

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°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	60	Vdc
Drain-to-Gate Voltage (R _{GS} = 10 MΩ)	V _{DGR}	60	Vdc
Gate-to-Source Voltage	V _{GS}	±20	Vdc
– Continuous	V _{GS}	±30	
– Non-repetitive (t _p ≤ 10 ms)			
Drain Current	I _D	9.0	Adc
– Continuous @ T _A = 25°C	I _D	3.0	
– Continuous @ T _A = 100°C	I _{DM}	27	Apk
– Single Pulse (t _p ≤ 10 μs)			
Total Power Dissipation @ T _A = 25°C	P _D	28.8	W
Derate above 25°C		0.19	W/°C
Total Power Dissipation @ T _A = 25°C (Note 1.)		2.1	W
Total Power Dissipation @ T _A = 25°C (Note 2.)		1.5	W
Operating and Storage Temperature Range	T _J , T _{stg}	–55 to 175	°C
Single Pulse Drain-to-Source Avalanche Energy – Starting T _J = 25°C (V _{DD} = 25 Vdc, V _{GS} = 10 Vdc, L = 1.0 mH, I _{L(pk)} = 7.75 A, V _{DS} = 60 Vdc)	E _{AS}	30	mJ
Thermal Resistance	R _{θJC}	5.2	°C/W
– Junction-to-Case	R _{θJA}	71.4	
– Junction-to-Ambient (Note 1.)	R _{θJA}	100	
– Junction-to-Ambient (Note 2.)			
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T _L	260	°C

1. When surface mounted to an FR4 board using 1" pad size, (Cu Area 1.127 in²).
2. When surface mounted to an FR4 board using minimum recommended pad size, (Cu Area 0.412 in²).

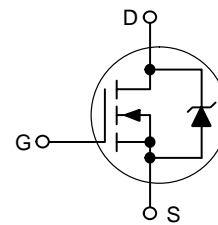


ON Semiconductor™

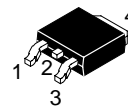
<http://onsemi.com>

9.0 AMPERES
60 VOLTS
RDS(on) = 150 mΩ

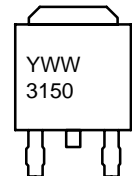
N-Channel



MARKING DIAGRAM

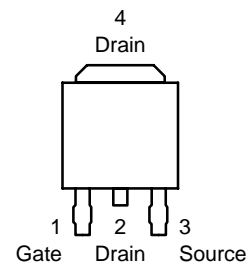


DPAK
CASE 369A
STYLE 2



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°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-to-Source Breakdown Voltage (Note 3.) (V _{GS} = 0 Vdc, I _D = 250 μAdc) Temperature Coefficient (Positive)	V _{(BR)DSS}	60 –	– 70.2	– –	Vdc mV/°C
Zero Gate Voltage Drain Current (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc, T _J = 150°C)	I _{DSS}	– –	– –	1.0 10	μAdc
Gate-Body Leakage Current (V _{GS} = ±20 Vdc, V _{DS} = 0 Vdc)	I _{GSS}	–	–	±100	nAdc

ON CHARACTERISTICS (Note 3.)

Gate Threshold Voltage (Note 3.) (V _{DS} = V _{GS} , I _D = 250 μAdc) Threshold Temperature Coefficient (Negative)	V _{GS(th)}	2.0 –	3.0 6.4	4.0 –	Vdc mV/°C
Static Drain-to-Source On-Resistance (Note 3.) (V _{GS} = 10 Vdc, I _D = 4.5 Adc)	R _{DS(on)}	–	122	150	mΩ
Static Drain-to-Source On-Voltage (Note 3.) (V _{GS} = 10 Vdc, I _D = 9.0 Adc) (V _{GS} = 10 Vdc, I _D = 4.5 Adc, T _J = 150°C)	V _{DS(on)}	– –	1.4 1.1	1.9 –	Vdc
Forward Transconductance (Note 3.) (V _{DS} = 7.0 Vdc, I _D = 6.0 Adc)	g _{FS}	–	5.4	–	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 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 Vdc, I _D = 9.0 Adc, V _{GS} = 10 Vdc, R _G = 9.1 Ω) (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 Vdc, I _D = 9.0 Adc, V _{GS} = 10 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 Adc, V _{GS} = 0 Vdc) (Note 3.) (I _S = 19 Adc, V _{GS} = 0 Vdc, T _J = 150°C)	V _{SD}	– –	0.98 0.86	1.20 –	Vdc
Reverse Recovery Time	(I _S = 9.0 Adc, V _{GS} = 0 Vdc, dI _S /dt = 100 A/μs) (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 ≤ 300 μs, Duty Cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

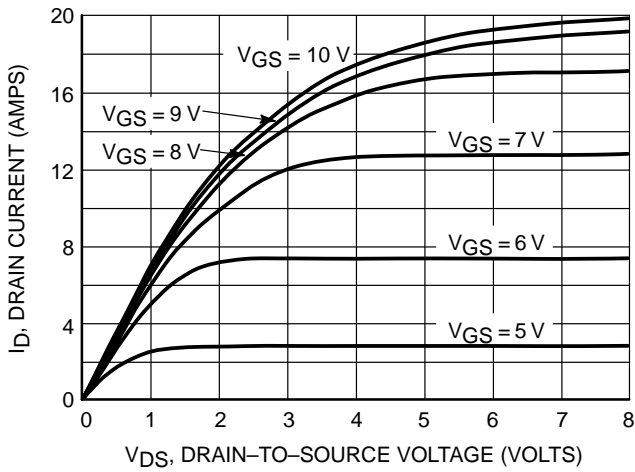


Figure 1. On-Region Characteristics

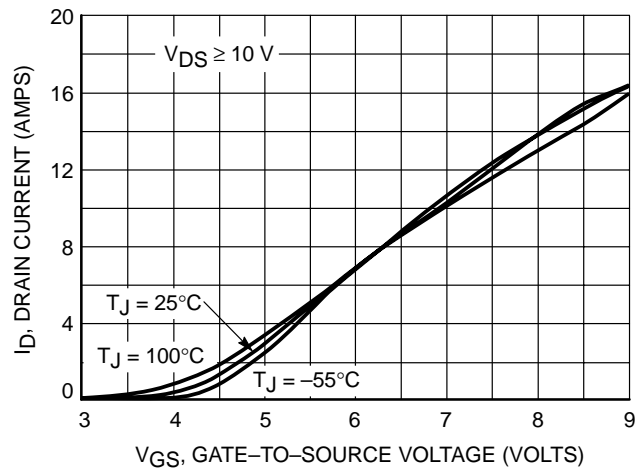


Figure 2. Transfer Characteristics

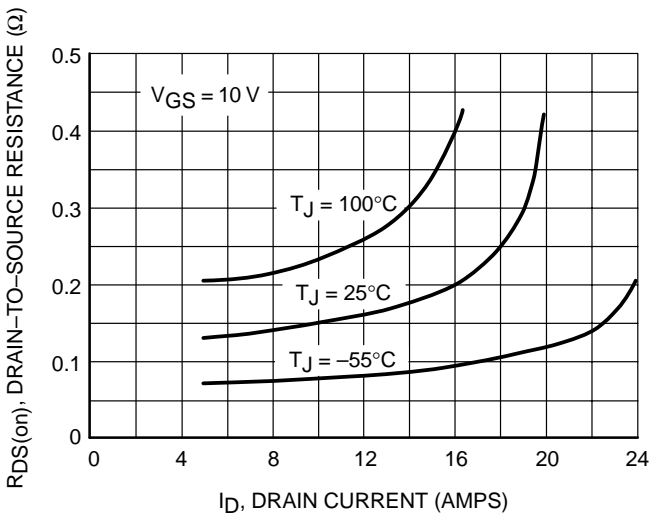


Figure 3. On-Resistance versus Gate-to-Source Voltage

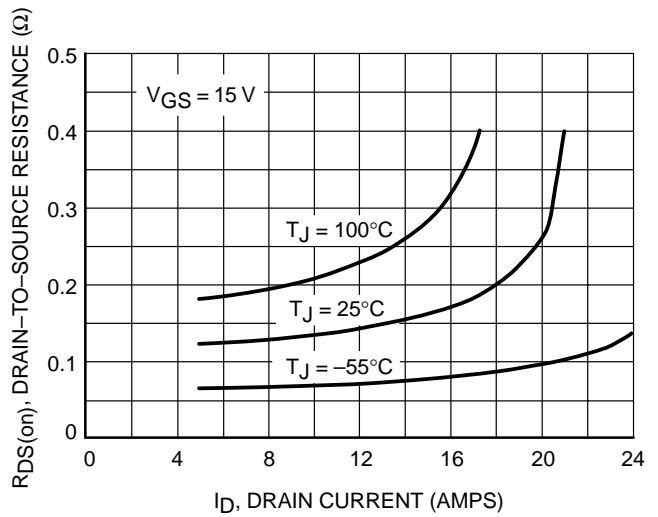


Figure 4. On-Resistance versus Drain Current and Gate Voltage

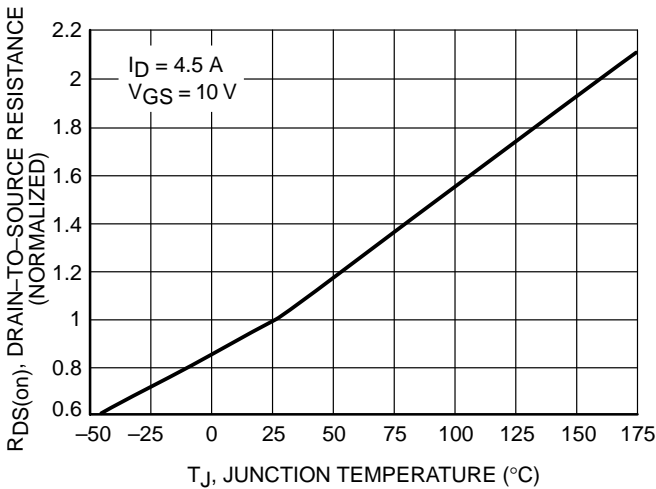


Figure 5. On-Resistance Variation with Temperature

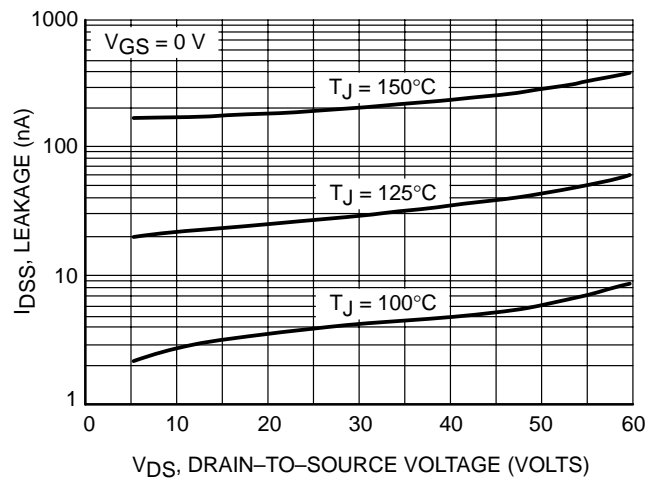


Figure 6. Drain-to-Source Leakage Current versus Voltage

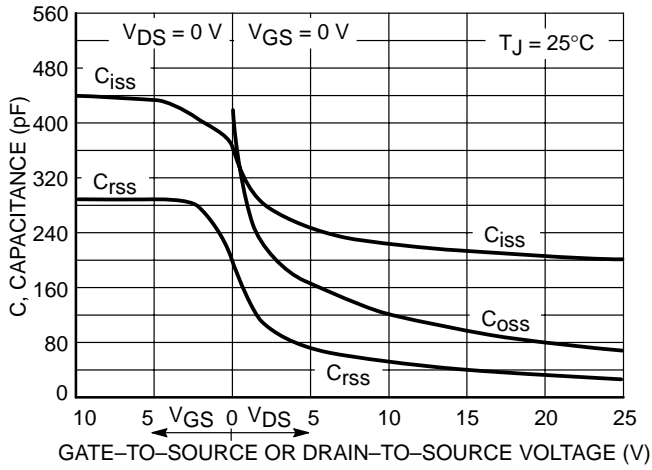


Figure 7. Capacitance Variation

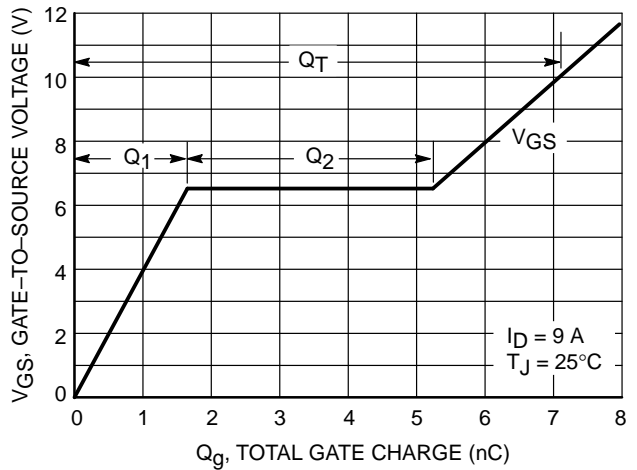


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

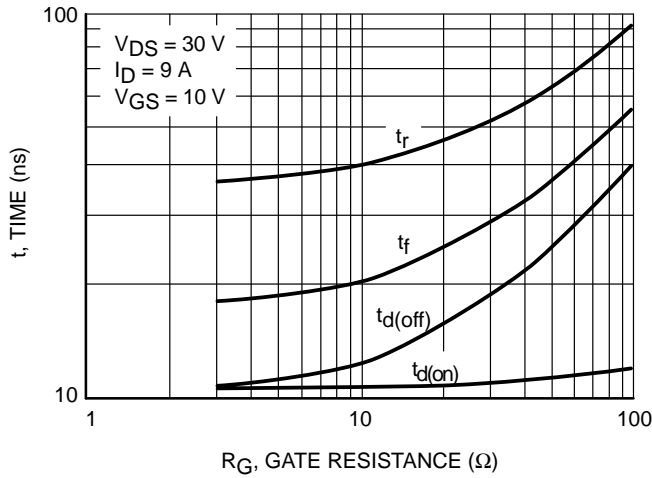


Figure 9. Resistive Switching Time Variation versus Gate Resistance

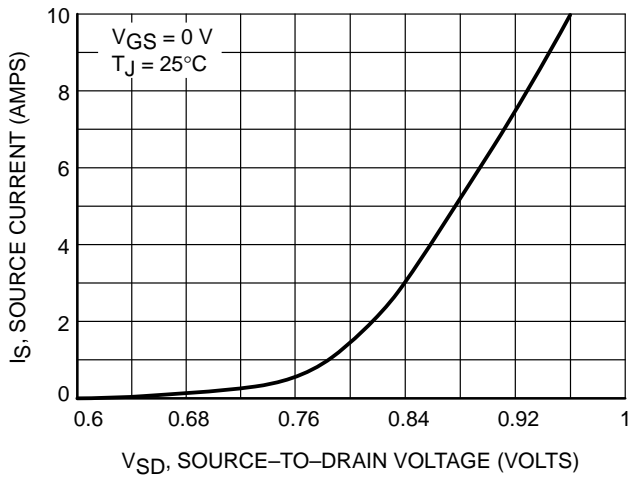


Figure 10. Diode Forward Voltage versus Current

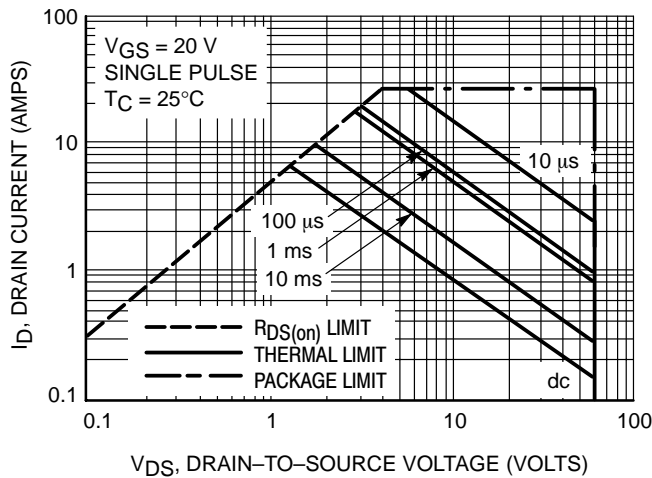


Figure 11. Maximum Rated Forward Biased Safe Operating Area

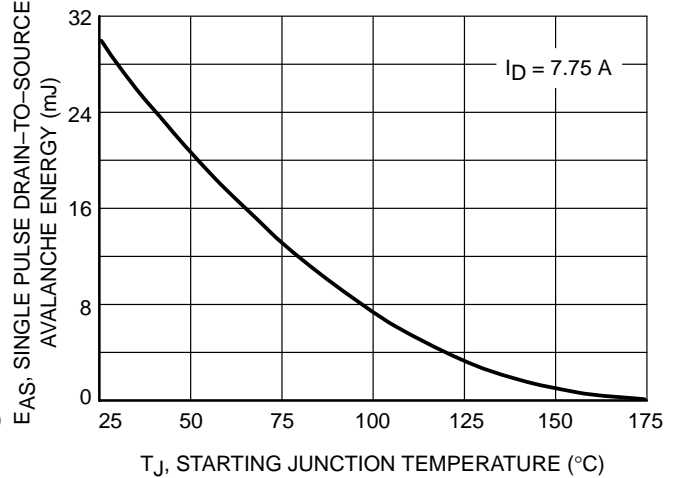


Figure 12. Maximum Avalanche Energy versus Starting Junction Temperature

NTD3055-150

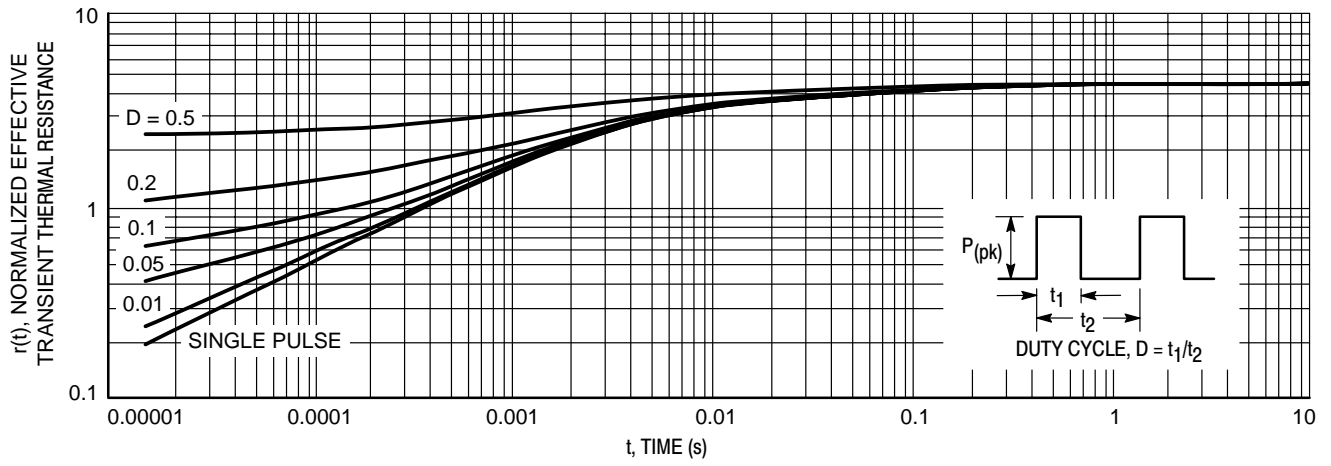
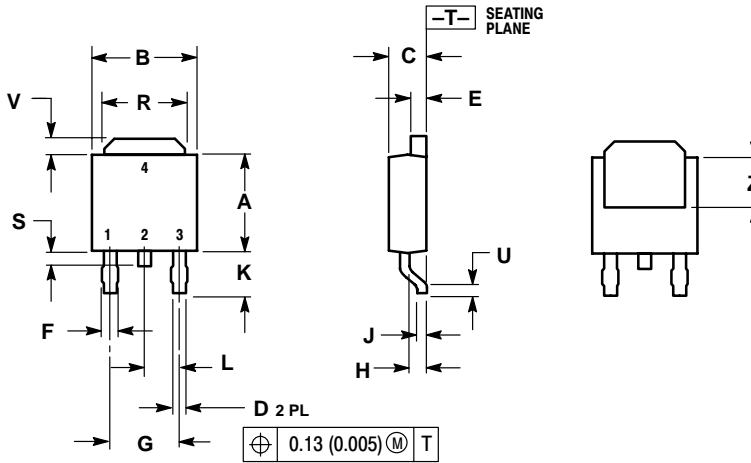


Figure 13. Thermal Response

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.