

NTJD4001N, NVTJD4001N

Small Signal MOSFET

30 V, 250 mA, Dual N-Channel, SC-88

Features

- Low Gate Charge for Fast Switching
- Small Footprint – 30% Smaller than TSOP-6
- ESD Protected Gate
- AEC Q101 Qualified – NVTJD4001N
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Low Side Load Switch
- Li-Ion Battery Supplied Devices – Cell Phones, PDAs, DSC
- Buck Converters
- Level Shifts

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

Parameter		Symbol	Value	Units	
Drain-to-Source Voltage		V _{DSS}	30	V	
Gate-to-Source Voltage		V _{GS}	±20	V	
Continuous Drain Current (Note 1)	Steady State	I _D	T _A = 25 °C	250	mA
			T _A = 85 °C	180	
Power Dissipation (Note 1)	Steady State	P _D	T _A = 25 °C	272	mW
Pulsed Drain Current		t = 10 μs	I _{DM}	600	mA
Operating Junction and Storage Temperature		T _J , T _{STG}	-55 to 150		°C
Source Current (Body Diode)		I _S	250		mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T _L	260		°C

THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Ambient – Steady State	R _{θJA}	458	°C/W
Junction-to-Lead – Steady State	R _{θJL}	252	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on FR4 board using min pad size (Cu area = 0.155 in sq [1 oz] including traces).

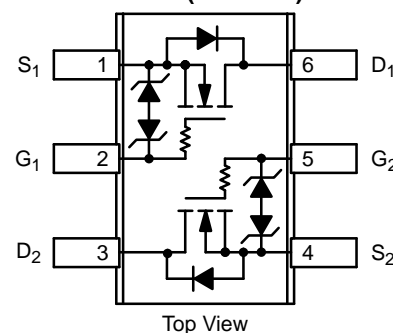


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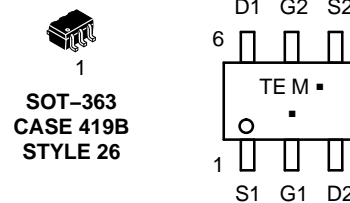
V _{(BR)DSS}	R _{DS(on)} TYP	I _D Max
30 V	1.0 Ω @ 4.0 V	250 mA
	1.5 Ω @ 2.5 V	

SOT-363
SC-88 (6 LEADS)



Top View

MARKING DIAGRAM & PIN ASSIGNMENT



TE = Device Code
M = Date Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NTJD4001NT1G	SOT-363 (Pb-Free)	3000 / Tape & Reel
NVTJD4001NT1G	SOT-363 (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°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 100 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			56		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 30 V			1.0	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10 V			±1.0	μA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 100 μA	0.8	1.2	1.5	V
Gate Threshold Temperature Coefficient	V _{GS(TH)} /T _J			-3.2		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 4.0 V, I _D = 10 mA		1.0	1.5	Ω
		V _{GS} = 2.5 V, I _D = 10 mA		1.5	2.5	
Forward Transconductance	g _{FS}	V _{DS} = 3.0 V, I _D = 10 mA		80		mS

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 5.0 V		20	33	pF
Output Capacitance	C _{OSS}			19	32	
Reverse Transfer Capacitance	C _{RSS}			7.25	12	
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 5.0 V, V _{DS} = 24 V, I _D = 0.1 A		0.9	1.3	nC
Threshold Gate Charge	Q _{G(TH)}			0.2		
Gate-to-Source Charge	Q _{GS}			0.3		
Gate-to-Drain Charge	Q _{GD}			0.2		

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DD} = 5.0 V, I _D = 10 mA, R _G = 50 Ω		17		ns
Rise Time	t _r			23		
Turn-Off Delay Time	t _{d(OFF)}			94		
Fall Time	t _f			82		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 mA	T _J = 25°C		0.65	0.7	V
			T _J = 125°C		0.45		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 8.0 A/μs, I _S = 10 mA			12.4		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

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TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

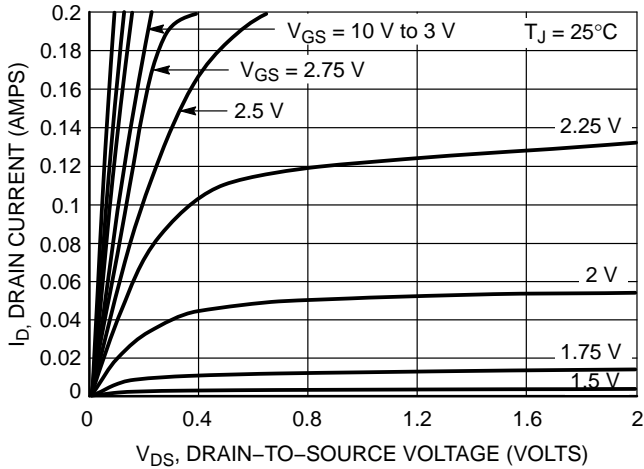


Figure 1. On-Region Characteristics

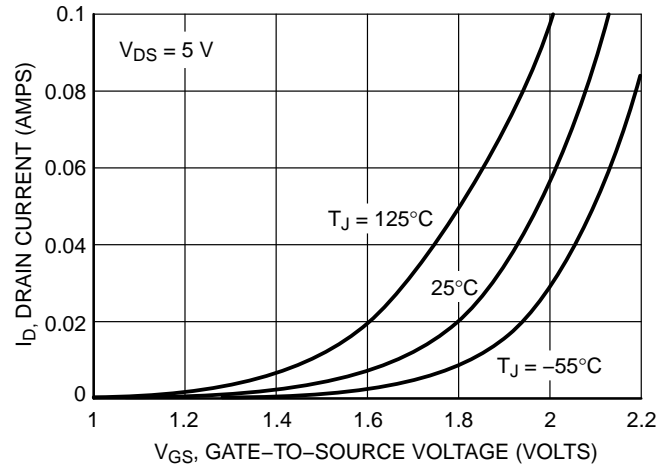


Figure 2. Transfer Characteristics

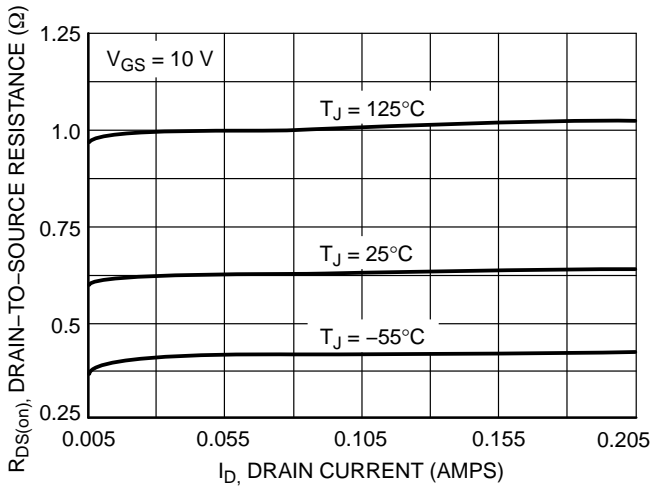


Figure 3. On-Resistance vs. Drain Current and Temperature

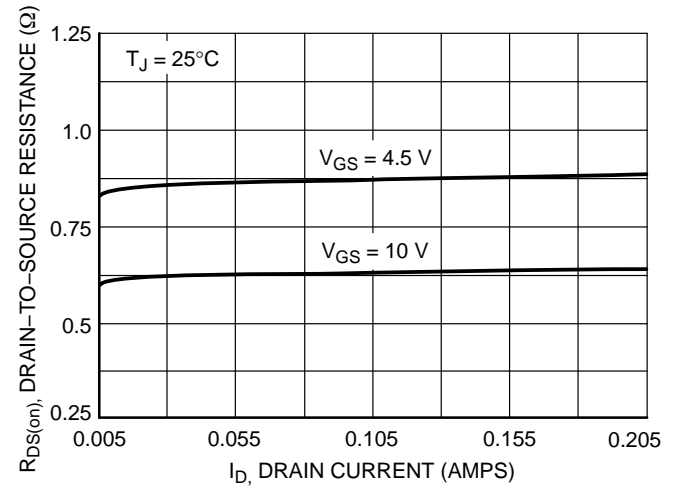


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

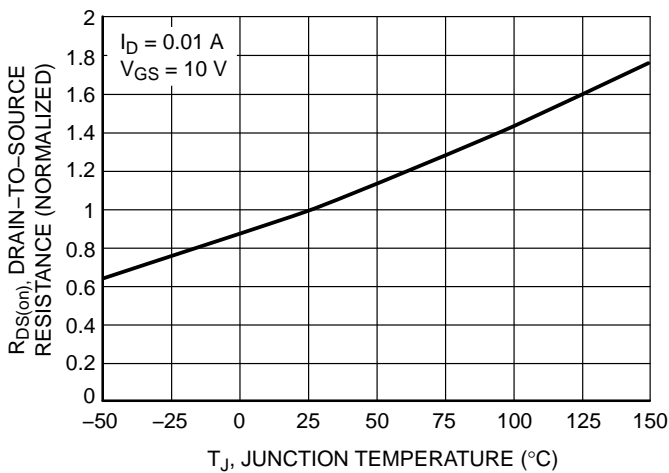


Figure 5. On-Resistance Variation with Temperature

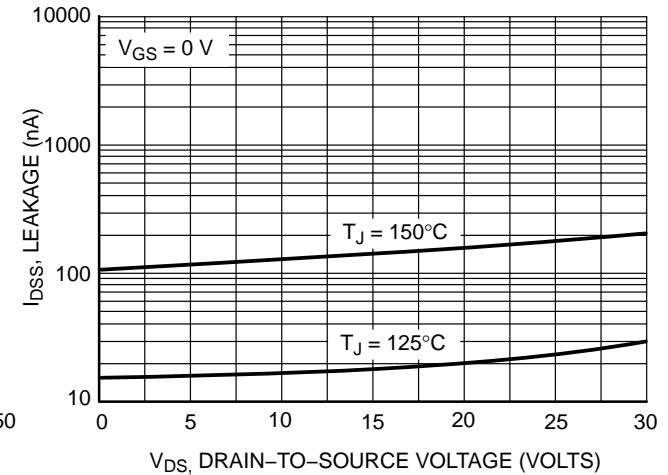


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

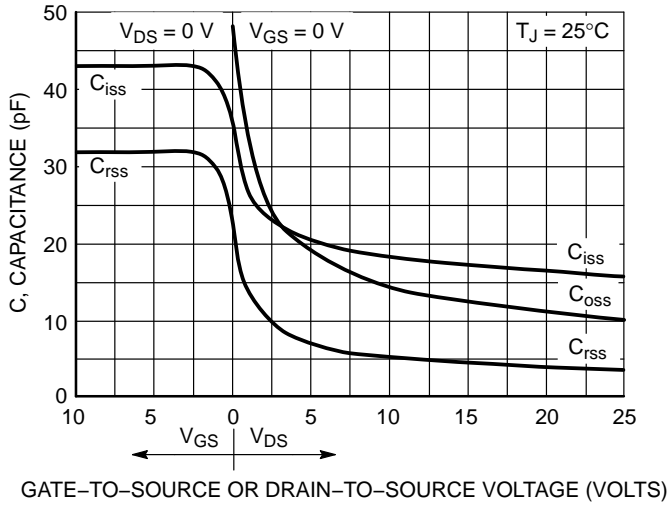


Figure 7. Capacitance Variation

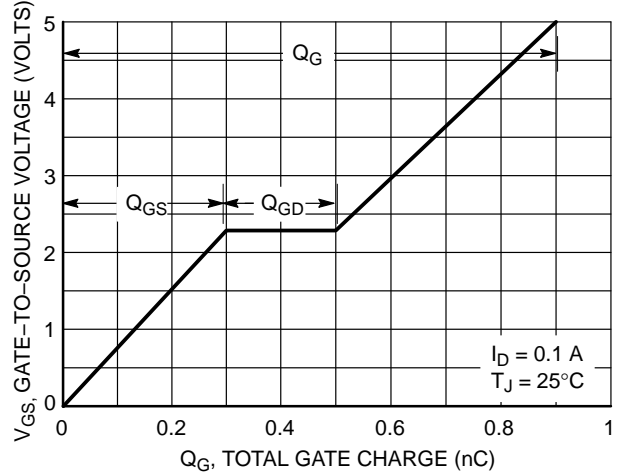


Figure 8. Gate-to-Source Voltage vs. Total Gate Charge

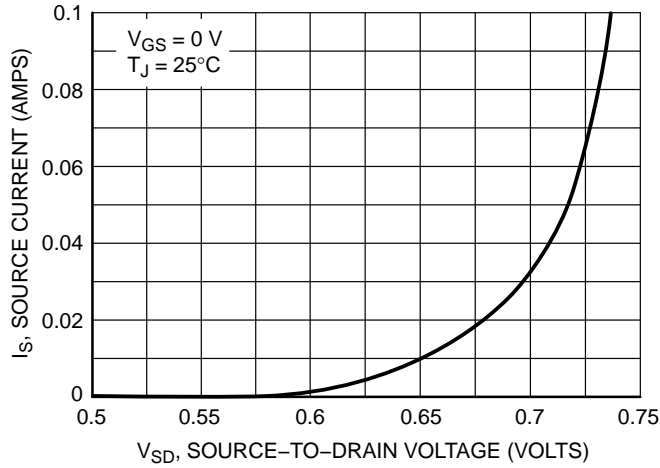


Figure 9. Diode Forward Voltage vs. Current

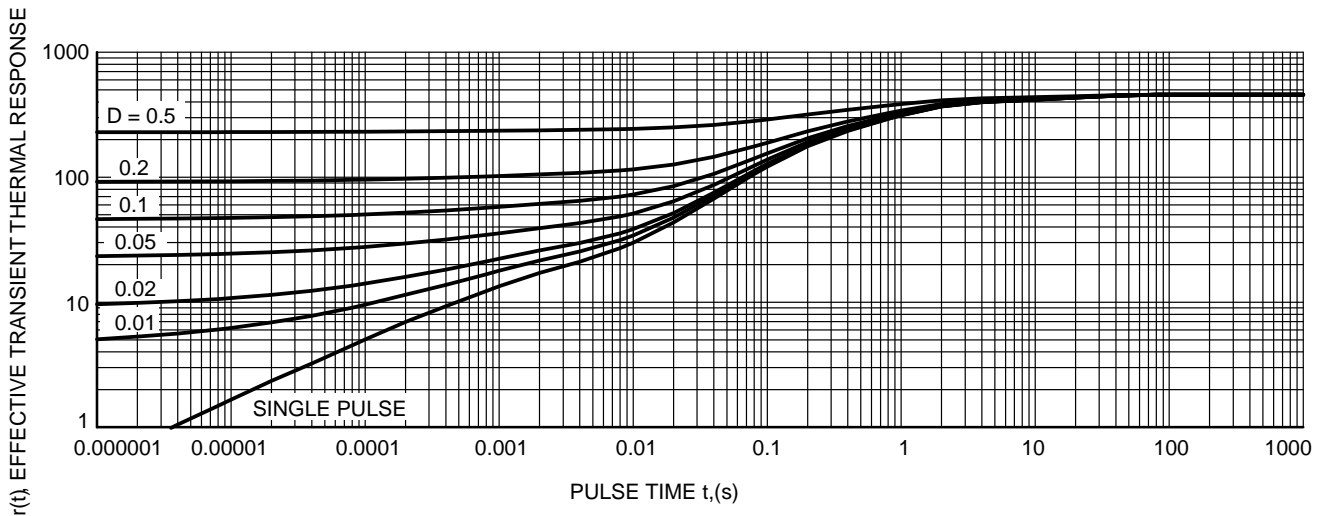
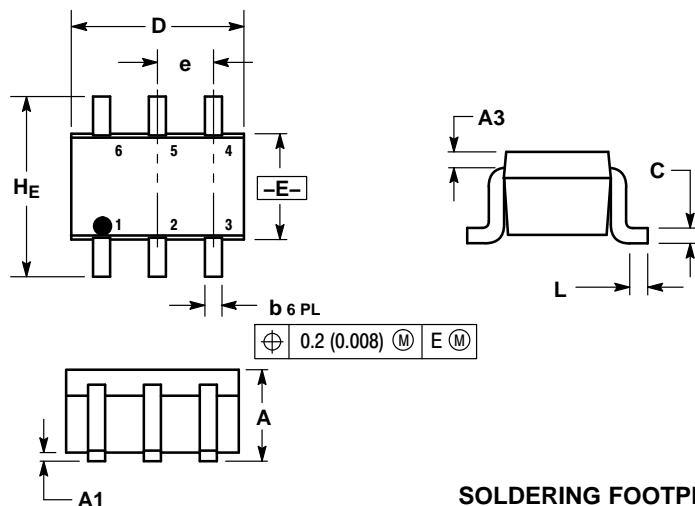


Figure 10. Thermal Response

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PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE W



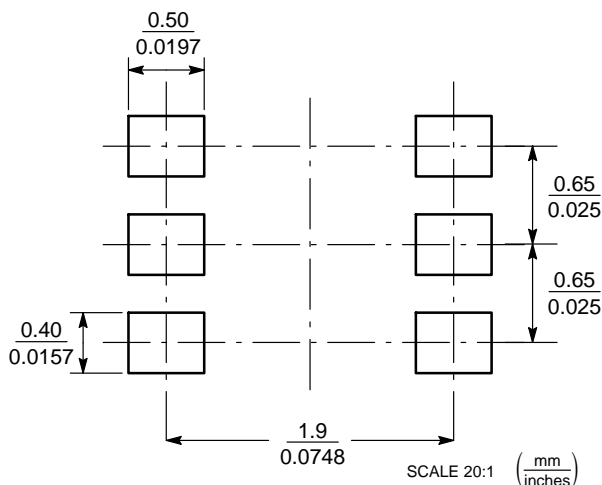
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20 REF			0.008 REF		
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
HE	2.00	2.10	2.20	0.078	0.082	0.086


STYLE 26:

- PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

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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