

NTGS3441T1

Power MOSFET 1 Amp, 20 Volts

P-Channel TSOP-6

Features

- Ultra Low $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- Miniature TSOP-6 Surface Mount Package
- Pb-Free Package is Available

Applications

- Power Management in Portable and Battery-Powered Products, i.e.: Cellular and Cordless Telephones, and PCMCIA Cards

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	-20	V
Gate-to-Source Voltage - Continuous	V_{GS}	± 8.0	V
Thermal Resistance Junction-to-Ambient (Note 1)	$R_{\theta JA}$	244	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	0.5	W
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-1.65	A
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-10	A
Thermal Resistance Junction-to-Ambient (Note 2)	$R_{\theta JA}$	128	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	1.0	W
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-2.35	A
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-14	A
Thermal Resistance Junction-to-Ambient (Note 3)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	2.0	W
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-3.3	A
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-20	A
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	$^\circ\text{C}$

1. Minimum FR-4 or G-10PCB, operating to steady state.
2. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), operating to steady state.
3. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), $t < 5.0$ seconds.

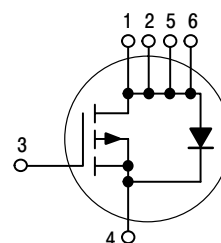


ON Semiconductor®

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**1 AMPERE
20 VOLTS**
 $R_{DS(on)} = 90 \text{ m}\Omega$

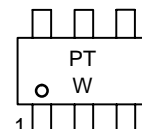
P-Channel



MARKING DIAGRAM

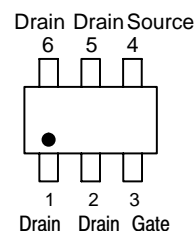


**TSOP-6
CASE 318G
STYLE 1**



PT = Device Code
W = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping†
NTGS3441T1	TSOP-6	3000 / Tape & Reel
NTGS3441T1G	TSOP-6 (Pb-Free)	3000 / 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.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Notes 4 & 5)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = -10\ \mu\text{A}$)	$V_{(BR)DSS}$	-20	-	-	Vdc
Zero Gate Voltage Drain Current ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -20\text{ Vdc}$, $T_J = 25^\circ\text{C}$) ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -20\text{ Vdc}$, $T_J = 70^\circ\text{C}$)	I_{DSS}	-	-	-1.0 -5.0	μAdc
Gate-Body Leakage Current ($V_{GS} = -8.0\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	-100	nAdc
Gate-Body Leakage Current ($V_{GS} = +8.0\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	100	nAdc

ON CHARACTERISTICS					
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = -250\ \mu\text{Adc}$)	$V_{GS(th)}$	-0.45	-1.05	-1.50	Vdc
Static Drain-Source On-State Resistance ($V_{GS} = -4.5\text{ Vdc}$, $I_D = -3.3\text{ Adc}$) ($V_{GS} = -2.5\text{ Vdc}$, $I_D = -2.9\text{ Adc}$)	$R_{DS(on)}$	-	0.069 0.117	0.090 0.135	Ω
Forward Transconductance ($V_{DS} = -10\text{ Vdc}$, $I_D = -3.3\text{ Adc}$)	g_{FS}	-	6.8	-	mhos

DYNAMIC CHARACTERISTICS						
Input Capacitance	$(V_{DS} = -5.0\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	C_{ISS}	-	480	-	pF
Output Capacitance		C_{OSS}	-	265	-	pF
Reverse Transfer Capacitance		C_{RSS}	-	100	-	pF

SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$(V_{DD} = -20\text{ Vdc}$, $I_D = -1.6\text{ Adc}$, $V_{GS} = -4.5\text{ Vdc}$, $R_g = 6.0\ \Omega$)	$t_{d(on)}$	-	13	25	ns
Rise Time		t_r	-	23.5	45	ns
Turn-Off Delay Time		$t_{d(off)}$	-	27	50	ns
Fall Time		t_f	-	24	45	ns
Total Gate Charge	$(V_{DS} = -10\text{ Vdc}$, $V_{GS} = -4.5\text{ Vdc}$, $I_D = -3.3\text{ Adc}$)	Q_{tot}	-	6.2	14	nC
Gate-Source Charge		Q_{gs}	-	1.3	-	nC
Gate-Drain Charge		Q_{gd}	-	2.5	-	nC

BODY-DRAIN DIODE RATINGS						
Diode Forward On-Voltage	$(I_S = -1.6\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$)	V_{SD}	-	-0.88	-1.2	Vdc
Diode Forward On-Voltage	$(I_S = -3.3\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$)	V_{SD}	-	-0.98	-	Vdc
Reverse Recovery Time	$(I_S = -1.6\text{ Adc}$, $dI_S/dt = 100\text{ A}/\mu\text{s}$)	t_{rr}	-	30	60	ns

- Indicates Pulse Test: P.W. = 300 μsec max, Duty Cycle = 2%.
- Handling precautions to protect against electrostatic discharge is mandatory.

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TYPICAL ELECTRICAL CHARACTERISTICS

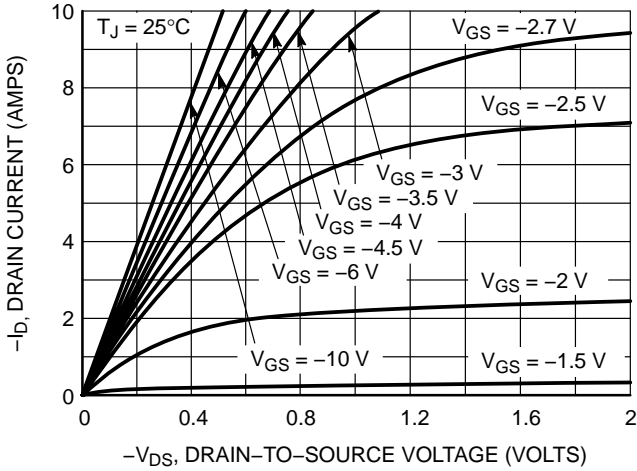


Figure 1. On-Region Characteristics

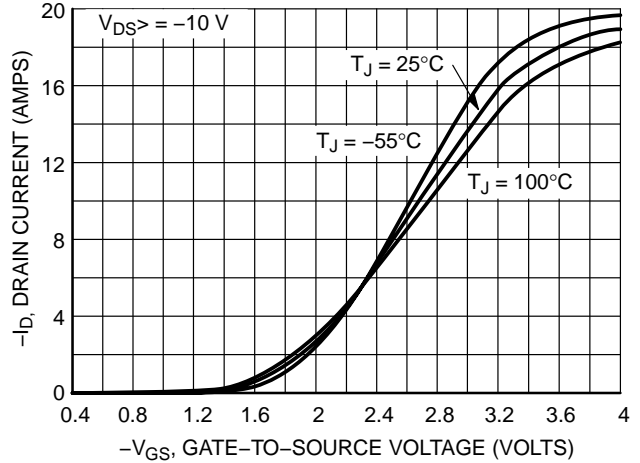


Figure 2. Transfer Characteristics

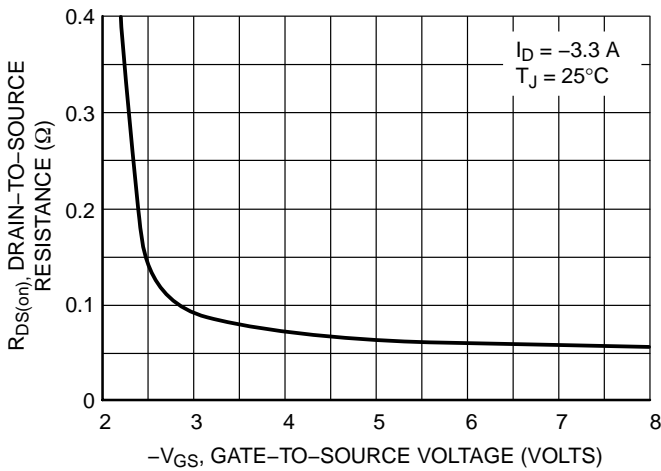


Figure 3. On-Resistance vs. Gate-to-Source Voltage

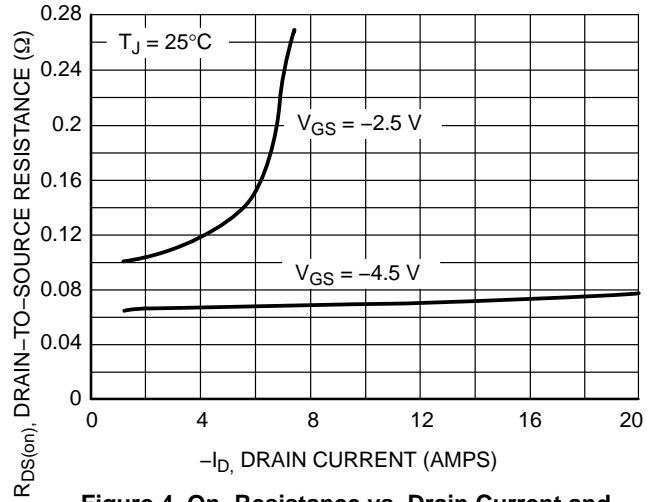


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

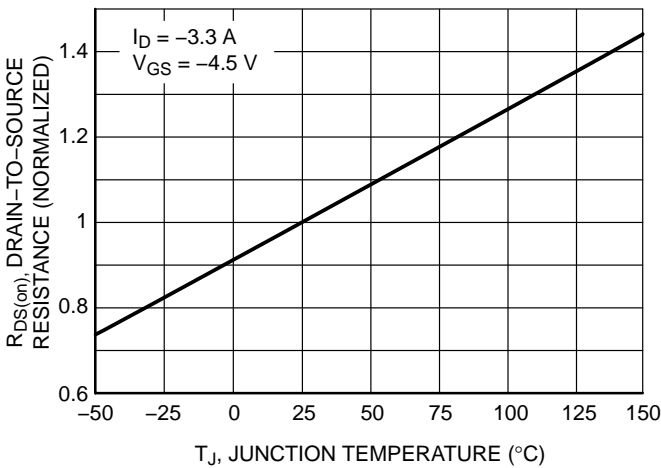


Figure 5. On-Resistance Variation with Temperature

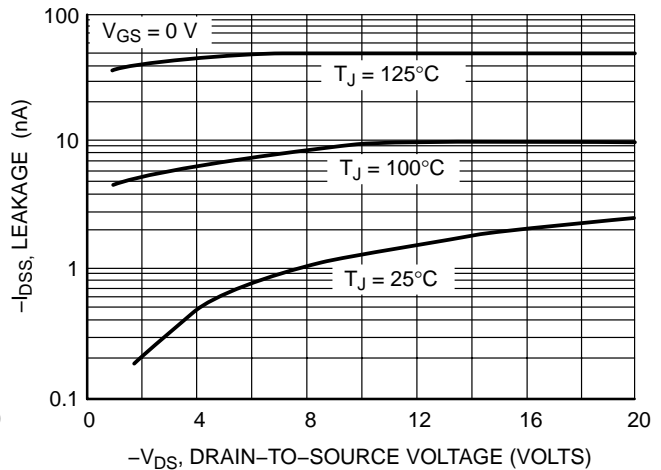


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL ELECTRICAL CHARACTERISTICS

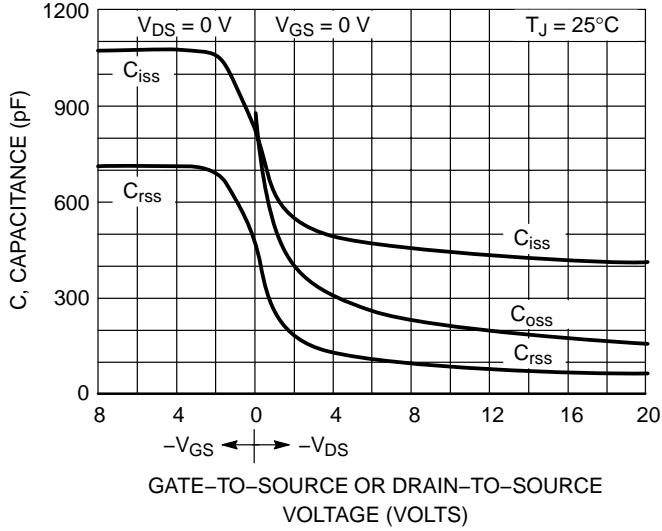


Figure 7. Capacitance Variation

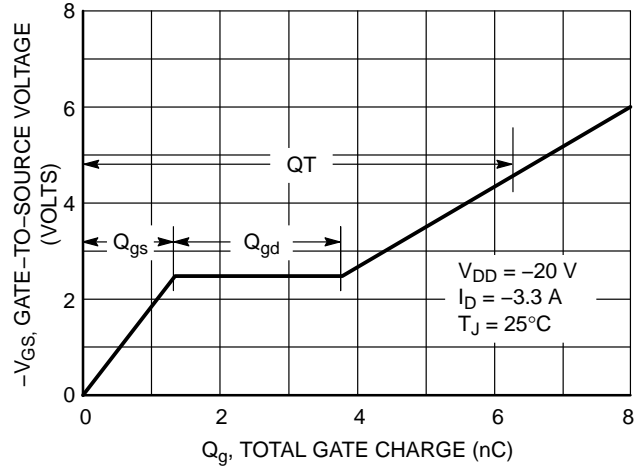


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

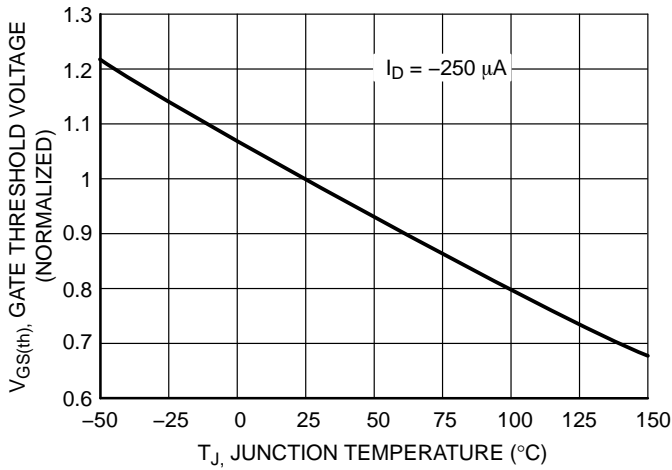


Figure 9. Gate Threshold Voltage Variation with Temperature

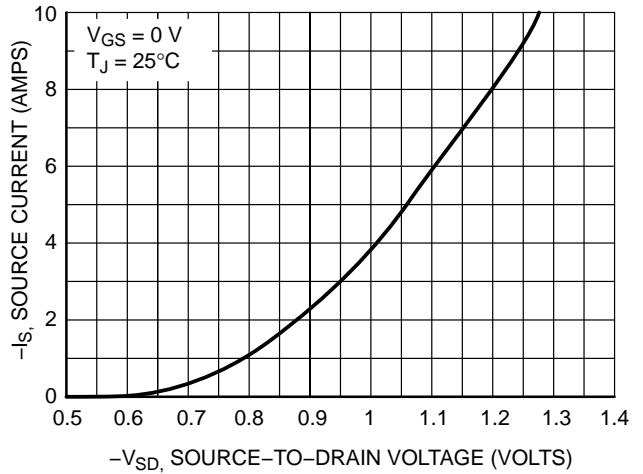


Figure 10. Diode Forward Voltage vs. Current

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TYPICAL ELECTRICAL CHARACTERISTICS

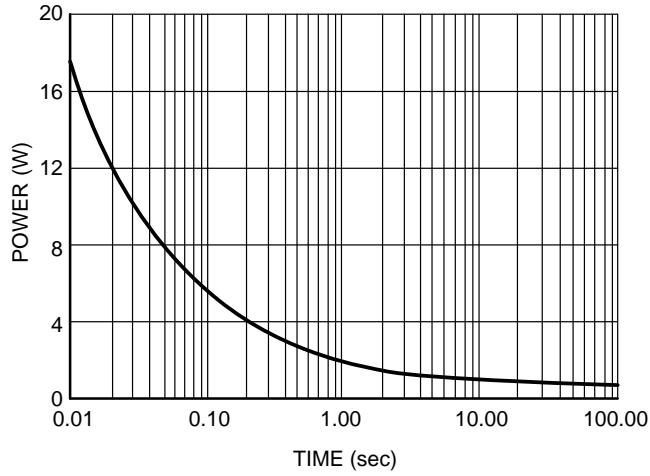


Figure 11. Single Pulse Power

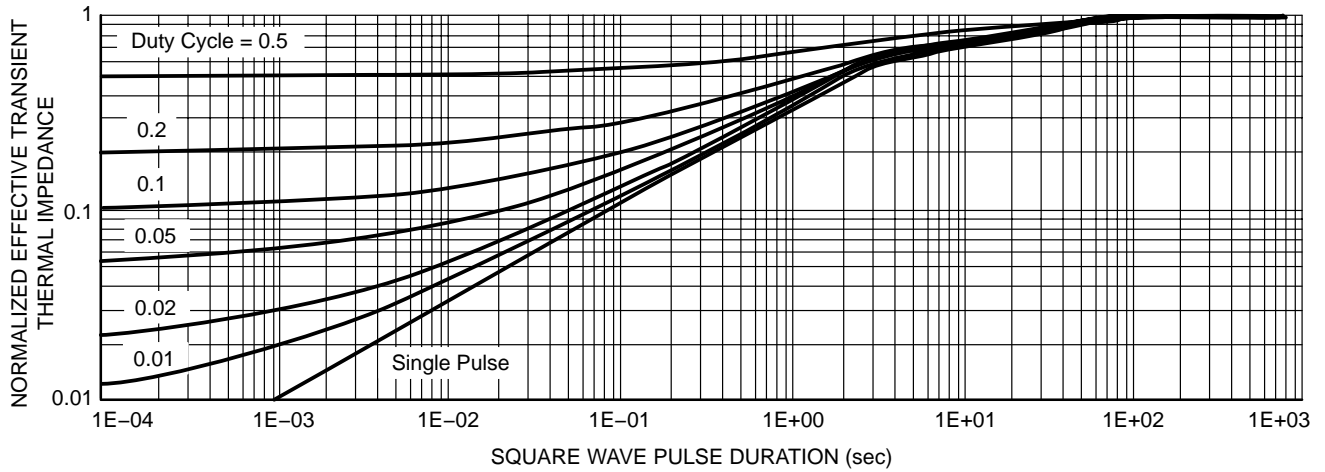
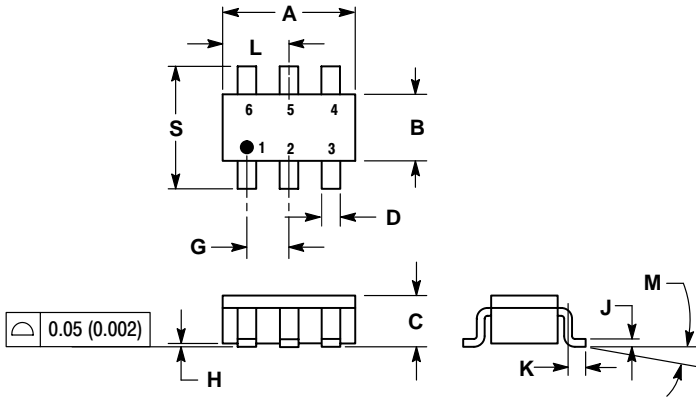


Figure 12. Normalized Thermal Transient Impedance, Junction-to-Ambient

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PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE L



NOTES:

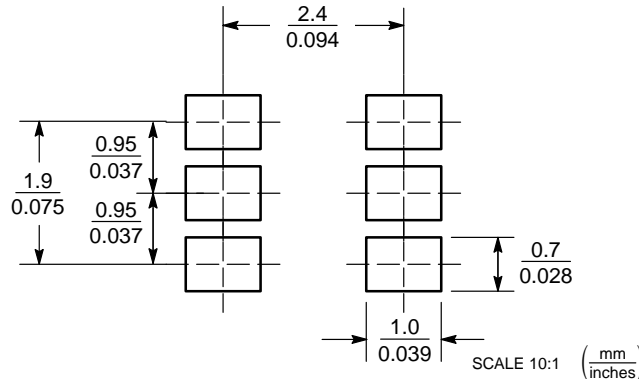
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.1142	0.1220
B	1.30	1.70	0.0512	0.0669
C	0.90	1.10	0.0354	0.0433
D	0.25	0.50	0.0098	0.0197
G	0.85	1.05	0.0335	0.0413
H	0.013	0.100	0.0005	0.0040
J	0.10	0.26	0.0040	0.0102
K	0.20	0.60	0.0079	0.0236
L	1.25	1.55	0.0493	0.0610
M	0°	10°	0°	10°
S	2.50	3.00	0.0985	0.1181

STYLE 1:

1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. 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.

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