

NTGS3455T1

MOSFET -3.5 Amps, -30 Volts P-Channel TSOP-6

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

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	-30	Volts
Gate-to-Source Voltage - Continuous	V_{GS}	± 20.0	Volts
Thermal Resistance Junction-to-Ambient (Note 1.)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	2.0	Watts
Drain Current		-3.5	Amps
- Continuous @ $T_A = 25^\circ\text{C}$	I_D		
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-20	Amps
Maximum Operating Power Dissipation	P_d	1.0	Watts
Maximum Operating Drain Current	I_D	-2.5	Amps
Thermal Resistance Junction-to-Ambient (Note 2.)	$R_{\theta JA}$	128	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	1.0	Watts
Drain Current			
- Continuous @ $T_A = 25^\circ\text{C}$	I_D	-2.5	Amps
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-14	Amps
Maximum Operating Power Dissipation	P_d	0.5	Watts
Maximum Operating Drain Current	I_D	-1.75	Amps
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	$^\circ\text{C}$

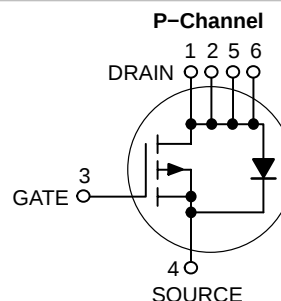
1. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), $t < 5.0$ seconds.
2. Mounted onto a 2" square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), operating to steady state.



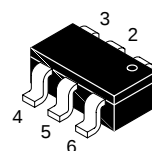
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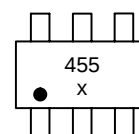
$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
-30 V	100 m Ω @ -10 V	-3.5 A



MARKING DIAGRAM

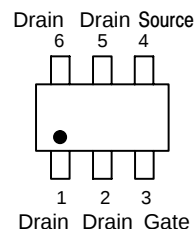


TSOP-6
CASE 318G
STYLE 1



455 = Device Code
x = Date Code

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping†
NTGS3455T1	TSOP-6	3000 Tape & Reel
NTGS3455T1G	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.

NTGS3455T1

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Notes 3. & 4.)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = -10\text{ }\mu\text{A}$)	$V_{(BR)DSS}$	-30	-	-	Vdc
Zero Gate Voltage Drain Current ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -30\text{ Vdc}$, $T_J = 25^\circ\text{C}$) ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -30\text{ Vdc}$, $T_J = 70^\circ\text{C}$)	I_{DSS}	- -	- -	-1.0 -5.0	μAdc
Gate-Body Leakage Current ($V_{GS} = -20.0\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	-100	nAdc
Gate-Body Leakage Current ($V_{GS} = +20.0\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	100	nAdc

ON CHARACTERISTICS

Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{Adc}$)	$V_{GS(th)}$	-1.0	-1.87	-3.0	Vdc
Static Drain-Source On-State Resistance ($V_{GS} = -10\text{ Vdc}$, $I_D = -3.5\text{ Adc}$) ($V_{GS} = -4.5\text{ Vdc}$, $I_D = -2.7\text{ Adc}$)	$R_{DS(on)}$	- -	0.094 0.144	0.100 0.170	Ω
Forward Transconductance ($V_{DS} = -15\text{ Vdc}$, $I_D = -3.5\text{ Adc}$)	g_{FS}	-	6.0	-	mhos

DYNAMIC CHARACTERISTICS

Total Gate Charge	$(V_{DS} = -15\text{ Vdc}$, $V_{GS} = -10\text{ Vdc}$, $I_D = -3.5\text{ Adc})$	Q_{tot}	-	9.0	13	nC
Gate-Source Charge		Q_{gs}	-	2.5	-	
Gate-Drain Charge		Q_{gd}	-	2.0	-	
Input Capacitance	$(V_{DS} = -5.0\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, $f = 1.0\text{ MHz})$	C_{iss}	-	480	-	pF
Output Capacitance		C_{oss}	-	220	-	
Reverse Transfer Capacitance		C_{rss}	-	60	-	

SWITCHING CHARACTERISTICS

Turn-On Delay Time	$(V_{DD} = -20\text{ Vdc}$, $I_D = -1.0\text{ Adc}$, $V_{GS} = -10\text{ Vdc}$, $R_g = 6.0\text{ }\Omega$)	$t_{d(on)}$	-	10	20	ns
Rise Time		t_r	-	15	30	
Turn-Off Delay Time		$t_{d(off)}$	-	20	35	
Fall Time		t_f	-	10	20	
Reverse Recovery Time	$(I_S = -1.7\text{ Adc}$, $di_S/dt = 100\text{ A}/\mu\text{s})$	t_{rr}	-	30	-	ns

BODY-DRAIN DIODE RATINGS

Diode Forward On-Voltage	$(I_S = -1.7\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$)	V_{SD}	-	-0.90	-1.2	Vdc
Diode Forward On-Voltage	$(I_S = -3.5\text{ Adc}$, $V_{GS} = 0\text{ Vdc}$)	V_{SD}	-	-1.0	-	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 is mandatory.

NTGS3455T1

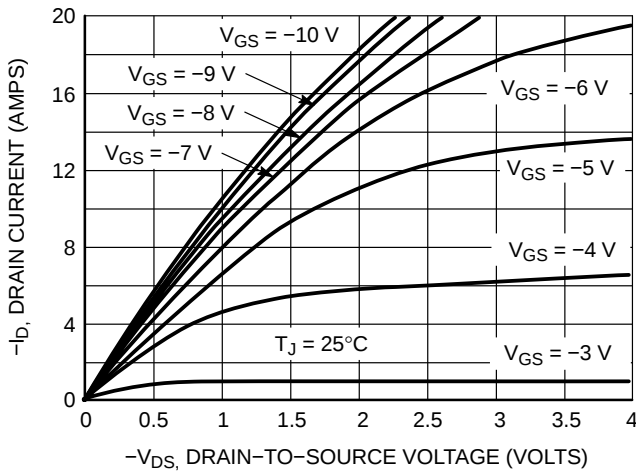


Figure 1. On-Region Characteristics

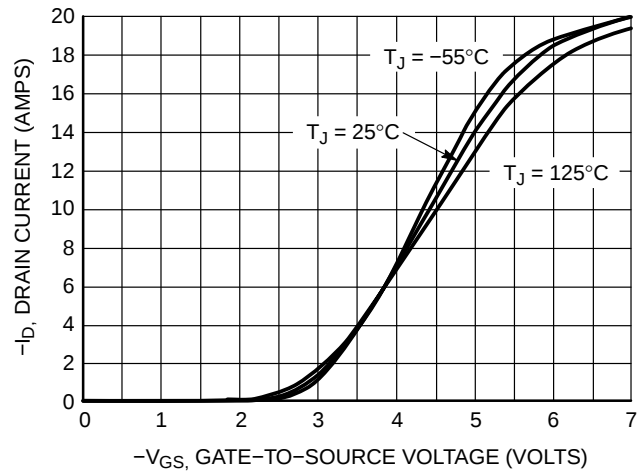


Figure 2. Transfer Characteristics

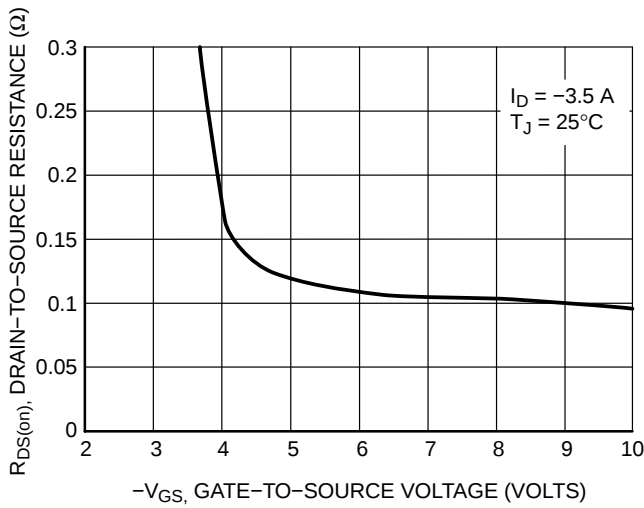


Figure 3. On-Resistance vs. Gate-to-Source Voltage

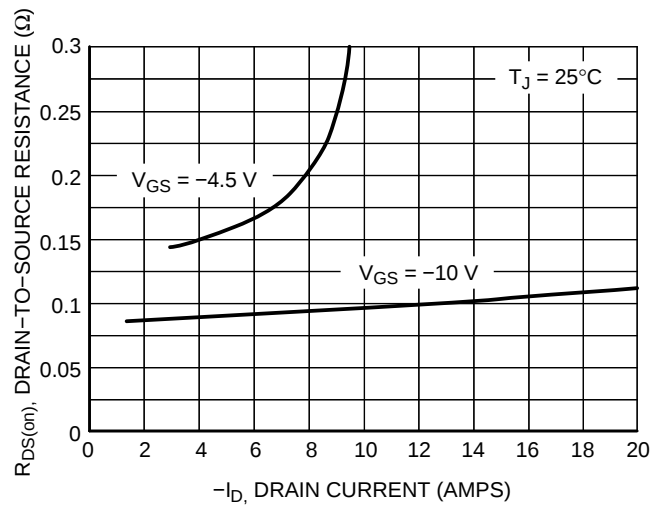


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

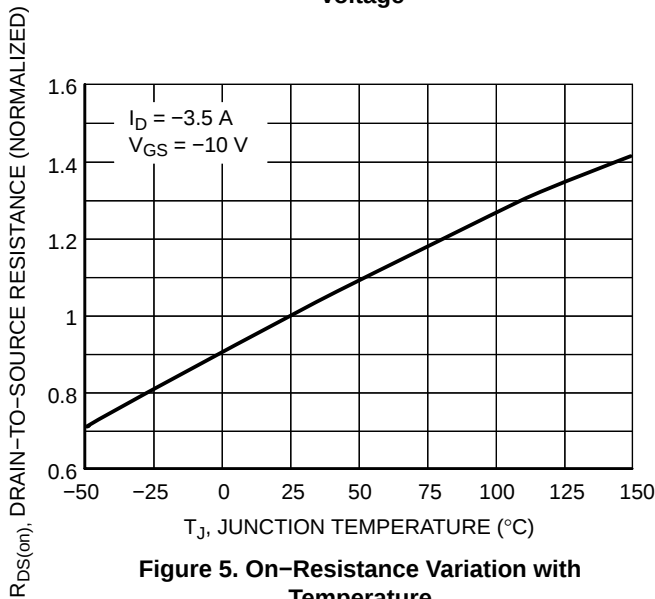


Figure 5. On-Resistance Variation with Temperature

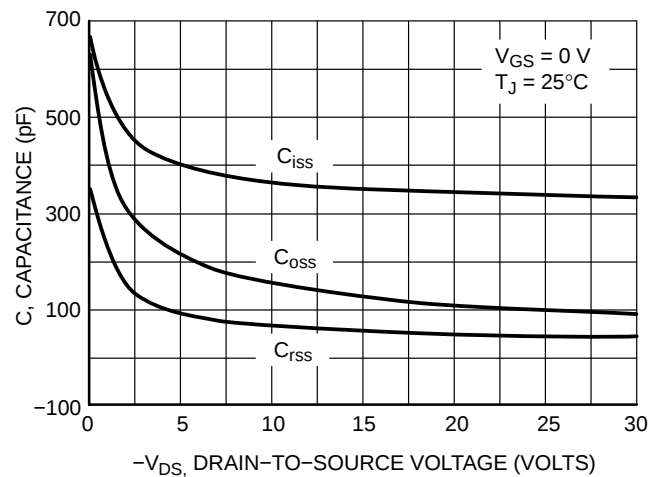


Figure 6. Capacitance Variation

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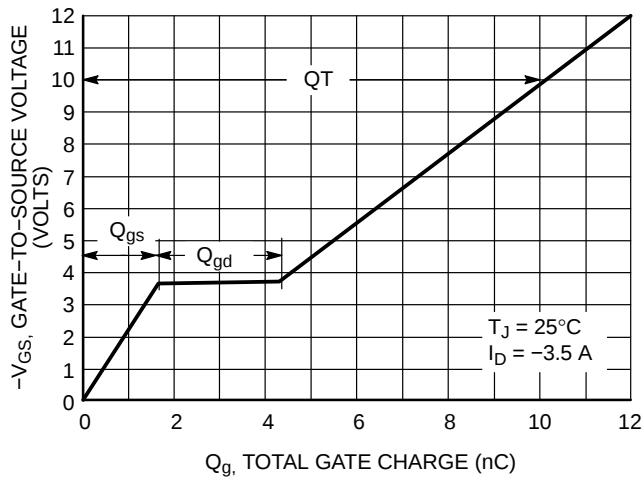


Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

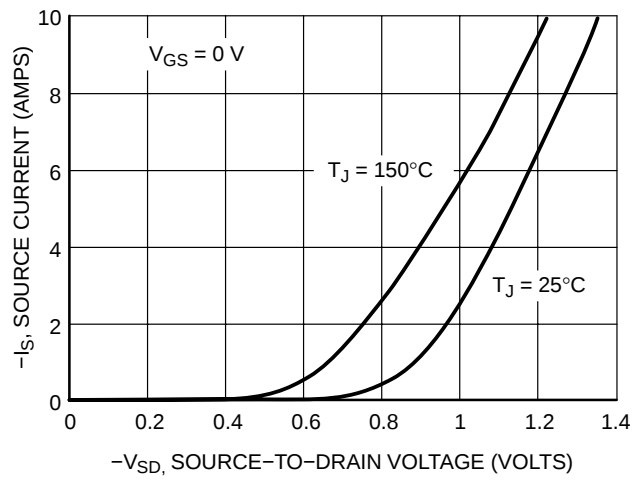


Figure 8. Diode Forward Voltage vs. Current

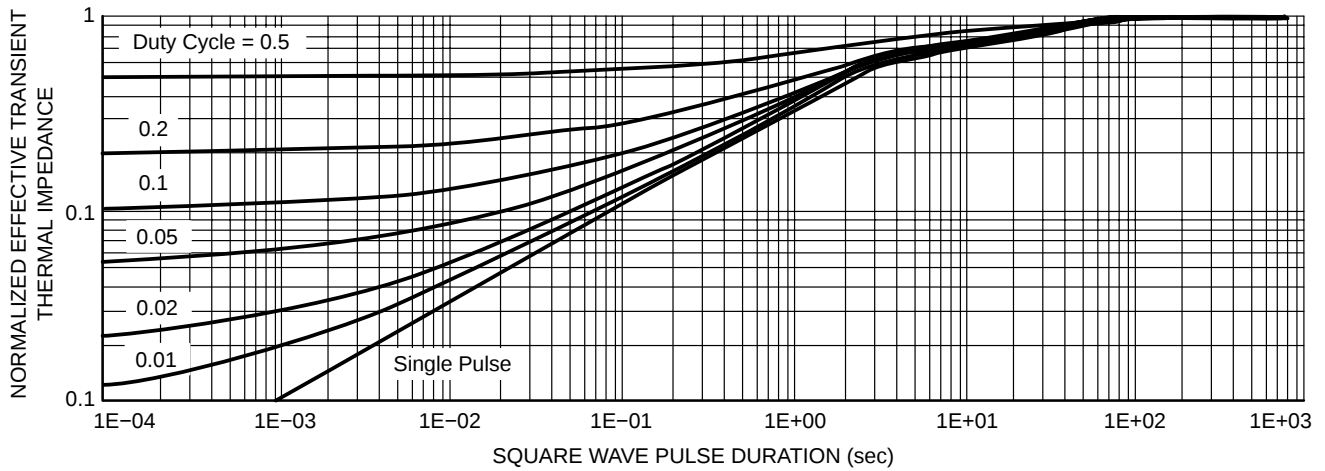


Figure 9. Normalized Thermal Transient Impedance, Junction-to-Ambient

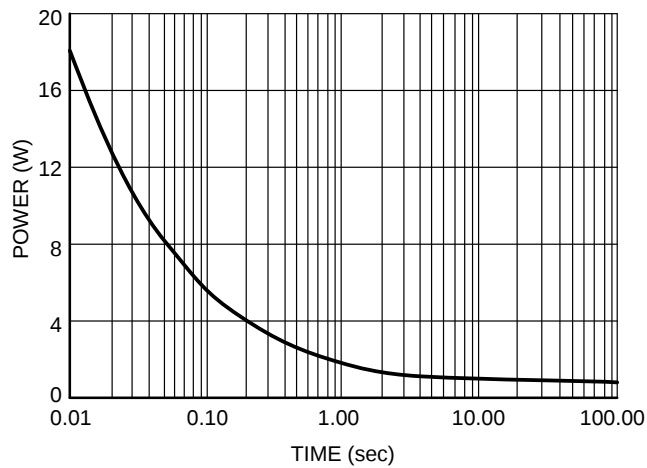
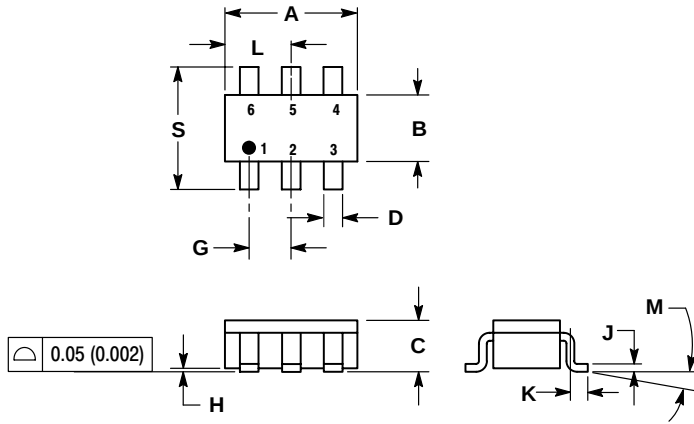


Figure 10. Single Pulse Power

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PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE G



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.

DIM	MILLIMETERS		INCHES	
	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

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