NTJD2152P

Trench Small Signal MOSFET

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

ON Semiconductor®

http://onsemi.com

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

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°C unless otherwise stated)

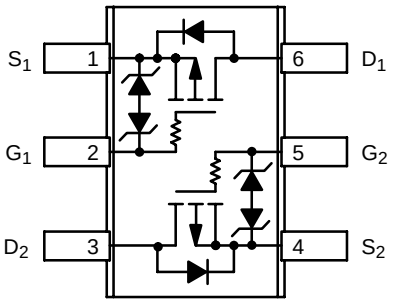
Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	−8.0	V
Gate−to−Source Voltage			V_{GS}	±8.0	V
Continuous Drain Current (Based on $R_{\theta JA}$)	Steady State	T_A = 25 °C	I_D	−0.775	A
		T_A = 85 °C		−0.558	
Power Dissipation (Based on $R_{\theta JA}$)	Steady State	T_A = 25 °C	P_D	0.27	W
		T_A = 85 °C		0.14	
Continuous Drain Current (Based on $R_{\theta JL}$)	Steady State	T_A = 25 °C	I_D	−1.1	A
		T_A = 85 °C		−0.8	
Power Dissipation (Based on $R_{\theta JL}$)	Steady State	T_A = 25 °C	P_D	0.55	W
		T_A = 85 °C		0.29	
Pulsed Drain Current		t ≤10 μs	I_{DM}	±1.2	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°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	°C

THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Typ	Max	Unit
Junction−to−Ambient – Steady State	$R_{\theta JA}$	400	460	°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.

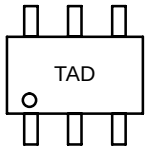
SOT−363
SC−88 (6 LEADS)



Top View

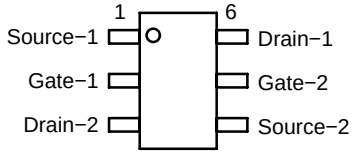
SC−88 (SOT−363)
CASE 419B
Style 26

MARKING DIAGRAM



TA = Device Code
D = Date Code

PIN ASSIGNMENT



Top View

ORDERING INFORMATION

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

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 = −250 μA	−8.0	−10.5		V
Drain−to−Source Breakdown Voltage Temperature Coefficient	V(BR)DSS/ T_J			−6.0		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = −6.4 V			1.0	μA
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8.0 V			10	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, ID = −250 μA	−0.45	−0.83	−1.0	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			2.2		mV/ °C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = −4.5 V, I_D = −0.57 A		0.22	0.3	Ω
		V_{GS} = −2.5 V, I_D = −0.48 A		0.32	0.46	
		V_{GS} = −1.8 V, I_D = −0.20 A		0.51	0.9	
Forward Transconductance	g_{FS}	V_{GS} = −4.0 V, I_D = −0.57 A		2.0		S
CHARGES AND CAPACITANCES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = −8.0 V		160	225	pF
Output Capacitance	C_{OSS}			38	55	
Reverse Transfer Capacitance	C_{RSS}			28	40	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = −4.5 V, V_{DS} = −5.0 V, I_D = −0.6 A		2.2	4.0	nC
Threshold Gate Charge	$Q_{G(TH)}$			0.1		
Gate−to−Source Charge	Q_{GS}			0.5		
Gate−to−Drain Charge	Q_{GD}			0.5		
SWITCHING CHARACTERISTICS (Note 3)						
Turn−On Delay Time	$td_{(ON)}$	V_{GS} = −4.5 V, V_{DD} = −4.0 V, I_D = −0.5 A, R_G = 8.0 Ω		13		ns
Rise Time	tr			23		
Turn−Off Delay Time	$td_{(OFF)}$			50		
Fall Time	tf			36		
DRAIN−SOURCE DIODE CHARACTERISTICS						
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = −0.23 A, T_J = 25°C		0.76	1.1	V
		V_{GS} = 0 V, I_S = −0.23 A, T_J = 125°C		0.63		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_S/dt = 100 A/μs, I_S = −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°C unless otherwise noted)

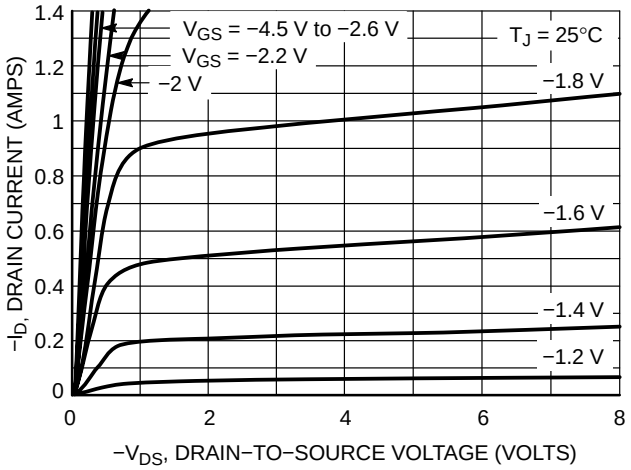


Figure 1. On−Region Characteristics

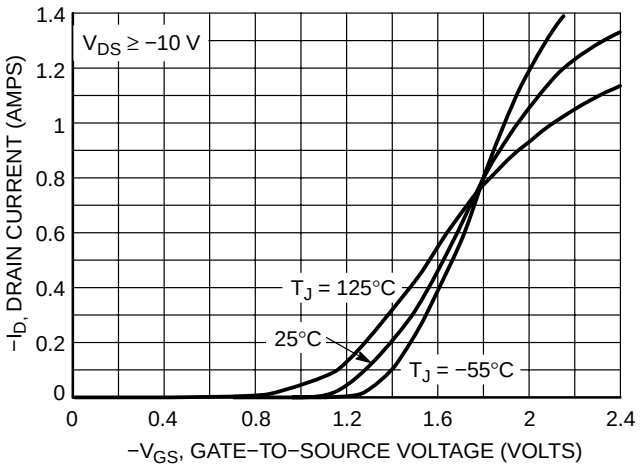


Figure 2. Transfer Characteristics

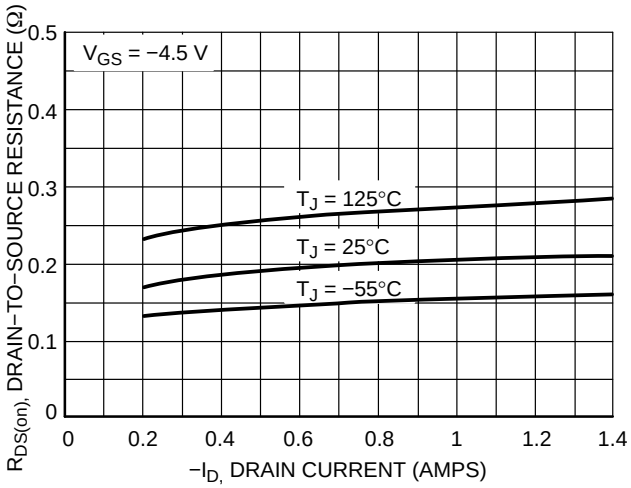


Figure 3. On−Resistance vs. Drain Current and Temperature

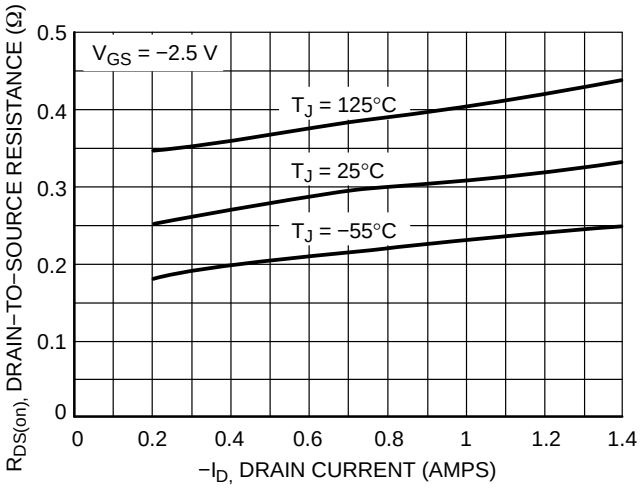


Figure 4. On−Resistance vs. Drain Current and Temperature

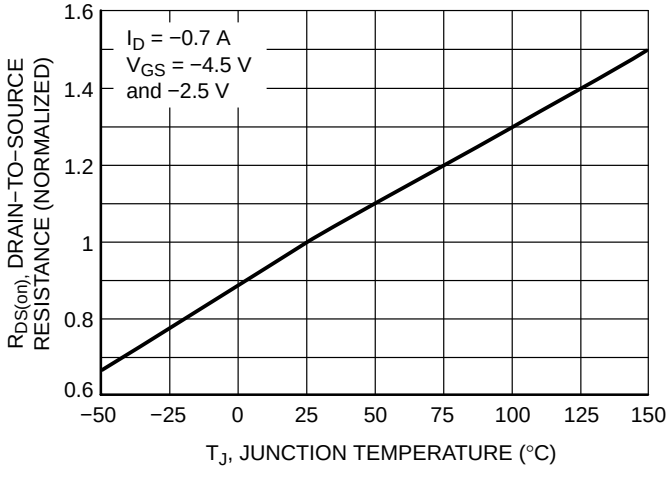


Figure 5. On−Resistance Variation with Temperature

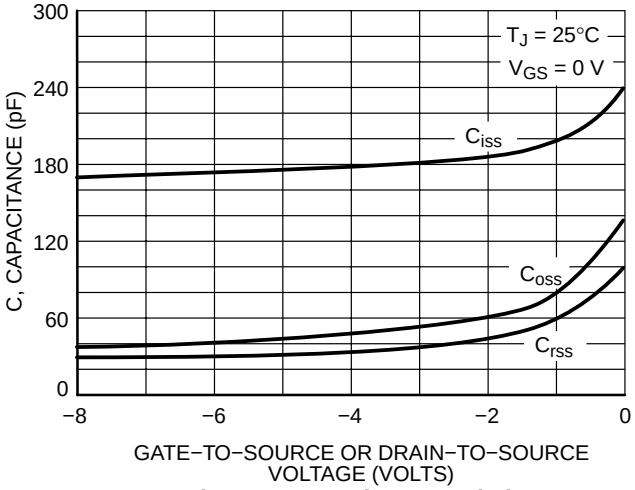


Figure 6. Capacitance Variation

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

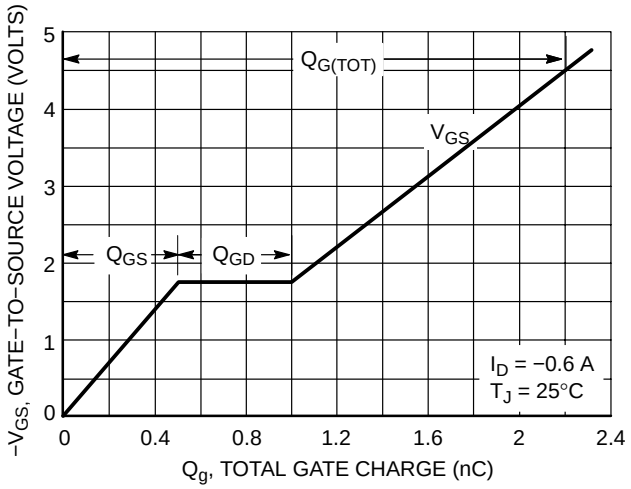


Figure 7. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

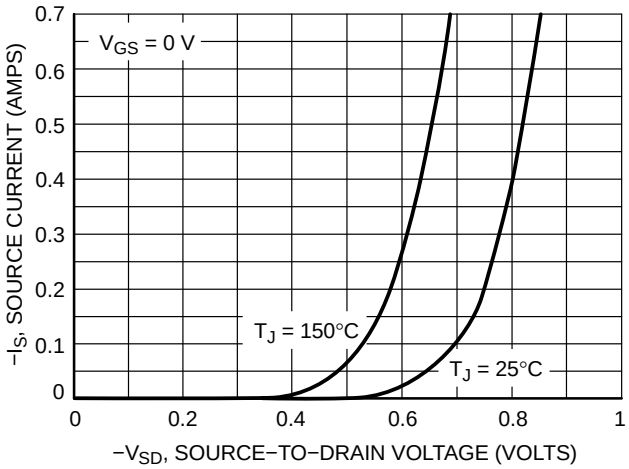


Figure 8. Diode Forward Voltage vs. Current

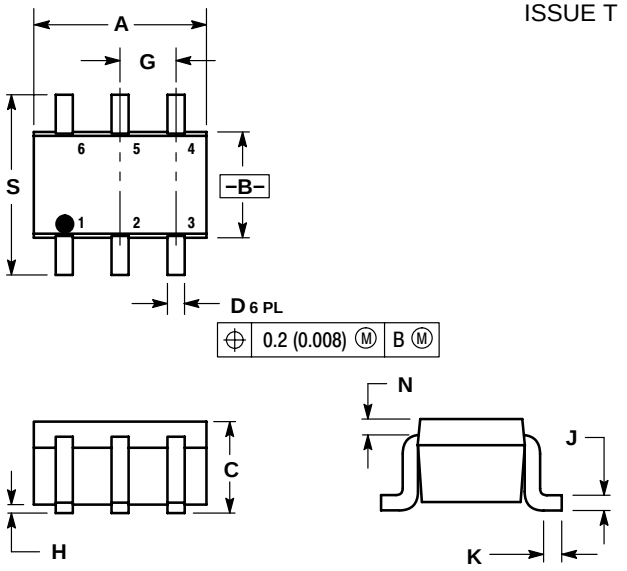
ORDERING INFORMATION

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.

PACKAGE DIMENSIONS

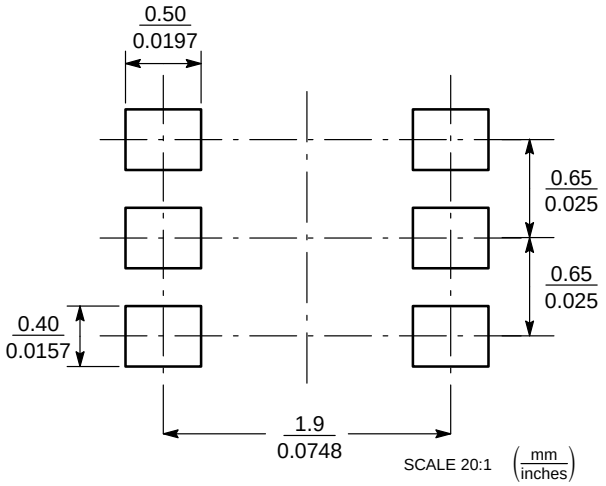
SC−88 (SOT−363)
CASE 419B−02
ISSUE T



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

	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

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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.