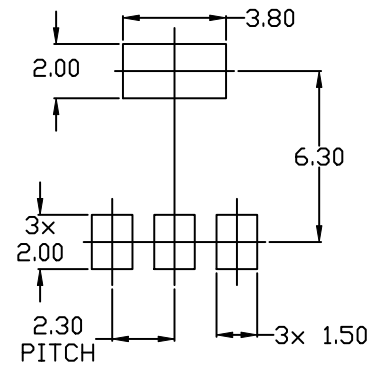
DATE 02 OCT 2018



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.200MM PER SIDE.
4. DATUMS A AND B ARE DETERMINED AT DATUM H.
5. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
6. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

MILLIMETERS			
DIM	MIN.	NOM.	MAX.
A	1.50	1.63	1.75
A1	0.02	0.06	0.10
b	0.60	0.75	0.89
b1	2.90	3.06	3.20
c	0.24	0.29	0.35
D	6.30	6.50	6.70
E	3.30	3.50	3.70
e	2.30 BSC		
L	0.20	---	---
L1	1.50	1.75	2.00
He	6.70	7.00	7.30
θ	0°	---	10°



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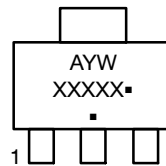
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SOT-223 (TO-261)
CASE 318E-04
ISSUE R

DATE 02 OCT 2018

- | | | | | |
|--|---|---|---|---|
| STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR | STYLE 2:
PIN 1. ANODE
2. CATHODE
3. NC
4. CATHODE | STYLE 3:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN | STYLE 4:
PIN 1. SOURCE
2. DRAIN
3. GATE
4. DRAIN | STYLE 5:
PIN 1. DRAIN
2. GATE
3. SOURCE
4. GATE |
| STYLE 6:
PIN 1. RETURN
2. INPUT
3. OUTPUT
4. INPUT | STYLE 7:
PIN 1. ANODE 1
2. CATHODE
3. ANODE 2
4. CATHODE | STYLE 8:
CANCELLED | STYLE 9:
PIN 1. INPUT
2. GROUND
3. LOGIC
4. GROUND | STYLE 10:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE |
| STYLE 11:
PIN 1. MT 1
2. MT 2
3. GATE
4. MT 2 | STYLE 12:
PIN 1. INPUT
2. OUTPUT
3. NC
4. OUTPUT | STYLE 13:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR | | |

**GENERIC
 MARKING DIAGRAM***




- A = Assembly Location
- Y = Year
- W = Work Week
- XXXXX = Specific Device Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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