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°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	T_A = 25 °C	I_D	250	mA
		T_A = 85 °C		180	
Power Dissipation (Note 1)	Steady State	T_A = 25 °C	P_D	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

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

ON Semiconductor®

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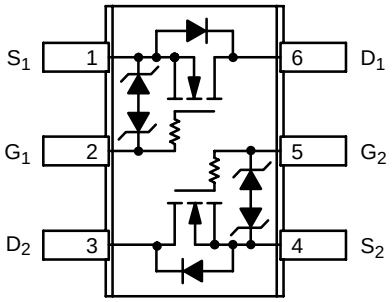
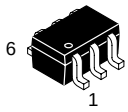
$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
30 V	1.0 Ω @ 4.0 V	250 mA
	1.5 Ω @ 2.5 V	

SOT−363
SC−88 (6 LEADS)

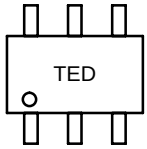


Top View



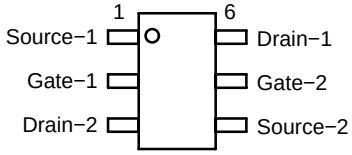
SC−88 / SOT−363
CASE 419B
STYLE 26

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

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

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
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	$td_{(ON)}$	V_{GS} = 4.5 V, V_{DD} = 5.0 V, I_D = 10 mA, R_G = 50 Ω		17		ns
Rise Time	tr			23		
Turn−Off Delay Time	$td_{(OFF)}$			94		
Fall Time	tf			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
		V_{GS} = 0 V, I_S = 10 mA, 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

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

TYPICAL PERFORMANCE CURVES (T_J = 25°C unless otherwise noted)

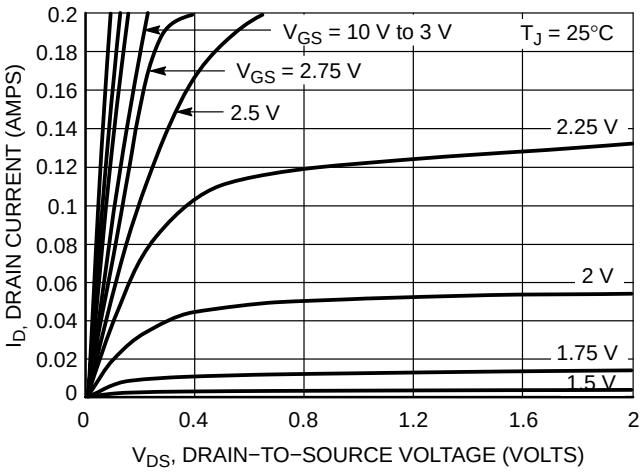


Figure 1. On−Region Characteristics

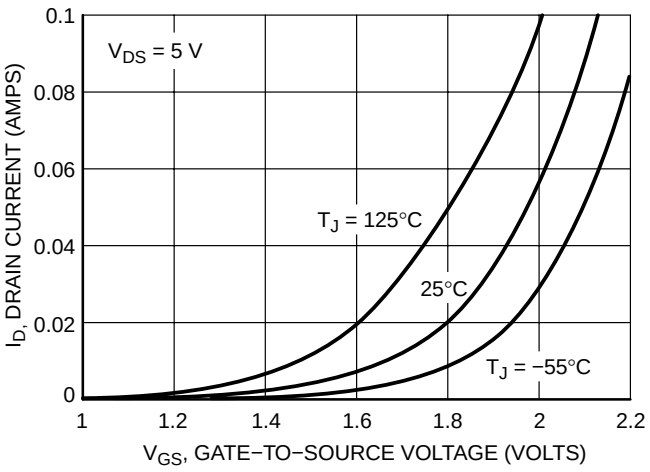


Figure 2. Transfer Characteristics

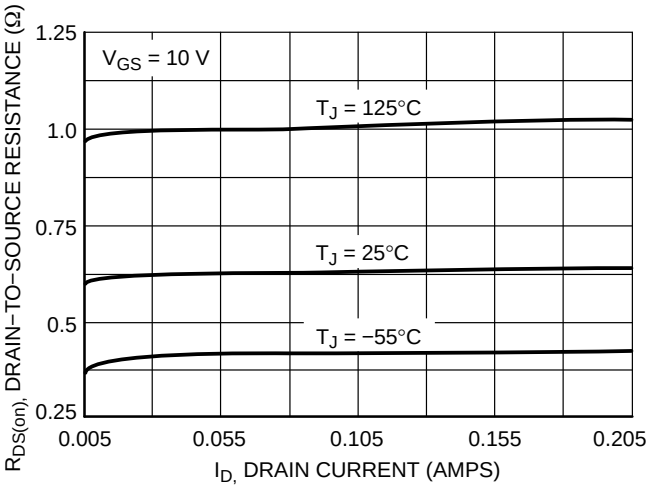


Figure 3. On−Resistance vs. Drain Current and Temperature

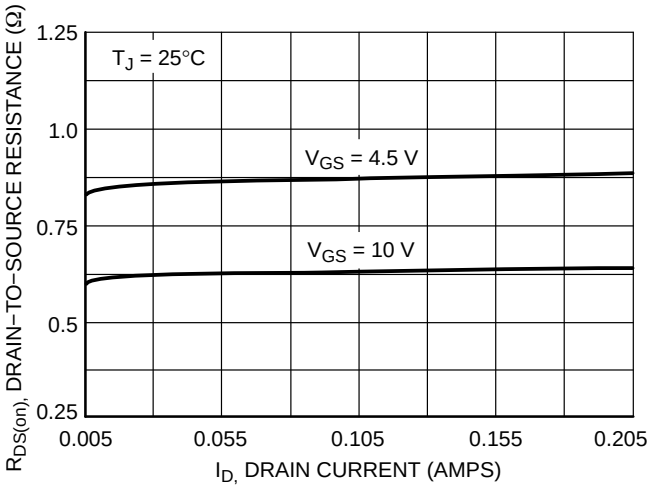


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

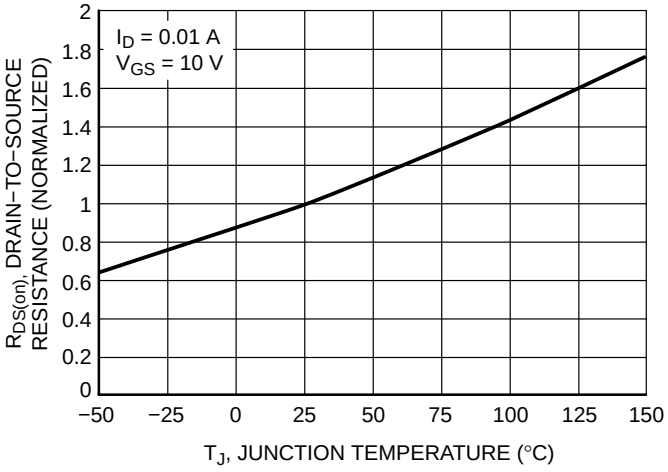


Figure 5. On−Resistance Variation with Temperature

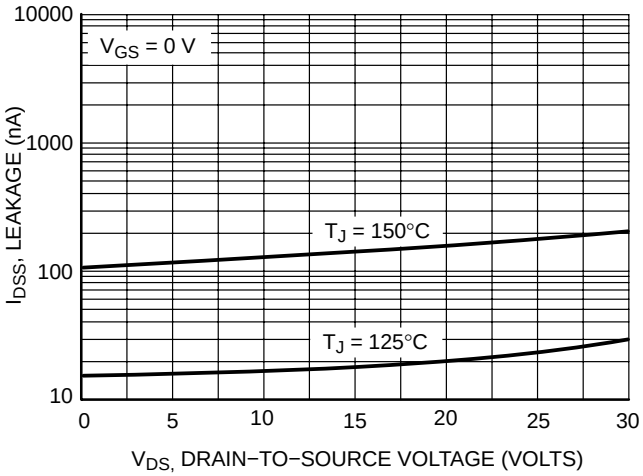


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES (T_J = 25°C unless otherwise noted)

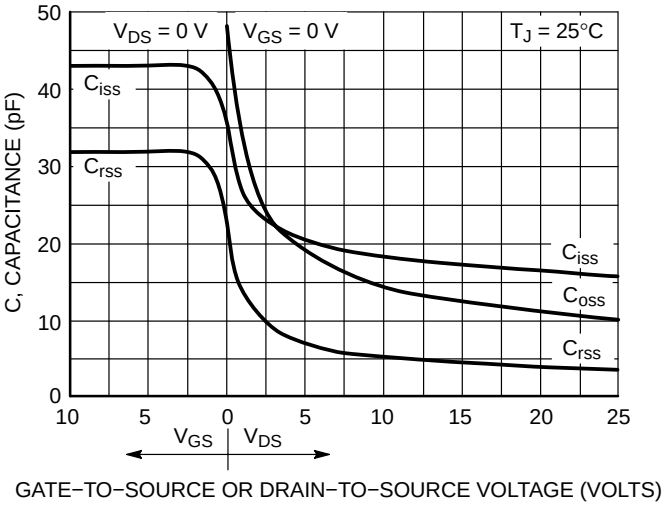


Figure 7. Capacitance Variation

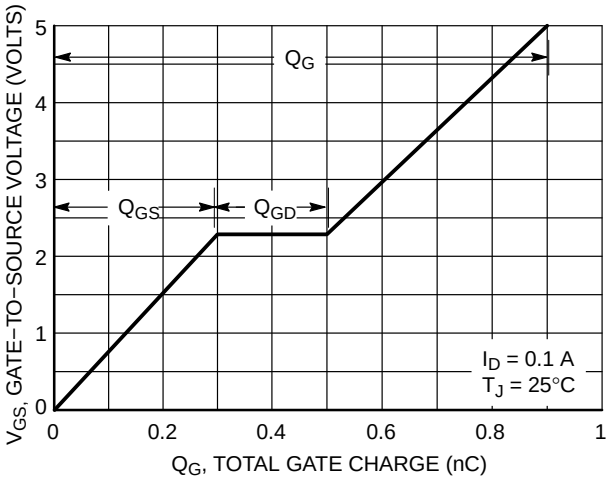


Figure 8. Gate−to−Source Voltage vs. Total Gate Charge

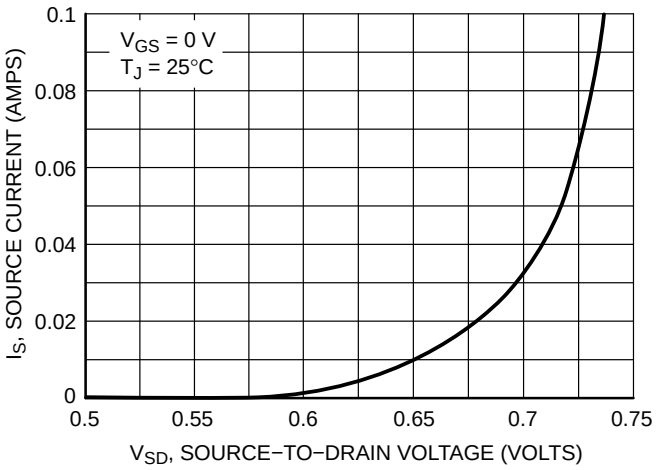
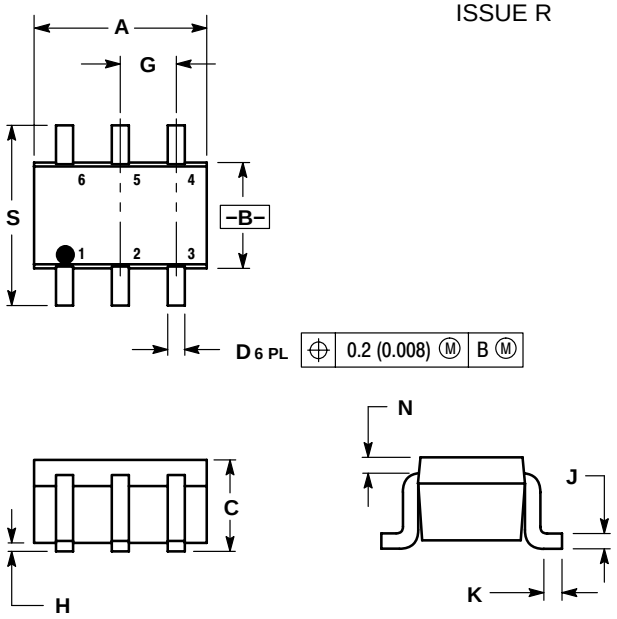


Figure 9. Diode Forward Voltage vs. Current

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.

	INCHES		MILLIMETERS	
DIM	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

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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