

NTF2955, NVF2955

MOSFET – Power, Single, P-Channel, SOT-223 -60 V, -2.6 A

Features

- Design for low $R_{DS(on)}$
- Withstands High Energy in Avalanche and Commutation Modes
- AEC-Q101 Qualified – NVF2955
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Power Supplies
- PWM Motor Control
- Converters
- Power Management

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	−60	V
Gate-to-Source Voltage			V _{GS}	±20	V
Continuous Drain Current (Note 1)	Steady State	T _A = 25°C	I _D	−2.6	A
		T _A = 85°C		−2.0	
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D	2.3	W
Continuous Drain Current (Note 2)	Steady State	T _A = 25°C	I _D	−1.7	A
		T _A = 85°C		−1.3	
Power Dissipation (Note 2)		T _A = 25°C	P _D	1.0	W
Pulsed Drain Current	tp = 10 μs		I _{DM}	−17	A
Operating Junction and Storage Temperature			T _J , T _{STG}	−55 to 175	°C
Single Pulse Drain-to-Source Avalanche Energy (V _{DD} = 25 V, V _G = 10 V, I _{PK} = 6.7 A, L = 10 mH, R _G = 25 Ω)			EAS	225	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 seconds)			T _L	260	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Tab (Drain) – Steady State (Note 2)	$R_{\theta JC}$	14	$^\circ\text{C/W}$
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	65	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	150	

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. When surface mounted to an FR4 board using 1 in. pad size (Cu. area = 1.127 in² [1 oz] including traces)

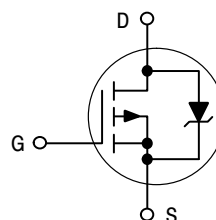


ON Semiconductor®

<http://onsemi.com>

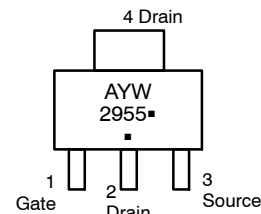
$V_{(BR)DS}$	$R_{DS(on)}$ TYP	I_D MAX
-60 V	145 m Ω @ -10 V	-2.6 A

P-Channel



MARKING DIAGRAM AND PIN ASSIGNMENT

SOT-223
CASE 318E
STYLE 3



A = Assembly Location
Y = Year
W = Work Week
■ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NTF2955T1G	SOT-223 (Pb-Free)	1000 /Tape & Reel
NVF2955T1G	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 Specification Brochure, BRD8011/D.

NTF2955, NVF2955

2. When surface mounted to an FR4 board using the minimum recommended pad size (Cu. area = 0.341 in²)

NTF2955, NVF2955

ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
-----------	--------	----------------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			66.4		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -60 V	T _J = 25°C		-1.0	μA
			T _J = 125°C		-50	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -1.0 mA	-2.0		-4.0	V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -10 V, I _D = -0.75 A		145	170	mΩ
		V _{GS} = -10 V, I _D = -1.5 A		150	180	
		V _{GS} = -10 V, I _D = -2.4 A		154	185	
Forward Transconductance	g _{FS}	V _{GS} = -15 V, I _D = -0.75 A		1.77		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V		492		pF
Output Capacitance	C _{OSS}			165		
Reverse Transfer Capacitance	C _{RSS}			50		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 30 V, I _D = 1.5 A		14.3		nC
Threshold Gate Charge	Q _{G(TH)}			1.2		
Gate-to-Source Charge	Q _{GS}			2.3		
Gate-to-Drain Charge	Q _{GD}			5.2		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 10 V, V _{DD} = 25 V, I _D = 1.5 A, R _G = 9.1 Ω, R _L = 25 Ω		11		ns
Rise Time	t _r			7.6		
Turn-Off Delay Time	t _{d(OFF)}			65		
Fall Time	t _f			38		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 1.5 A	T _J = 25°C		-1.10	-1.30	V
			T _J = 125°C		-0.9		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 1.5 A		36		ns	
Charge Time	t _a			20			
Discharge Time	t _b			16			
Reverse Recovery Charge	Q _{RR}			0.139		nC	

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 ≤ 300μs, duty cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

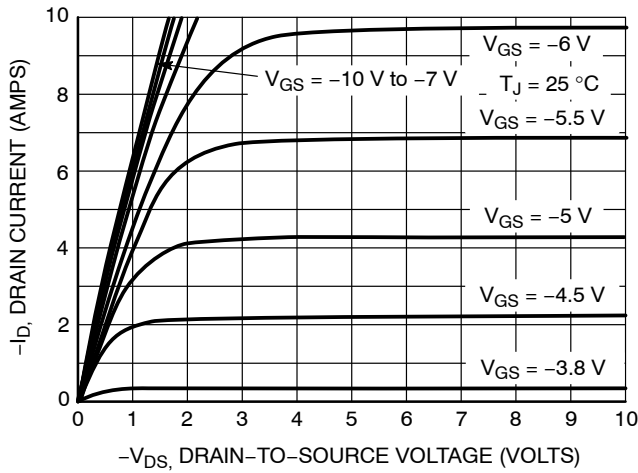


Figure 1. On-Region Characteristics

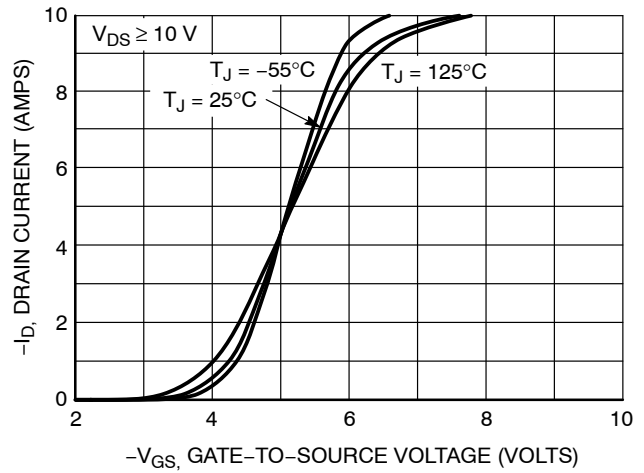


Figure 2. Transfer Characteristics

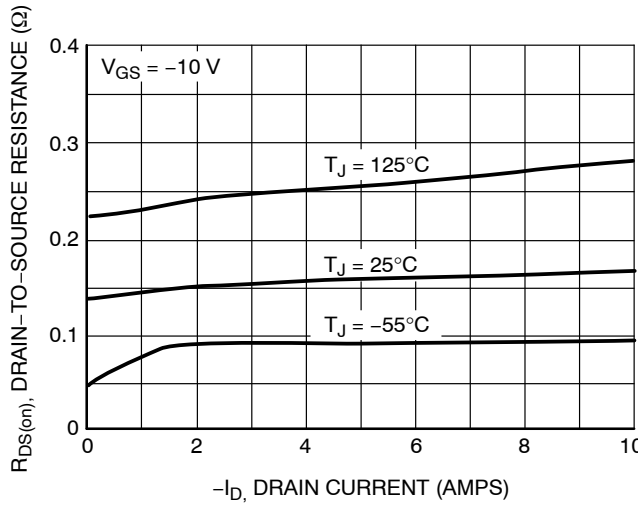


Figure 3. On-Resistance versus Drain Current and Temperature

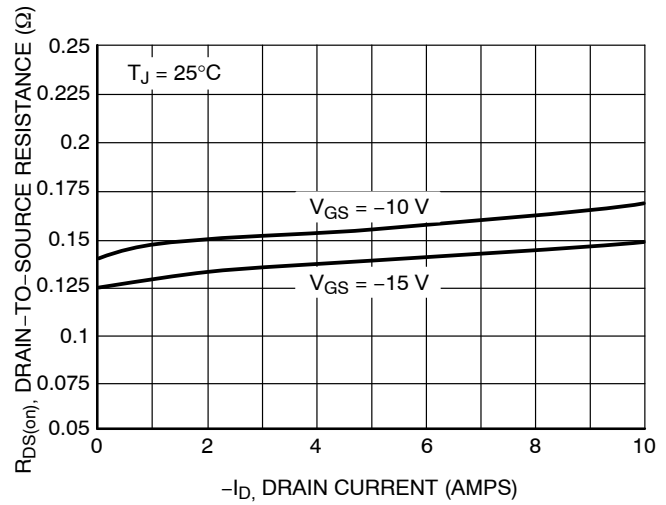


Figure 4. On-Resistance versus Drain Current and Gate Voltage

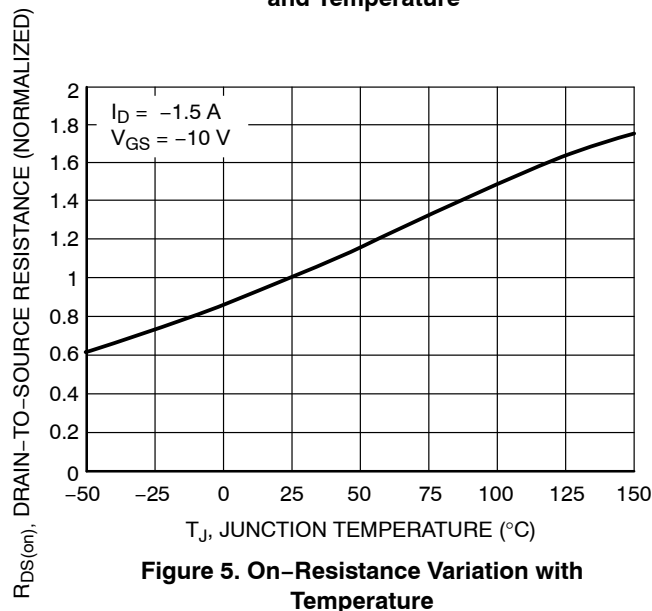


Figure 5. On-Resistance Variation with Temperature

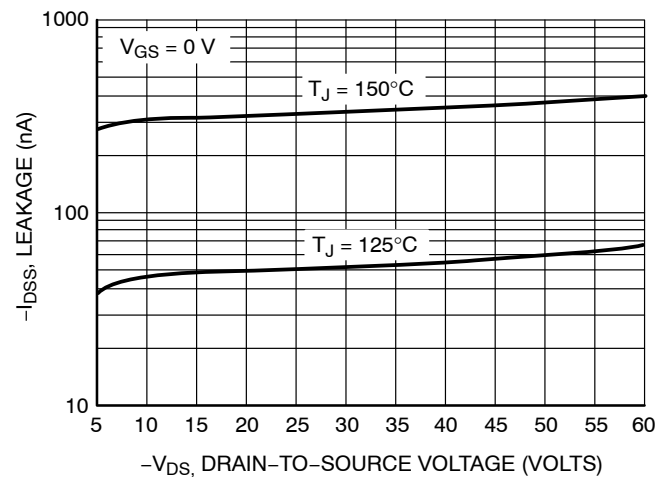
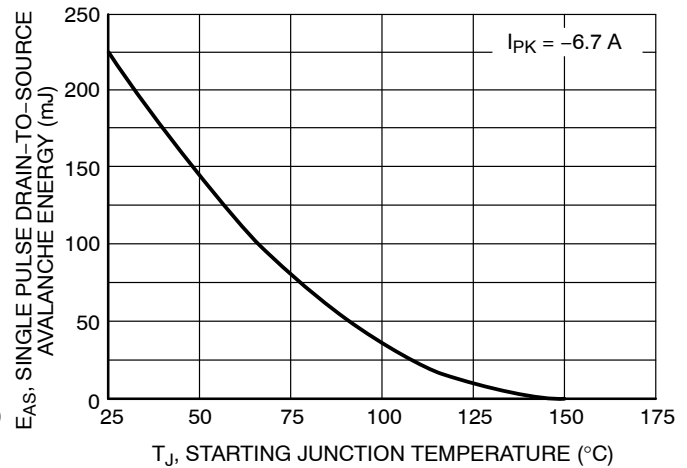
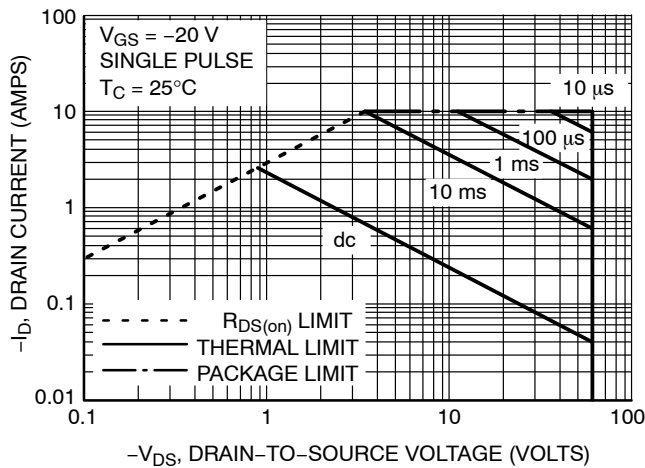
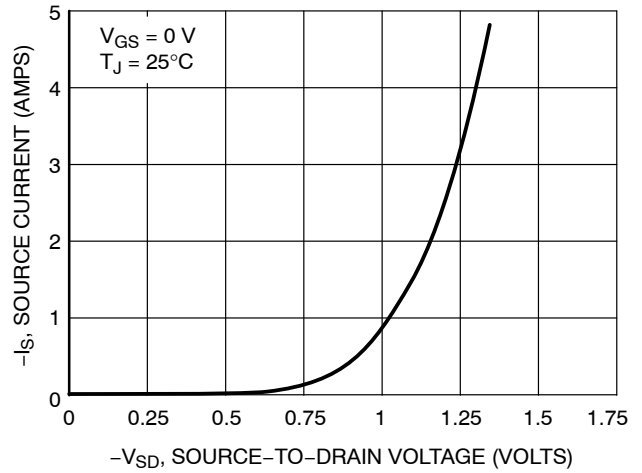
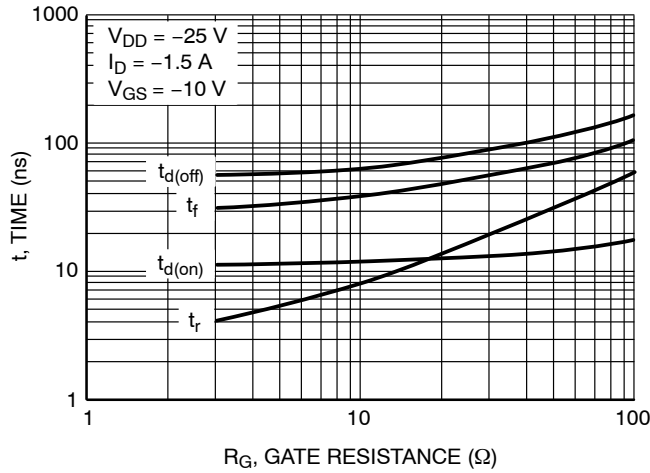
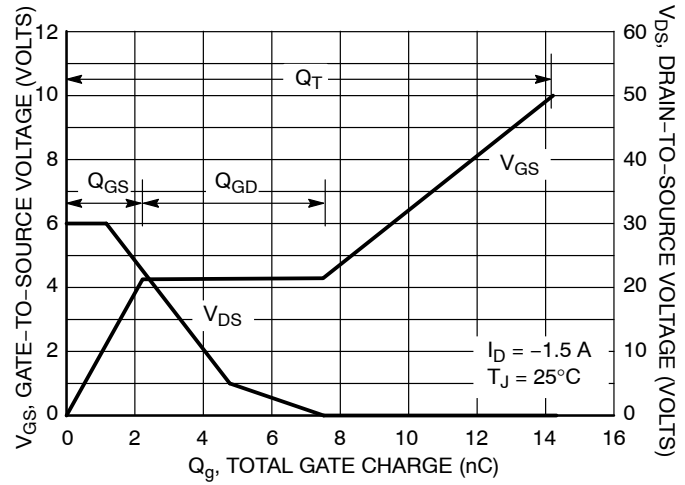
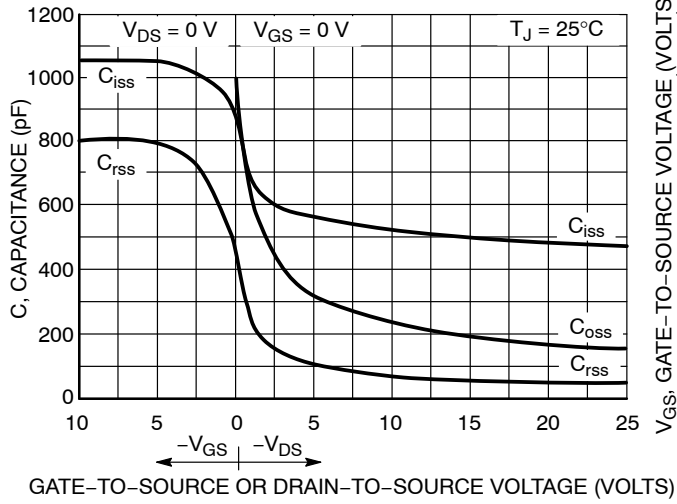


Figure 6. Drain-to-Source Leakage Current versus Voltage

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)



NTF2955, NVF2955

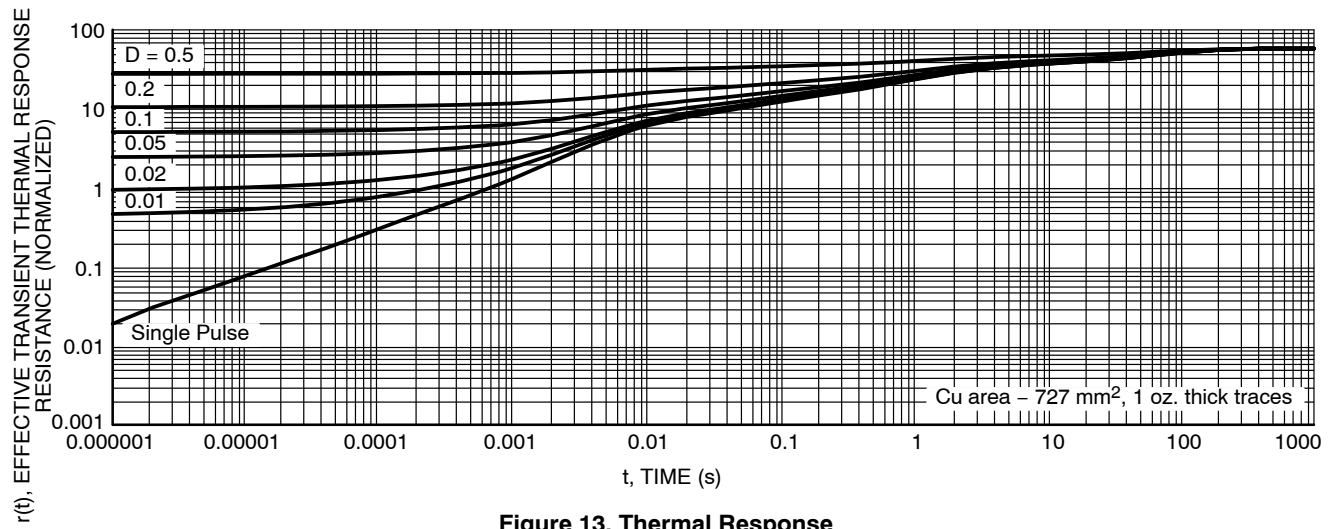
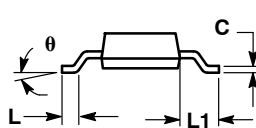
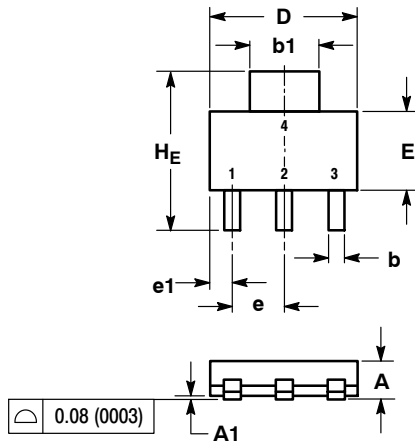


Figure 13. Thermal Response

NTF2955, NVF2955

PACKAGE DIMENSIONS

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



NOTES:

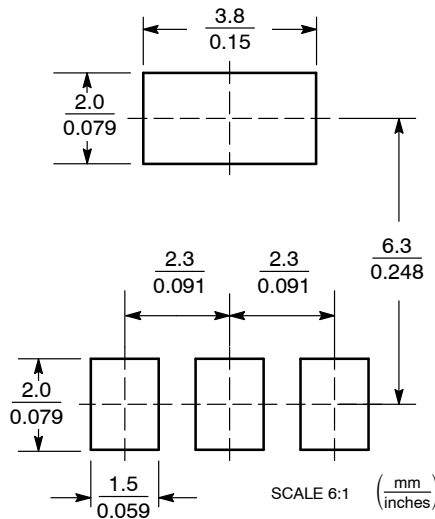
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.

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
H_E	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	---	10°	0°	---	10°

STYLE 3:

- PIN 1. GATE
2. DRAIN
3. SOURCE
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 owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. 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