

NTD3055-150

Power MOSFET 9.0 Amps, 60 Volts

N-Channel DPAK

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

Typical Applications

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

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	60	Vdc
Drain-to-Gate Voltage ($R_{GS} = 10\text{ M}\Omega$)	V_{DGR}	60	Vdc
Gate-to-Source Voltage	V_{GS}	± 20	Vdc
– Continuous	V_{GS}	± 30	
– Non-repetitive ($t_p \leq 10\text{ ms}$)			
Drain Current	I_D	9.0	Adc
– Continuous @ $T_A = 25^\circ\text{C}$	I_D	3.0	
– Continuous @ $T_A = 100^\circ\text{C}$	I_{DM}	27	Apk
– Single Pulse ($t_p \leq 10\text{ }\mu\text{s}$)			
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_D	28.8	W
Derate above 25°C		0.19	W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1.)		2.1	W
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 2.)		1.5	W
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$
Single Pulse Drain-to-Source Avalanche Energy – Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 25\text{ Vdc}$, $V_{GS} = 10\text{ Vdc}$, $L = 1.0\text{ mH}$, $I_L(pk) = 7.75\text{ A}$, $V_{DS} = 60\text{ Vdc}$)	E_{AS}	30	mJ
Thermal Resistance	$R_{\theta JC}$	5.2	$^\circ\text{C/W}$
– Junction-to-Case	$R_{\theta JA}$	71.4	
– Junction-to-Ambient (Note 1.)	$R_{\theta JA}$	100	
– Junction-to-Ambient (Note 2.)			
Maximum Lead Temperature for Soldering Purposes, $1/8"$ from case for 10 seconds	T_L	260	$^\circ\text{C}$

1. When surface mounted to an FR4 board using $1"$ pad size, (Cu Area 1.127 in^2).
2. When surface mounted to an FR4 board using minimum recommended pad size, (Cu Area 0.412 in^2).

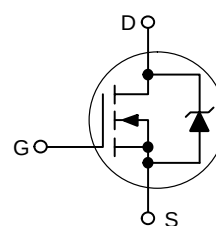


ON Semiconductor™

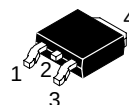
<http://onsemi.com>

9.0 AMPERES
60 VOLTS
 $R_{DS(on)} = 150\text{ m}\Omega$

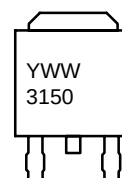
N-Channel



MARKING DIAGRAM

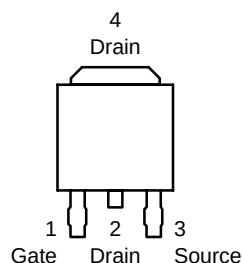


DPAK
CASE 369A
STYLE 2



3150 = Device Code
Y = Year
WW = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping
NTD3055-150	DPAK	75 Units/Rail
NTD3055-150-1	DPAK	75 Units/Rail
NTD3055-150T4	DPAK	2500/Tape & Reel

NTD3055–150

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage (Note 3.) ($V_{GS} = 0\text{ Vdc}$, $I_D = 250\text{ }\mu\text{Adc}$) Temperature Coefficient (Positive)	$V_{(BR)DSS}$	60 –	– 70.2	– –	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 ($V_{GS} = \pm 20\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	–	–	± 100	nAdc

ON CHARACTERISTICS (Note 3.)

Gate Threshold Voltage (Note 3.) ($V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{Adc}$) Threshold Temperature Coefficient (Negative)	$V_{GS(th)}$	2.0 –	3.0 6.4	4.0 –	Vdc mV/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance (Note 3.) ($V_{GS} = 10\text{ Vdc}$, $I_D = 4.5\text{ Adc}$)	$R_{DS(on)}$	–	122	150	m Ω
Static Drain-to-Source On-Voltage (Note 3.) ($V_{GS} = 10\text{ Vdc}$, $I_D = 9.0\text{ Adc}$) ($V_{GS} = 10\text{ Vdc}$, $I_D = 4.5\text{ Adc}$, $T_J = 150^\circ\text{C}$)	$V_{DS(on)}$	– –	1.4 1.1	1.9 –	Vdc
Forward Transconductance (Note 3.) ($V_{DS} = 7.0\text{ Vdc}$, $I_D = 6.0\text{ Adc}$)	g_{FS}	–	5.4	–	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	$(V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	C_{iss}	–	200	280	pF
Output Capacitance		C_{oss}	–	70	100	
Transfer Capacitance		C_{rss}	–	26	40	

SWITCHING CHARACTERISTICS (Note 4.)

Turn-On Delay Time	$(V_{DD} = 48\text{ Vdc}$, $I_D = 9.0\text{ Adc}$, $V_{GS} = 10\text{ Vdc}$, $R_G = 9.1\text{ }\Omega$) (Note 3.)	$t_{d(on)}$	–	11.2	25	ns
Rise Time		t_r	–	37.1	80	
Turn-Off Delay Time		$t_{d(off)}$	–	12.2	25	
Fall Time		t_f	–	23	50	
Gate Charge	$(V_{DS} = 48\text{ Vdc}$, $I_D = 9.0\text{ Adc}$, $V_{GS} = 10\text{ Vdc}$) (Note 3.)	Q_T	–	7.1	15	nC
		Q_1	–	1.7	–	
		Q_2	–	3.5	–	

SOURCE–DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	$(I_S = 9.0\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$) (Note 3.) $(I_S = 19\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$, $T_J = 150^\circ\text{C}$)	V_{SD}	– –	0.98 0.86	1.20 –	Vdc
Reverse Recovery Time	$(I_S = 9.0\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$, $dI_S/dt = 100\text{ A}/\mu\text{s}$) (Note 3.)	t_{rr}	–	28.9	–	ns
		t_a	–	21.6	–	
		t_b	–	7.3	–	
Reverse Recovery Stored Charge		Q_{RR}	–	0.036	–	μC

3. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

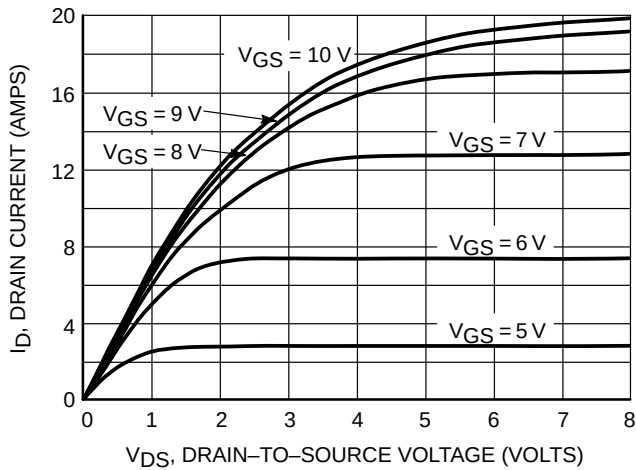


Figure 1. On-Region Characteristics

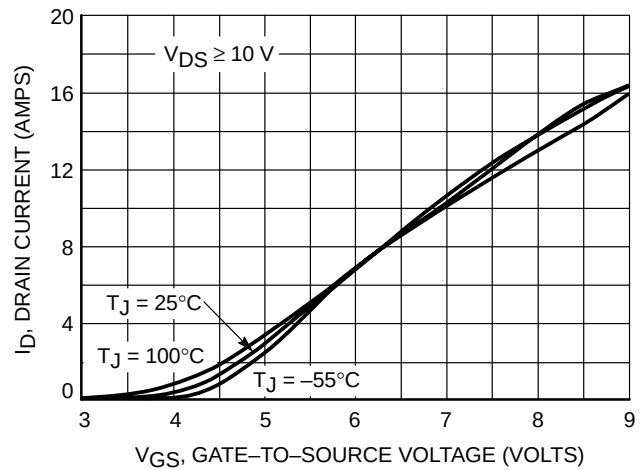


Figure 2. Transfer Characteristics

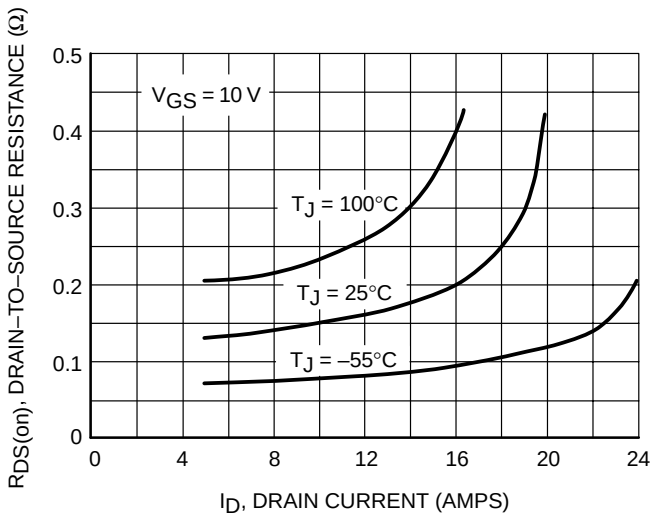


Figure 3. On-Resistance versus Gate-to-Source Voltage

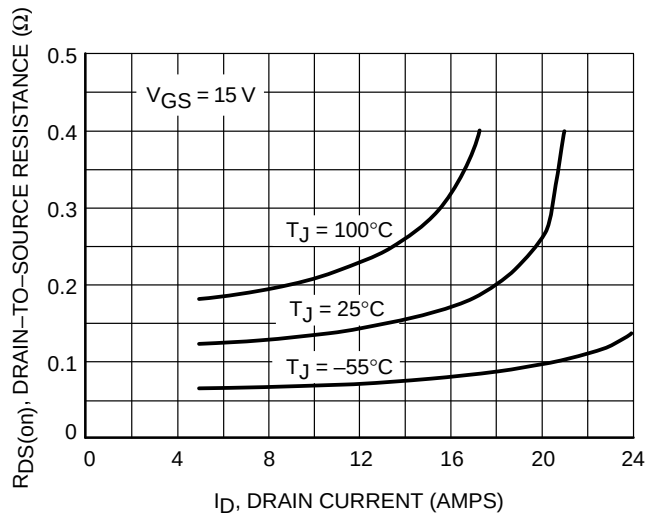


Figure 4. On-Resistance versus Drain Current and Gate Voltage

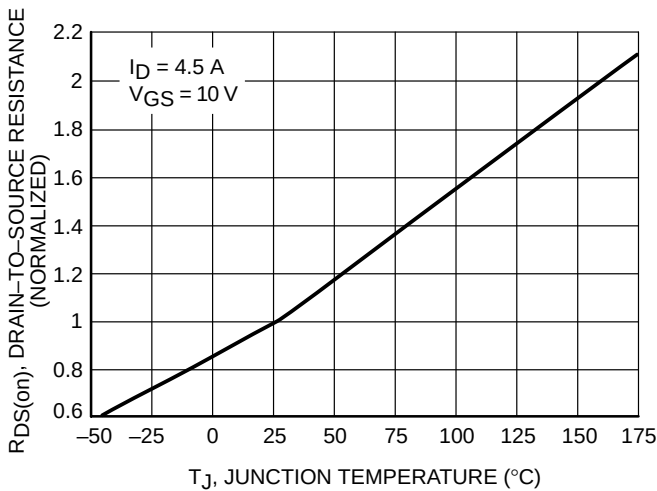


Figure 5. On-Resistance Variation with Temperature

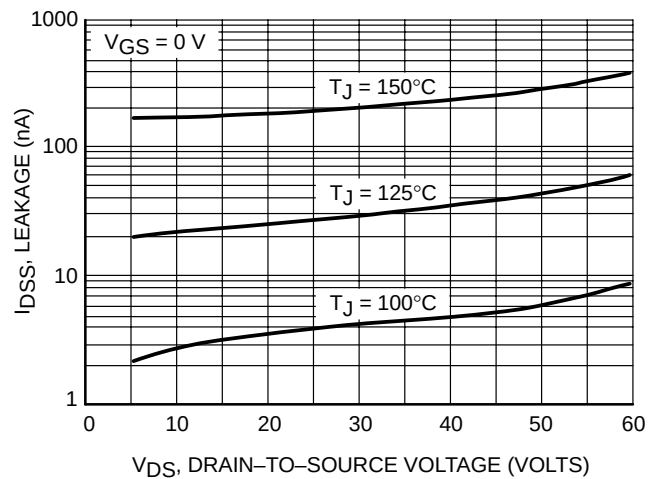


Figure 6. Drain-to-Source Leakage Current versus Voltage

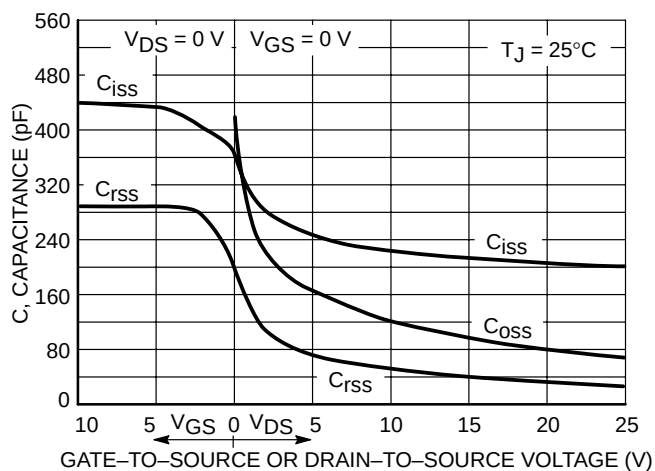


Figure 7. Capacitance Variation

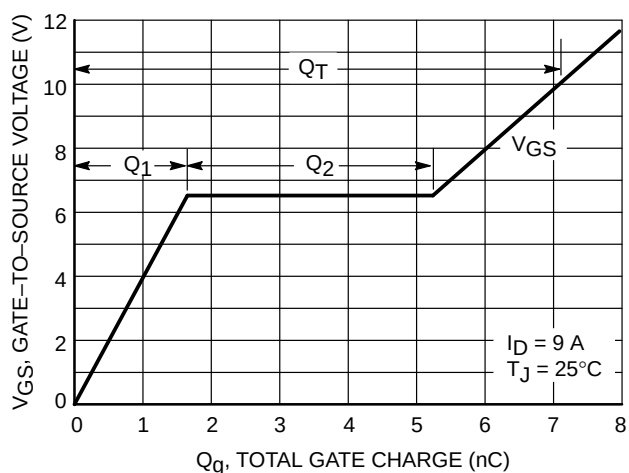


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

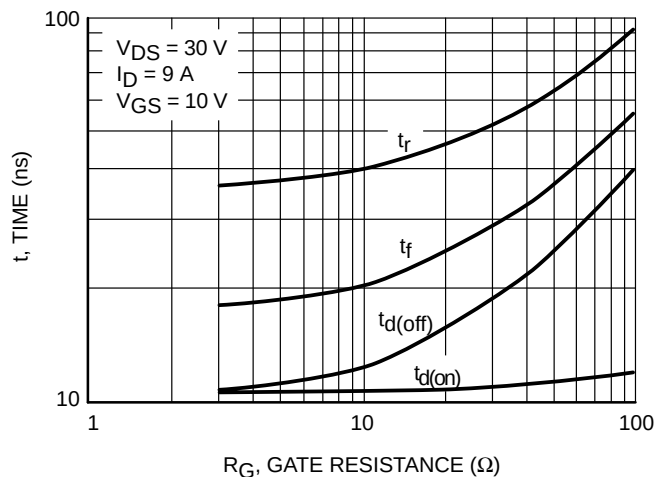


Figure 9. Resistive Switching Time Variation versus Gate Resistance

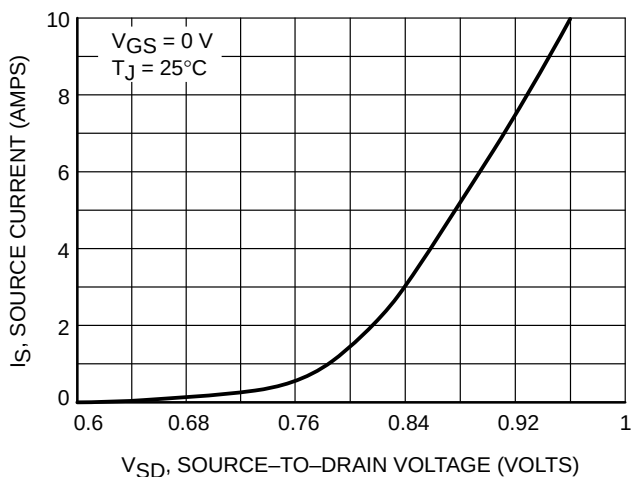


Figure 10. Diode Forward Voltage versus Current

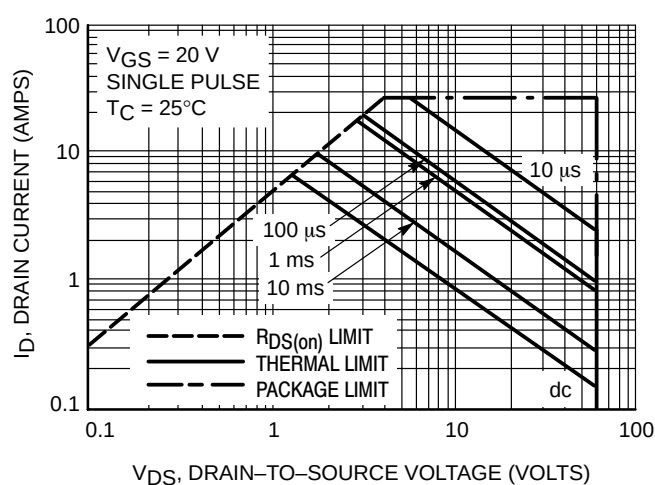


Figure 11. Maximum Rated Forward Biased Safe Operating Area

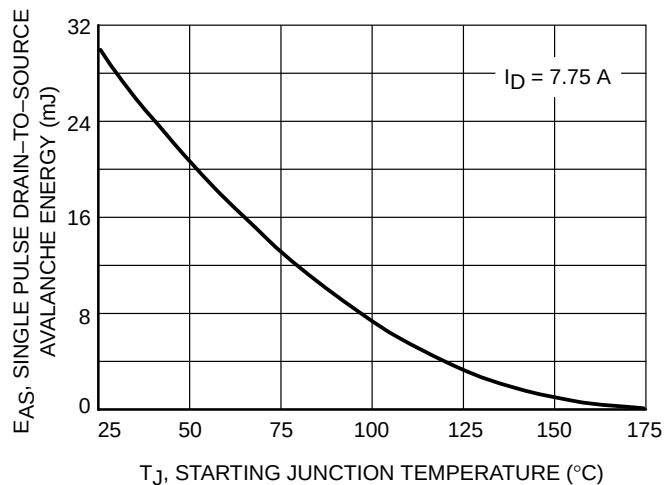


Figure 12. Maximum Avalanche Energy versus Starting Junction Temperature

NTD3055-150

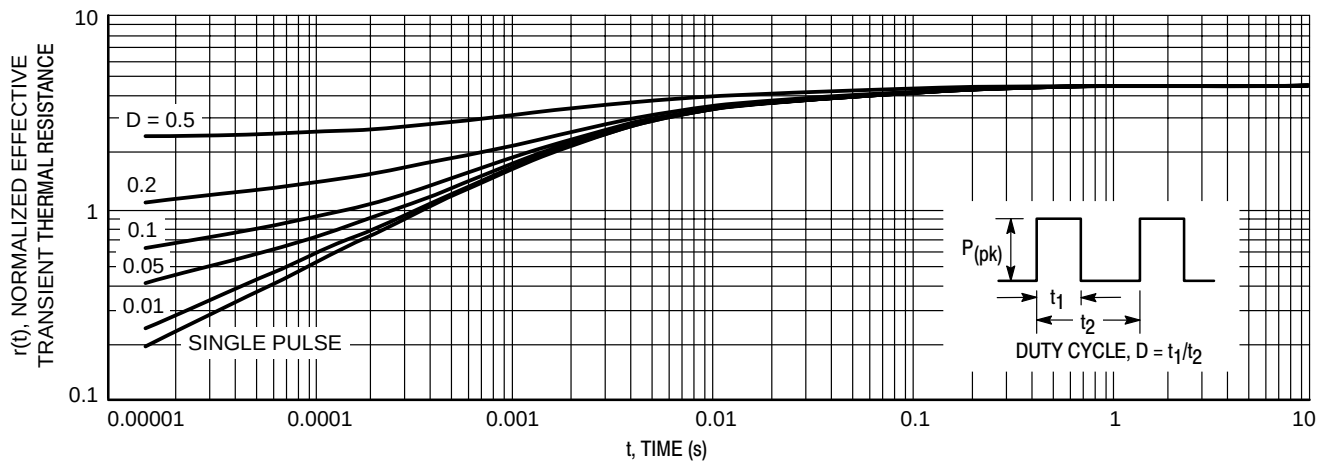
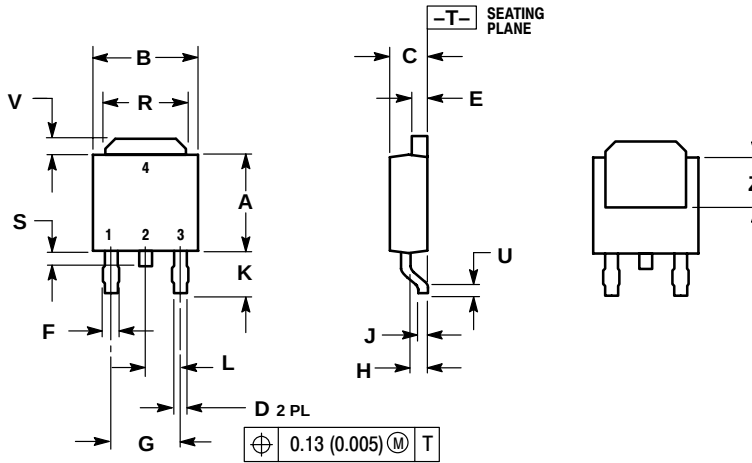


Figure 13. Thermal Response

NTD3055-150

PACKAGE DIMENSIONS

DPAK
CASE 369A-13
ISSUE AA



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

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

Notes

ON Semiconductor and  are 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.

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: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.