

60 V, 6.0 A, Low $V_{CE(sat)}$ PNP Transistor

NSS60600MZ4

onsemi's e²PowerEdge family of low $V_{CE(sat)}$ transistors are surface mount devices featuring ultra low saturation voltage ($V_{CE(sat)}$) and high current gain capability. These are designed for use in low voltage, high speed switching applications where affordable efficient energy control is important.

Typical applications are DC-DC converters and power management in portable and battery powered products such as cellular and cordless phones, PDAs, computers, printers, digital cameras and MP3 players. Other applications are low voltage motor controls in mass storage products such as disc drives and tape drives. In the automotive industry they can be used in air bag deployment and in the instrument cluster. The high current gain allows e²PowerEdge devices to be driven directly from PMU's control outputs, and the Linear Gain (Beta) makes them ideal components in analog amplifiers.

Features

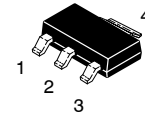
- Complementary to NSS60601MZ4
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant*

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

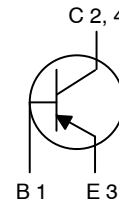
Symbol	Rating	Max	Unit
V_{CEO}	Collector-Emitter Voltage	-60	Vdc
V_{CBO}	Collector-Base Voltage	-100	Vdc
V_{EBO}	Emitter-Base Voltage	-6.0	Vdc
I_C	Collector Current - Continuous	-6.0	A
I_{CM}	Collector Current - Peak	-12.0	A

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.

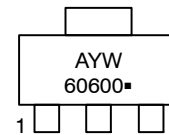
-60 VOLTS, 6.0 AMPS
2.0 WATTS
PNP LOW $V_{CE(sat)}$ TRANSISTOR
EQUIVALENT $R_{DS(on)}$ 50 m Ω



SOT-223
CASE 318E
STYLE 1

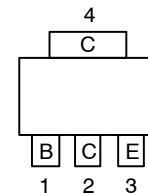


MARKING DIAGRAM



A = Assembly Location
Y = Year
W = Work Week
60600 = Specific Device Code
■ = Pb-Free Package

PIN ASSIGNMENT



Top View Pinout

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, [SOLDERM/D](#).

THERMAL CHARACTERISTICS

Symbol	Characteristic	Max	Unit
P_D (Note 1)	Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	800 6.5	mW mW/ $^\circ\text{C}$
$R_{\theta JA}$ (Note 1)	Thermal Resistance, Junction-to-Ambient	155	$^\circ\text{C}/\text{W}$
P_D (Note 2)	Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	2 15.6	W mW/ $^\circ\text{C}$
$R_{\theta JA}$ (Note 2)	Thermal Resistance, Junction-to-Ambient	64	$^\circ\text{C}/\text{W}$
$P_{D\text{single}}$ (Note 3)	Total Device Dissipation (Single Pulse < 10 sec.)	710	mW
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

1. FR-4 @ 7.6 mm², 1 oz. copper traces.
2. FR-4 @ 645 mm², 1 oz. copper traces.
3. Thermal response.



NSS60600MZ4

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

Symbol	Characteristic	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

V _{(BR)CEO}	Collector-Emitter Breakdown Voltage (I _C = -10 mAdc, I _B = 0)	-60	-	-	Vdc
V _{(BR)CBO}	Collector-Base Breakdown Voltage (I _C = -0.1 mAdc, I _E = 0)	-100	-	-	Vdc
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _E = -0.1 mAdc, I _C = 0)	-6.0	-	-	Vdc
I _{CBO}	Collector Cutoff Current (V _{CB} = -100 Vdc, I _E = 0)	-	-	-0.1	μAdc
I _{EBO}	Emitter Cutoff Current (V _{EB} = -6.0 Vdc)	-	-	-0.1	μAdc

ON CHARACTERISTICS

h _{FE}	DC Current Gain (Note 4) (I _C = -500 mA, V _{CE} = -2.0 V) (I _C = -1.0 A, V _{CE} = -2.0 V) (I _C = -2.0 A, V _{CE} = -2.0 V) (I _C = -6.0 A, V _{CE} = -2.0 V)	150 120 100 70	- - - -	- 360 - -	-
V _{CE(sat)}	Collector-Emitter Saturation Voltage (Note 4) (I _C = -0.1 A, I _B = -2.0 mA) (I _C = -1.0 A, I _B = -0.100 A) (I _C = -2.0 A, I _B = -0.200 A) (I _C = -3.0 A, I _B = -60 mA) (I _C = -6.0 A, I _B = -0.6 A)	- - - - -	- -0.050 -0.100 - -	-0.050 -0.070 -0.120 -0.250 -0.350	V
V _{BE(sat)}	Base-Emitter Saturation Voltage (Note 4) (I _C = -1.0 A, I _B = -0.1 A)	-	-	-1.0	V
V _{BE(on)}	Base-Emitter Turn-on Voltage (Note 4) (I _C = -1.0 A, V _{CE} = -2.0 V)	-	-	-0.900	V
f _T	Cutoff Frequency (I _C = -500 mA, V _{CE} = -10 V, f = 1.0 MHz)	100	-	-	MHz
C _{ibo}	Input Capacitance (V _{EB} = 5.0 V, f = 1.0 MHz)	-	360	-	pF
C _{obo}	Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz)	-	60	-	pF

SWITCHING CHARACTERISTICS

t _d	Delay (V _{CC} = -30 V, I _C = 750 mA, I _{B1} = 15 mA)	-	100	-	ns
t _r	Rise (V _{CC} = -30 V, I _C = 750 mA, I _{B1} = 15 mA)	-	180	-	ns
t _s	Storage (V _{CC} = -30 V, I _C = 750 mA, I _{B1} = 15 mA)	-	540	-	ns
t _f	Fall (V _{CC} = -30 V, I _C = 750 mA, I _{B1} = 15 mA)	-	145	-	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle ≤ 2%.

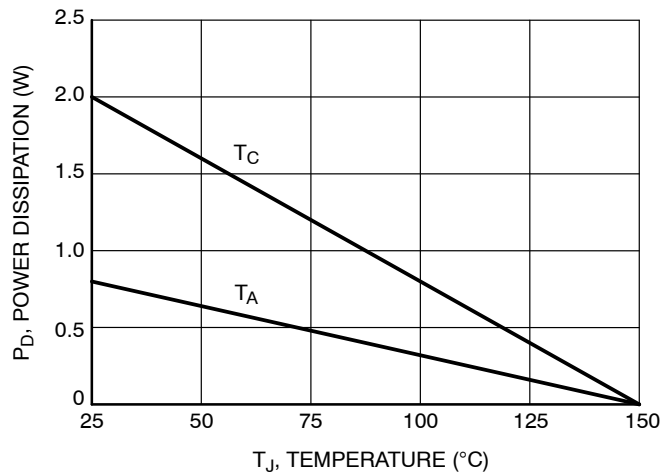


Figure 1. Power Derating

TYPICAL CHARACTERISTICS

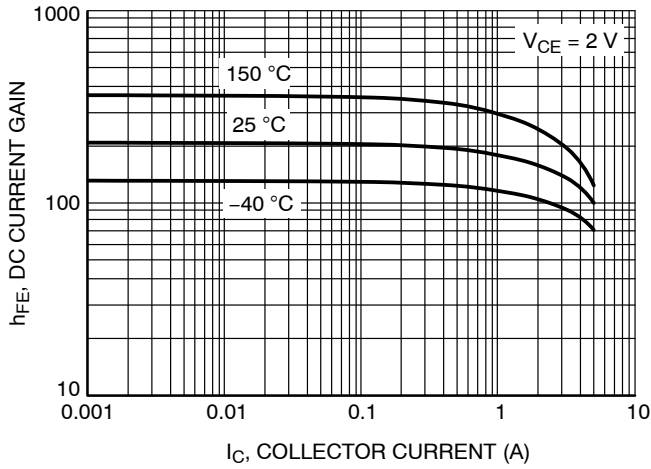


Figure 2. DC Current Gain

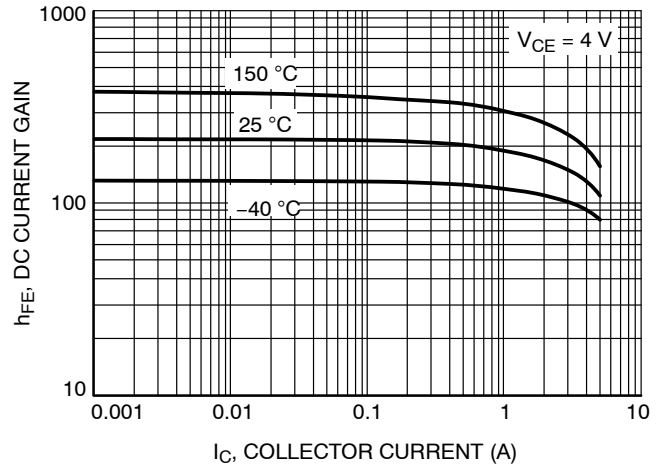


Figure 3. DC Current Gain

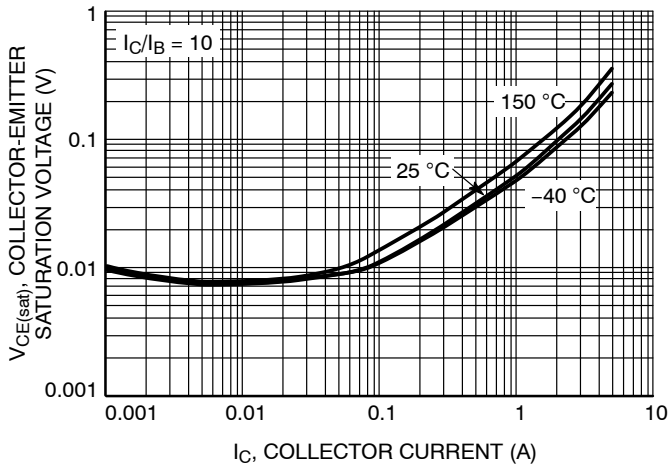


Figure 4. Collector-Emitter Saturation Voltage

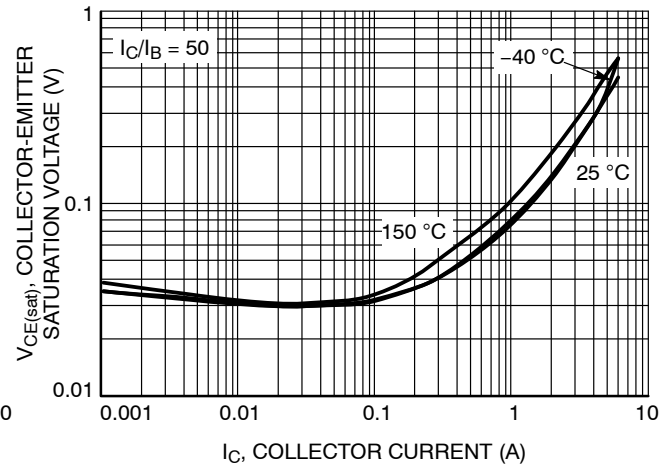


Figure 5. Collector-Emitter Saturation Voltage

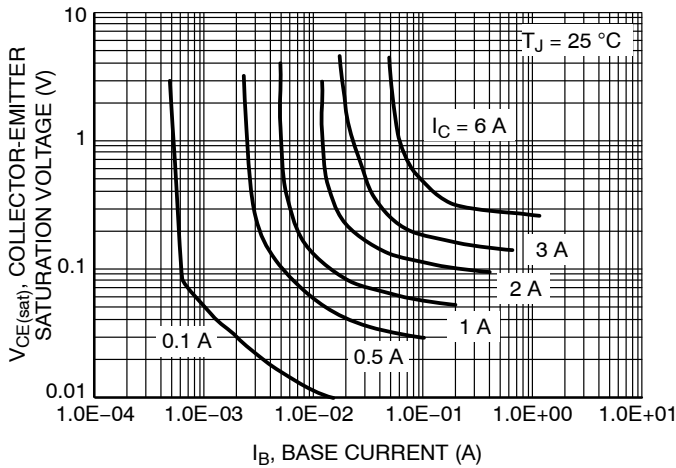


Figure 6. Collector Saturation Region

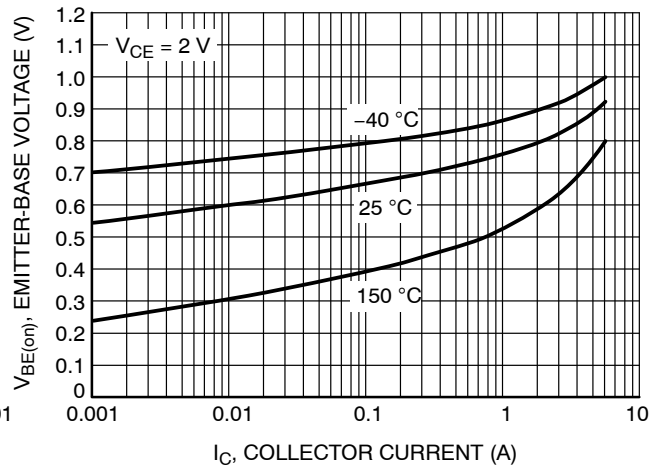


Figure 7. $V_{BE(on)}$ Voltage

TYPICAL CHARACTERISTICS

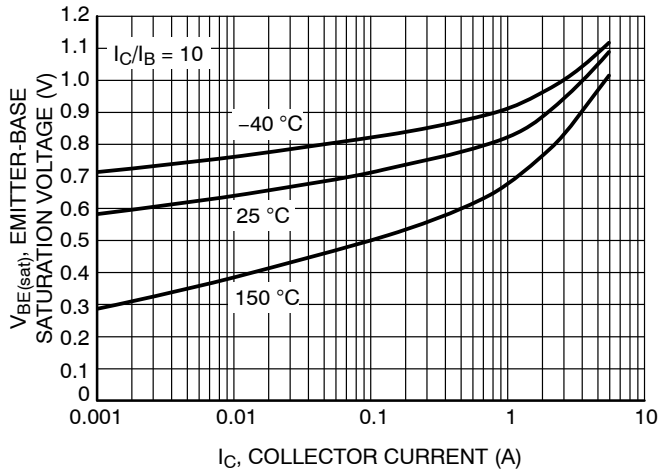


Figure 8. Base-Emitter Saturation Voltage

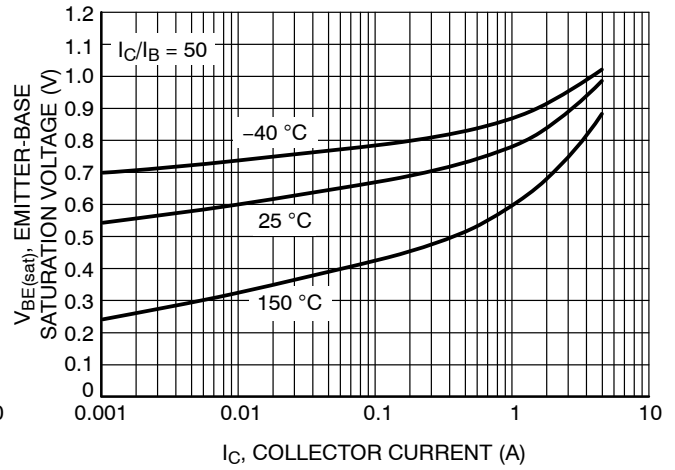


Figure 9. Base-Emitter Saturation Voltage

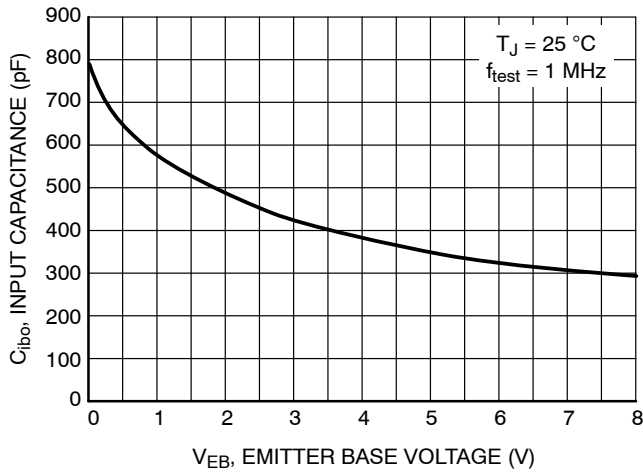


Figure 10. Input Capacitance

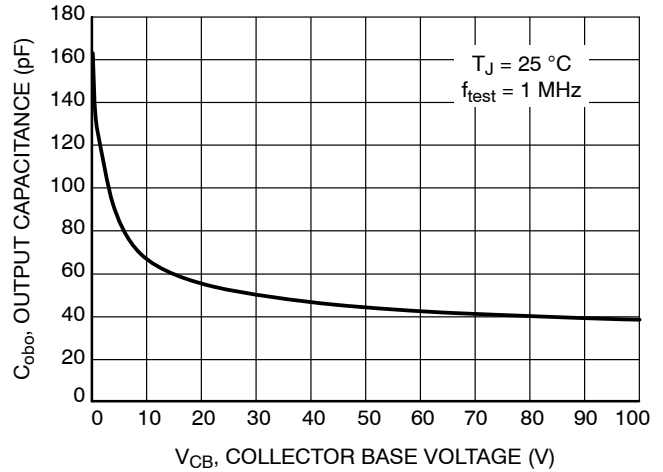


Figure 11. Output Capacitance

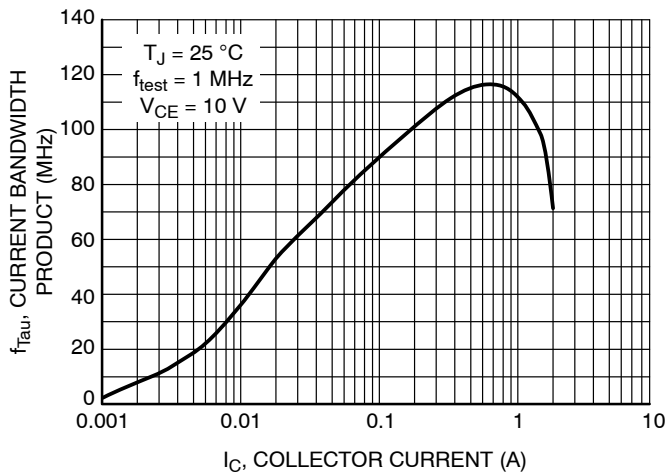


Figure 12. Current-Gain Bandwidth Product

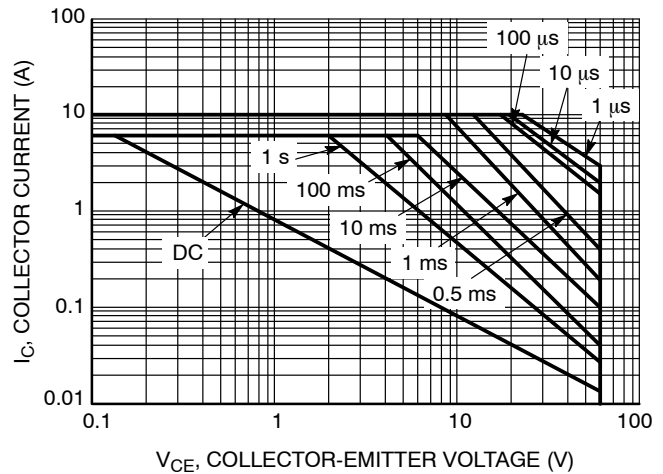


Figure 13. Safe Operating Area

NSS60600MZ4

ORDERING INFORMATION

Device	Package	Shipping [†]
NSS60600MZ4T1G	SOT-223 (Pb-Free)	1,000 / Tape & Reel
NSV60600MZ4T1G	SOT-223 (Pb-Free)	1,000 / Tape & Reel
NSS60600MZ4T3G	SOT-223 (Pb-Free)	4,000 / Tape & Reel
NSV60600MZ4T3G	SOT-223 (Pb-Free)	4,000 / 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](#).



REVISION HISTORY

Revision	Description of Changes	Date
6	Rebranded the Data Sheet to onsemi format.	01/12/2026

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

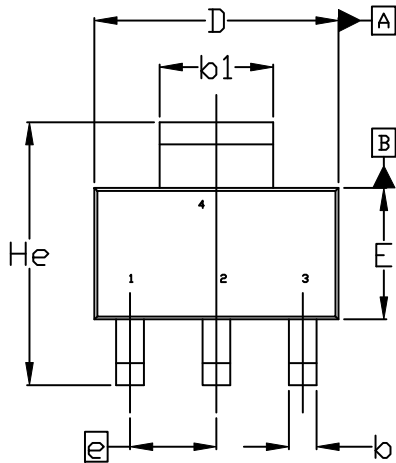




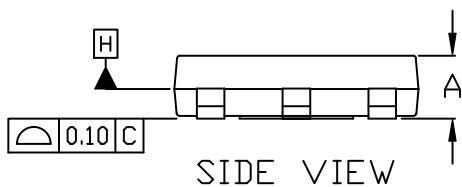
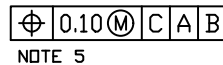
SCALE 1:1

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

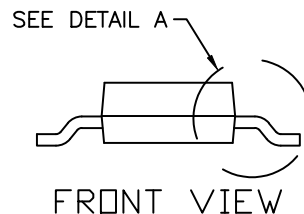
DATE 02 OCT 2018



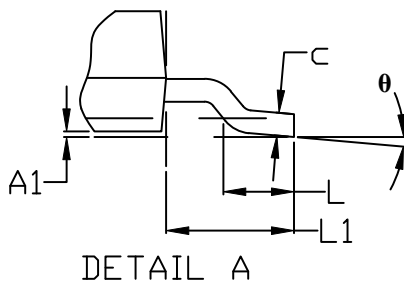
TOP VIEW



SIDE VIEW



FRONT VIEW

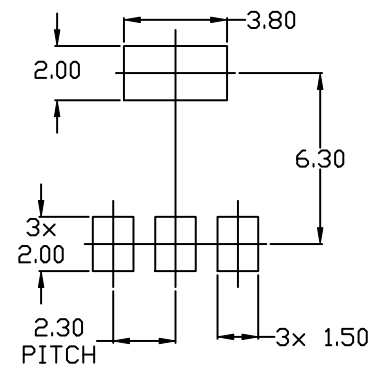


DETAIL A

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°



RECOMMENDED MOUNTING
FOOTPRINT

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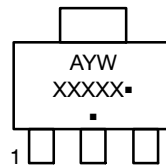
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SOT-223 (TO-261)
CASE 318E-04
ISSUE R

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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