

NTJD4152P

Trench Small Signal MOSFET

20 V, 0.88 A, Dual P-Channel, ESD Protected SC-88



ON Semiconductor®

<http://onsemi.com>

Features

- Leading Trench Technology for Low $R_{DS(ON)}$ Performance
- Small Footprint Package (SC70-6 Equivalent)
- ESD Protected Gate
- This is a Pb-Free Device

Applications

- Load/Power Management
- Charging Circuits
- Load Switching
- Cell Phones, Computing, Digital Cameras, MP3s and PDAs

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	-20	V	
Gate-to-Source Voltage		V_{GS}	± 12	V	
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	-0.88	A
			$T_A = 85^\circ\text{C}$	-0.63	
Power Dissipation (Note 1)	Steady State	P_D	$T_A = 25^\circ\text{C}$	0.272	W
			$T_A = 85^\circ\text{C}$	0.141	
Continuous Drain Current (Note 2)	$t \leq 5 \text{ s}$	I_D	$T_A = 25^\circ\text{C}$	-1.0	A
			$T_A = 85^\circ\text{C}$	-0.72	
Power Dissipation (Note 2)	$t \leq 5 \text{ s}$	P_D	$T_A = 25^\circ\text{C}$	0.35	W
			$T_A = 85^\circ\text{C}$	0.181	
Pulsed Drain Current		I_{DM}	± 3.0	A	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Continuous Source Current (Body Diode)		I_S	-0.48	A	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$	

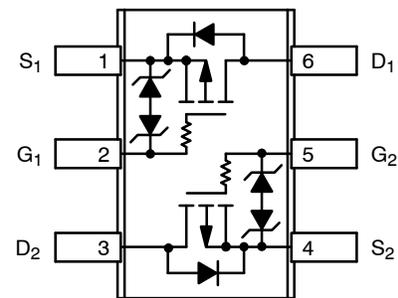
THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State	$R_{\theta JA}$	460	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – $t \leq 5 \text{ s}$	$R_{\theta JA}$	357	
Junction-to-Lead – Steady State	$R_{\theta JL}$	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.

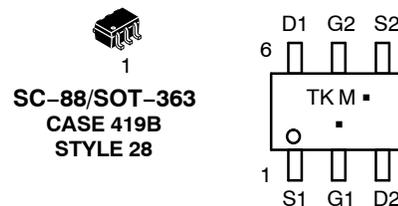
1. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces), steady state.
2. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces), $t \leq 5 \text{ s}$.

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max
-20 V	215 m Ω @ -4.5 V	-0.88 A
	345 m Ω @ -2.5 V	
	600 m Ω @ -1.8 V	



Top View

MARKING DIAGRAM & PIN ASSIGNMENT



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

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
NTJD4152PT1G	SOT-363 (Pb-Free)	3000 Units/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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ELECTRICAL CHARACTERISTICS (T_J=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 _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -16 V	T _J = 25°C		-1.0	μA
			T _J = 125°C		-1.0	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±4.5 V		0.03	1.0	μA
		V _{DS} = 0 V, V _{GS} = ±12 V		6.0		

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250 μA	-0.45		-1.2	V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -0.88 A		215	260	mΩ
		V _{GS} = -2.5 V, I _D = -0.71 A		345	500	
		V _{GS} = -1.8 V, I _D = -0.20 A		600	1000	
Forward Transconductance	g _{FS}	V _{DS} = -10 V, I _D = -0.88 A		3.0		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = -20 V		155		pF
Output Capacitance	C _{OSS}			25		
Reverse Transfer Capacitance	C _{RSS}			18		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DS} = -10 V, I _D = -0.88 A		2.2		nC
Gate-to-Source Charge	Q _{GS}			0.5		
Gate-to-Drain Charge	Q _{GD}			0.65		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = -4.5 V, V _{DD} = -10 V, I _D = -0.5 A, R _G = 20 Ω		5.8		ns
Rise Time	t _r			6.5		
Turn-Off Delay Time	t _{d(OFF)}			13.5		
Fall Time	t _f			3.5		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -0.48 A	T _J = 25°C		-0.8	-1.2	V
			T _J = 125°C		-0.66		

3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

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

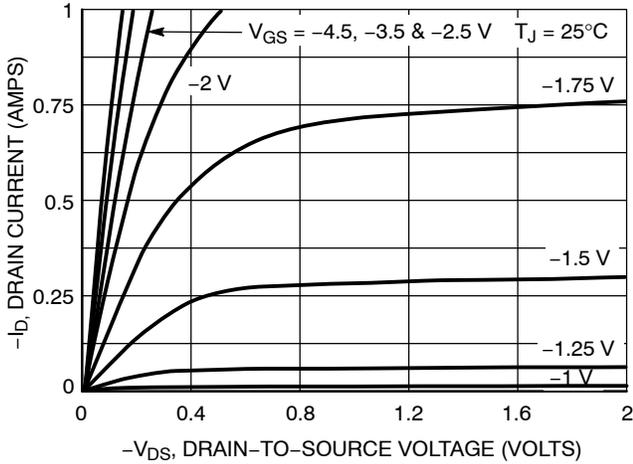


Figure 1. On-Region Characteristics

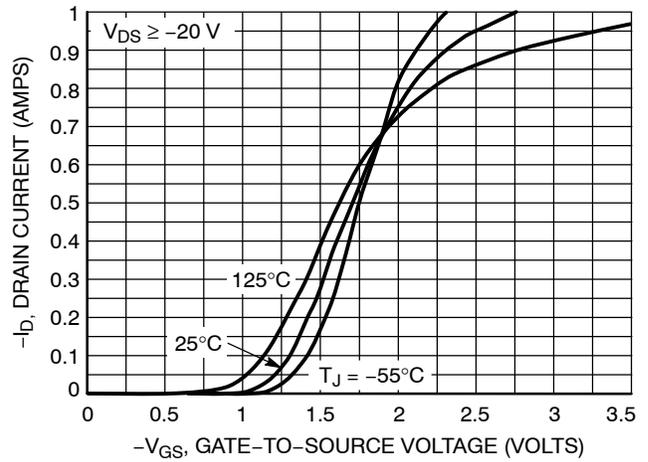


Figure 2. Transfer Characteristics

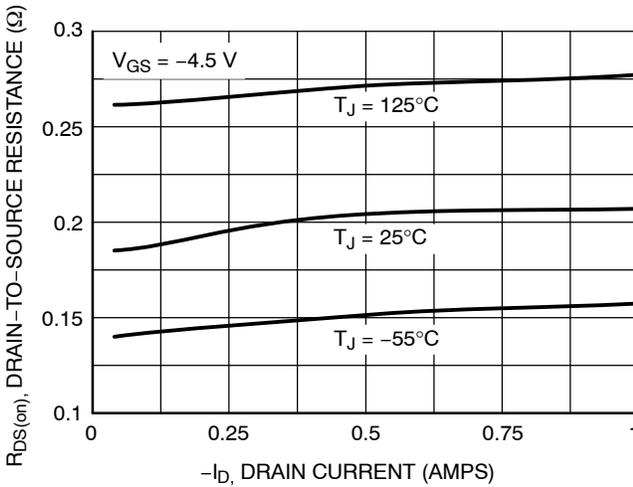


Figure 3. On-Resistance vs. Drain Current and Temperature

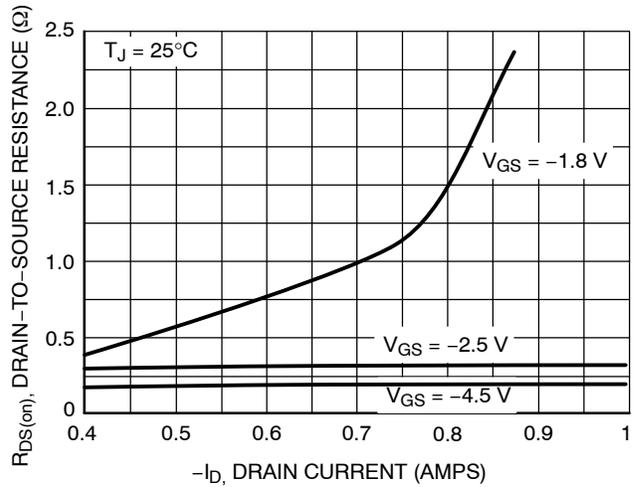


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

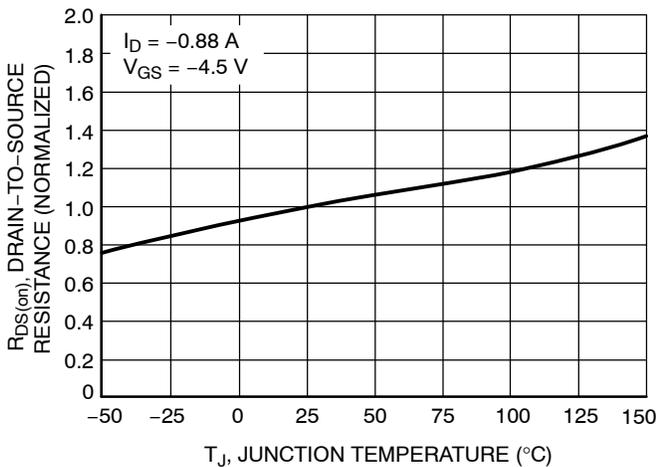


Figure 5. On-Resistance Variation with Temperature

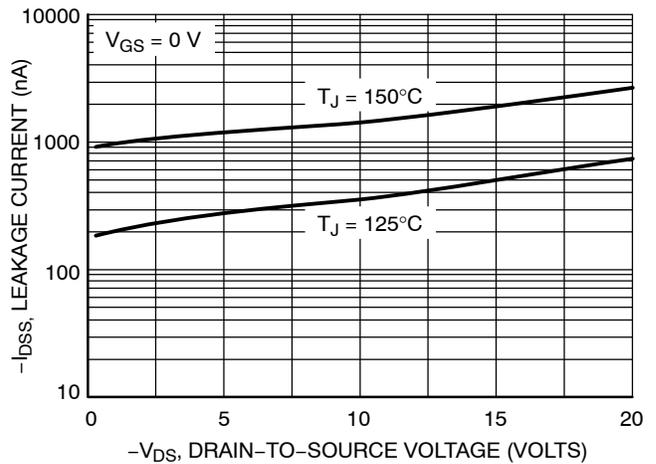


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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

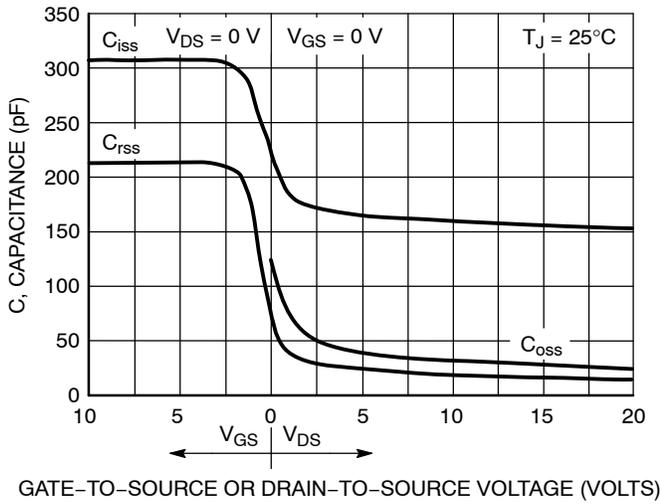


Figure 7. Capacitance Variation

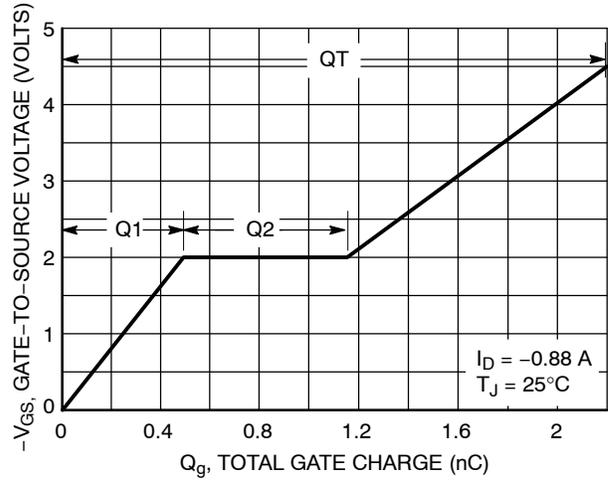


Figure 8. Gate-to-Source Voltage vs. Total Gate Charge

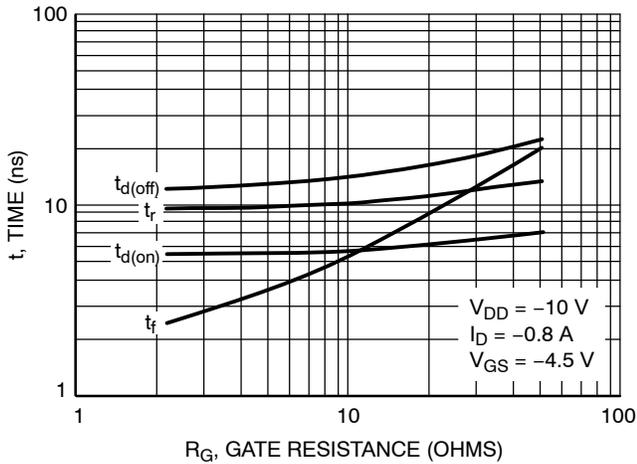


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

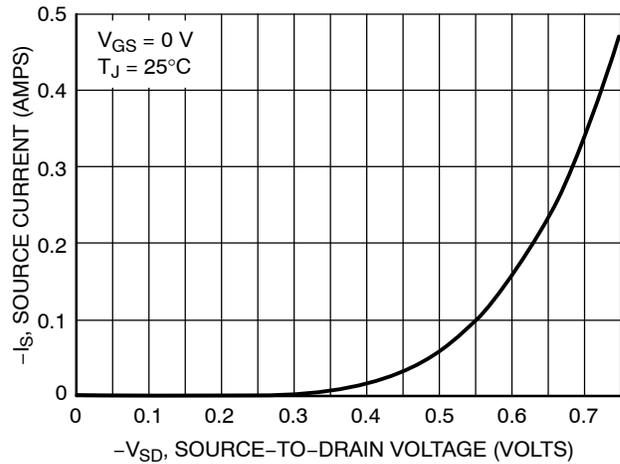
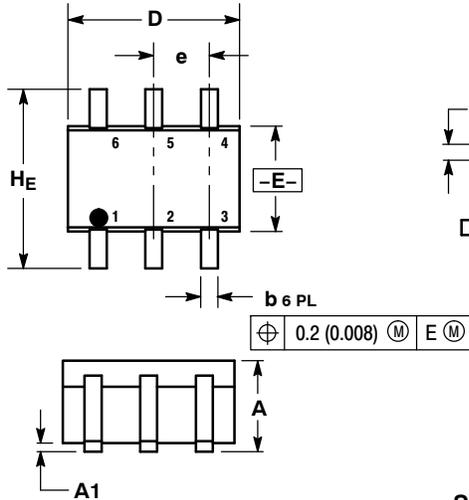


Figure 10. Diode Forward Voltage vs. Current

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PACKAGE DIMENSIONS

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



NOTES:

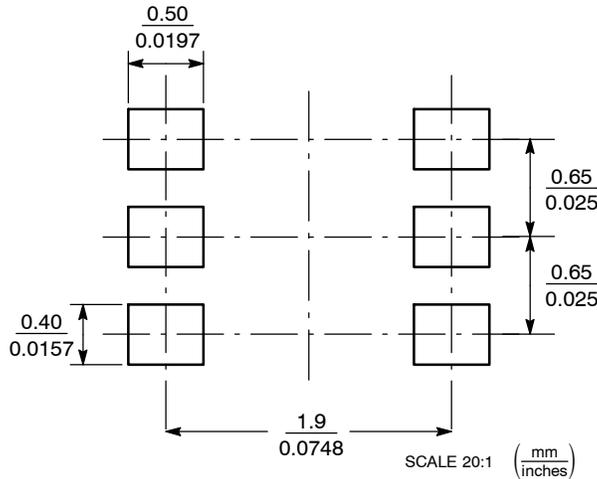
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

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
HE	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.

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