

NTLGF3402P

MOSFET – Power, P-Channel, Schottky Diode, Schottky Barrier Diode, FETKY, DFN6

-20 V, -3.9 A, 2.0 A

Features

- Flat Lead 6 Terminal Package 3x3x1 mm
- Enhanced Thermal Characteristics
- Low V_F and Low Leakage Schottky Diode
- Reduced Gate Charge to Improve Switching Response
- This is a Pb-Free Device

Applications

- Buck Converter
- High Side DC-DC Conversion Circuits
- Power Management in Portable, HDD and Computing

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	−20	V
Gate-to-Source Voltage			V _{GS}	±12	V
Continuous Drain Current (Note 1)	Steady State	T _A = 25°C	I _D	−2.7	A
		T _A = 85°C		−2.0	
		t ≤ 10 s		T _A = 25°C	
Power Dissipation (Note 1)	Steady State	T _A = 25°C	P _D	1.6	W
	t ≤ 10 s			3.0	
Continuous Drain Current (Note 2)	Steady State	T _A = 25°C	I _D	−2.3	A
		T _A = 85°C		−1.7	
Power Dissipation (Note 2)	Steady State	T _A = 25°C	P _D	1.14	W
Pulsed Drain Current	t _p = 10 μs		I _{DM}	11	A
Operating Junction and Storage Temperature			T _J , T _{STG}	−55 to 150	°C
Source Current (Body Diode)			I _S	1.1	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T _L	260	°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. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
2. Surface Mounted on FR4 Board using the minimum recommended pad size (Cu area = 0.5 in sq).



ON Semiconductor®

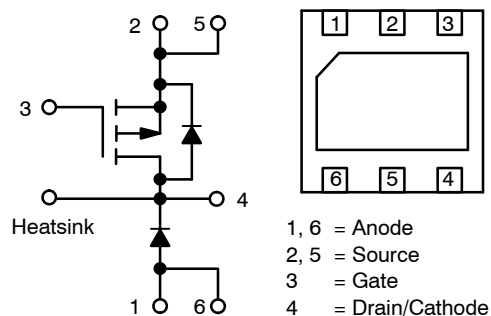
<http://onsemi.com>

MOSFET

$V_{(BR)DS}$	$R_{DS(on)}$ TYP	I_D MAX
-20 V	110 m Ω @ -4.5 V	-3.9 A

SCHOTTKY DIODE

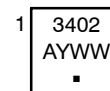
V_R MAX	V_F TYP	I_F MAX
20 V	0.36 V	2.0 A



MARKING DIAGRAMS



**DFN6
CASE 506AH**



3402 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NTLGF3402PT1G	DFN6 (Pb-Free)	3000 / Tape & Reel
NTLGF3402PT2G	DFN6 (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.

NTLGF3402P

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

Parameter	Symbol	Max	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	20	V
DC Blocking Voltage	V_R	20	V
Average Rectified Forward Current	I_F	2.0	A

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	110	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 10$ s (Note 2)	$R_{\theta JA}$	58	$^\circ\text{C/W}$
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	79	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 10$ s (Note 3)	$R_{\theta JA}$	41	$^\circ\text{C/W}$

3. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).

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

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

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0$ V, $I_D = -250$ μA	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			-9.0		$\text{mV}/^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16$ V, $V_{GS} = 0$ V	$T_J = 25^\circ\text{C}$		-1.0	μA
			$T_J = 125^\circ\text{C}$		-5.0	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 12$ V			± 100	nA

ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = -250$ μA	-0.6		-2.0	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			2.7		$\text{mV}/^\circ\text{C}$
Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = -4.5$ V, $I_D = -2.7$ A		110	140	$\text{m}\Omega$
		$V_{GS} = -2.5$ V, $I_D = -1.0$ A		190	225	
Forward Transconductance	g_{FS}	$V_{DS} = -10$ V, $I_D = -2.7$ A		4.8		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0$ V, $f = 1.0$ MHz, $V_{DS} = -10$ V		230	350	pF
Output Capacitance	C_{OSS}			105	225	
Reverse Transfer Capacitance	C_{RSS}			40	75	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5$ V, $V_{DS} = -10$ V, $I_D = -2.7$ A		3.8	10	nC
Threshold Gate Charge	$Q_{G(TH)}$			0.32		
Gate-to-Source Charge	Q_{GS}			0.7		
Gate-to-Drain Charge	Q_{GD}			1.6		

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5$ V, $V_{DD} = -16$ V, $I_D = -2.7$ A, $R_G = 2.4$ Ω		6.2	15	ns
Rise Time	t_r			22	30	
Turn-Off Delay Time	$t_{d(OFF)}$			25	45	
Fall Time	t_f			34	60	

4. Pulse Test: Pulse Width ≤ 300 μs , Duty Cycle $\leq 2\%$.

5. Switching characteristics are independent of operating junction temperatures.

NTLGF3402P

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

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

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -1.1\text{ A}$	$T_J = 25^\circ\text{C}$		-0.8	-1.2	V
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, I_S = -1.1\text{ A},$ $di_S/dt = 100\text{ A}/\mu\text{s}$			53		ns
Charge Time	t_a				15		
Discharge Time	t_b				38		
Reverse Recovery Charge	Q_{RR}				37		nC

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Instantaneous Forward Voltage	V_F	$I_F = 0.1\text{ A}$		0.32	0.34	V
		$I_F = 1.0\text{ A}$		0.36	0.39	
Maximum Instantaneous Reverse Current	I_R	$V_R = 5\text{ V}, T_J = 100^\circ\text{C}$			12	mA
		$V_R = 10\text{ V}$		70		μA
		$V_R = 20\text{ V}$		225		

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

7. Switching characteristics are independent of operating junction temperatures.

TYPICAL P-CHANNEL PERFORMANCE CURVES

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

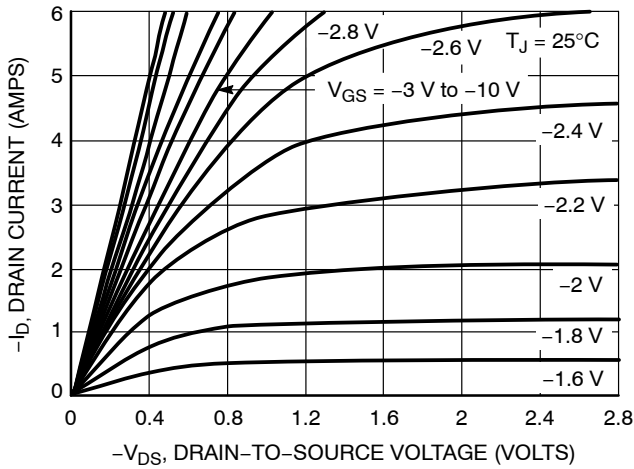


Figure 1. On-Region Characteristics

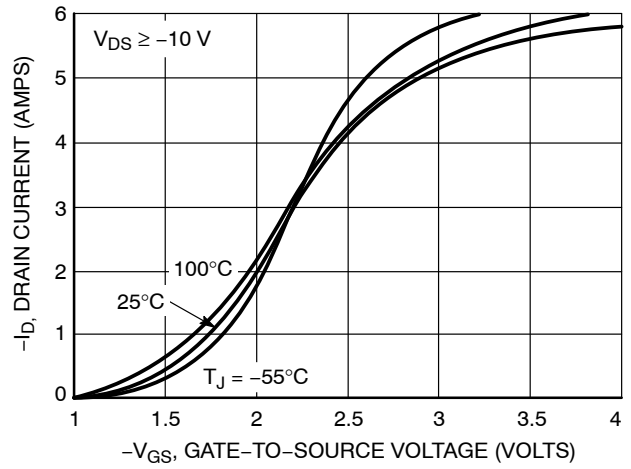


Figure 2. Transfer Characteristics

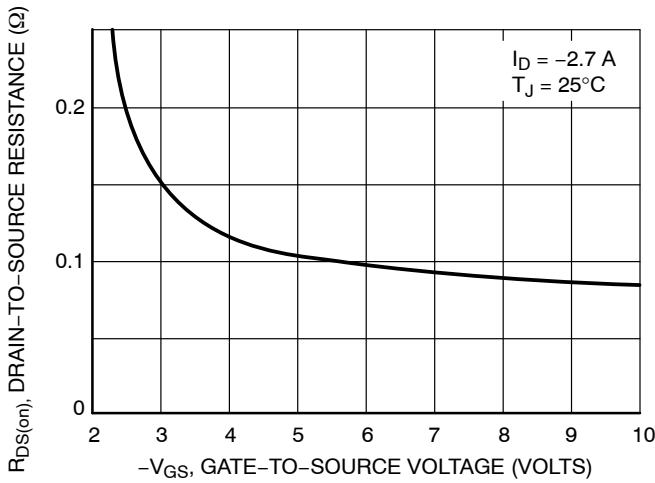


Figure 3. On-Resistance vs. Gate-to-Source Voltage

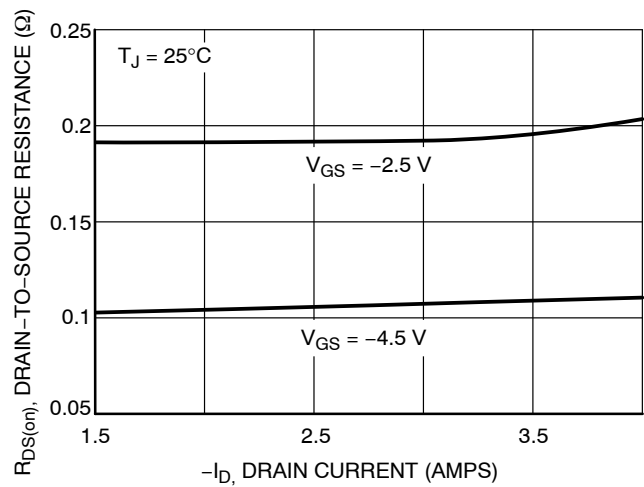


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

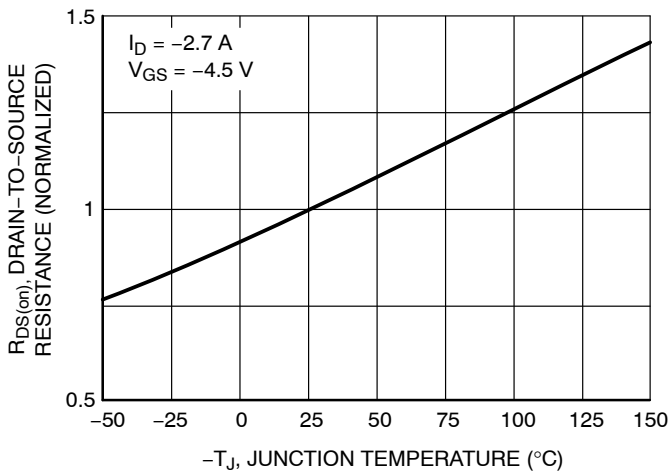


Figure 5. On-Resistance Variation with Temperature

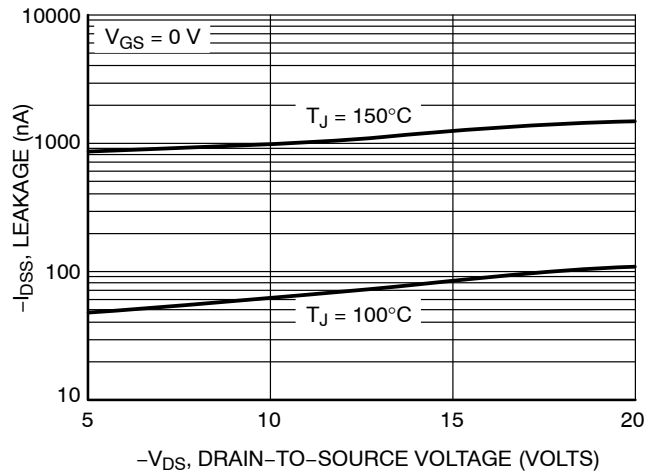
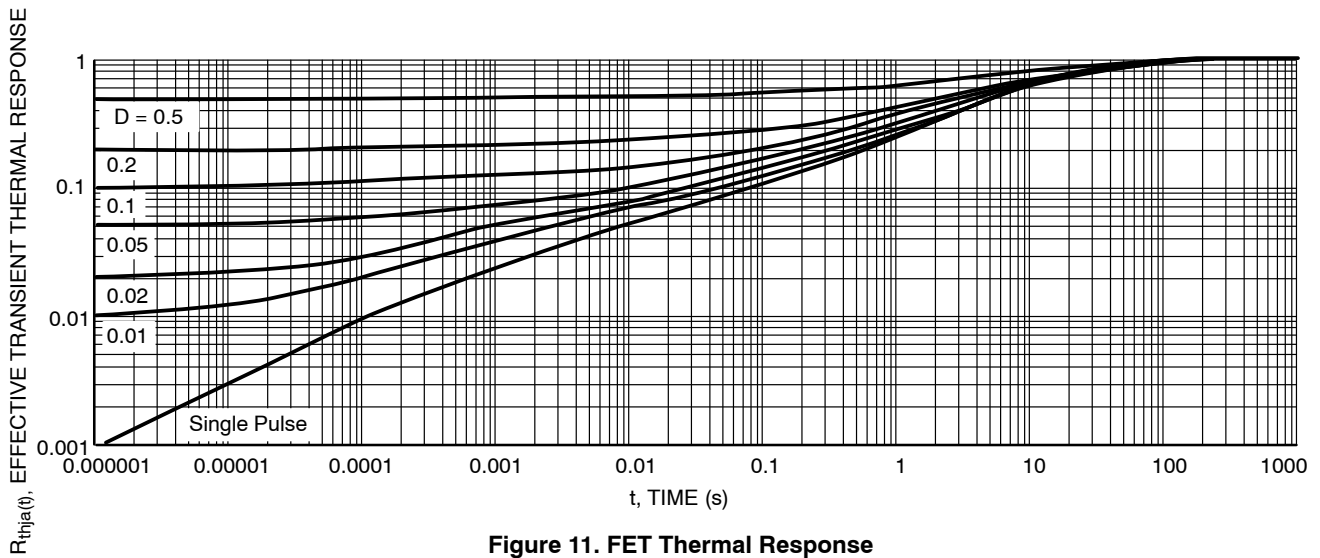
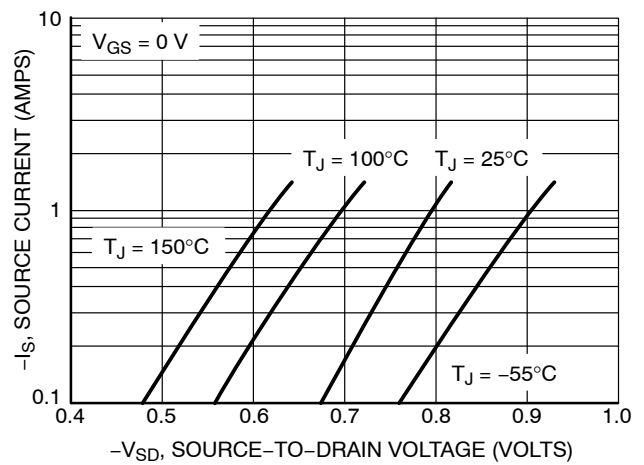
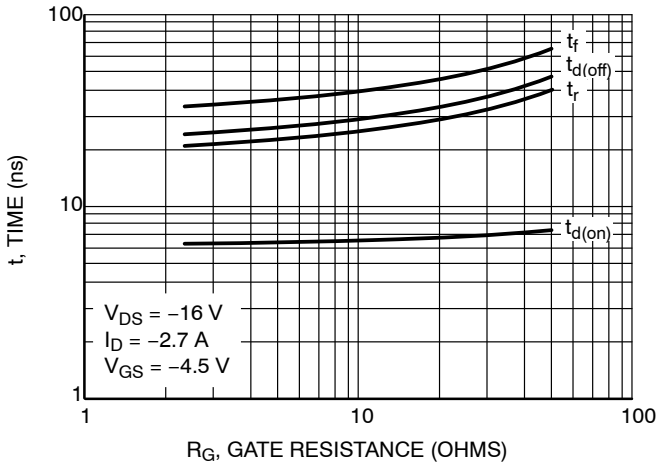
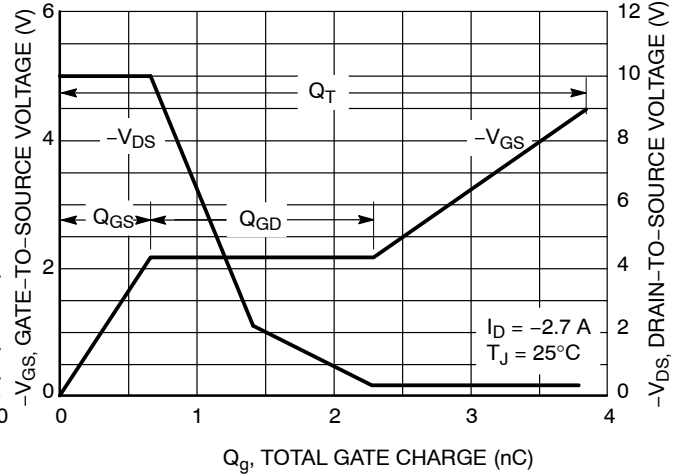
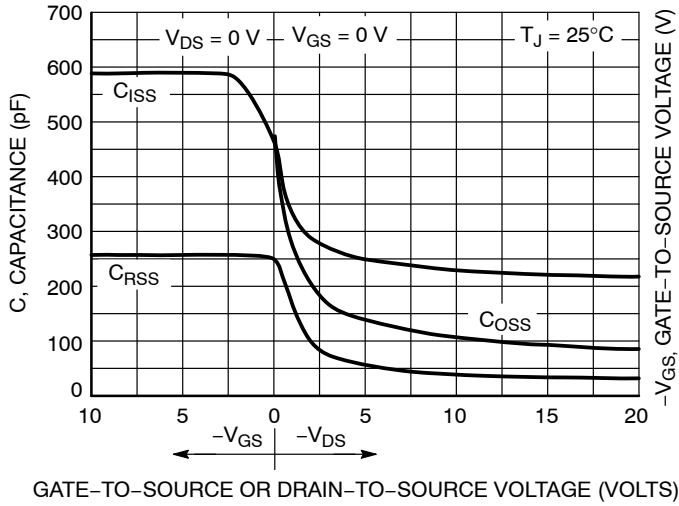


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL P-CHANNEL PERFORMANCE CURVES

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



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

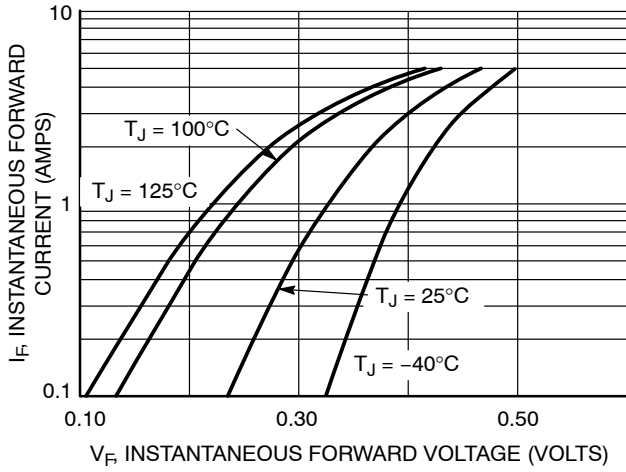


Figure 12. Typical Forward Voltage

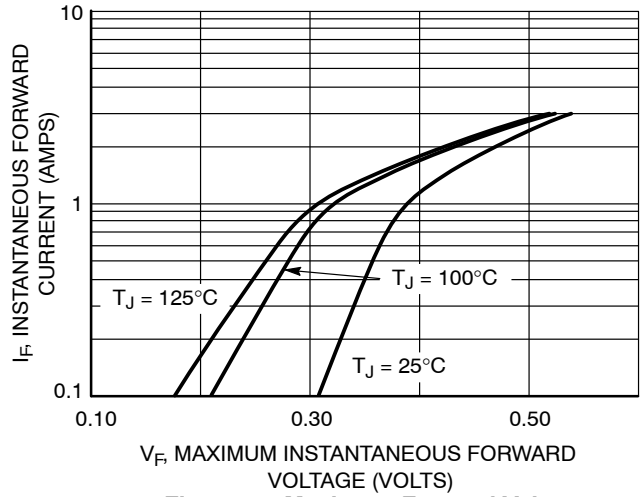


Figure 13. Maximum Forward Voltage

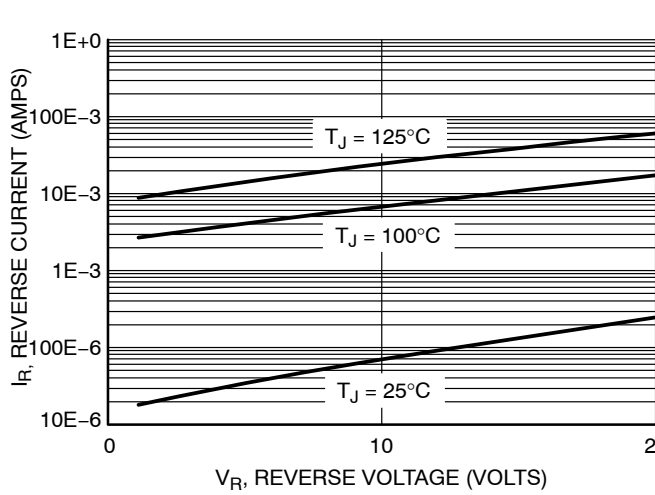


Figure 14. Typical Reverse Current

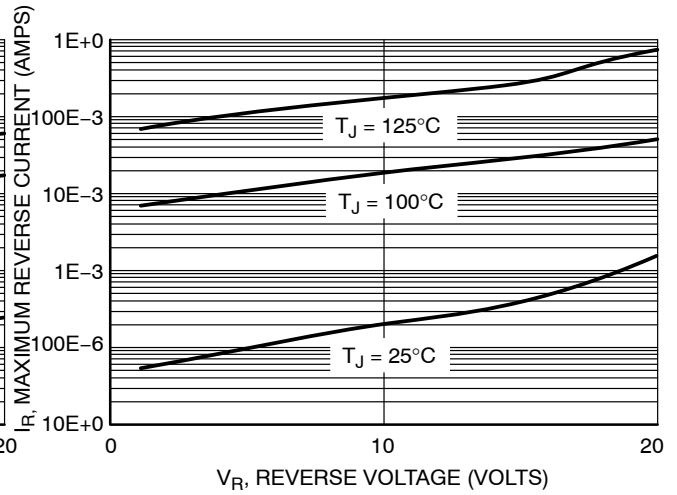


Figure 15. Maximum Reverse Current

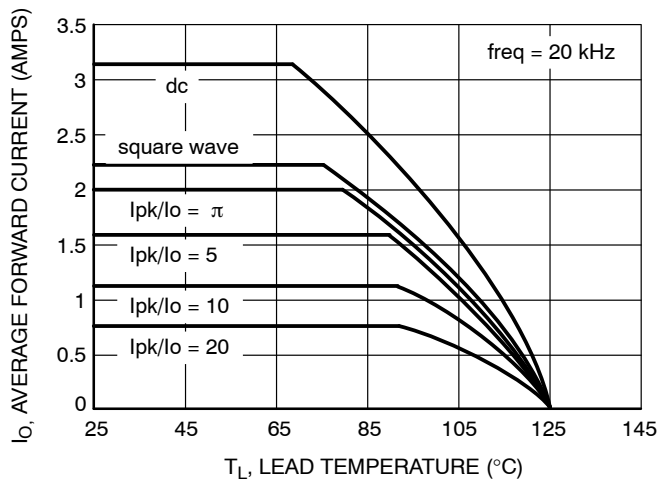


Figure 16. Current Derating

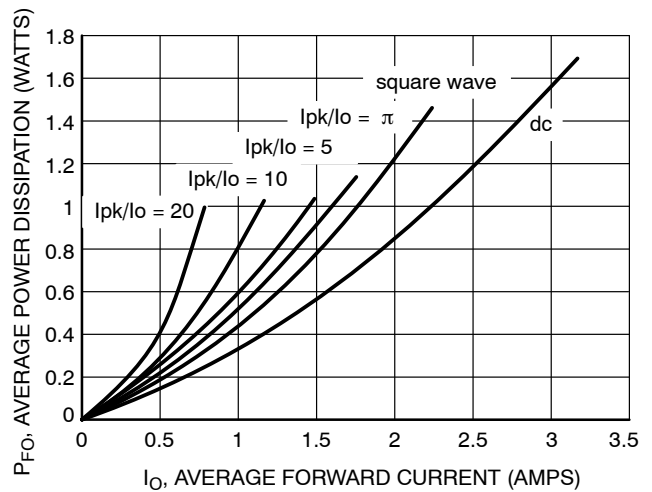
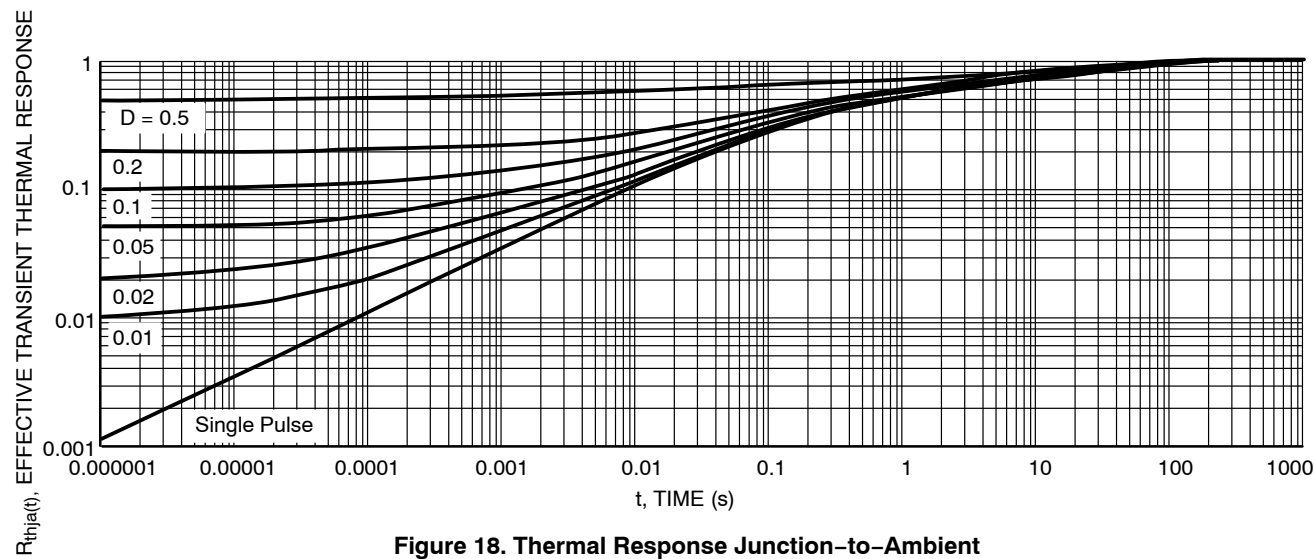


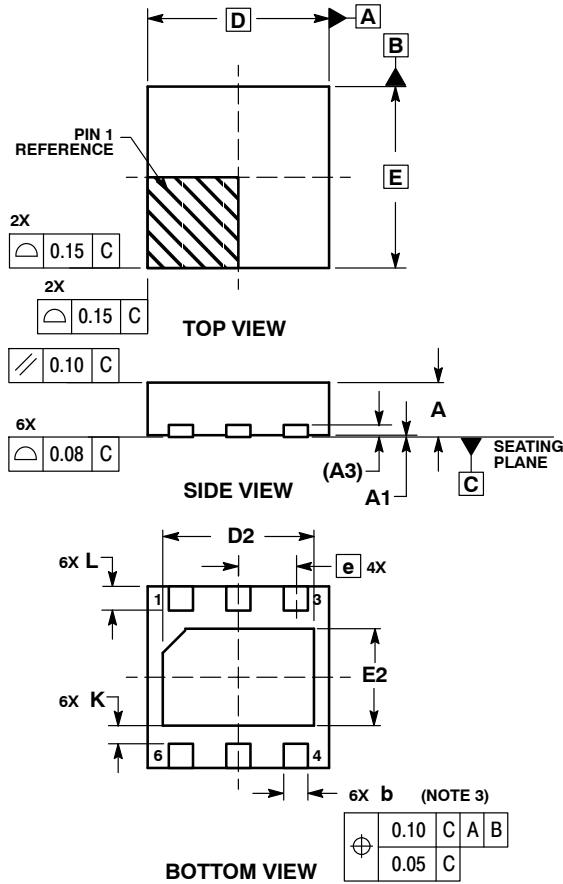
Figure 17. Forward Power Dissipation



NTLGF3402P

PACKAGE DIMENSIONS

DFN6 3*3 MM, 0.95 PITCH
CASE 506AH-01
ISSUE O

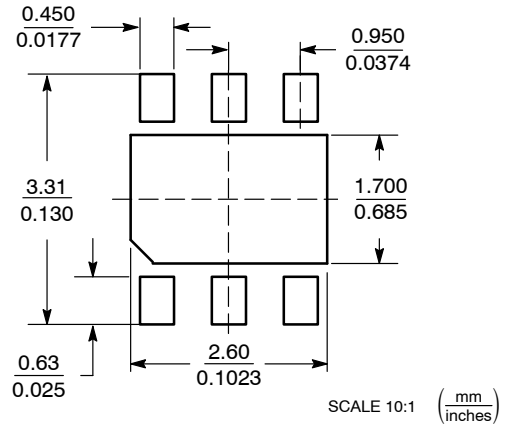


NOTES:


1. DIMENSIONS AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
A3	0.20 REF		
b	0.35	0.40	0.45
D	3.00 BSC		
D2	2.40	2.50	2.60
E	3.00 BSC		
E2	1.50	1.60	1.70
e	0.95 BSC		
K	0.21		
L	0.30	0.40	0.50

SOLDERING FOOTPRINT*



FETKY is a registered trademark of International Rectifier Corporation.

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 61312, Phoenix, Arizona 85062-1312 USA
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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

Japan: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

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

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.

NTLGF3402P/D

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor:](#)

[NTLGF3402PT2G](#)