

# NTJD4001N

## 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
- Pb-Free Package for Green Manufacturing (G Suffix)

### Applications

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

### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			$V_{DSS}$	30	V
Gate-to-Source Voltage			$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	250	mA
		$T_A = 85^\circ\text{C}$		180	
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	$P_D$	272	mW
Pulsed Drain Current		$t = 10 \mu\text{s}$	$I_{DM}$	600	mA
Operating Junction and Storage Temperature			$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$
Source Current (Body Diode)			$I_S$	250	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			$T_L$	260	$^\circ\text{C}$

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

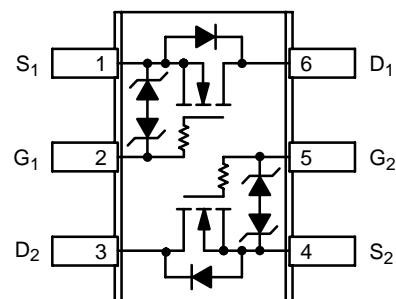


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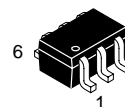
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	$I_D$ Max
30 V	1.0 $\Omega$ @ 4.0 V	250 mA
	1.5 $\Omega$ @ 2.5 V	

SOT-363  
SC-88 (6 LEADS)

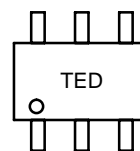


Top View



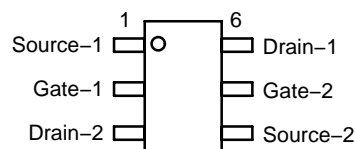
SC-88 / SOT-363  
CASE 419B  
STYLE 26

### MARKING DIAGRAM



TE = Device Code  
D = Date Code

### PIN ASSIGNMENT



Top View

### ORDERING INFORMATION

Device	Package	Shipping
NTJD4001NT1	SC-88	3000 Units/Reel
NTJD4001NT1G	SC-88 (Pb-Free)	3000 Units/Reel

# NTJD4001N

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 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 <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 100 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>			56		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V			1.0	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±10 V			±1.0	μA

### ON CHARACTERISTICS (Note 2)

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

### CHARGES AND CAPACITANCES

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

### SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DD</sub> = 5.0 V, I <sub>D</sub> = 10 mA, R <sub>G</sub> = 50 Ω		17		ns
Rise Time	t <sub>r</sub>			23		
Turn-Off Delay Time	t <sub>d(OFF)</sub>			94		
Fall Time	t <sub>f</sub>			82		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 10 mA	T <sub>J</sub> = 25°C	0.65	0.7	V
			T <sub>J</sub> = 125°C	0.45		
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V, dI <sub>S</sub> /dt = 8.0 A/μs, I <sub>S</sub> = 10 mA		12.4		ns

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

# NTJD4001N

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

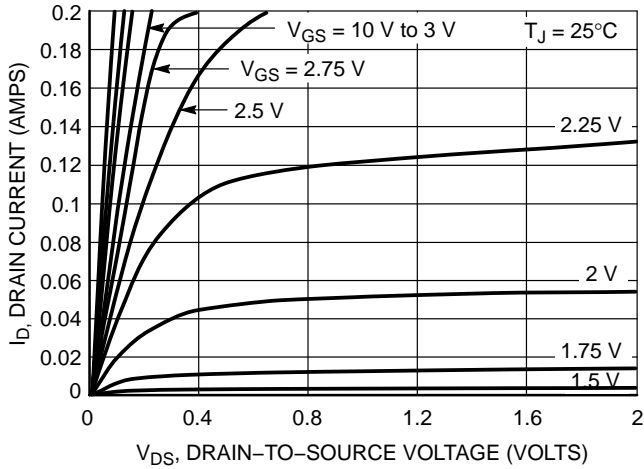


Figure 1. On-Region Characteristics

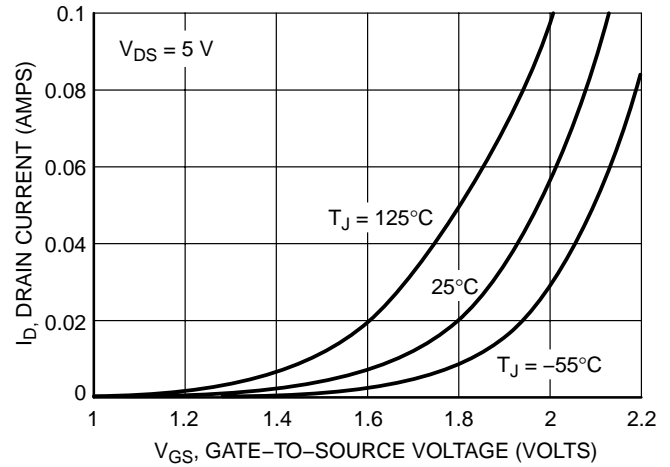


Figure 2. Transfer Characteristics

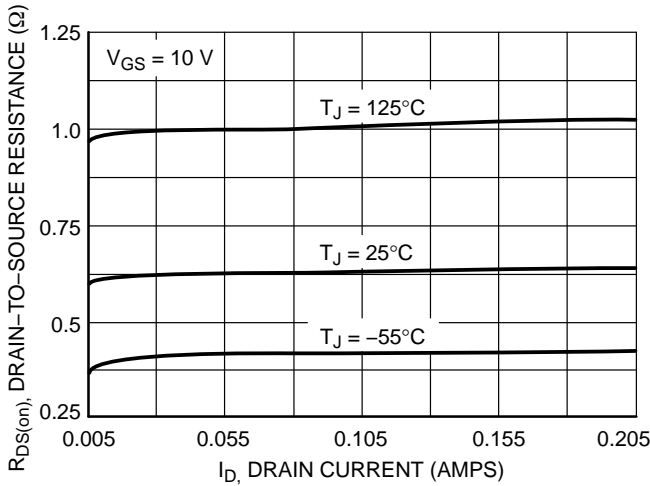


Figure 3. On-Resistance vs. Drain Current and Temperature

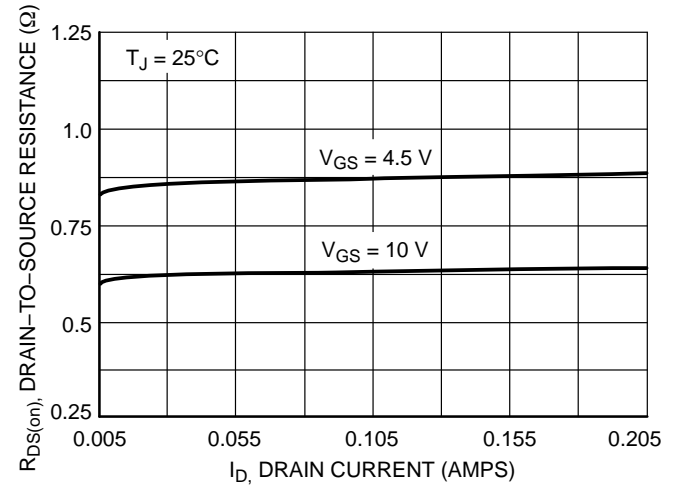


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

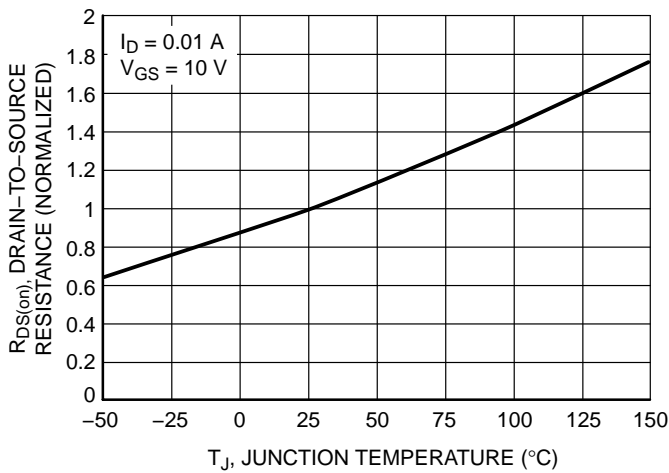


Figure 5. On-Resistance Variation with Temperature

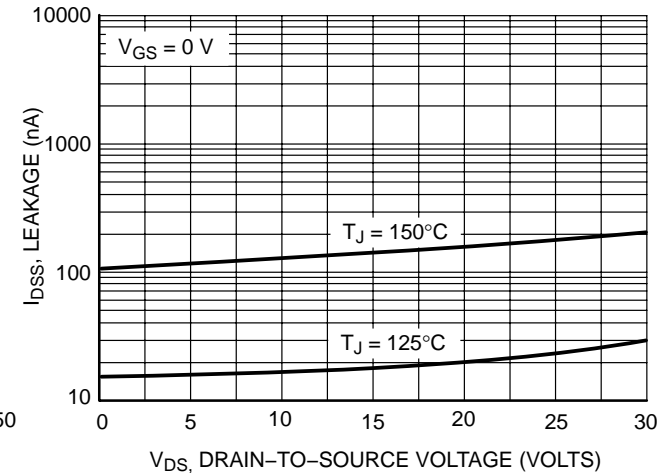


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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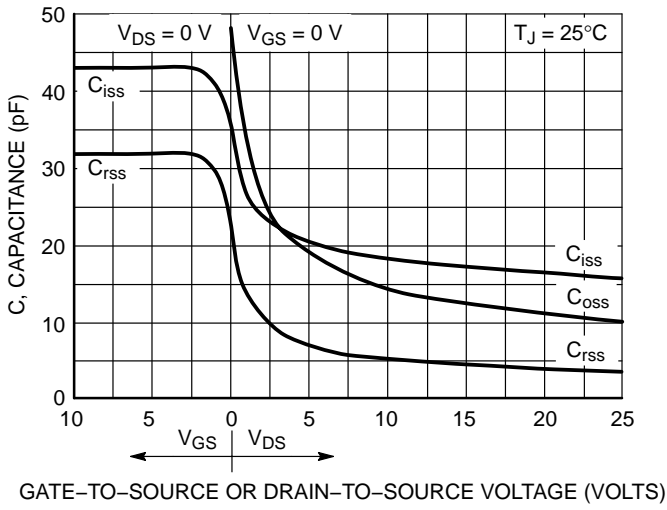


Figure 7. Capacitance Variation

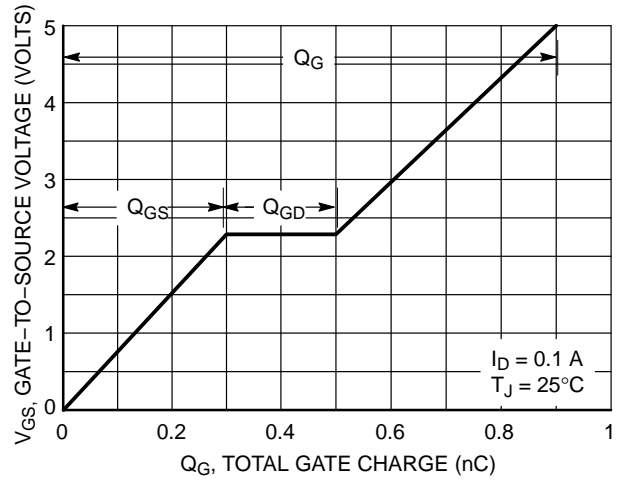


Figure 8. Gate-to-Source Voltage vs. Total Gate Charge

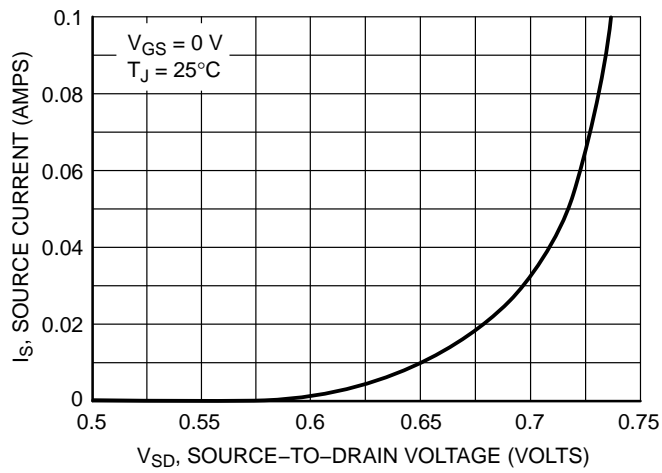
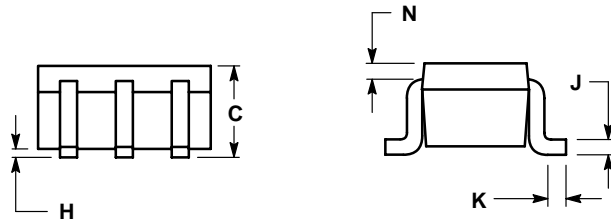
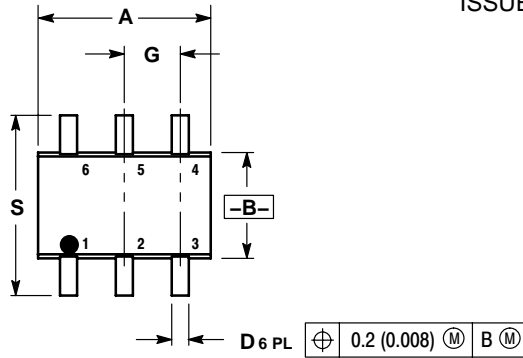


Figure 9. Diode Forward Voltage vs. Current

# NTJD4001N

## PACKAGE DIMENSIONS

SC-88 (SOT-363)  
CASE 419B-02  
ISSUE R




NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

STYLE 26:

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

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