

# NTJD2152P

## Trench Small Signal MOSFET

8 V, Dual P-Channel, SC-88  
ESD Protection

### Features

- Leading -8 V Trench for Low  $R_{DS(ON)}$  Performance
- ESD Protected Gate
- Small Footprint (2 x 2 mm)
- Same Package as SC-70-6
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

### Applications

- Load Power switching
- DC-DC Conversion
- Li-Ion Battery Charging Circuits
- Cell Phones, Media Players, Digital Cameras, PDAs

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		$V_{DSS}$	-8.0	V	
Gate-to-Source Voltage		$V_{GS}$	$\pm 8.0$	V	
Continuous Drain Current (Based on $R_{\theta JA}$ )	Steady State	$I_D$	$T_A = 25^\circ\text{C}$	-0.775	A
			$T_A = 85^\circ\text{C}$	-0.558	
Power Dissipation (Based on $R_{\theta JA}$ )	Steady State	$P_D$	$T_A = 25^\circ\text{C}$	0.27	W
			$T_A = 85^\circ\text{C}$	0.14	
Continuous Drain Current (Based on $R_{\theta JL}$ )	Steady State	$I_D$	$T_A = 25^\circ\text{C}$	-1.1	A
			$T_A = 85^\circ\text{C}$	-0.8	
Power Dissipation (Based on $R_{\theta JL}$ )	Steady State	$P_D$	$T_A = 25^\circ\text{C}$	0.55	W
			$T_A = 85^\circ\text{C}$	0.29	
Pulsed Drain Current		$t \leq 10 \mu\text{s}$	$I_{DM}$	$\pm 1.2$	A
Operating Junction and Storage Temperature		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$	
Continuous Source Current (Body Diode)		$I_S$	-0.775	A	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		$T_L$	260	$^\circ\text{C}$	

### THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Typ	Max	Unit
Junction-to-Ambient - Steady State	$R_{\theta JA}$	400	460	$^\circ\text{C/W}$
Junction-to-Lead (Drain) - Steady State	$R_{\theta JL}$	194	226	

1. Surface mounted on FR4 board using 1 oz Cu area = 0.9523 in sq.

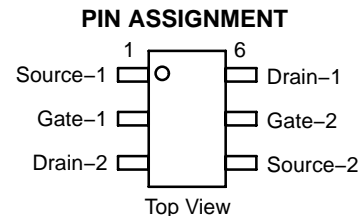
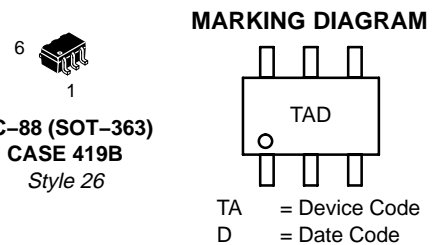
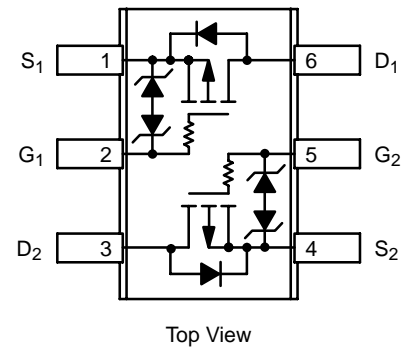


ON Semiconductor®

<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	$I_D$ Max
-8 V	0.22 $\Omega$ @ -4.5 V	-0.775 A
	0.32 $\Omega$ @ -2.5 V	
	0.51 $\Omega$ @ -1.8 V	

### SOT-363 SC-88 (6 LEADS)



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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## 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> = -250 μA	-8.0	-10.5		V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>			-6.0		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = -6.4 V			1.0	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8.0 V			10	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> = -250 μA	-0.45	-0.83	-1.0	V
Gate Threshold Temperature Coefficient	V <sub>GS(TH)</sub> /T <sub>J</sub>			2.2		mV/°C
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.57 A		0.22	0.3	Ω
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -0.48 A		0.32	0.46	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -0.20 A		0.51	0.9	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -0.57 A		2.0		S

### CHARGES AND CAPACITANCES

Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1.0 MHz, V <sub>DS</sub> = -8.0 V		160	225	pF
Output Capacitance	C <sub>OSS</sub>			38	55	
Reverse Transfer Capacitance	C <sub>RSS</sub>			28	40	
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = -4.5 V, V <sub>DS</sub> = -5.0 V, I <sub>D</sub> = -0.6 A		2.2	4.0	nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			0.1		
Gate-to-Source Charge	Q <sub>GS</sub>			0.5		
Gate-to-Drain Charge	Q <sub>GD</sub>			0.5		

### SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = -4.5 V, V <sub>DD</sub> = -4.0 V, I <sub>D</sub> = -0.5 A, R <sub>G</sub> = 8.0 Ω		13		ns
Rise Time	t <sub>r</sub>			23		
Turn-Off Delay Time	t <sub>d(OFF)</sub>			50		
Fall Time	t <sub>f</sub>			36		

### DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = -0.23 A	T <sub>J</sub> = 25°C	0.76	1.1	V
			T <sub>J</sub> = 125°C	0.63		
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V, dI <sub>S</sub> /dt = 100 A/μs, I <sub>S</sub> = -0.77 A		78		ns

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

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

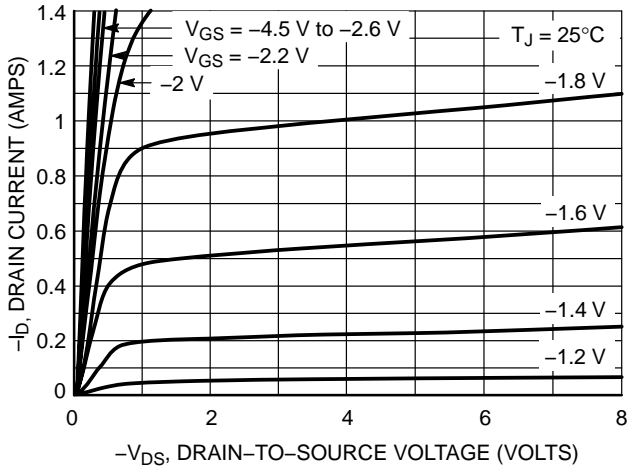


Figure 1. On-Region Characteristics

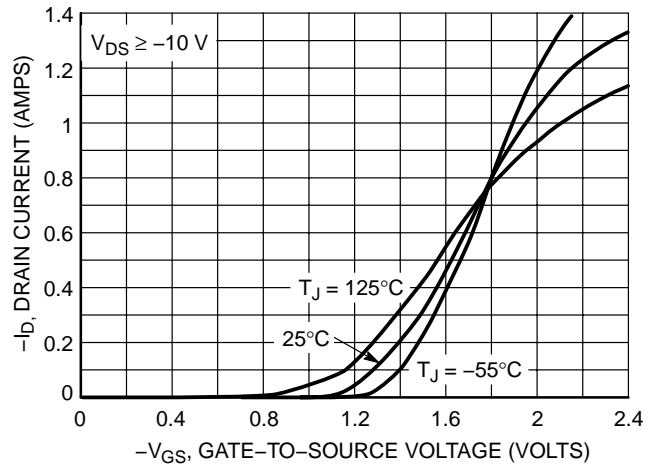


Figure 2. Transfer Characteristics

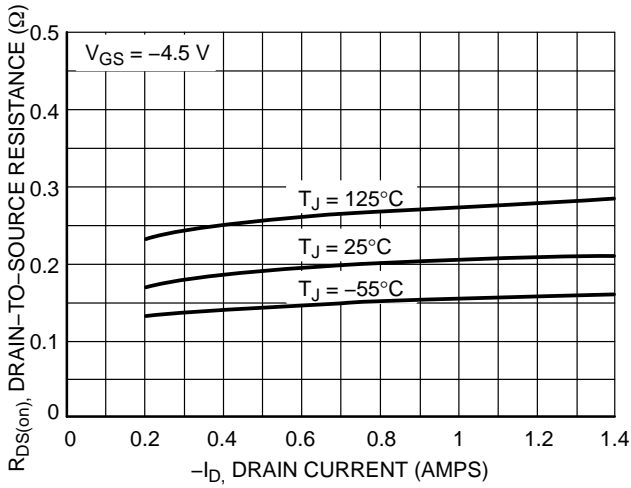


Figure 3. On-Resistance vs. Drain Current and Temperature

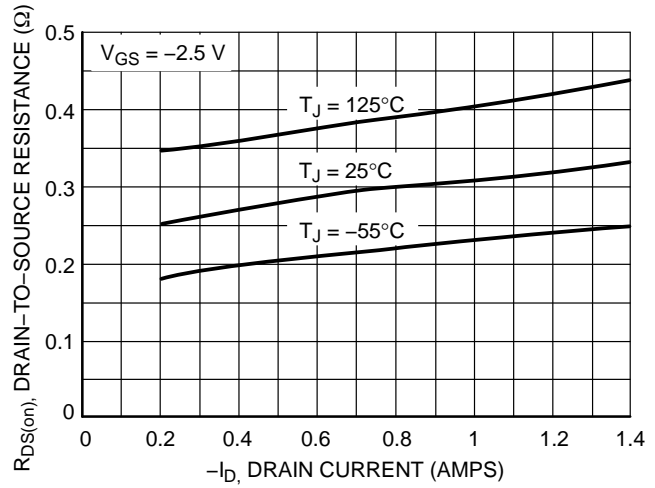


Figure 4. On-Resistance vs. Drain Current and Temperature

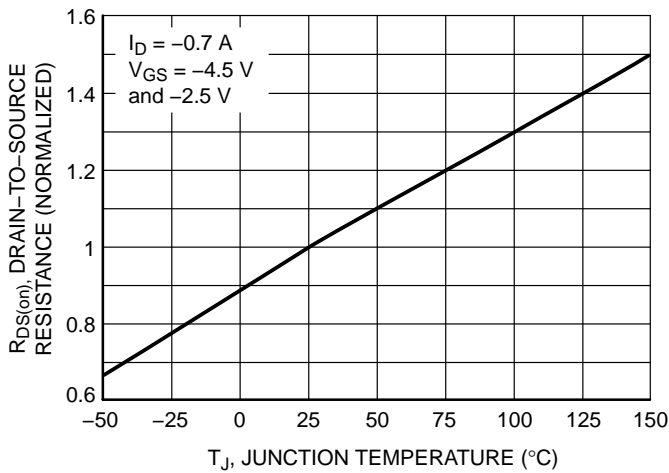


Figure 5. On-Resistance Variation with Temperature

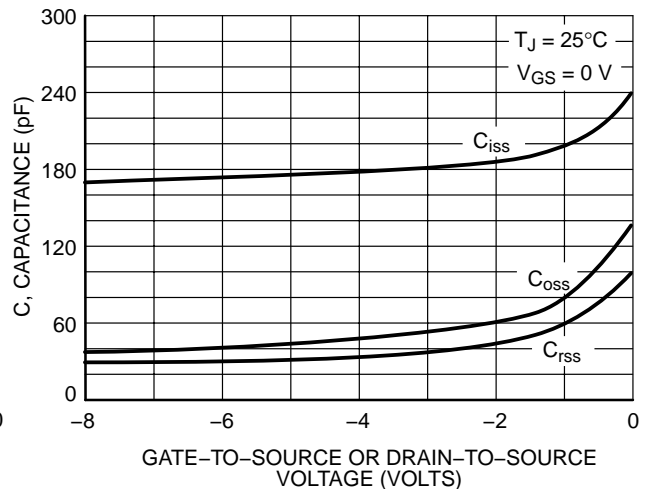
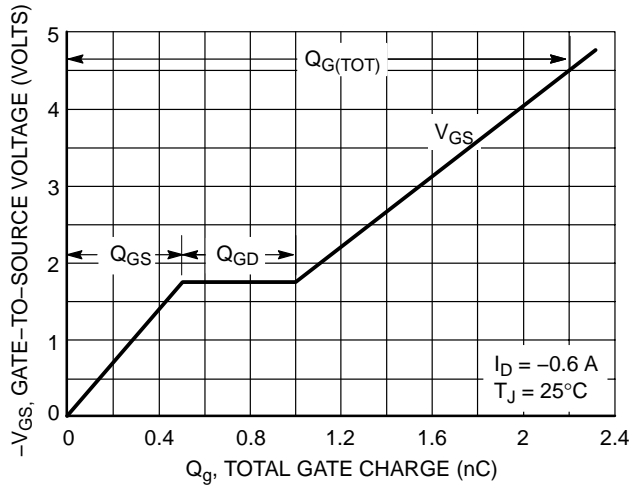


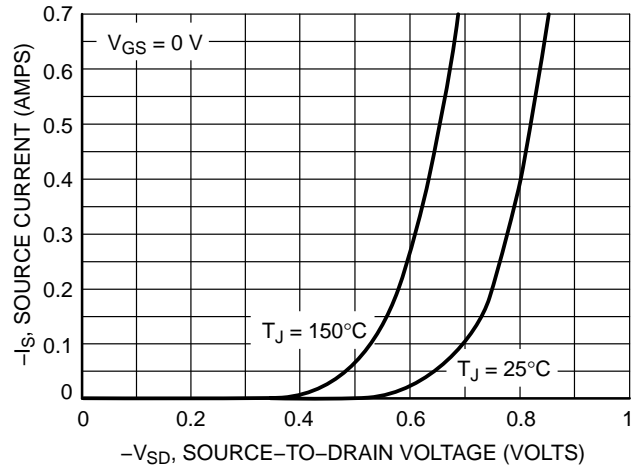
Figure 6. Capacitance Variation

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



**Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge**



**Figure 8. Diode Forward Voltage vs. Current**

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## ORDERING INFORMATION

Device Order Number	Package Type	Tape and Reel Size†
NTJD2152PT1	SOT-363	3000 / Tape & Reel
NTJD2152PT1G	SOT-363 (Pb-Free)	3000 / Tape & Reel
NTJD2152PT2	SOT-363	3000 / Tape & Reel
NTJD2152PT2G	SOT-363 (Pb-Free)	3000 / Tape & Reel
NTJD2152PT4	SOT-363	10,000 / Tape & Reel
NTJD2152PT4G	SOT-363 (Pb-Free)	10,000 / Tape & Reel

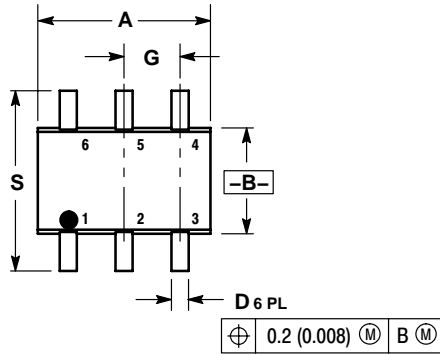
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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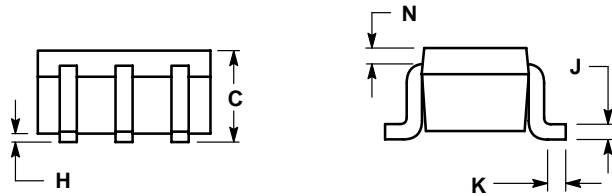
## PACKAGE DIMENSIONS

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

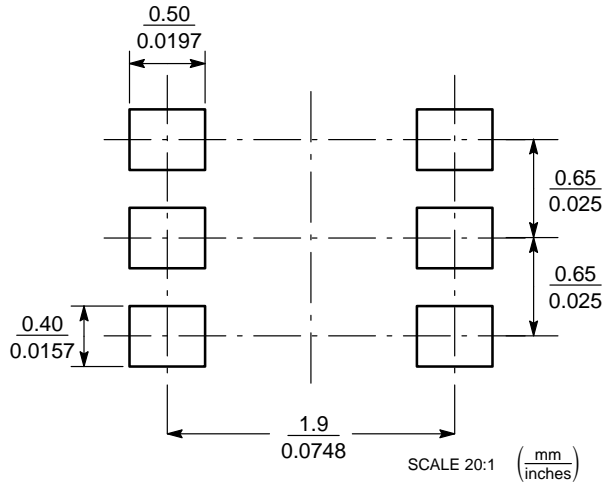
- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.  
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.



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



### SOLDERING FOOTPRINT\*



### SC-88/SC70-6

\*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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