NTGS3433T1

MOSFET
-3.3 Amps, -12 Volts

P−Channel TSOP−6

ON Semiconductor®

http://onsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
−12 V	75 mΩ @ −4.5 V	−3.3 A

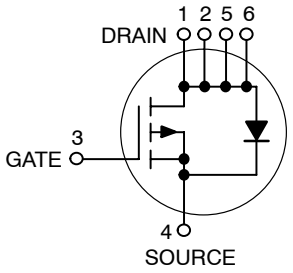
Features

- 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

P−Channel



MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

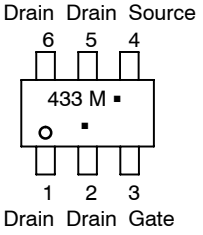
Rating	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	−12	Volts
Gate−to−Source Voltage − Continuous	V_{GS}	±8.0	Volts
Thermal Resistance Junction−to−Ambient (Note 1)	$R_{\theta JA}$	62.5	°C/W
Total Power Dissipation @ T_A = 25°C	P_d	2.0	Watts
Drain Current − Continuous @ T_A = 25°C	I_D	−3.3	Amps
− Pulsed Drain Current (t_p < 10 μS)	I_{DM}	−20	Amps
Maximum Operating Power Dissipation	P_d	1.0	Watts
Maximum Operating Drain Current	I_D	−2.35	Amps
Thermal Resistance Junction−to−Ambient (Note 2)	$R_{\theta JA}$	128	°C/W
Total Power Dissipation @ T_A = 25°C	P_d	1.0	Watts
Drain Current − Continuous @ T_A = 25°C	I_D	−2.35	Amps
− Pulsed Drain Current (t_p < 10 μS)	I_{DM}	−14	Amps
Maximum Operating Power Dissipation	P_d	0.5	Watts
Maximum Operating Drain Current	I_D	−1.65	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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Mounted onto a 2″ square FR−4 board (1 in sq, 2 oz. Cu 0.06″ thick single sided), t < 5.0 seconds.
2. Mounted onto a 2″ square FR−4 board (1 in sq, 2 oz. Cu 0.06″ thick single sided), operating to steady state.

MARKING DIAGRAM & PIN ASSIGNMENT

TSOP−6
CASE 318G
STYLE 1



433 = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
NTGS3433T1	TSOP−6	3000 Tape & Reel
NTGS3433T1G	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 Specification Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Notes 3 & 4)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain−Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = −10 μA)		$V_{(BR)DSS}$	−12	−	−	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0 Vdc, V_{DS} = −8 Vdc, T_J = 25°C) (V_{GS} = 0 Vdc, V_{DS} = −8 Vdc, T_J = 70°C)		I_{DSS}	− −	− −	−1.0 −5.0	μAdc
Gate−Body Leakage Current (V_{GS} = −8.0 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	−	−	−100	nAdc
Gate−Body Leakage Current (V_{GS} = +8.0 Vdc, V_{DS} = 0 Vdc)		I_{GSS}	−	−	100	nAdc
ON CHARACTERISTICS						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = −250 μAdc)		$V_{GS(th)}$	−0.50	−0.70	−1.50	Vdc
Static Drain−Source On−State Resistance (V_{GS} = −4.5 Vdc, I_D = −3.3 Adc) (V_{GS} = −2.5 Vdc, I_D = −2.9 Adc)		$R_{DS(on)}$	− −	0.055 0.075	0.075 0.095	Ω
Forward Transconductance (V_{DS} = −10 Vdc, I_D = −3.3 Adc)		g_{FS}	−	7.0	−	mhos
DYNAMIC CHARACTERISTICS						
Total Gate Charge	(V_{DS} = −10 Vdc, V_{GS} = −4.5 Vdc, I_D = −3.3 Adc)	Q_{tot}	−	7.0	15	nC
Gate−Source Charge		Q_{gs}	−	2.0	−	
Gate−Drain Charge		Q_{gd}	−	3.5	−	
Input Capacitance	(V_{DS} = −5.0 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz)	C_{iss}	−	550	−	pF
Output Capacitance		C_{oss}	−	450	−	
Reverse Transfer Capacitance		C_{rss}	−	200	−	
SWITCHING CHARACTERISTICS						
Turn−On Delay Time	(V_{DD} = −10 Vdc, I_D = −1.0 Adc, V_{GS} = −4.5 Vdc, R_g = 6.0 Ω)	$t_{d(on)}$	−	20	30	ns
Rise Time		t_r	−	20	30	
Turn−Off Delay Time		$t_{d(off)}$	−	110	120	
Fall Time		t_f	−	100	115	
Reverse Recovery Time	(I_S = −1.7 Adc, dI_S/dt = 100 A/μs)	t_{rr}	−	30	−	ns
BODY−DRAIN DIODE RATINGS						
Diode Forward On−Voltage	(I_S = −1.7 Adc, V_{GS} = 0 Vdc)	V_{SD}	−	−0.80	−1.5	Vdc
Diode Forward On−Voltage	(I_S = −3.3 Adc, V_{GS} = 0 Vdc)	V_{SD}	−	−0.90	−	Vdc

3. Indicates Pulse Test: P.W. = 300 μsec max, Duty Cycle = 2%.
4. Class 1 ESD rated − Handling precautions to protect against electrostatic discharge are mandatory.

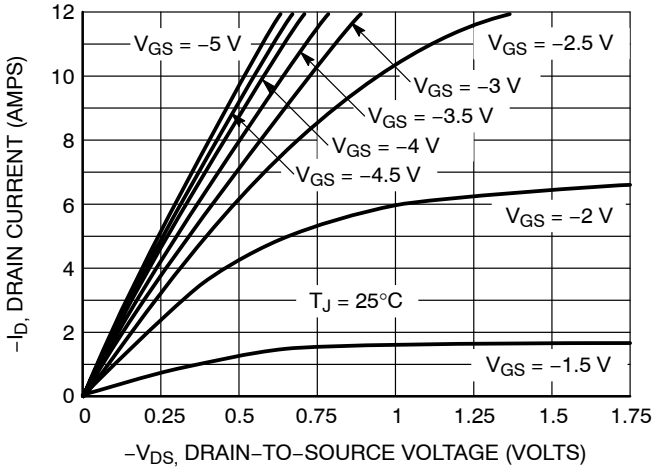


Figure 1. On−Region Characteristics

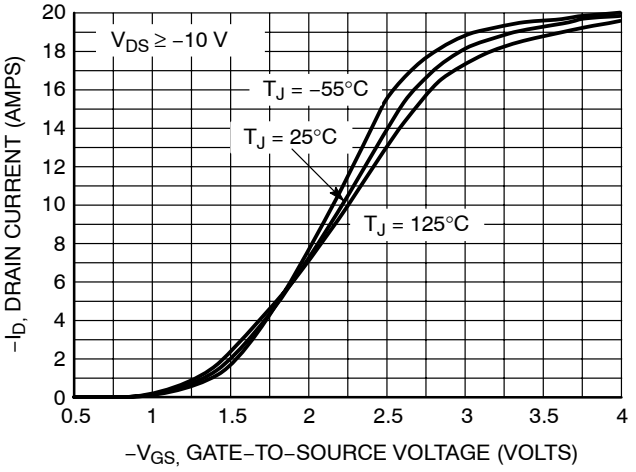


Figure 2. Transfer Characteristics

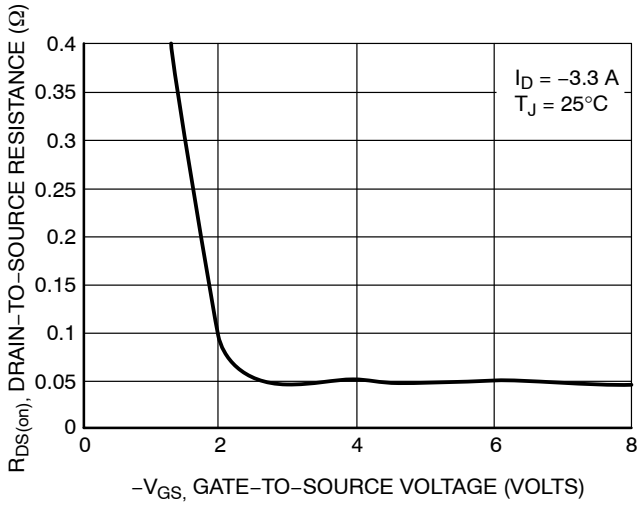


Figure 3. On−Resistance vs. Gate−to−Source Voltage

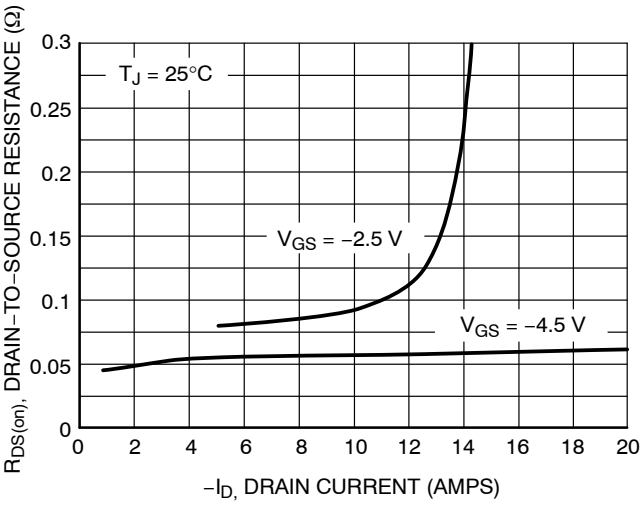


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

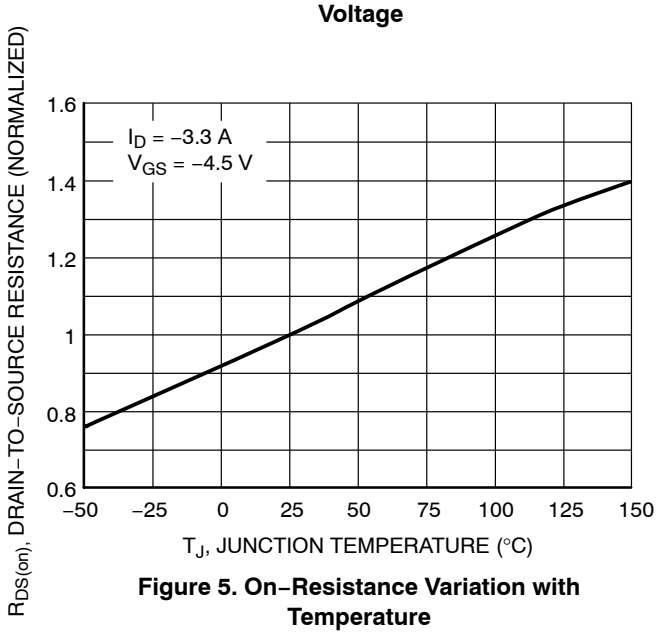


Figure 5. On−Resistance Variation with Temperature

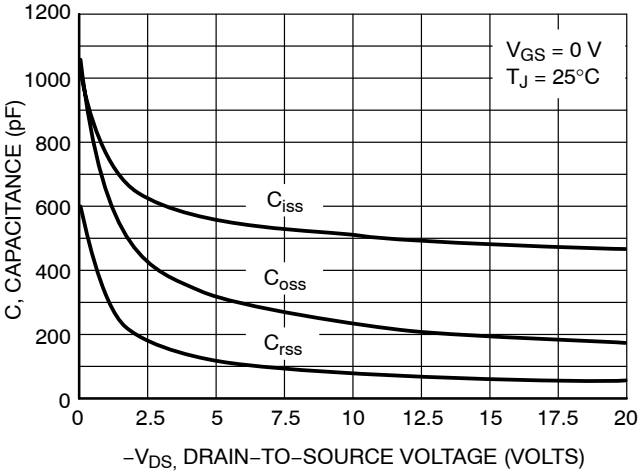


Figure 6. Capacitance Variation

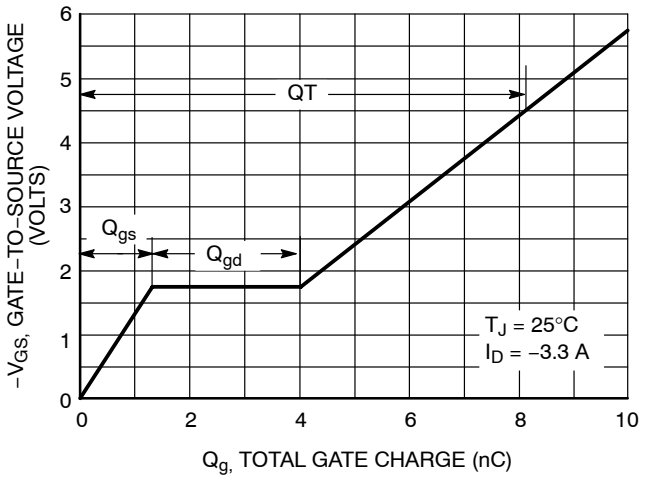


Figure 7. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

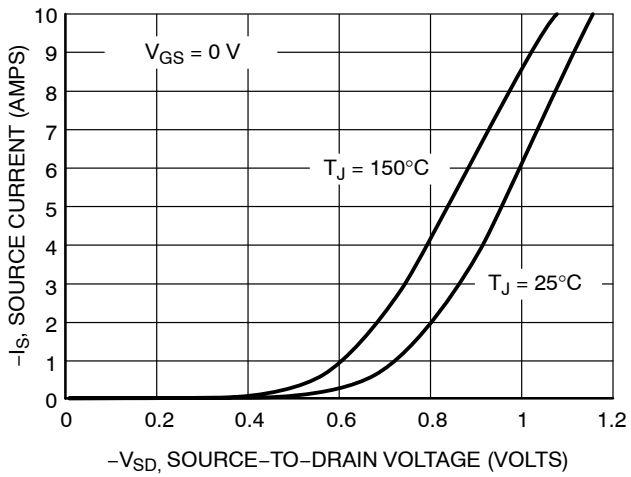


Figure 8. Diode Forward Voltage vs. Current

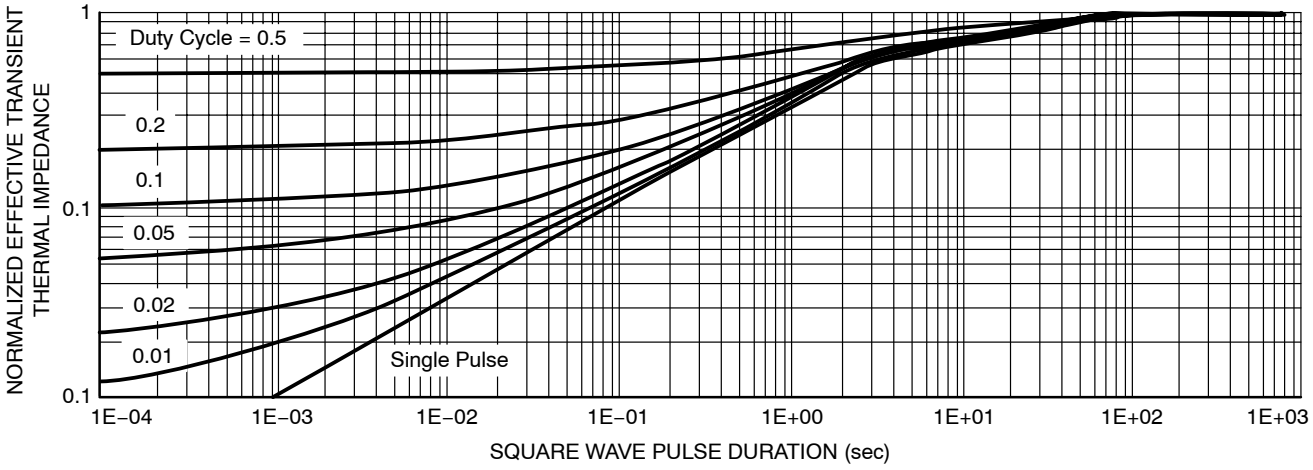


Figure 9. Normalized Thermal Transient Impedance, Junction−to−Ambient

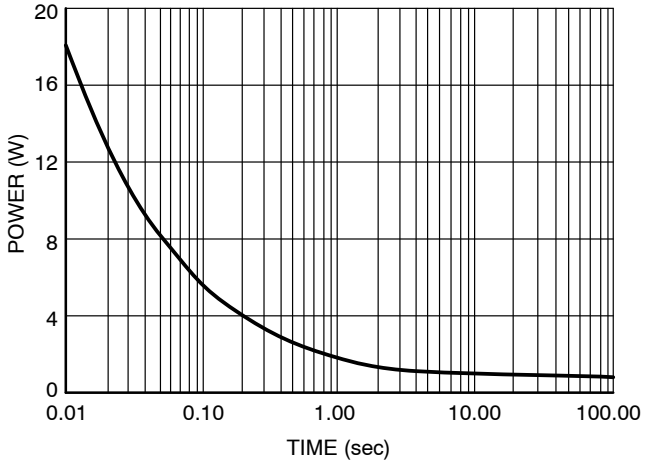
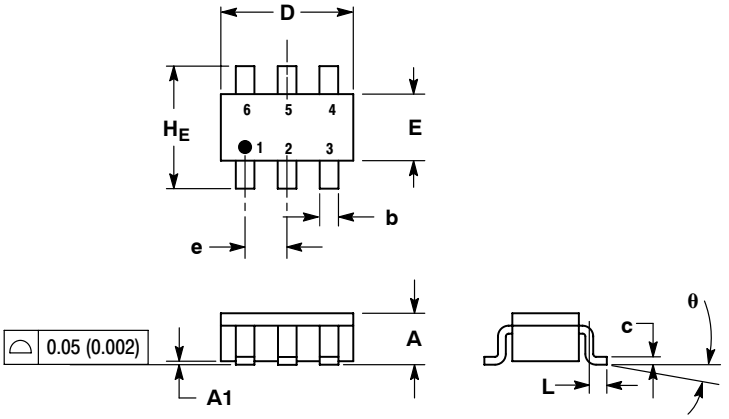


Figure 10. Single Pulse Power

PACKAGE DIMENSIONS

TSOP−6
CASE 318G−02
ISSUE P

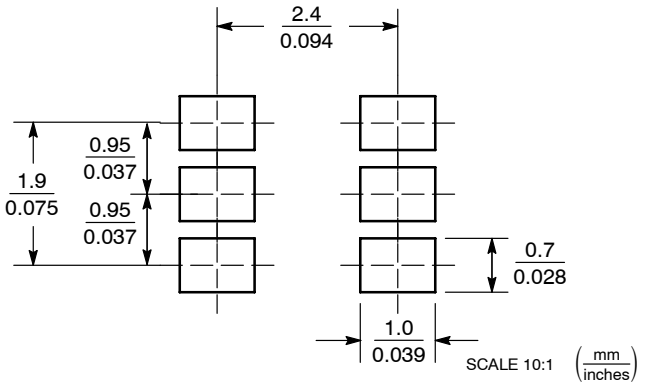


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
H_E	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	–	10°	0°	–	10°

STYLE 1:
PIN 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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