NTGS3446T1

Power MOSFET
5.1 Amps, 20 Volts
N-Channel TSOP-6

Features

- Ultra Low $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- Logic Level Gate Drive
- Diode Exhibits High Speed, Soft Recovery
- Avalanche Energy Specified
- I_{DSS} Specified at Elevated Temperature

Applications

- Power Management in portable and battery-powered products, i.e. computers, printers, PCMCIA cards, cellular and cordless
- Lithium Ion Battery Applications
- Notebook PC

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Thermal Resistance Junction-to-Ambient (Note 1) Total Power Dissipation @ T_A = 25°C Drain Current - Continuous @ T_A = 25°C - Pulsed Drain Current (t_p < 10 μs)	 $R_{\theta JA}$ P_d I_D I_{DM}	 244 0.5 2.5 10	 °C/W Watts Amps Amps
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ T_A = 25°C Drain Current - Continuous @ T_A = 25°C - Pulsed Drain Current (t_p < 10 μs)	 $R_{\theta JA}$ P_d I_D I_{DM}	 128 1.0 3.6 14	 °C/W Watts Amps Amps
Thermal Resistance Junction-to-Ambient (Note 3) Total Power Dissipation @ T_A = 25°C Drain Current - Continuous @ T_A = 25°C - Pulsed Drain Current (t_p < 10 μs)	 $R_{\theta JA}$ P_d I_D I_{DM}	 62.5 2.0 5.1 2.0	 °C/W Watts Amps Amps
Operating and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Maximum Lead Temperature for Soldering Purposes for 10 seconds	T_L	260	°C

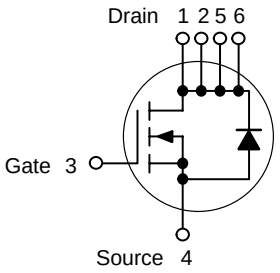
1. Minimum FR-4 or G-10PCB, operating to steady state.
2. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single-sided), operating to steady state.
3. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single-sided), t < 5.0 seconds.

ON Semiconductor®

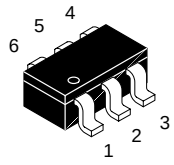
http://onsemi.com

5.1 AMPERES
20 VOLTS
$R_{DS(on)}$ = 45 mΩ

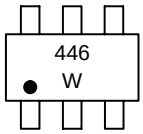
N-Channel



MARKING DIAGRAM

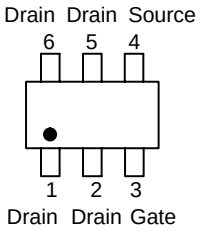


TSOP-6
CASE 318G
STYLE 1



446 = Device Code
W = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping
NTGS3446T1	TSOP-6	3000 Tape & Reel

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 0.25 mAdc) Temperature Coefficient (Positive)		$V_{(BR)DSS}$	20 -	- 22	- -	Vdc mV/°C
Zero Gate Voltage Collector Current (V_{DS} = 20 Vdc, V_{GS} = 0 Vdc) (V_{DS} = 20 Vdc, V_{GS} = 0 Vdc, T_J = 85°C)		I_{DSS}	- -	- -	1.0 25	μAdc
Gate-Body Leakage Current (V_{GS} = ±12 Vdc, V_{DS} = 0)		$I_{GSS(f)}$ $I_{GSS(r)}$	- -	- -	100 -100	nAdc
ON CHARACTERISTICS (Note 4)						
Gate Threshold Voltage I_D = 0.25 mA, V_{DS} = V_{GS} Temperature Coefficient (Negative)		$V_{GS(th)}$	0.6 -	0.85 -2.5	1.2 -	Vdc mV/°C
Static Drain-to-Source On-Resistance (V_{GS} = 4.5 Vdc, I_D = 5.1 Adc) (V_{GS} = 2.5 Vdc, I_D = 4.4 Adc)		$R_{DS(on)}$	- -	36 44	45 55	mΩ
Forward Transconductance (V_{DS} = 10 Vdc, I_D = 5.1 Adc)		g_{FS}	-	12	-	mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance	(V_{DS} = 10 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{iss}	-	510	750	pF
Output Capacitance		C_{oss}	-	200	350	
Transfer Capacitance		C_{rss}	-	60	100	
SWITCHING CHARACTERISTICS (Note 5)						
Turn-On Delay Time	(V_{DD} = 10 Vdc, I_D = 1.0 Adc, V_{GS} = 4.5 Vdc, R_G = 6.0 Ω)	$t_{d(on)}$	-	9.0	16	ns
Rise Time		t_r	-	12	20	
Turn-Off Delay Time		$t_{d(off)}$	-	35	60	
Fall Time		t_f	-	20	35	
Gate Charge	(V_{DS} = 10 Vdc, I_D = 5.1 Adc, V_{GS} = 4.5 Vdc)	Q_T	-	8.0	15	nC
		Q_{gs}	-	2.0	-	
		Q_{gd}	-	2.0	-	
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage (Note 4)	(I_S = 1.7 Adc, V_{GS} = 0 Vdc) (I_S = 1.7 Adc, V_{GS} = 0 Vdc, T_J = 85°C)	V_{SD}	- -	0.74 0.66	1.1 -	Vdc
Reverse Recovery Time	(I_S = 1.7 Adc, V_{GS} = 0 Vdc, di_S/dt = 100 A/μs)	t_{rr}	-	20	-	ns
		t_a	-	11	-	
		t_b	-	9.0	-	
Reverse Recovery Stored Charge		Q_{RR}	-	0.01	-	μC

4. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
5. Switching characteristics are independent of operating junction temperature.

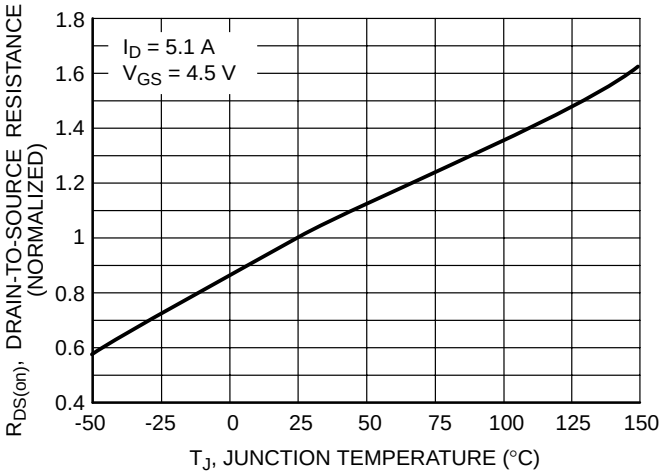


Figure 1. On-Resistance Variation with Temperature

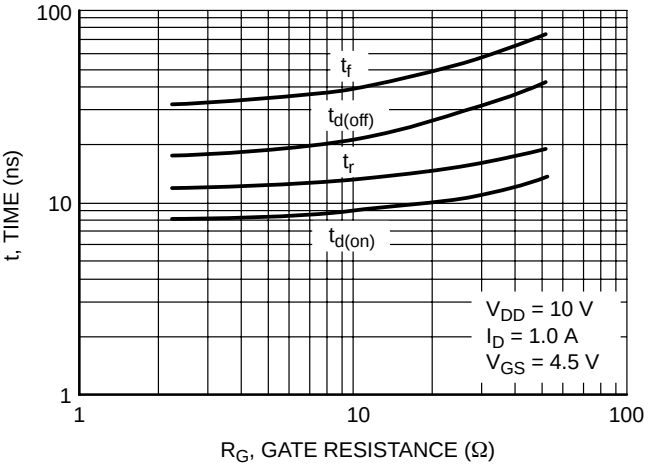
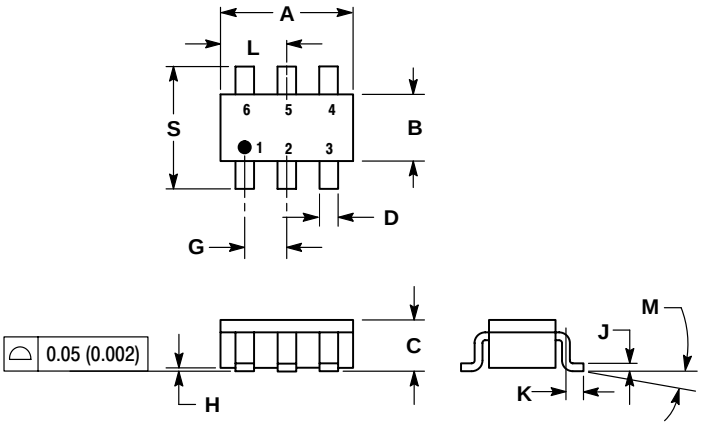


Figure 2. Resistive Switching Time Variation vs. Gate Resistance

PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE H



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.

	MILLIMETERS		INCHES	
DIM	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:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

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
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For additional information, please contact your local Sales Representative.