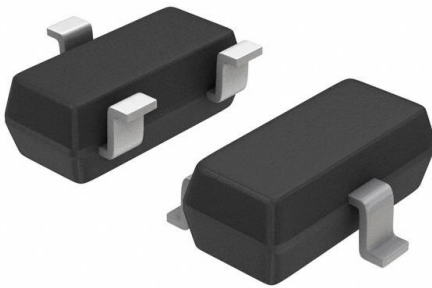


BSS138LT3G Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	BSS138LT3G-DG
Manufacturer	onsemi
Manufacturer Product Number	BSS138LT3G
Description	MOSFET N-CH 50V 200MA SOT23-3
Detailed Description	N-Channel 50 V 200mA (Ta) 225mW (Ta) Surface Mount SOT-23-3 (TO-236)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BSS138LT3G

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

50 V

Drive Voltage (Max Rds On, Min Rds On):

5V

Vgs(th) (Max) @ Id:

1.5V @ 1mA

Input Capacitance (Ciss) (Max) @ Vds:

50 pF @ 25 V

Power Dissipation (Max):

225mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

Manufacturer:

onsemi

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

200mA (Ta)

Rds On (Max) @ Id, Vgs:

3.5Ohm @ 200mA, 5V

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (TJ)

Supplier Device Package:

SOT-23-3 (TO-236)

Base Product Number:

BSS138

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

MOSFET – Power, N-Channel, SOT-23

200 mA, 50 V

BSS138L, BVSS138L

Typical applications are DC–DC converters, power management in portable and battery–powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

Features

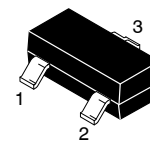
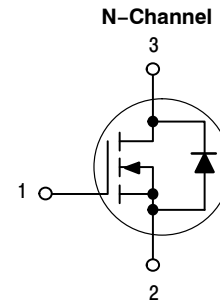
- Low Threshold Voltage ($V_{GS(th)}$: 0.85 V–1.5 V) Makes it Ideal for Low Voltage Applications
- Miniature SOT–23 Surface Mount Package Saves Board Space
- HBM Class 0A, MM Class M1A, CDM Class IV (Note 3)
- BVSS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

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

Rating	Symbol	Value	Unit
Drain–to–Source Voltage	V_{DSS}	50	Vdc
Gate–to–Source Voltage – Continuous	V_{GS}	± 20	Vdc
Drain Current			mA
– Continuous @ $T_A = 25^\circ\text{C}$	I_D	200	
– Pulsed Drain Current ($t_p \leq 10 \mu\text{s}$)	I_{DM}	800	
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_D	225	mW
Operating and Storage Temperature Range	T_J, T_{stg}	– 55 to 150	$^\circ\text{C}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	T_L	260	$^\circ\text{C}$

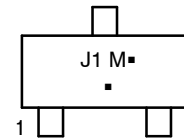
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

200 mA, 50 V
 $R_{DS(on)} = 3.5 \Omega$



**SOT-23
CASE 318
STYLE 21**

MARKING DIAGRAM



J1 = Device Code
M = Date Code*
▪ = Pb–Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
BSS138LT1G, BVSS138LT1G	SOT-23 (Pb–Free)	3,000 / Tape & Reel
BSS138LT7G	SOT-23 (Pb–Free)	3,500 / Tape & Reel
BSS138LT3G, BVSS138LT3G	SOT-23 (Pb–Free)	10,000 / 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.

BSS138L, BVSS138L**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-to-Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = 250\ \mu\text{Adc}$)	$V_{(BR)DSS}$	50	–	–	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, 25°C) ($V_{DS} = 50\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, 25°C) ($V_{DS} = 50\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, 150°C)	I_{DSS}	–	–	0.1 0.5 5.0	μAdc
Gate-Source Leakage Current ($V_{GS} = \pm 20\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	–	–	± 0.1	μAdc

ON CHARACTERISTICS (Note 1)

Gate-Source Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 1.0\text{ mAdc}$)	$V_{GS(th)}$	0.85	–	1.5	Vdc
Static Drain-to-Source On-Resistance ($V_{GS} = 2.75\text{ Vdc}$, $I_D < 200\text{ mAdc}$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$) ($V_{GS} = 5.0\text{ Vdc}$, $I_D = 200\text{ mAdc}$)	$r_{DS(on)}$	–	5.6 –	10 3.5	Ω
Forward Transconductance ($V_{DS} = 25\text{ Vdc}$, $I_D = 200\text{ mAdc}$, $f = 1.0\text{ kHz}$)	g_{fs}	100	–	–	mmhos

DYNAMIC CHARACTERISTICS

Input Capacitance	($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1\text{ MHz}$)	C_{iss}	–	40	50	pF
Output Capacitance	($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1\text{ MHz}$)	C_{oss}	–	12	25	
Transfer Capacitance	($V_{DG} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1\text{ MHz}$)	C_{rss}	–	3.5	5.0	

SWITCHING CHARACTERISTICS (Note 2)

Turn-On Delay Time	(V _{DD} = 30 Vdc, I _D = 0.2 Adc.)	$t_{d(on)}$	–	–	20	ns
Turn-Off Delay Time		$t_{d(off)}$	–	–	20	

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.

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.
2. Switching characteristics are independent of operating junction temperature.
3. ESD between the gate and source serves only, no gate overvoltage rating is implied.

BSS138L, BVSS138L

TYPICAL ELECTRICAL CHARACTERISTICS

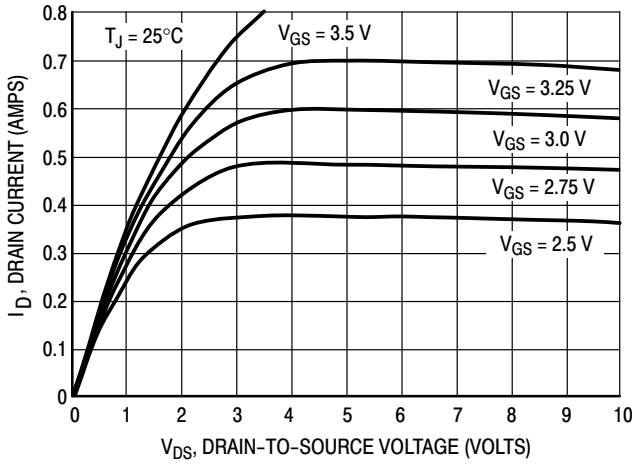


Figure 1. On-Region Characteristics

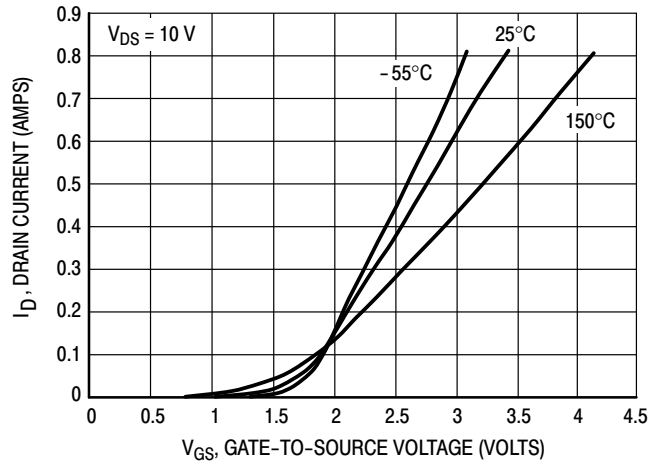


Figure 2. Transfer Characteristics

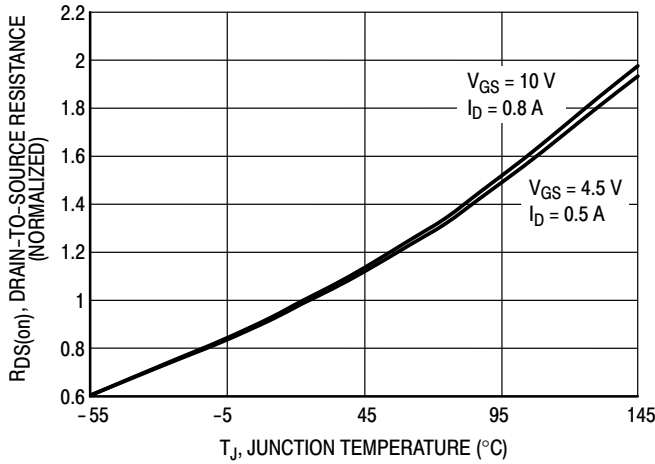


Figure 3. On-Resistance Variation with Temperature

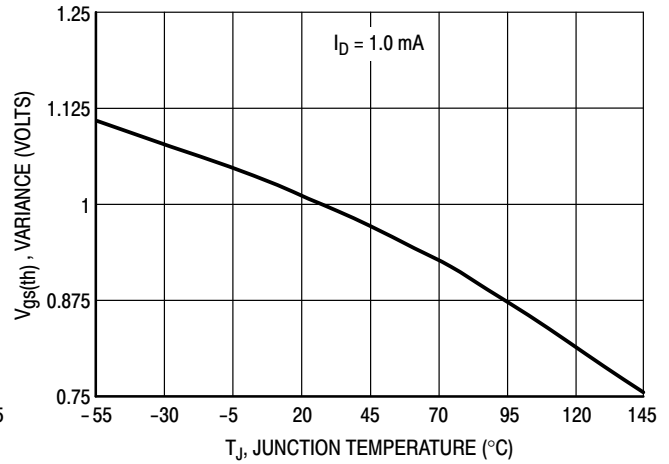


Figure 4. Threshold Voltage Variation with Temperature

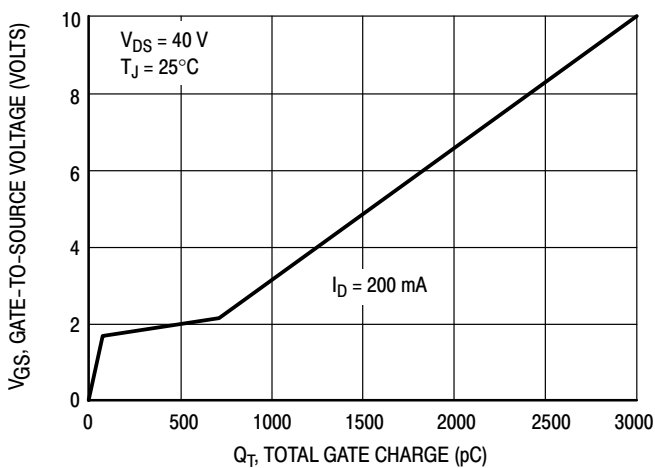


Figure 5. Gate Charge

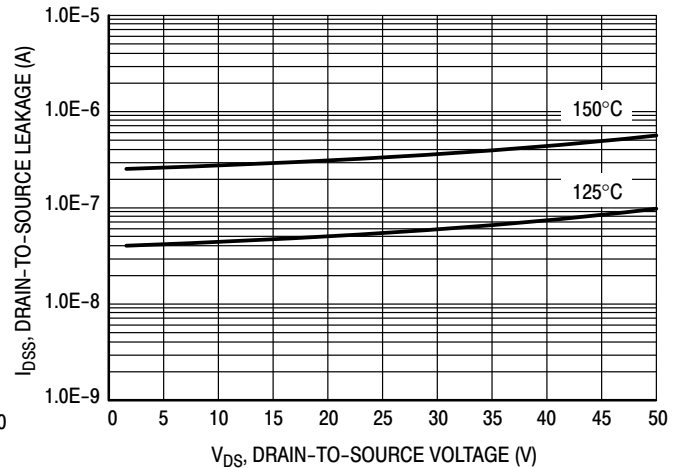


Figure 6. IDSS

BSS138L, BVSS138L

TYPICAL ELECTRICAL CHARACTERISTICS

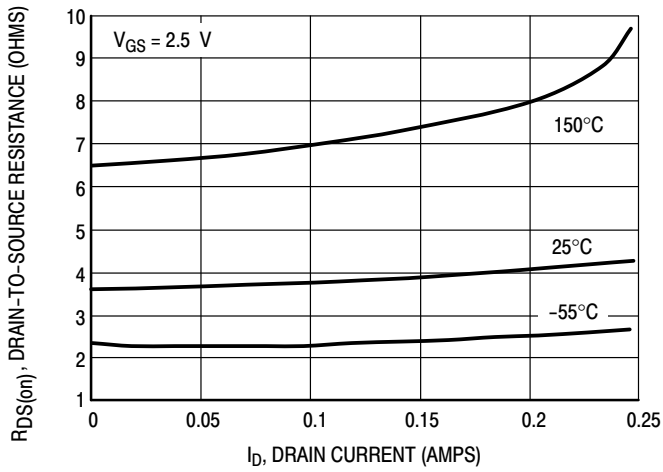


Figure 7. On-Resistance versus Drain Current

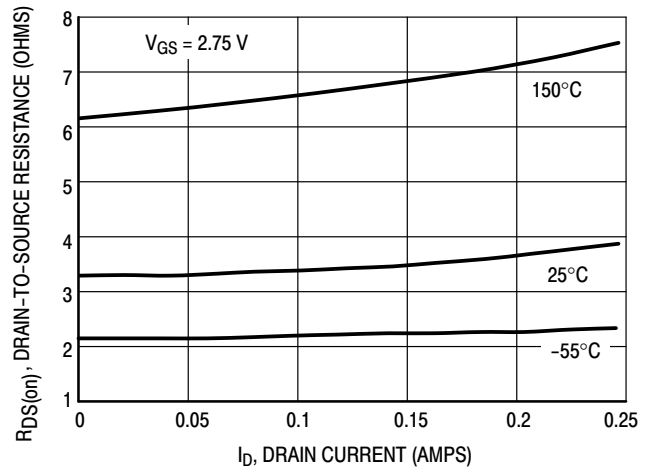


Figure 8. On-Resistance versus Drain Current

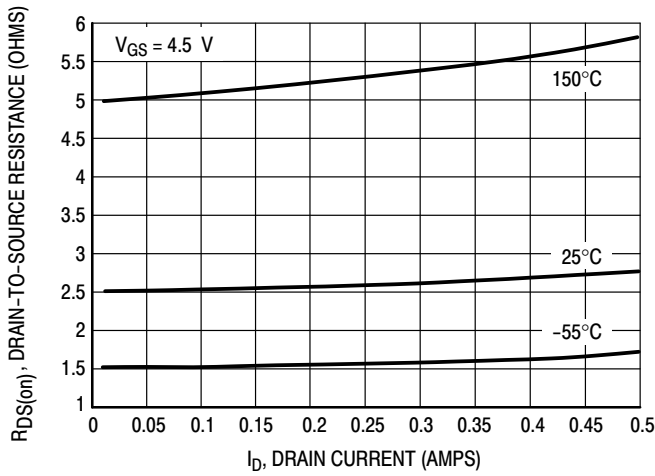


Figure 9. On-Resistance versus Drain Current

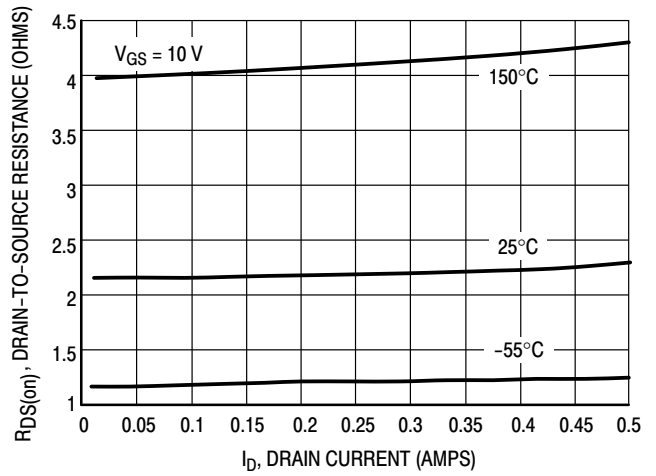


Figure 10. On-Resistance versus Drain Current

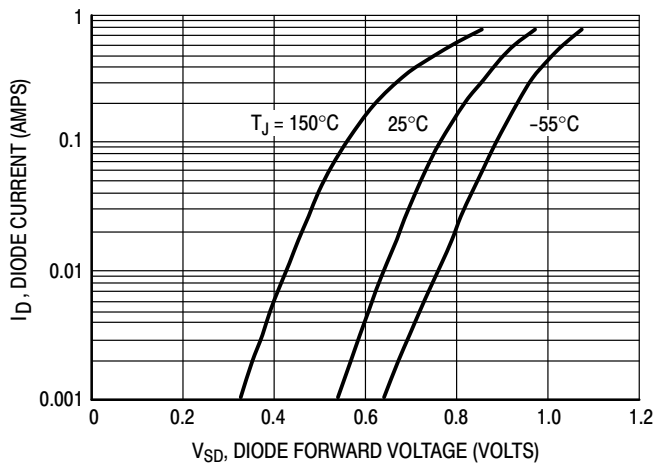


Figure 11. Body Diode Forward Voltage

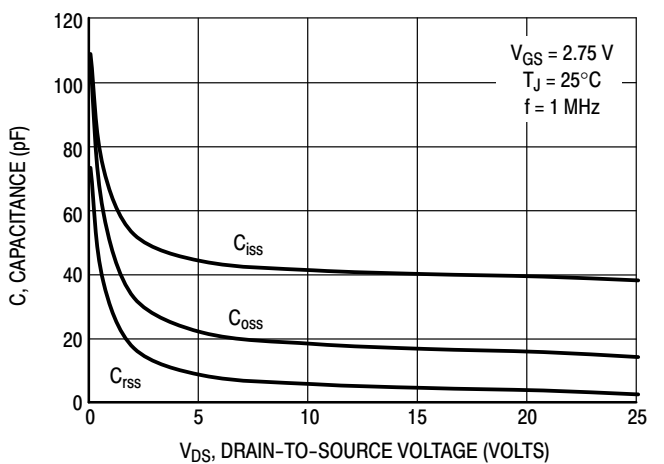


Figure 12. Capacitance

BSS138L, BVSS138L

TYPICAL ELECTRICAL CHARACTERISTICS

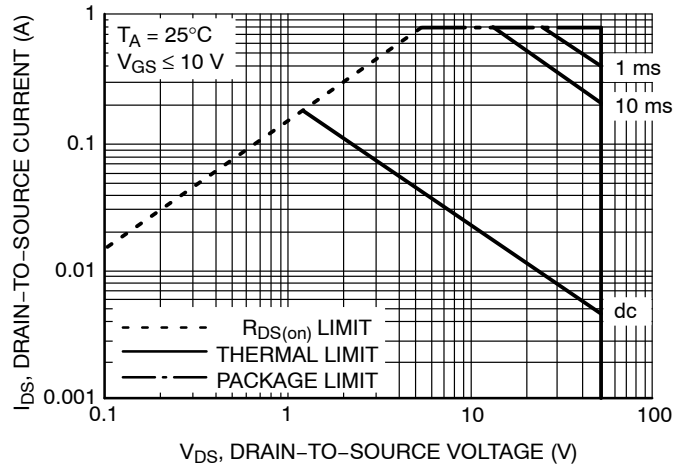
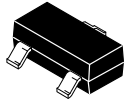


Figure 13. Safe Operating Area



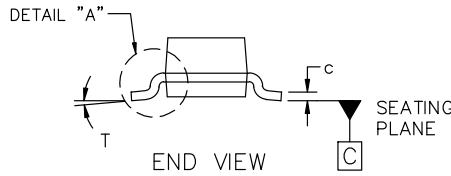
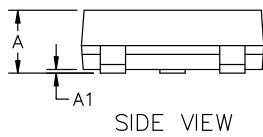
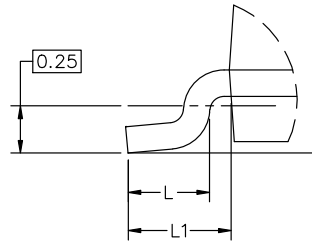
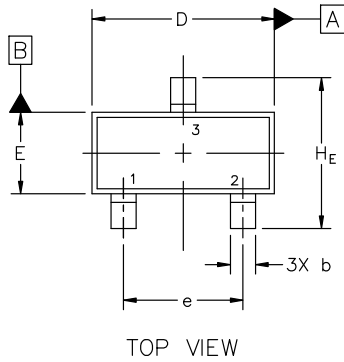
**MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS**



SCALE 4:1

SOT-23 (TO-236) 2.90x1.30x1.00 1.90P
CASE 318
ISSUE AU

DATE 14 AUG 2024

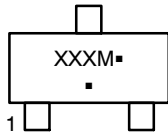


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

NOTES:

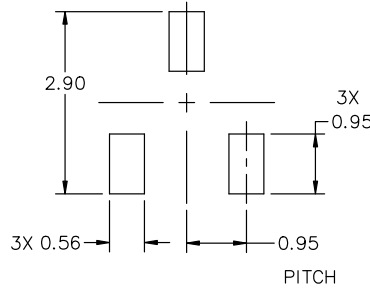
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package

*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.



* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

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CASE 318
ISSUE AU

DATE 14 AUG 2024

- STYLE 1 THRU 5:
CANCELLED
- STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
- STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
- STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE
- STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE
- STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE
- STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE-ANODE
- STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE
- STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE
- STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE
- STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE
- STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE
- STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE
- STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE
- STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE-ANODE
- STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE
- STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN
- STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT
- STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE
- STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE
- STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE
- STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION
- STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE
- STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

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