

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 ($T_J = 25^\circ\text{C}$ 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	$t_P \leq 10 \mu\text{s}$	I_{DM}	618	mA
Operating Junction and Storage Temperature		T_J , T_{STG}	-55 to 150	$^\circ\text{C}$
Continuous Source Current (Body Diode)		I_{SD}	154	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	R_{0JA}	416	$^\circ\text{C}/\text{W}$

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.

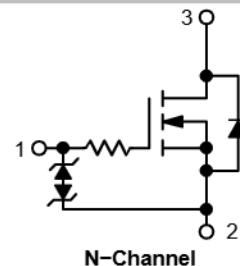
1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).



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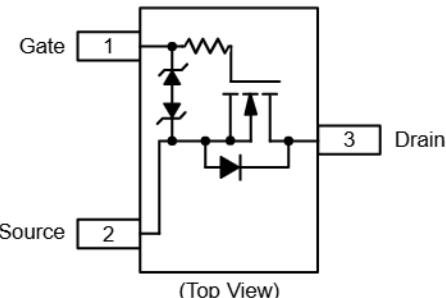
$V_{(BR)DSS}$	$R_{DS(on)}$ Typ @ V_{GS}	I_D MAX (Note 1)
30 V	1.4 Ω @ 4.5 V	154 mA
	2.3 Ω @ 2.5 V	



N-Channel

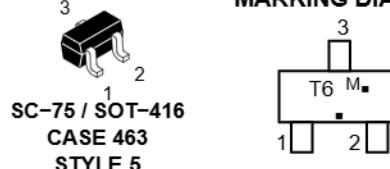
PIN CONNECTIONS

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.

NTA7002N

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 100 μA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 30 V			1.0	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 20 V, T = 85 °C			1.0	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10 V			±25	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±5 V			±1.0	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±5 V T = 85 °C			±1.0	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 100 μA	0.5	1.0	1.5	V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 154 mA		1.4	7.0	Ω
		V _{GS} = 2.5 V, I _D = 154 mA		2.3	7.5	
Forward Transconductance	g _{FS}	V _{DS} = 3 V, I _D = 154 mA		80		mS
CAPACITANCES						
Input Capacitance	C _{ISS}	V _{DS} = 5.0 V, f = 1 MHz, V _{GS} = 0 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 V, V _{DS} = 5.0 V, I _D = 75 mA, R _G = 10 Ω		13		ns
Rise Time	t _r			15		ns
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 V, I _S = 0.154 mA		0.77	0.9	V

2. Pulse Test: pulse width \leq 300 μs, duty cycle \leq 2%.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

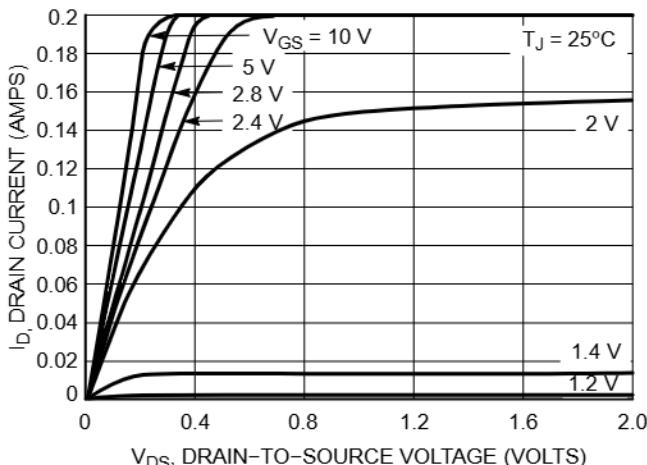


Figure 1. On-Region Characteristics

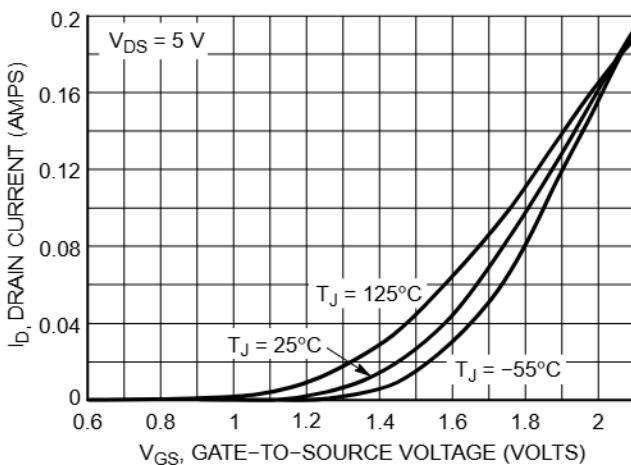


Figure 2. Transfer Characteristics

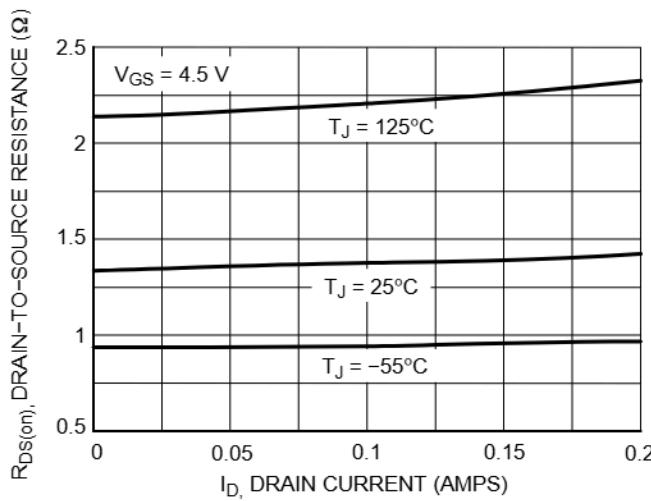


Figure 3. On-Resistance vs. Drain Current and Temperature

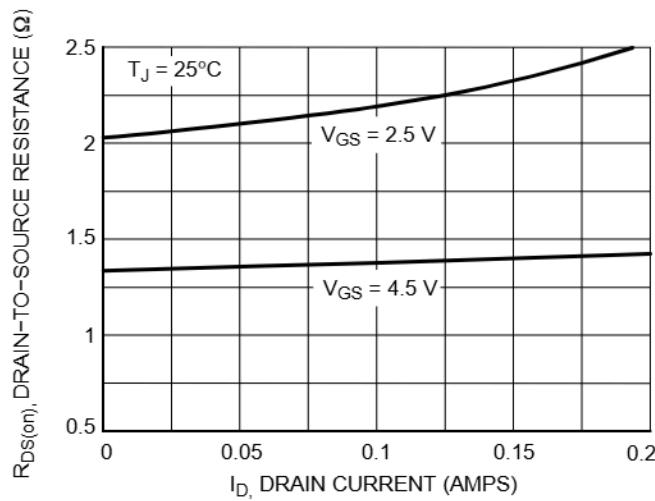


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

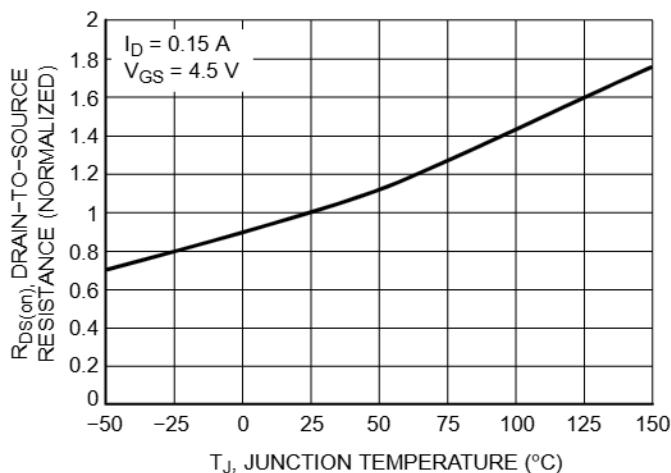


Figure 5. On-Resistance Variation with Temperature

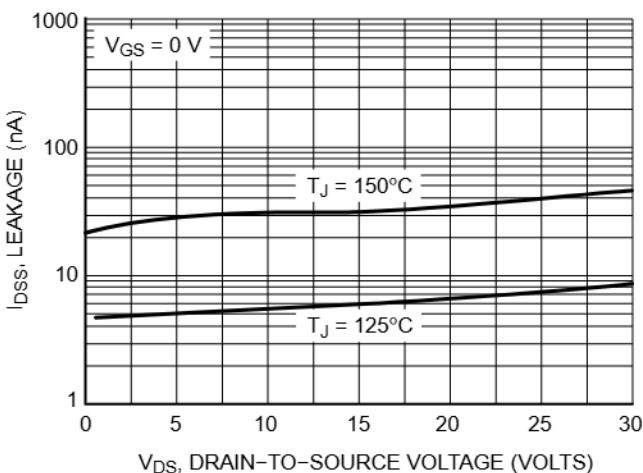
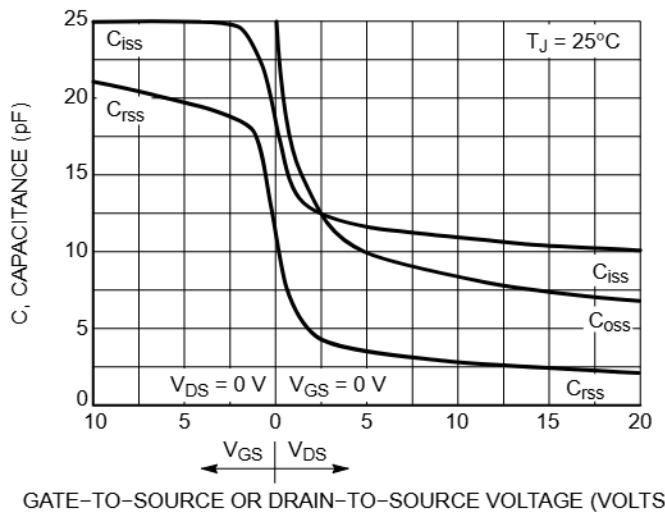


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES



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

Figure 7. Capacitance Variation

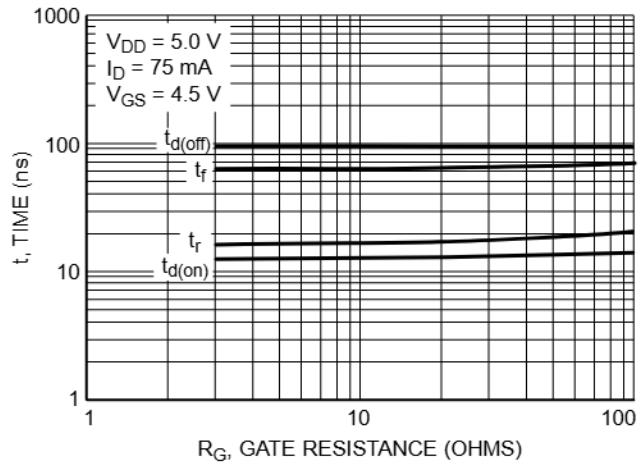


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

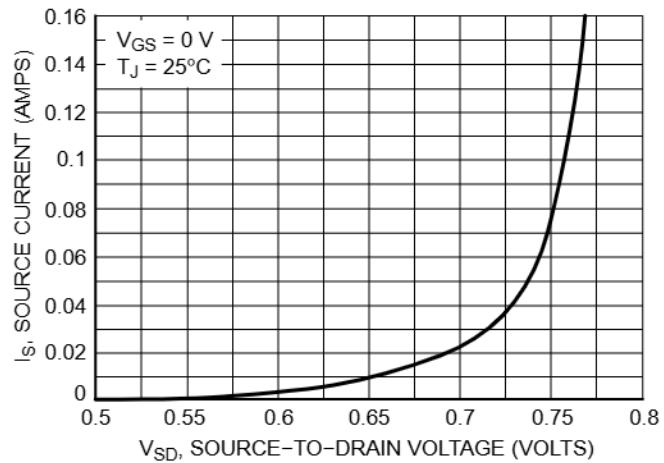
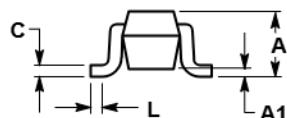
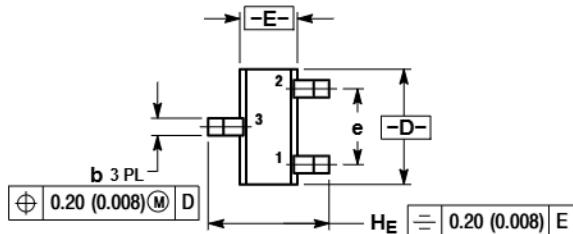


Figure 9. Diode Forward Voltage vs. Current

PACKAGE DIMENSIONS

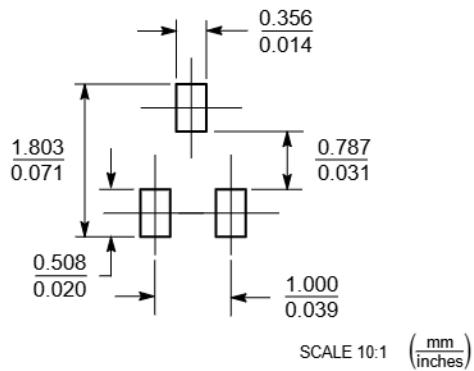
SC-75 / SOT-416
CASE 463-01
ISSUE F

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

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
H _E	1.50	1.60	1.70	0.061	0.063	0.065

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

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}} \right)$

*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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