

NTF3055L108, NVF3055L108

Power MOSFET

3.0 A, 60 V, Logic Level, N-Channel SOT-223

Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

Features

- AEC Q101 Qualified – NVF3055L108
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	Vdc
Drain-to-Gate Voltage ($R_{GS} = 1.0\ \text{M}\Omega$)	V_{DGR}	60	Vdc
Gate-to-Source Voltage - Continuous - Non-repetitive ($t_p \leq 10\ \text{ms}$)	V_{GS}	± 15 ± 20	Vdc Vpk
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$ - Continuous @ $T_A = 100^\circ\text{C}$ - Single Pulse ($t_p \leq 10\ \mu\text{s}$)	I_D I_D I_{DM}	3.0 1.4 9.0	Adc Apk
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1) Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 2) Derate above 25°C	P_D	2.1 1.3 0.014	Watts Watts W/ $^\circ\text{C}$
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$
Single Pulse Drain-to-Source Avalanche Energy - Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 25\ \text{Vdc}$, $V_{GS} = 5.0\ \text{Vdc}$, $I_{L(pk)} = 7.0\ \text{Apk}$, $L = 3.0\ \text{mH}$, $V_{DS} = 60\ \text{Vdc}$)	E_{AS}	74	mJ
Thermal Resistance - Junction-to-Ambient (Note 1) - Junction-to-Ambient (Note 2)	$R_{\theta JA}$ $R_{\theta JA}$	72.3 114	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

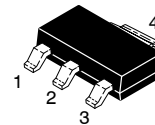
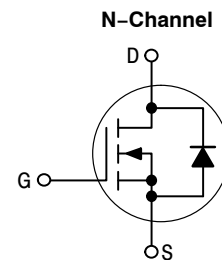
1. When surface mounted to an FR4 board using 1" pad size, 1 oz. (Cu. Area 0.0995 in²).
2. When surface mounted to an FR4 board using minimum recommended pad size, 2-2.4 oz. (Cu. Area 0.272 in²).



ON Semiconductor®

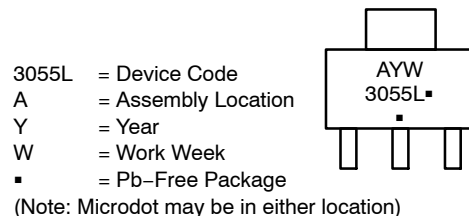
<http://onsemi.com>

3.0 A, 60 V
 $R_{DS(on)} = 120\ \text{m}\Omega$

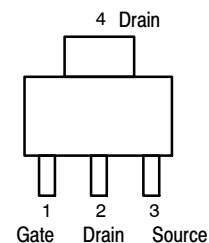


SOT-223
CASE 318E
STYLE 3

MARKING DIAGRAM



PIN ASSIGNMENT



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

NTF3055L108, NVF3055L108

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-to-Source Breakdown Voltage (Note 3) ($V_{GS} = 0\text{ Vdc}$, $I_D = 250\ \mu\text{Adc}$) Temperature Coefficient (Positive)	$V_{(BR)DSS}$	60 -	68 68	- -	Vdc mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current ($V_{DS} = 60\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$) ($V_{DS} = 60\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, $T_J = 150^\circ\text{C}$)	I_{DSS}	- -	- -	1.0 10	μAdc
Gate-Body Leakage Current ($V_{GS} = \pm 15\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	± 100	nAdc

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage (Note 3) ($V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{Adc}$) Threshold Temperature Coefficient (Negative)	$V_{GS(th)}$	1.0 -	1.68 4.6	2.0 -	Vdc mV/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance (Note 3) ($V_{GS} = 5.0\text{ Vdc}$, $I_D = 1.5\text{ Adc}$)	$R_{DS(on)}$	-	92	120	m Ω
Static Drain-to-Source On-Resistance (Note 3) ($V_{GS} = 5.0\text{ Vdc}$, $I_D = 3.0\text{ Adc}$) ($V_{GS} = 5.0\text{ Vdc}$, $I_D = 1.5\text{ Adc}$, $T_J = 150^\circ\text{C}$)	$V_{DS(on)}$	-	0.290 0.250	0.43 -	Vdc
Forward Transconductance (Note 3) ($V_{DS} = 7.0\text{ Vdc}$, $I_D = 3.0\text{ Adc}$)	g_{fs}	-	5.7	-	Mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	$(V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}	-	313	440	pF
Output Capacitance		C_{oss}	-	112	160	
Transfer Capacitance		C_{rss}	-	40	60	

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$(V_{DD} = 30\text{ Vdc}$, $I_D = 3.0\text{ Adc}$, $V_{GS} = 5.0\text{ Vdc}$, $R_G = 9.1\ \Omega$) (Note 3)	$t_{d(on)}$	-	11	25	ns
Rise Time		t_r	-	35	70	
Turn-Off Delay Time		$t_{d(off)}$	-	22	45	
Fall Time		t_f	-	27	60	
Gate Charge	$(V_{DS} = 48\text{ Vdc}$, $I_D = 3.0\text{ Adc}$, $V_{GS} = 5.0\text{ Vdc}$) (Note 3)	Q_T	-	7.6	15	nC
		Q_1	-	1.4	-	
		Q_2	-	4.0	-	

SOURCE-DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	$(I_S = 3.0\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$) $(I_S = 3.0\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$, $T_J = 150^\circ\text{C}$) (Note 3)	V_{SD}	- -	0.87 0.72	1.0 -	Vdc
Reverse Recovery Time	$(I_S = 3.0\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$, $dI_S/dt = 100\text{ A}/\mu\text{s}$) (Note 3)	t_{rr}	-	35	-	ns
		t_a	-	21	-	
		t_b	-	14	-	
Reverse Recovery Stored Charge		Q_{RR}	-	0.044	-	μC

3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
 4. Switching characteristics are independent of operating junction temperatures.

TYPICAL ELECTRICAL CHARACTERISTICS

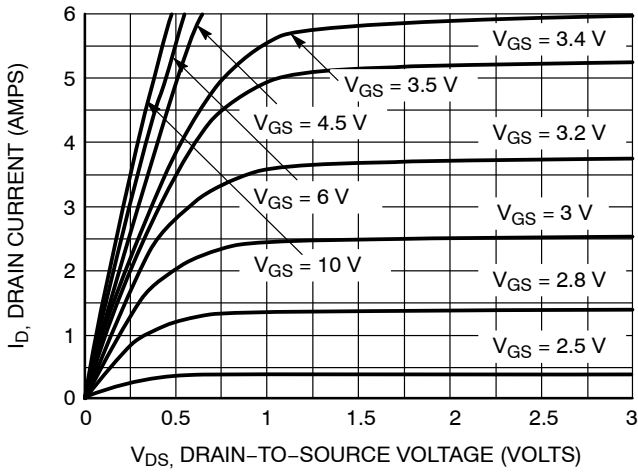


Figure 1. On-Region Characteristics

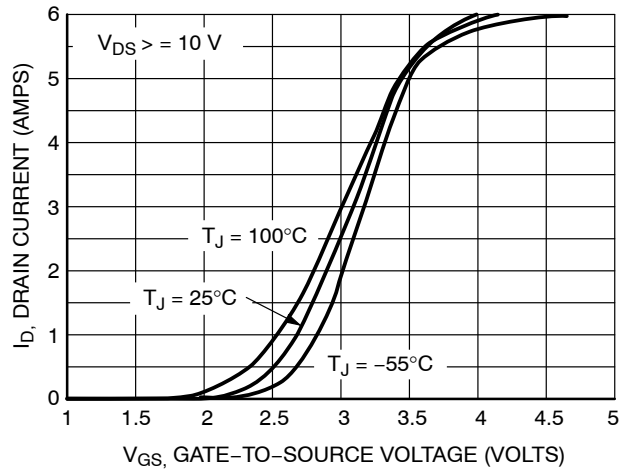


Figure 2. Transfer Characteristics

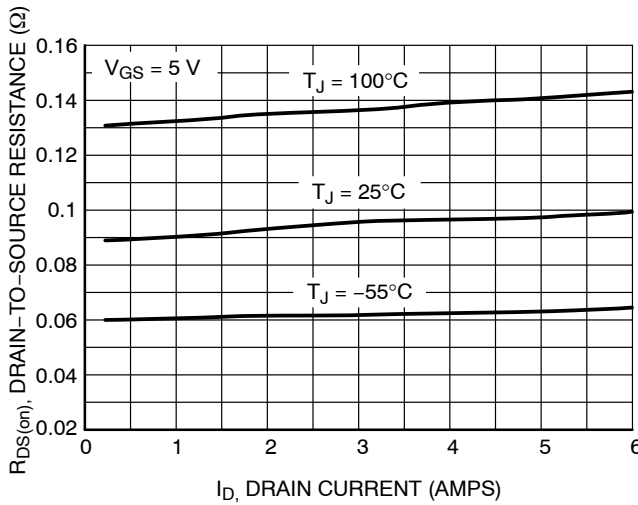


Figure 3. On-Resistance vs. Gate-to-Source Voltage

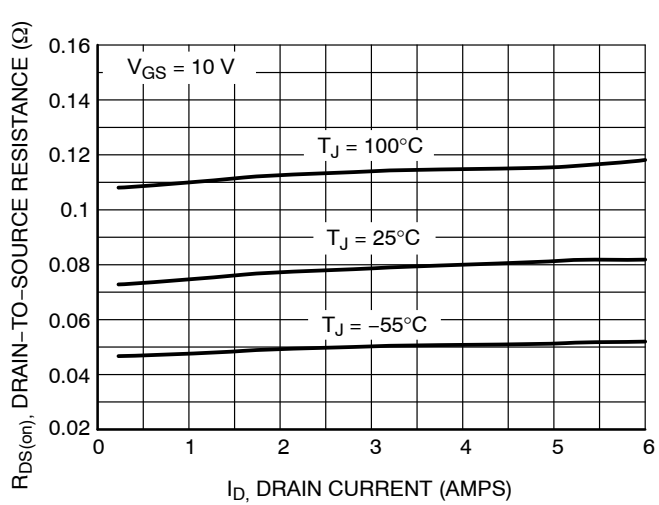


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

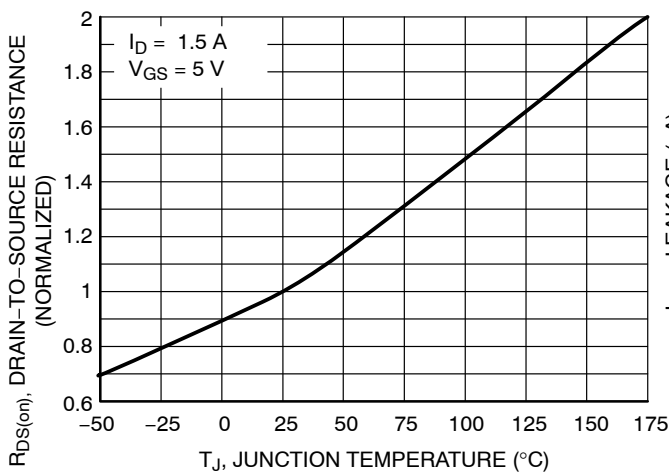


Figure 5. On-Resistance Variation with Temperature

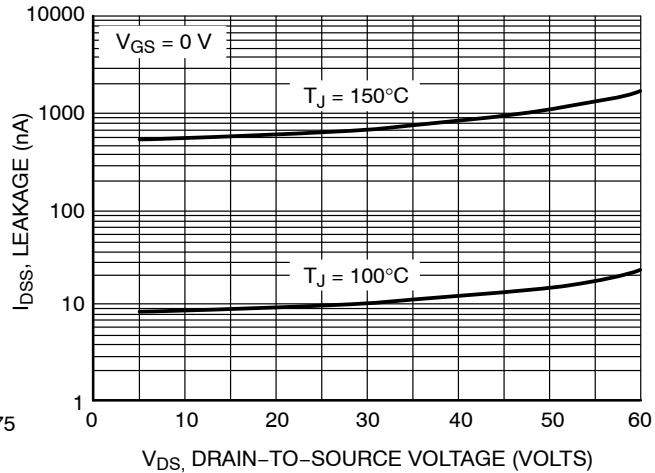


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL ELECTRICAL CHARACTERISTICS

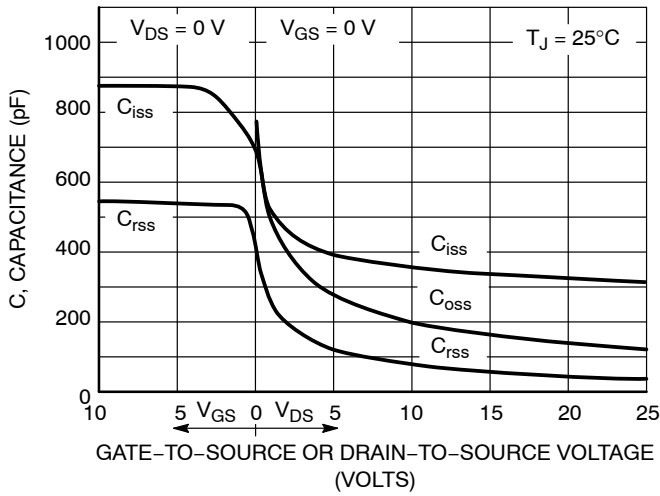


Figure 7. Capacitance Variation

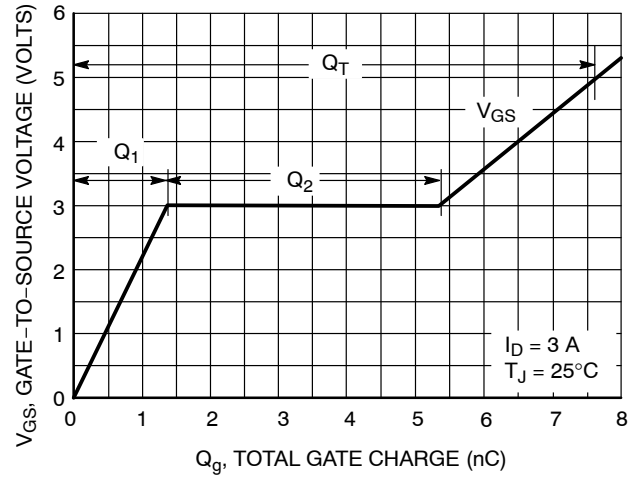


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

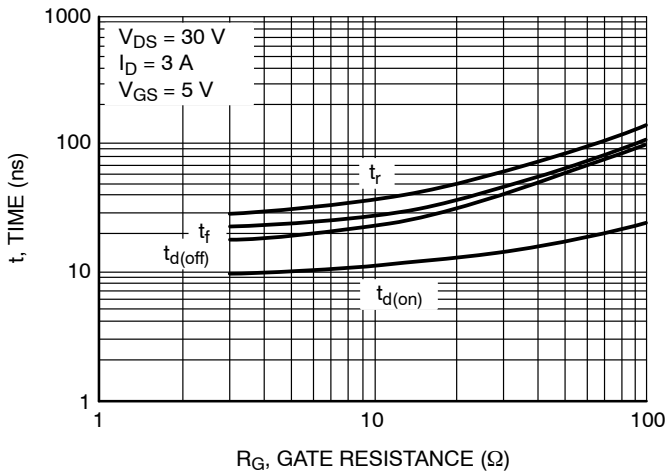


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

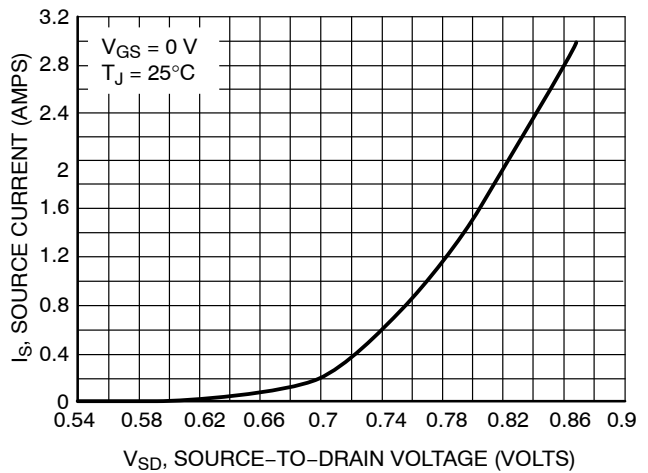


Figure 10. Diode Forward Voltage vs. Current

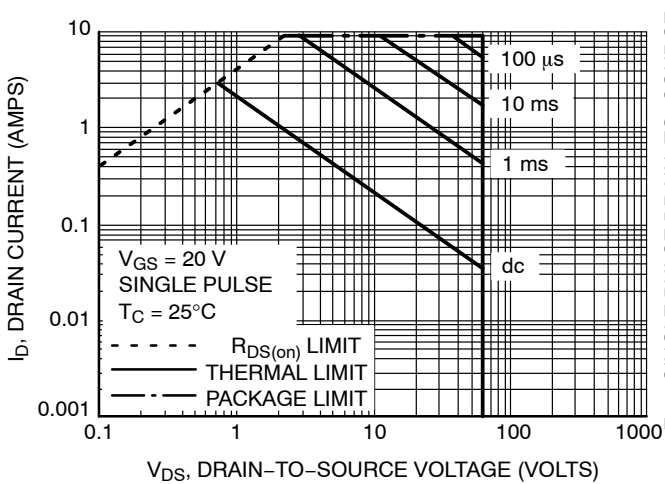


Figure 11. Maximum Rated Forward Biased Safe Operating Area

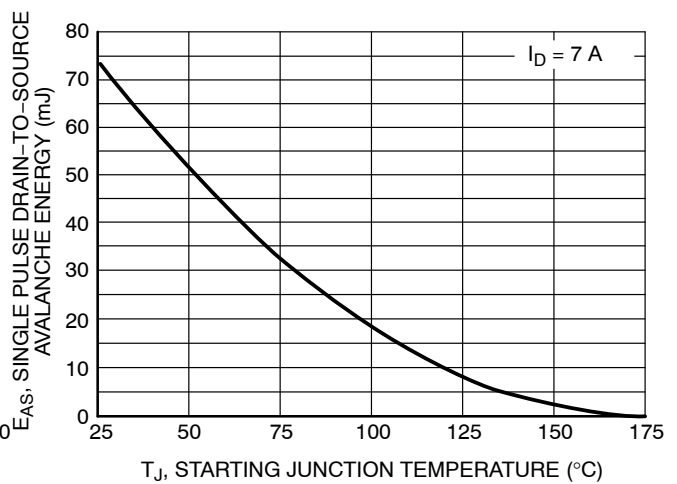


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

NTF3055L108, NVF3055L108

TYPICAL ELECTRICAL CHARACTERISTICS

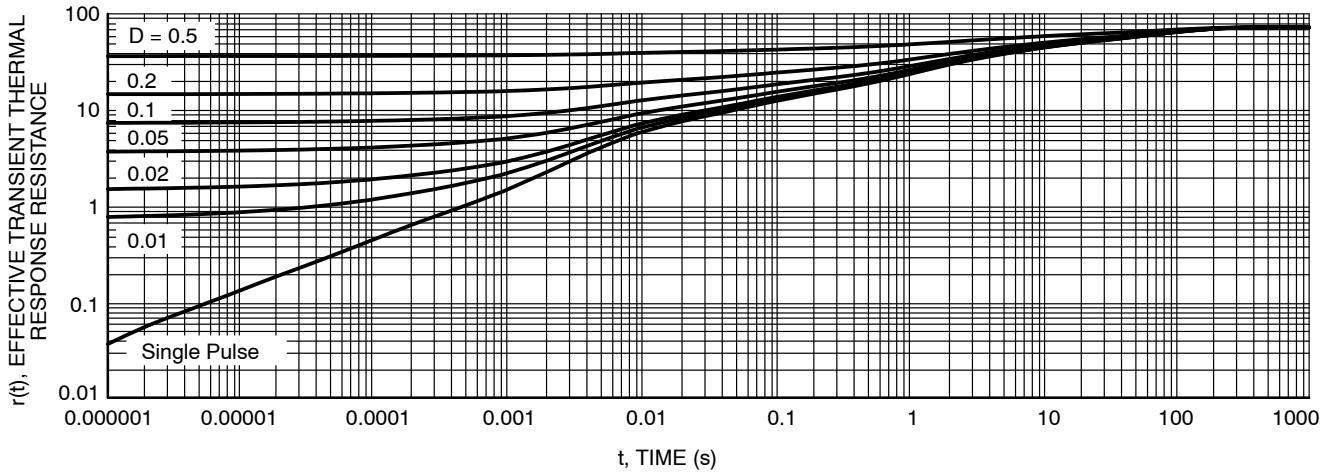


Figure 13. Thermal Response

ORDERING INFORMATION

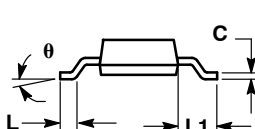
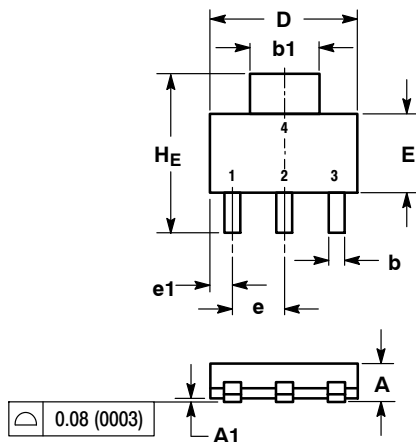
Device	Package	Shipping [†]
NTF3055L108T1G	SOT-223 (TO-261) (Pb-Free)	1000 / Tape & Reel
NVF3055L108T1G	SOT-223 (TO-261) (Pb-Free)	1000 / Tape & Reel

[†]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.

NTF3055L108, NVF3055L108

PACKAGE DIMENSIONS

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

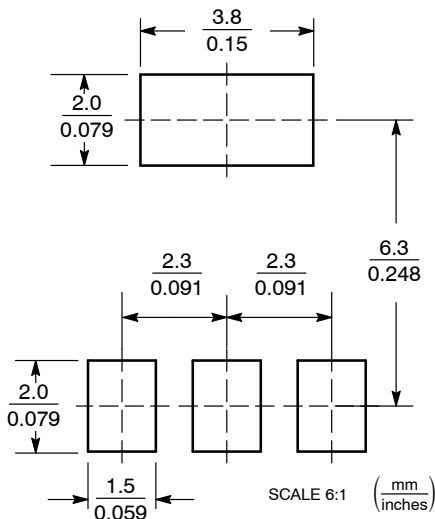


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L	0.20	---	---	0.008	---	---
L1	1.50	1.75	2.00	0.060	0.069	0.078
HE	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	-	10°	0°	-	10°

STYLE 3:
PIN 1. GATE
PIN 2. DRAIN
PIN 3. SOURCE
PIN 4. DRAIN

SOLDERING FOOTPRINT*



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

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative