

NTA7002N



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)

Parameter		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	t _p ≤ 10 μs	I _{DM}	618	mA
Operating Junction and Storage Temperature		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)		T _L	260	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	R _{θJA}	416	°C/W

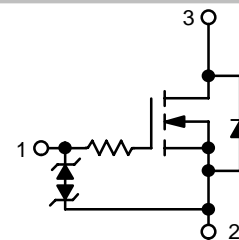
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

ON Semiconductor®

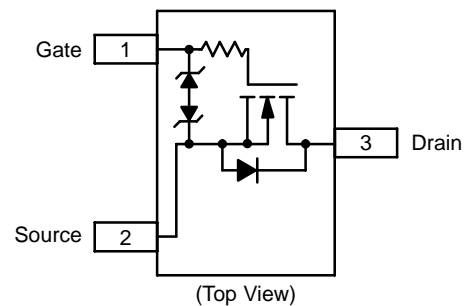
http://onsemi.com

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



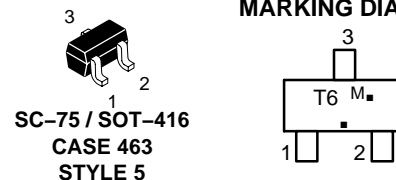
N-Channel

PIN CONNECTIONS SC-75 (3-Leads)



(Top View)

MARKING DIAGRAM



T6 = Specific Device Code

M = 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.

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

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Parameter	Symbol	Test Condition	Min	Typ	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}	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}$			1.0	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}, T = 85^\circ\text{C}$			1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 25	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			± 1.0	μA
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	μA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 100\ \mu\text{A}$	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	g_{FS}	$V_{DS} = 3\text{ V}, I_D = 154\text{ mA}$		80		mS

CAPACITANCES

Input Capacitance	C_{ISS}	$V_{DS} = 5.0\text{ V}, f = 1\text{ MHz}, V_{GS} = 0\text{ V}$		11.5		pF
Output Capacitance	C_{OSS}			10		
Reverse Transfer Capacitance	C_{RSS}			3.5		

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 5.0\text{ V}, I_D = 75\text{ mA}, R_G = 10\ \Omega$		13		ns
Rise Time	t_r			15		
Turn-Off Delay Time	$t_{d(OFF)}$			98		
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
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- Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Switching characteristics are independent of operating junction temperatures.

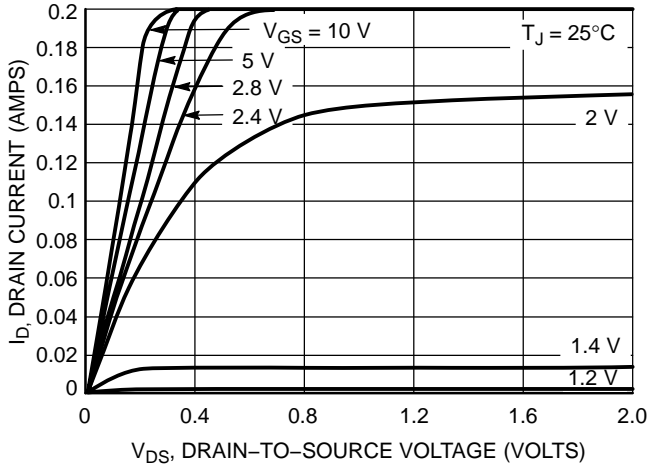


Figure 1. On-Region Characteristics

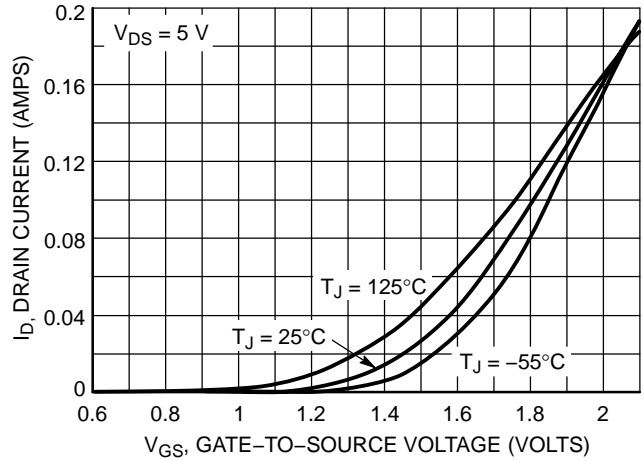


Figure 2. Transfer Characteristics

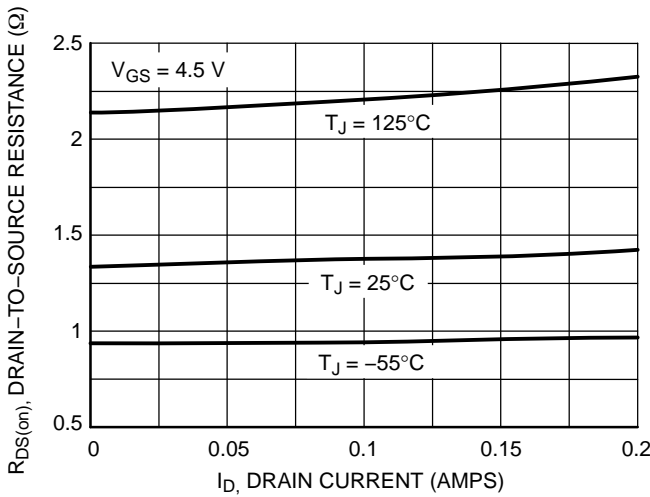


Figure 3. On-Resistance vs. Drain Current and Temperature

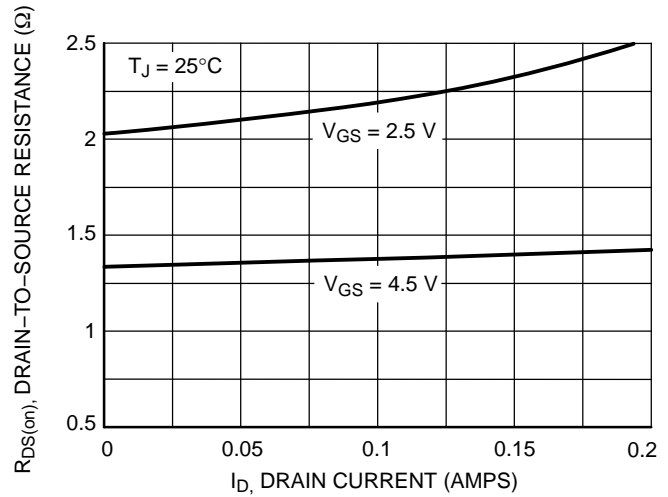


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

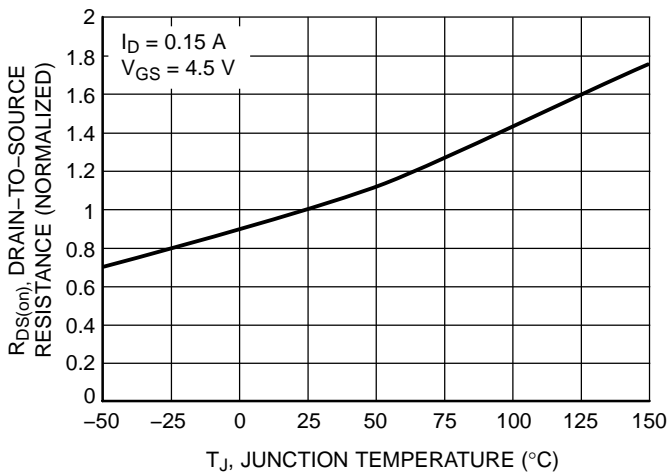


Figure 5. On-Resistance Variation with Temperature

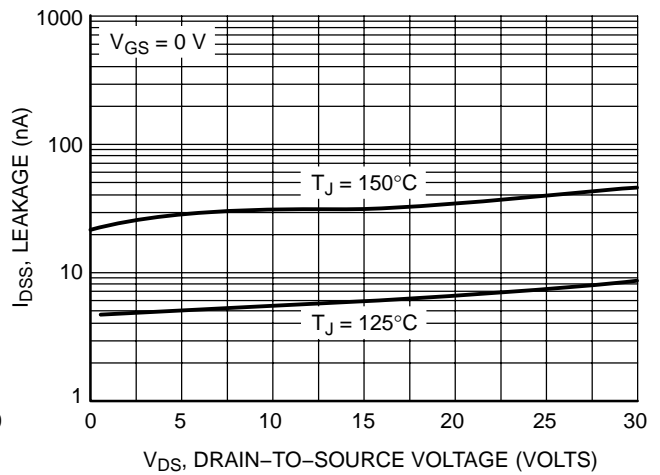


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

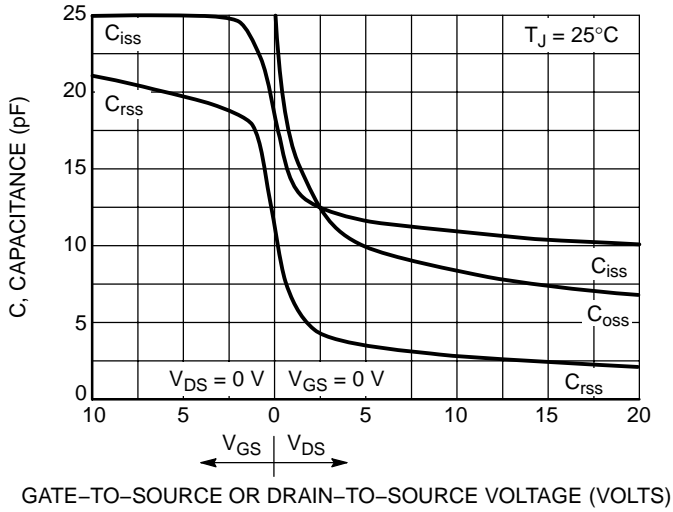


Figure 7. Capacitance Variation

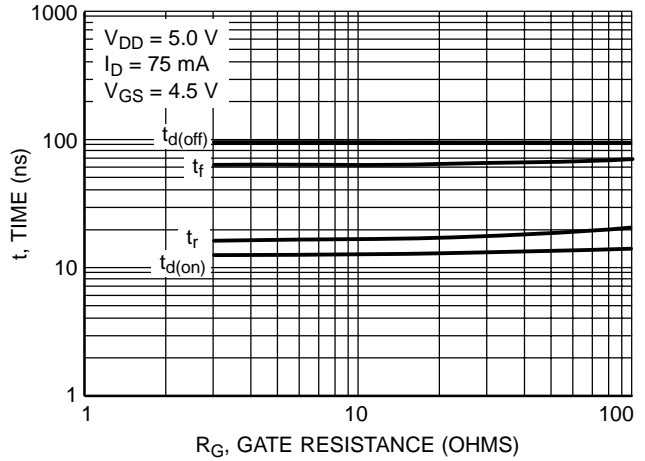


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

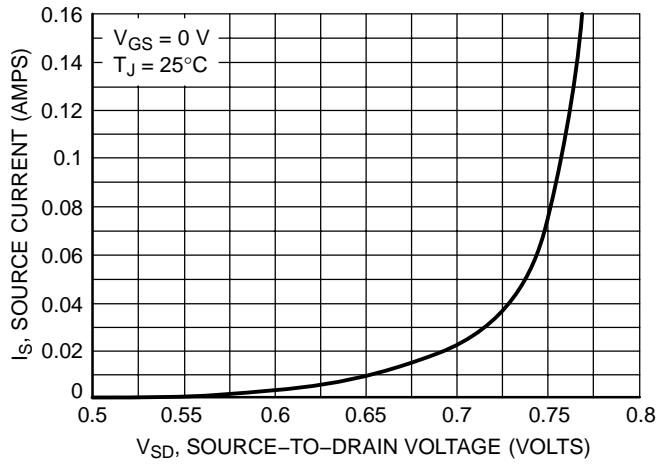


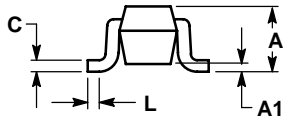
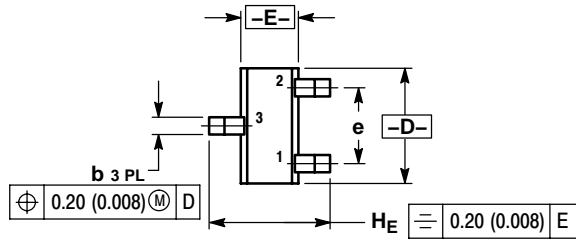
Figure 9. Diode Forward Voltage vs. Current

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PACKAGE DIMENSIONS

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

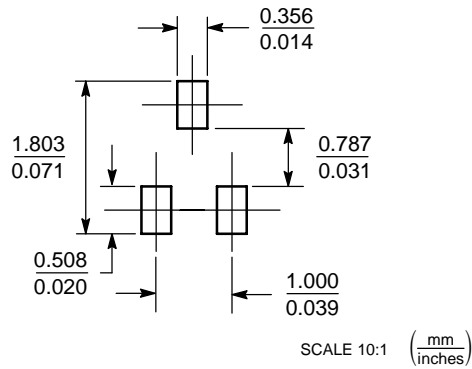


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	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
C	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
e	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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