

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 Packages are Available

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}	±8.0	V
Continuous Drain Current (Based on R _{θJA})	Steady State	T _A = 25 °C	I _D	−0.775	A
		T _A = 85 °C		−0.558	
Power Dissipation (Based on R _{θJA})	Steady State	T _A = 25 °C	P _D	0.27	W
		T _A = 85 °C		0.14	
Continuous Drain Current (Based on R _{θJL})	Steady State	T _A = 25 °C	I _D	−1.1	A
		T _A = 85 °C		−0.8	
Power Dissipation (Based on R _{θJL})	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	$^\circ\text{C/W}$
Junction-to-Lead (Drain) – Steady State	$R_{\theta JL}$	194	226	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

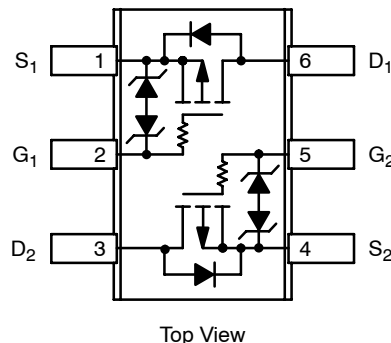


ON Semiconductor®

<http://onsemi.com>

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

SOT-363
SC-88 (6 LEADS)

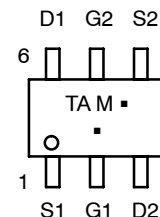


Top View

MARKING DIAGRAM & PIN ASSIGNMENT



SC-88/SOT-363
CASE 419B
STYLE 28



TA = Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

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

NTJD2152P

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} , I _D = -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	t _{d(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	t _r			23		
Turn-Off Delay Time	t _{d(OFF)}			50		
Fall Time	t _f			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
			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 ($T_J = 25^\circ\text{C}$ unless otherwise noted)

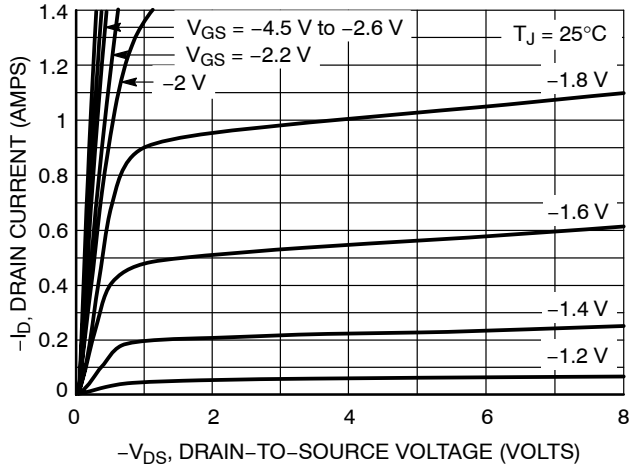


Figure 1. On-Region Characteristics

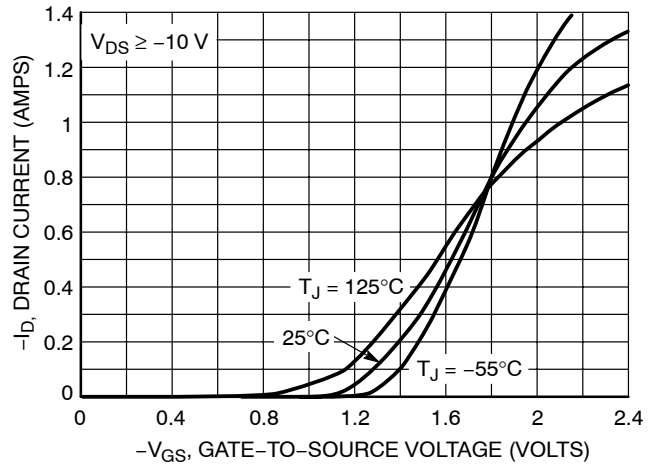


Figure 2. Transfer Characteristics

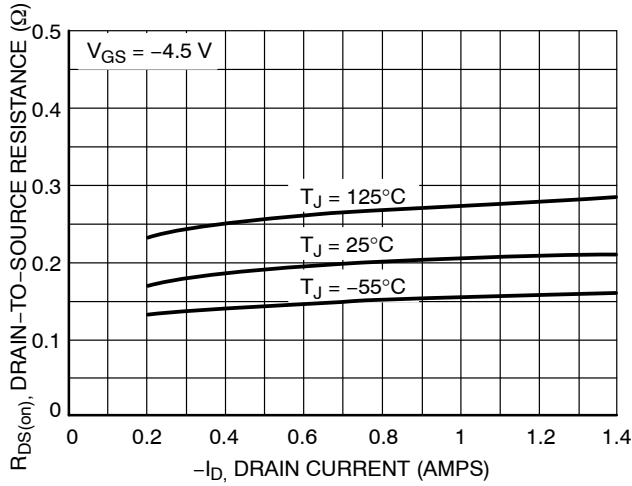


Figure 3. On-Resistance vs. Drain Current and Temperature

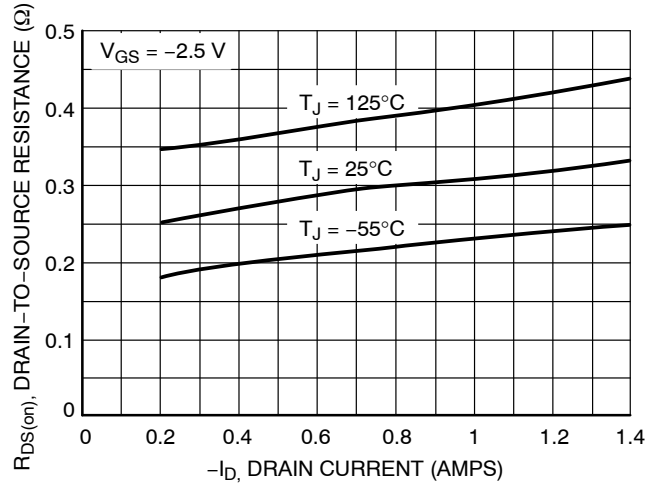


Figure 4. On-Resistance vs. Drain Current and Temperature

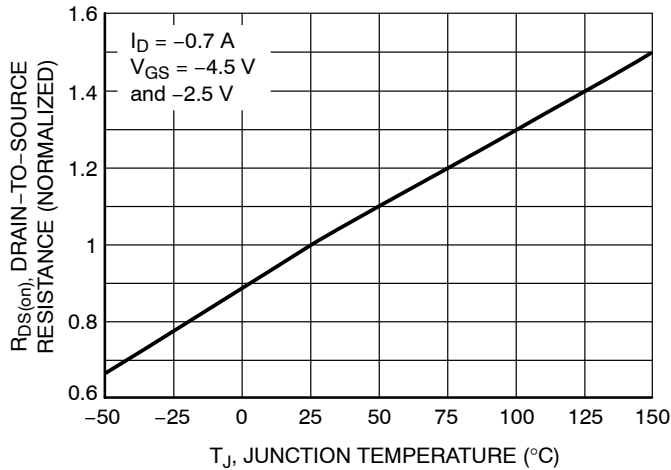


Figure 5. On-Resistance Variation with Temperature

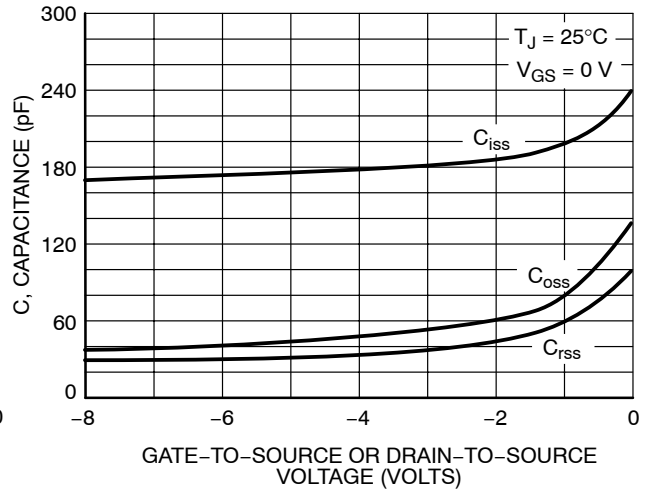


Figure 6. Capacitance Variation

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

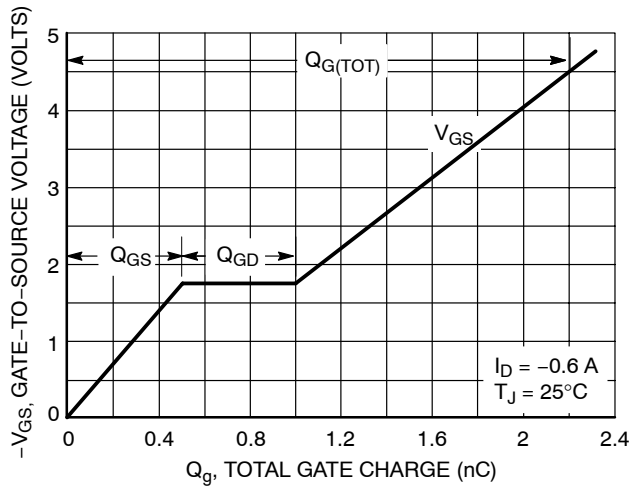


Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

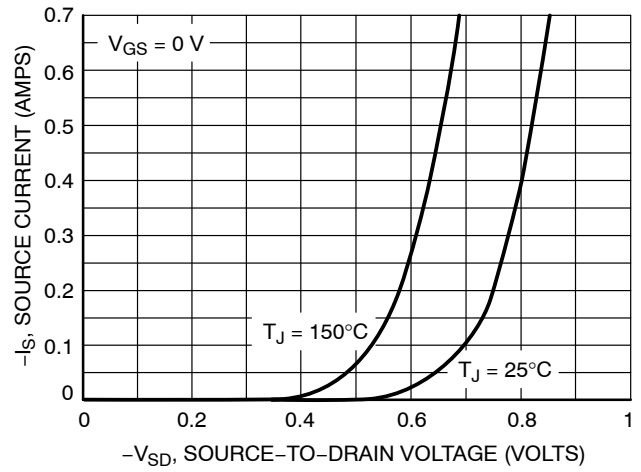


Figure 8. Diode Forward Voltage vs. Current

NTJD2152P

ORDERING INFORMATION

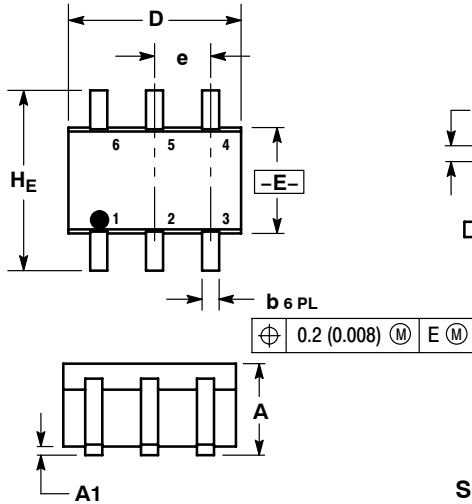
Device Order Number	Package Type	Tape and Reel Size [†]
NTJD2152PT1	SOT-363	3000 / Tape & Reel
NTJD2152PT1G	SOT-363 (Pb-Free)	3000 / Tape & Reel
NTJD2152PT2	SOT-363	3000 / Tape & Reel
NTJD2152PT2G	SOT-363 (Pb-Free)	3000 / Tape & Reel
NTJD2152PT4	SOT-363	10,000 / Tape & Reel
NTJD2152PT4G	SOT-363 (Pb-Free)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

NTJD2152P

PACKAGE DIMENSIONS

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



NOTES:

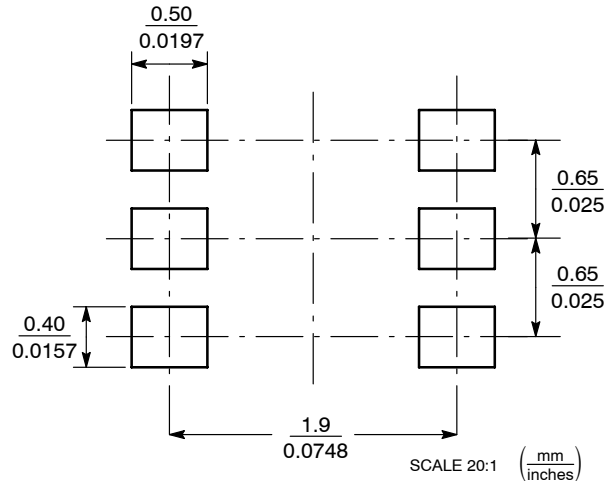
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

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
H_E	2.00	2.10	2.20	0.078	0.082	0.086

STYLE 26:

- PIN 1. SOURCE 1
- GATE 1
- DRAIN 2
- SOURCE 2
- GATE 2
- 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85062-1312 USA
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada
Fax: 480-829-7709 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.