Small Signal MOSFET

30 V, 154 mA, Single, N-Channel, Gate **ESD Protection, SC-75**

Features

- Low Gate Charge for Fast Switching
- Small 1.6 x 1.6 mm Footprint
- ESD Protected Gate
- Pb-Free Package is Available

Applications

- Power Management Load Switch
- Level Shift
- Portable Applications such as Cell Phones, Media Players, Digital Cameras, PDA's, Video Games, Hand-Held Computers, etc.

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

Paramo	Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	30	V
Gate-to-Source Voltage		V_{GS}	±10	V
Continuous Drain Current (Note 1)	Steady State = 25°C	I _D	154	mA
Power Dissipation (Note 1)	Steady State = 25°C	P _D	300	mW
Pulsed Drain Current	Pulsed Drain Current t _P ≤ 10 μs		618	mA
Operating Junction and S	T _J , T _{STG}	-55 to 150	°C	
Continuous Source Current (Body Diode)		I _{SD}	154	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		TL	260	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	416	°C/W

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.

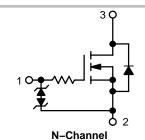
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).



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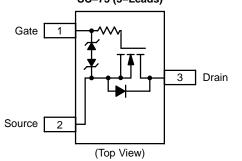
http://onsemi.com

V _{(BR)DSS}	R _{DS(on)} Typ @ V _{GS}	I _D MAX (Note 1)
20.1/	1.4 Ω @ 4.5 V	151 m A
30 V	2.3 Ω @ 2.5 V	154 mA

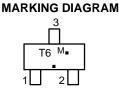


PIN CONNECTIONS

SC-75 (3-Leads)







= Specific Device Code

= Date Code

= Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NTA7002NT1	SC-75	3000 Tape & Reel
NTA7002NT1G	SC-75 (Pb-Free)	3000 Tape & Reel

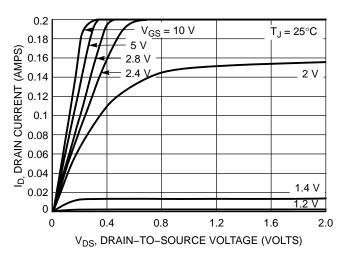
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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

Parameter	Symbol	Test Condition	Min	Тур	Max	Unit
OFF CHARACTERISTICS	_		•	•	•	
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_{D} = 100 \mu\text{A}$	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 30 V			1.0	μΑ
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 \text{ V}, V_{DS} = 20 \text{ V}, $ $T = 85 ^{\circ}\text{C}$			1.0	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 10 \text{ V}$			±25	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 5 \text{ V}$			±1.0	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V, } V_{GS} = \pm 5 \text{ V}$ $T = 85 ^{\circ}\text{C}$			±1.0	μΑ
ON CHARACTERISTICS (Note 2)	•		•	•	•	
Gate Threshold Voltage	V _{GS(TH)}	$V_{DS} = V_{GS}, I_{D} = 100 \mu A$	0.5	1.0	1.5	V
Drain-to-Source On Resistance	R _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 154 \text{ mA}$		1.4	7.0	Ω
		$V_{GS} = 2.5 \text{ V}, I_D = 154 \text{ mA}$		2.3	7.5	
Forward Transconductance	9FS	$V_{DS} = 3 \text{ V}, I_{D} = 154 \text{ mA}$		80		mS
CAPACITANCES						
Input Capacitance	C _{ISS}			11.5		
Output Capacitance	C _{OSS}	$V_{DS} = 5.0 \text{ V, f} = 1 \text{ MHz,}$ $V_{GS} = 0 \text{ V}$		10		pF
Reverse Transfer Capacitance	C _{RSS}	100 - 1		3.5		
SWITCHING CHARACTERISTICS (Note 3)						
Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DS} = 5.0 V,		13		ns
Rise Time	t _r			15		
Turn-Off Delay Time	t _{d(OFF)}	$I_D = 75 \text{ mA}, R_G = 10 \Omega$		98		ns
Fall Time	t _f			60		
Drain-Source Diode Characteristics			_			
Forward Diode Voltage	V_{SD}	$V_{GS} = 0 \text{ V}, I_{S} = 0.154 \text{ mA}$		0.77	0.9	V

Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
Switching characteristics are independent of operating junction temperatures.

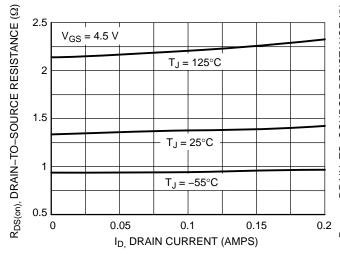
TYPICAL PERFORMANCE CURVES



0.2 V_{DS} = 5 V 0.16 0.12 0.08 T_J = 125°C T_J = -55°C 0.6 0.8 1 1.2 1.4 1.6 1.8 2 V_{GS}, GATE-TO-SOURCE VOLTAGE (VOLTS)

Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics



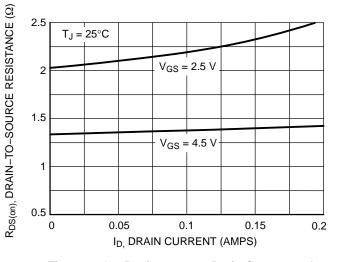
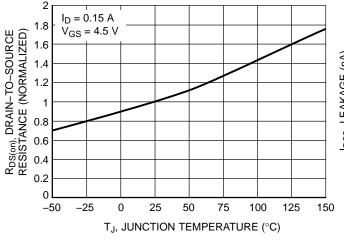


Figure 3. On–Resistance vs. Drain Current and Temperature

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



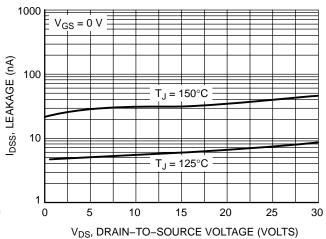
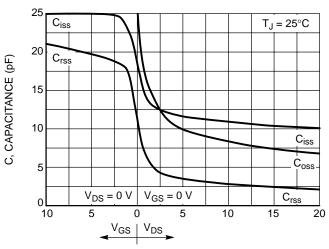
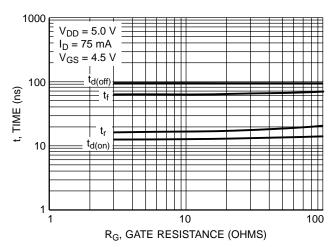


Figure 5. On–Resistance Variation with Temperature

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

TYPICAL PERFORMANCE CURVES





GATE-TO-SOURCE OR DRAIN-TO-SOURCE VOLTAGE (VOLTS)

Figure 7. Capacitance Variation

Figure 8. Resistive Switching Time Variation vs. Gate Resistance

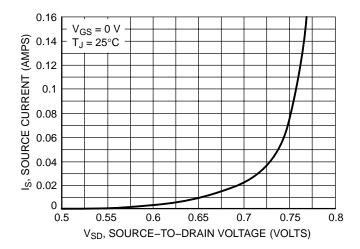
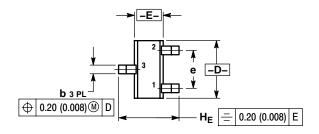
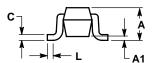


Figure 9. Diode Forward Voltage vs. Current

PACKAGE DIMENSIONS

SC-75 / SOT-416 CASE 463-01 ISSUE F



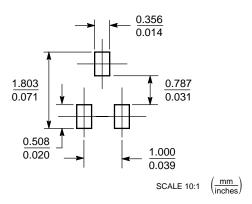


- NOTES: 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: MILLIMETER.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
Α	0.70	0.80	0.90	0.027	0.031	0.035
A1	0.00	0.05	0.10	0.000	0.002	0.004
b	0.15	0.20	0.30	0.006	0.008	0.012
С	0.10	0.15	0.25	0.004	0.006	0.010
D	1.55	1.60	1.65	0.059	0.063	0.067
E	0.70	0.80	0.90	0.027	0.031	0.035
е	1.00 BSC			0.04 BSC		
L	0.10	0.15	0.20	0.004	0.006	0.008
HE	1.50	1.60	1.70	0.061	0.063	0.065

STYLE 5: PIN 1. GATE 2. SOURCE 3. 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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