# MOSFET -3.5 Amps, -30 Volts

# P-Channel TSOP-6

### Features

- Ultra Low RDS(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** ( $T_J = 25^{\circ}C$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>	-30	Volts
Gate-to-Source Voltage - Continuous	V <sub>GS</sub>	±20.0	Volts
Thermal Resistance Junction-to-Ambient (Note 1) Total Power Dissipation @ $T_A = 25^{\circ}C$ Drain Current - Continuous @ $T_A = 25^{\circ}C$ - Pulsed Drain Current ( $T_p < 10 \mu$ S) Maximum Operating Power Dissipation Maximum Operating Drain Current	R <sub>eJA</sub> Pd I <sub>D</sub> I <sub>DM</sub> Pd I <sub>D</sub>	62.5 2.0 -3.5 -20 1.0 -2.5	°C/W Watts Amps Amps Watts Amps
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^{\circ}C$ Drain Current - Continuous @ $T_A = 25^{\circ}C$ - Pulsed Drain Current ( $T_p < 10 \mu$ S) Maximum Operating Power Dissipation Maximum Operating Drain Current	R <sub>eJA</sub> Pd I <sub>D</sub> I <sub>DM</sub> Pd I <sub>D</sub>	128 1.0 -2.5 -14 0.5 -1.75	°C/W Watts Amps Amps Watts Amps
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	ΤL	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.

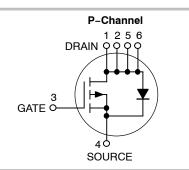
- 1. Mounted onto a 2" square FR-4 board (1 in sq, 2 oz. Cu. 0.06" thick single sided), t < 5.0 seconds.
- Mounted onto a 2" square FR-4 board (1 in sq, 2 oz. Cu. 0.06" thick single sided), operating to steady state.

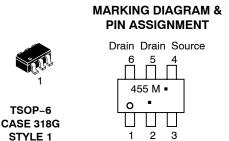


# **ON Semiconductor®**

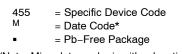
#### http://onsemi.com

1	V <sub>(BR)DSS</sub>	R <sub>DS(on)</sub> TYP	I <sub>D</sub> Max
	–30 V	100 mΩ @ –10 V	-3.5 A





Drain Drain Gate



(Note: Microdot may be in either location) \*Date Code orientation may vary depending upon manufacturing location.

### **ORDERING INFORMATION**

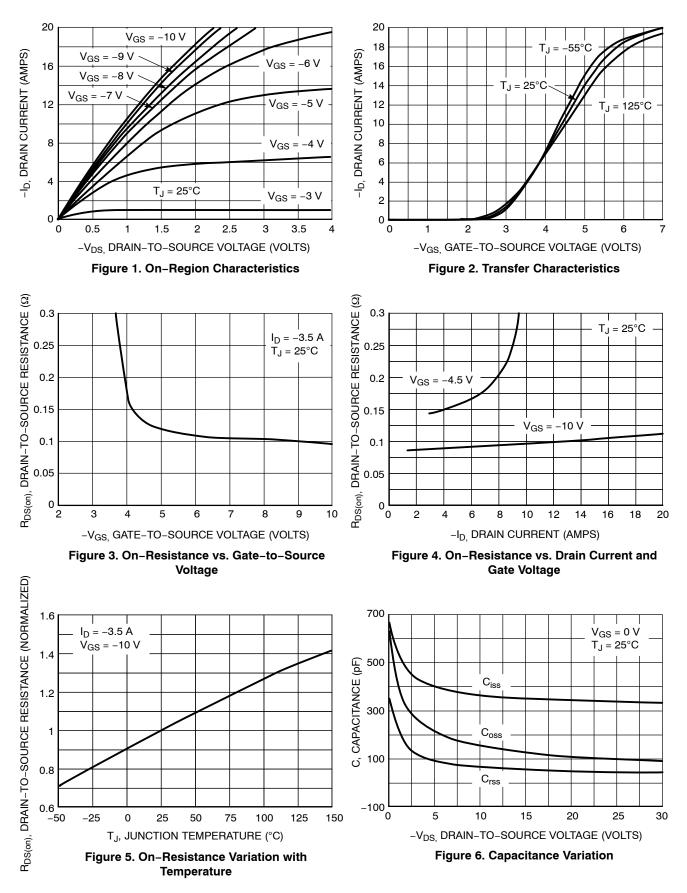
Device	Package	Shipping <sup>†</sup>
NTGS3455T1	TSOP-6	3000 Tape & Reel
NTGS3455T1G	TSOP-6 (Pb-Free)	3000 Tape & Reel

+ 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.

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

Cha	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS				•		•
Drain–Source Breakdown Voltage (V <sub>GS</sub> = 0 Vdc, I <sub>D</sub> = -10 $\mu$ A)	V <sub>(BR)DSS</sub>	-30	_	_	Vdc	
$\label{eq:VGS} \begin{array}{l} \mbox{Zero Gate Voltage Drain Current} \\ (V_{GS}=0 \mbox{ Vdc},  V_{DS}=-30 \mbox{ Vdc}, \\ (V_{GS}=0 \mbox{ Vdc},  V_{DS}=-30 \mbox{ Vdc}, \end{array}$	I <sub>DSS</sub>			-1.0 -5.0	μAdc	
Gate-Body Leakage Current (V <sub>GS</sub> = -20.0 Vdc, V <sub>DS</sub> = 0 Vd	c)	I <sub>GSS</sub>	-	_	-100	nAdc
Gate-Body Leakage Current (V <sub>GS</sub> = +20.0 Vdc, V <sub>DS</sub> = 0 Vd	I <sub>GSS</sub>	-	_	100	nAdc	
ON CHARACTERISTICS						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = -250 \mu\text{Adc})		V <sub>GS(th)</sub>	-1.0	-1.87	-3.0	Vdc
Static Drain–Source On–State Re $(V_{GS} = -10 \text{ Vdc}, I_D = -3.5 \text{ Adc})$ $(V_{GS} = -4.5 \text{ Vdc}, I_D = -2.7 \text{ Adc})$	R <sub>DS(on)</sub>		0.094 0.144	0.100 0.170	Ω	
Forward Transconductance ( $V_{DS} = -15$ Vdc, $I_D = -3.5$ Add	<b>9</b> FS	-	6.0	_	mhos	
DYNAMIC CHARACTERISTICS						
Total Gate Charge		Q <sub>tot</sub>	-	9.0	13	nC
Gate-Source Charge	$(V_{DS} = -15 \text{ Vdc}, V_{GS} = -10 \text{ Vdc}, I_{D} = -3.5 \text{ Adc})$	Q <sub>gs</sub>	-	2.5	-	
Gate-Drain Charge	, ,	Q <sub>gd</sub>	-	2.0	-	
Input Capacitance		C <sub>iss</sub>	-	480	-	pF
Output Capacitance	(V <sub>DS</sub> = -5.0 Vdc, V <sub>GS</sub> = 0 Vdc, f = 1.0 MHz)	C <sub>oss</sub>	-	220	-	
Reverse Transfer Capacitance		C <sub>rss</sub>	-	60	-	
SWITCHING CHARACTERISTICS		·				
Turn-On Delay Time		t <sub>d(on)</sub>	-	10	20	ns
Rise Time	(V <sub>DD</sub> = –20 Vdc, I <sub>D</sub> = –1.0 Adc,	t <sub>r</sub>	-	15	30	
Turn-Off Delay Time	$V_{GS} = -10 \text{ Vdc}, R_g = 6.0 \Omega$	t <sub>d(off)</sub>	-	20	35	
Fall Time		t <sub>f</sub>	-	10	20	
Reverse Recovery Time	(I <sub>S</sub> = –1.7 Adc, dI <sub>S</sub> /dt = 100 A/µs)	t <sub>rr</sub>	-	30	-	ns
BODY-DRAIN DIODE RATINGS						
Diode Forward On-Voltage	$(I_S = -1.7 \text{ Adc}, V_{GS} = 0 \text{ Vdc})$	V <sub>SD</sub>	-	-0.90	-1.2	Vdc
Diode Forward On-Voltage	$(I_{\rm S}$ = -3.5 Adc, $V_{\rm GS}$ = 0 Vdc)	V <sub>SD</sub>	-	-1.0	-	Vdc

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



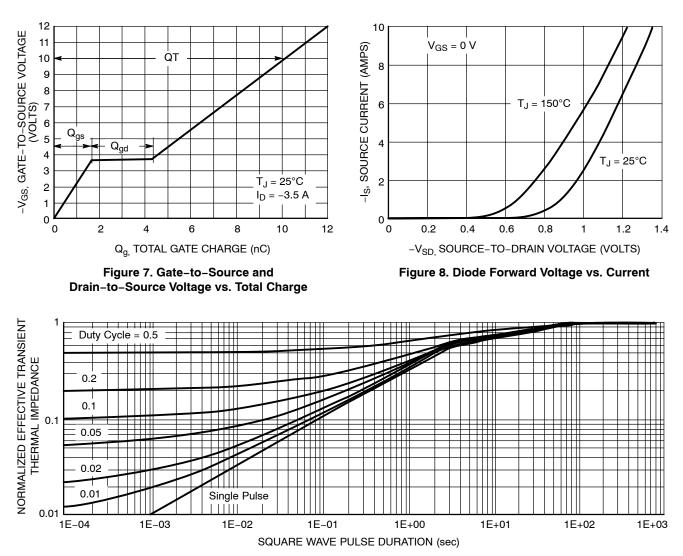


Figure 9. Normalized Thermal Transient Impedance, Junction-to-Ambient

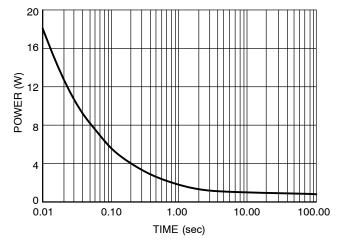
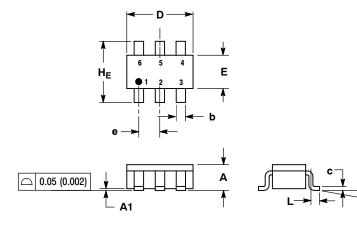


Figure 10. Single Pulse Power

#### PACKAGE DIMENSIONS

TSOP-6 CASE 318G-02 ISSUE P



NOTES

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

	MILLIMETERS			INCHES			
DIM	MIN	NOM	MAX	MIN	NOM	MAX	
Α	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	
С	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	
е	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	
HE	2.50	2.75	3.00	0.099	0.108	0.118	
θ	0°	-	10°	0°	-	10°	

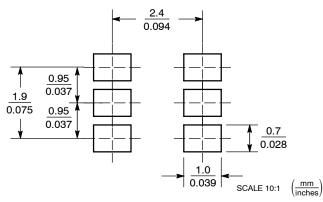
STYLE 1: PIN 1. DRAIN

2. DRAIN 3. GATE

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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