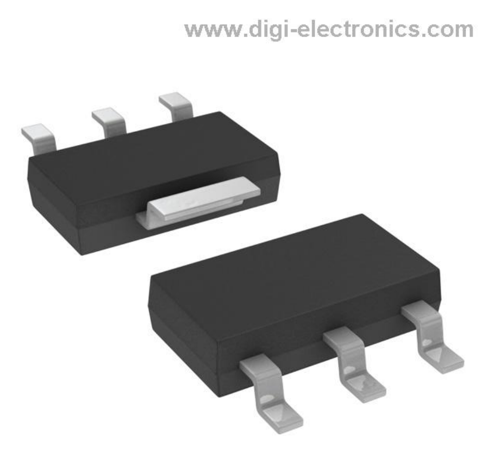
BCP56T3G Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	BCP56T3G-DG
Manufacturer	onsemi
Manufacturer Product Number	BCP56T3G
Description	TRANS NPN 80V 1A SOT223
Detailed Description	Bipolar (BJT) Transistor NPN 80 V 1 A 130MHz 1.5 W Surface Mount SOT-223 (TO-261)

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
BCP56T3G	onsemi
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
NPN	1 A
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
80 V	500mV @ 50mA, 500mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA (ICBO)	40 @ 150mA, 2V
Power - Max:	Frequency - Transition:
1.5 W	130MHz
Operating Temperature:	Mounting Type:
-65°C ~ 150°C (TJ)	Surface Mount
Package / Case:	Supplier Device Package:
TO-261-4, TO-261AA	SOT-223 (TO-261)
Base Product Number:	
BCP56	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0075	

NPN Silicon Epitaxial Transistor

BCP56 Series

These NPN Silicon Epitaxial transistors are designed for use in audio amplifier applications. The device is housed in the SOT−223 package, which is designed for medium power surface mount applications.

Features

- High Current: 1.0 A
- The SOT−223 package can be soldered using wave or reflow. The formed leads absorb thermal stress during soldering, eliminating the possibility of damage to the die
- Available in 12 mm Tape and Reel
  Use BCP56T1G to Order the 7 inch/1000 Unit Reel
  Use BCP56T3G to Order the 13 inch/4000 Unit Reel
- PNP Complement is BCP53T1G
- S and 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_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	80	Vdc
Collector−Base Voltage	V_{CBO}	100	Vdc
Emitter−Base Voltage	V_{EBO}	5	Vdc
Collector Current	I_C	1	Adc
Collector Current − Peak (Note 1)	I_{CM}	2	Adc
Total Power Dissipation @ T_A = 25°C (Note 2) Derate above 25°C	P_D	 1.5 12	 W mW/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−65 to 150	°C

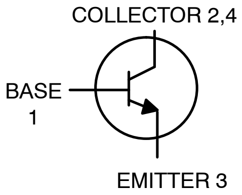
THERMAL CHARACTERISTICS

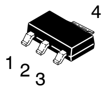
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient (surface mounted)	$R_{\theta JA}$	83.3	°C/W
Maximum Temperature for Soldering Purposes Time in Solder Bath	T_L	260 10	°C Sec

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. Reference SOA curve.
2. Device mounted on a FR−4 glass epoxy printed circuit board 1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.

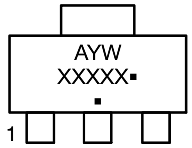
MEDIUM POWER NPN SILICON HIGH CURRENT TRANSISTOR SURFACE MOUNT





SOT−223
CASE 318E
STYLE 1

MARKING DIAGRAM



XXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 5 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 5.

August, 2024 − Rev. 16

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

Characteristics		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		$V_{(BR)CBO}$	100	–	–	Vdc
Collector−Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)		$V_{(BR)CEO}$	80	–	–	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	–	–	Vdc
Collector−Base Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)		I_{CBO}	–	–	100	nAdc
Emitter−Base Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)		I_{EBO}	–	–	10	μAdc
ON CHARACTERISTICS (Note 3)						
DC Current Gain		h_{FE}				–
(I_C = 5.0 mA, V_{CE} = 2.0 V)	All Part Types		25	–	–	
(I_C = 150 mA, V_{CE} = 2.0 V)	BCP56		40	–	250	
	BCP56−10		63	–	160	
	BCP56−16		100	–	250	
(I_C = 500 mA, V_{CE} = 2.0 V)	All Types		25	–	–	
Collector−Emitter Saturation Voltage (I_C = 500 mAdc, I_B = 50 mAdc)		$V_{CE(sat)}$	–	–	0.5	Vdc
Base−Emitter On Voltage (I_C = 500 mAdc, V_{CE} = 2.0 Vdc)		$V_{BE(on)}$	–	–	1.0	Vdc
SWITCHING CHARACTERISTICS						
Rise Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA)		t_r	–	14	–	ns
Delay Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA)		t_d	–	9	–	ns
Storage Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA, I_{B2} = 15 mA)		t_s	–	714	–	ns
Fall Time (V_{CC} = 30 Vdc, I_C = 150 mA, I_{B1} = 15 mA, I_{B2} = 15 mA)		t_f	–	58	–	ns
DYNAMIC CHARACTERISTICS						
Current−Gain − Bandwidth Product (I_C = 10 mAdc, V_{CE} = 5.0 Vdc, f = 35 MHz)		f_T	–	130	–	MHz

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.

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

TYPICAL ELECTRICAL CHARACTERISTICS

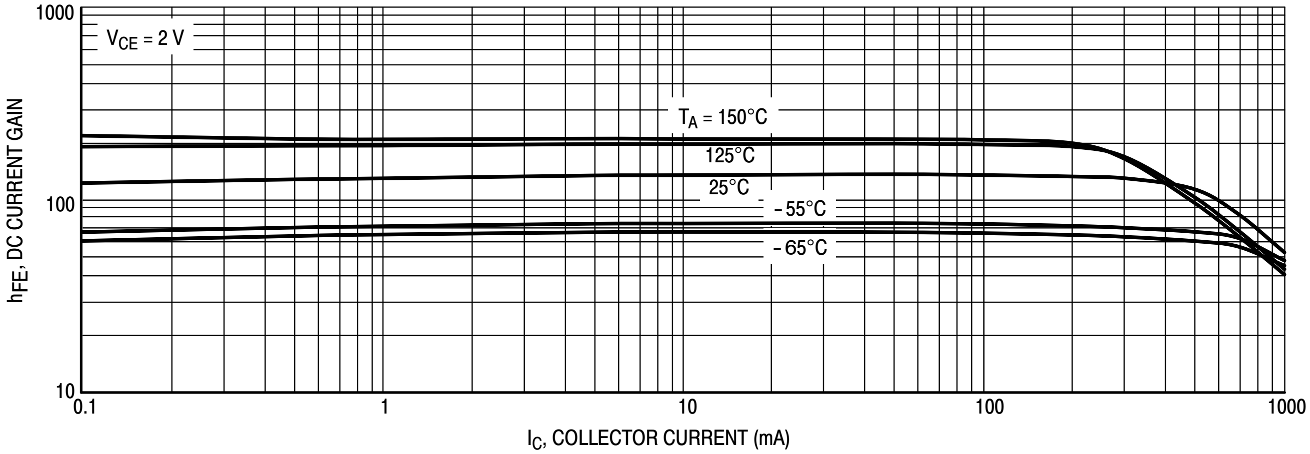


Figure 1. DC Current Gain

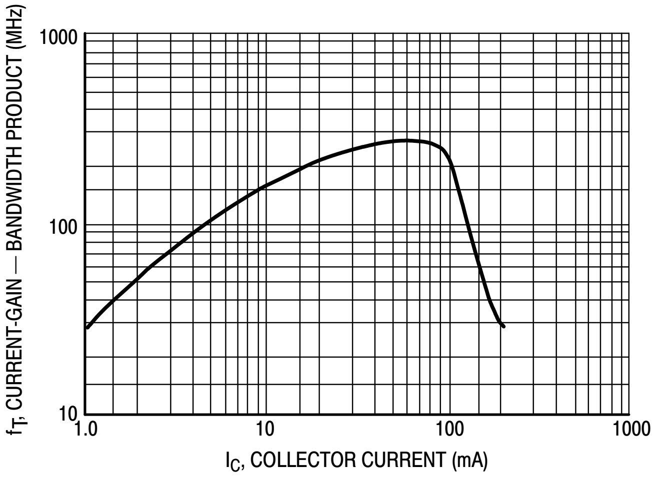


Figure 2. Current−Gain − Bandwidth Product

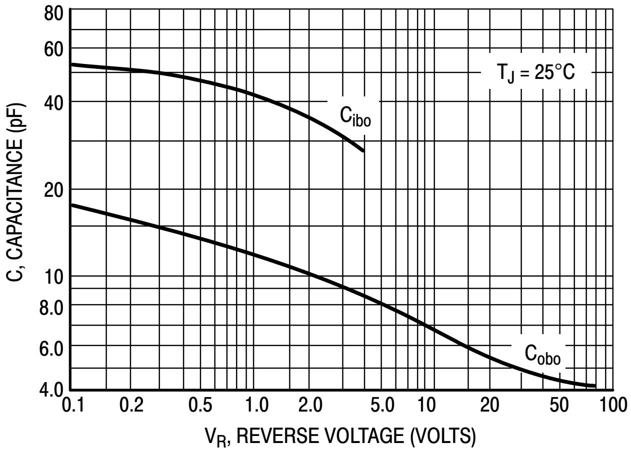


Figure 3. Capacitance

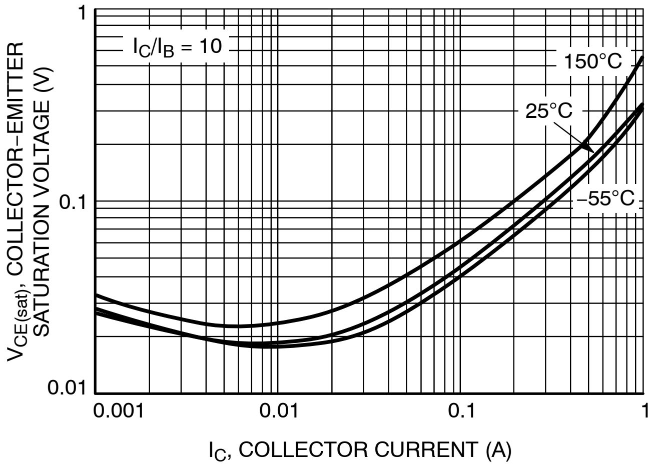


Figure 4. Collector Emitter Saturation Voltage vs. Collector Current

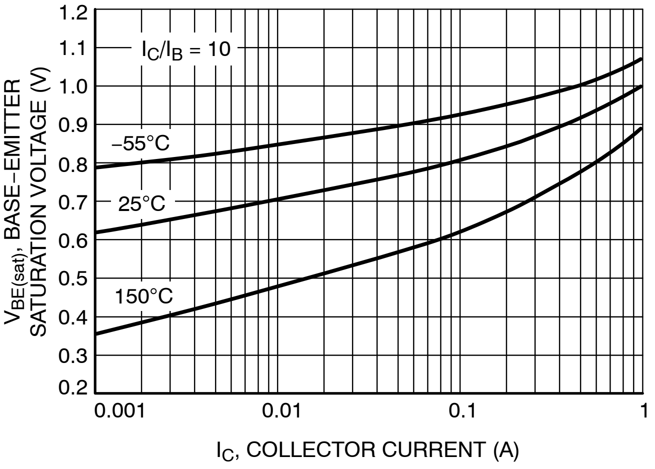


Figure 5. Base Emitter Saturation Voltage vs. Collector Current

TYPICAL ELECTRICAL CHARACTERISTICS

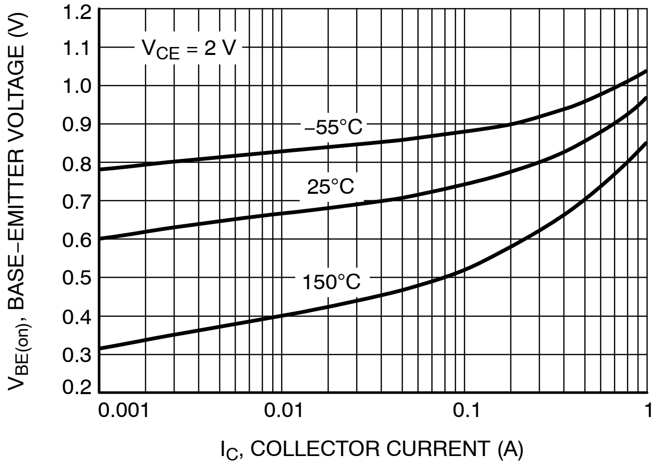


Figure 6. Base Emitter Voltage vs. Collector Current

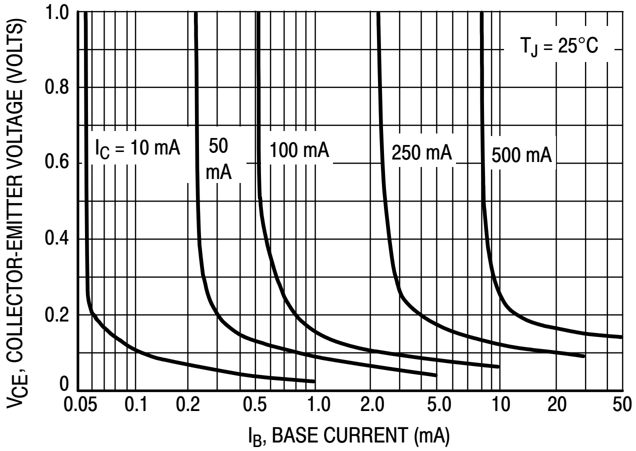


Figure 7. Collector Saturation Region

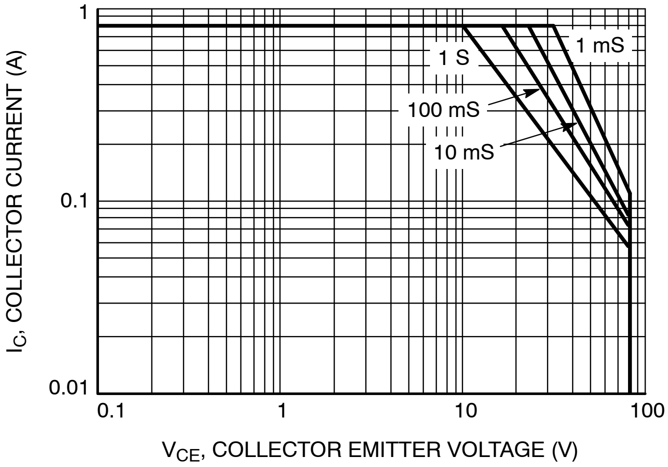


Figure 8. Safe Operating Area

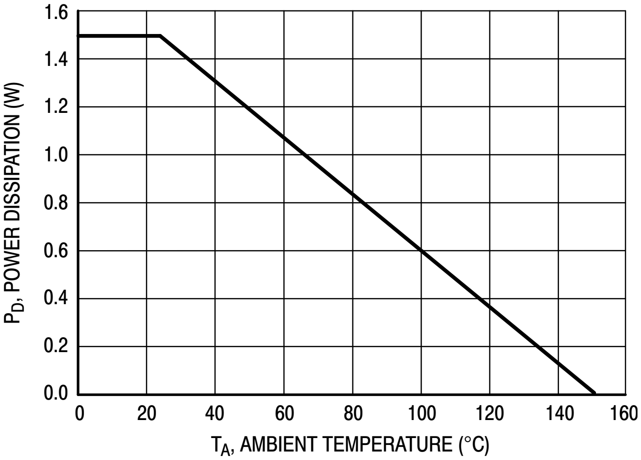


Figure 9. Power Derating Curve

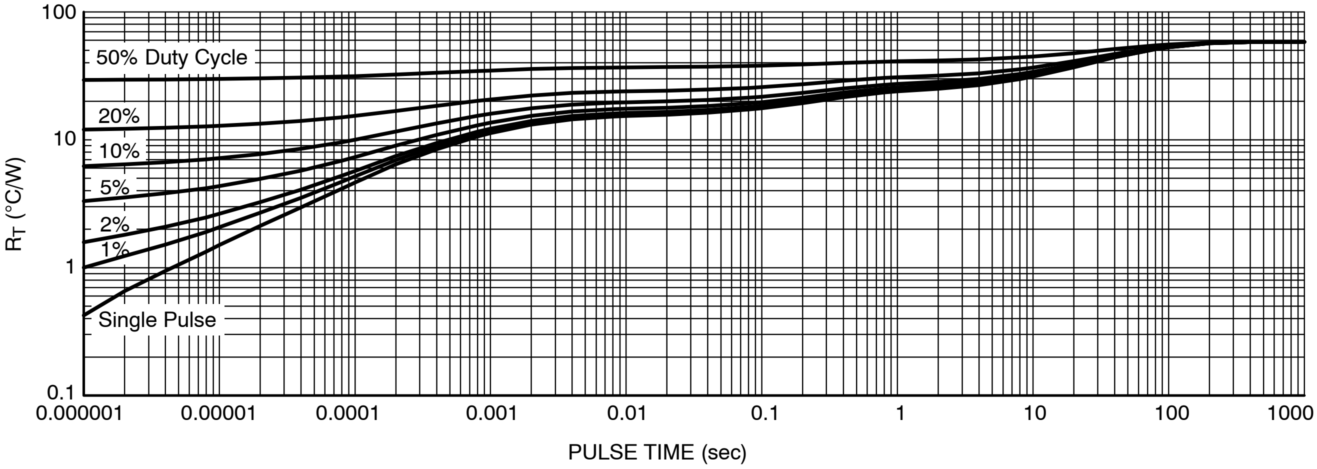


Figure 10. Thermal Response

ORDERING INFORMATION

Device	Marking	Package	Shipping†
BCP56T1G	BH	SOT−223 (Pb−Free)	1000 / Tape & Reel
SBCP56T1G*			
BCP56T3G	BH	SOT−223 (Pb−Free)	4000 / Tape & Reel
SBCP56T3G*			
BCP56−10T1G	BH−10	SOT−223 (Pb−Free)	1000 / Tape & Reel
SBCP56−10T1G*			
NSVBCP56−10T3G*	BH−10	SOT−223 (Pb−Free)	4000 / Tape & Reel
BCP56−16T1G	BH−16	SOT−223 (Pb−Free)	1000 / Tape & Reel
SBCP56−16T1G*			
BCP56−16T3G	BH−16	SOT−223 (Pb−Free)	4000 / Tape & Reel
SBCP56−16T3G*			

DISCONTINUED (Note 4)

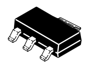
BCP56−10T3G	BH−10	SOT−223 (Pb−Free)	4000 / Tape & Reel

†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.

*S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

4. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

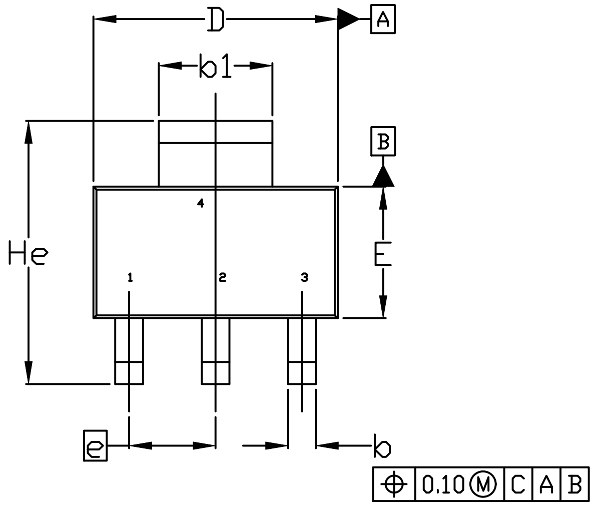
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



SCALE 1:1

SOT−223 (TO−261)
CASE 318E−04
ISSUE R

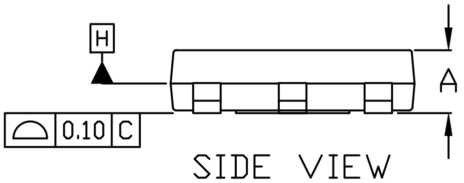
DATE 02 OCT 2018



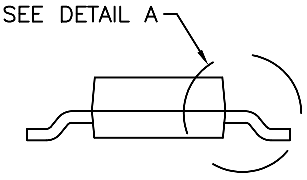
TOP VIEW

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.

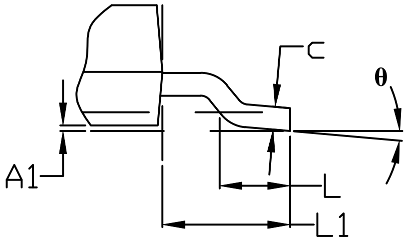
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	1.50	1.63	1.75
A1	0.02	0.06	0.10
b	0.60	0.75	0.89
b1	2.90	3.06	3.20
c	0.24	0.29	0.35
D	6.30	6.50	6.70
E	3.30	3.50	3.70
e	2.30 BSC		
L	0.20	---	---
L1	1.50	1.75	2.00
He	6.70	7.00	7.30
θ	0°	---	10°



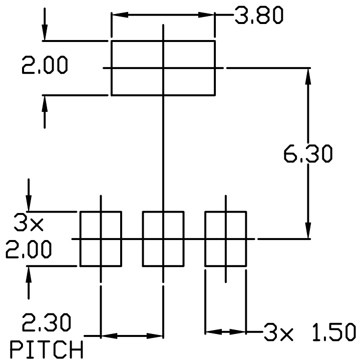
SIDE VIEW



FRONT VIEW



DETAIL A



RECOMMENDED MOUNTING FOOTPRINT

DOCUMENT NUMBER:	**98ASB42680B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.	
DESCRIPTION:	**SOT−223 (TO−261)**		**PAGE 1 OF 2**

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

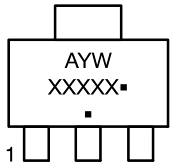
STYLE 10:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

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.

onsemi, onsemi, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**’s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided “as−is” and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. “Typical” parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊

DiGi Electronics

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com

DCI.

QUALITY MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T 19001-2016 idt ISO9001:2015

DCI Certification Ltd

DCI.

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T 24001-2016 idt ISO14001:2015

DCI Certification Ltd

DCI.

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T45001-2020 idt ISO45001:2018

DCI Certification Ltd

CR

CERTIFICATE OF INCORPORATION

I hereby certify that

DIGI ELECTRONICS HK LIMITED

is this day incorporated in Hong Kong under the Companies Ordinance (Chapter 622 of the Laws of Hong Kong), and that this company is a limited company.

Registrar of Companies
Hong Kong Special Administrative Region

ASA

MEMBERSHIP
Certificate

DIGI ELECTRONICS HK LIMITED

Michele Dickstein
President

dun & bradstreet

A Dun & Bradstreet
D-U-N-S® Registered™ Business