

NTJD4152P

Trench Small Signal MOSFET

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

Features

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

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)	$t \leq 5$ s	I_D	$T_A = 25^\circ\text{C}$	-1.0	A
			$T_A = 85^\circ\text{C}$	-0.72	
Power Dissipation (Note 2)	$t \leq 5$ 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 - $t \leq 5$ s	$R_{\theta JA}$	357	
Junction-to-Lead - Steady State	$R_{\theta JL}$	226	

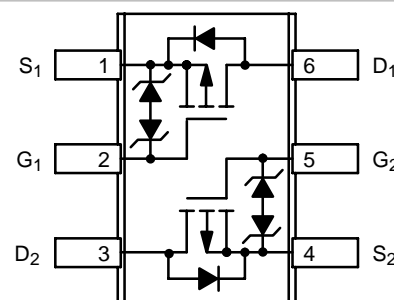
1. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces), steady state.
2. Surface mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces), $t \leq 5$ s.



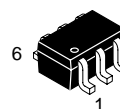
ON Semiconductor®

<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ 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	

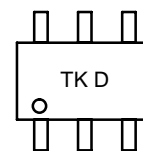


Top View
SOT-363 (SC-88-6)



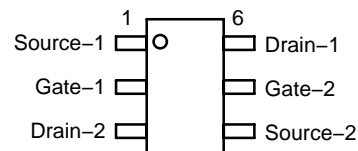
SOT-363 / SC-88
CASE 419B
STYLE 26

MARKING DIAGRAM



TK = Device Code
D = Date Code

PIN ASSIGNMENT



Top View

ORDERING INFORMATION

Device	Package	Shipping
NTJD4152PT1	SOT-363	3000 Units/Reel
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.

NTJD4152P

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		0.5	
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			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)

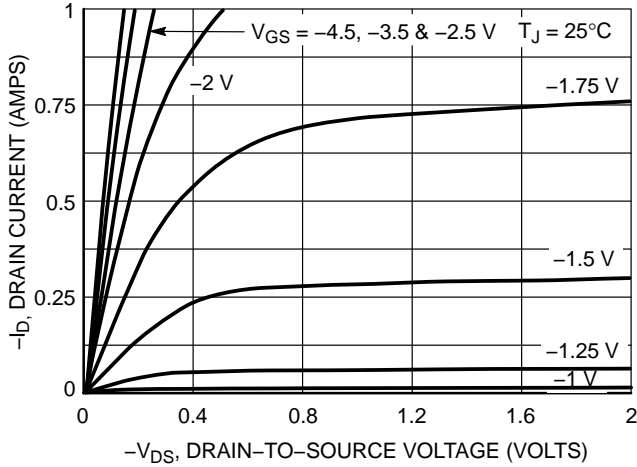


Figure 1. On-Region Characteristics

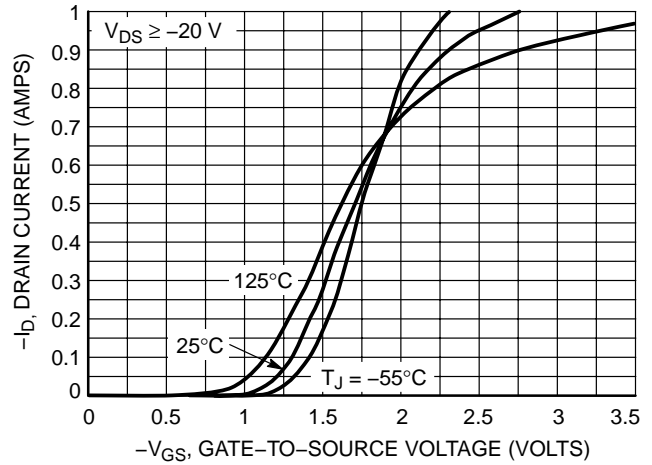


Figure 2. Transfer Characteristics

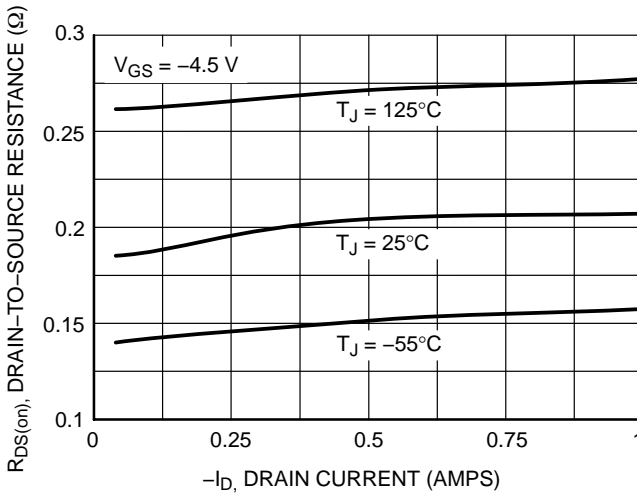


Figure 3. On-Resistance vs. Drain Current and Temperature

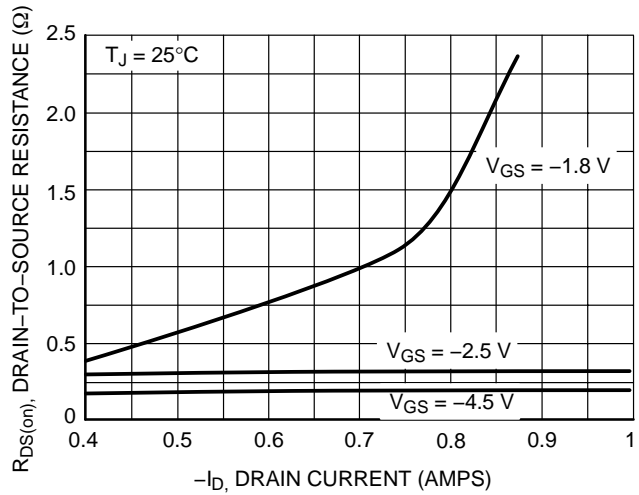


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

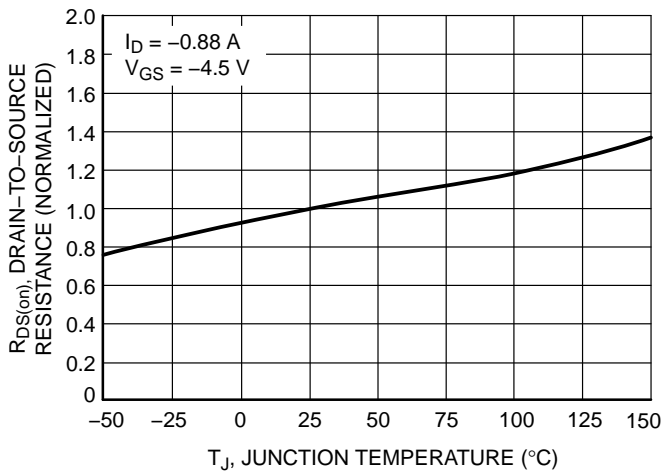


Figure 5. On-Resistance Variation with Temperature

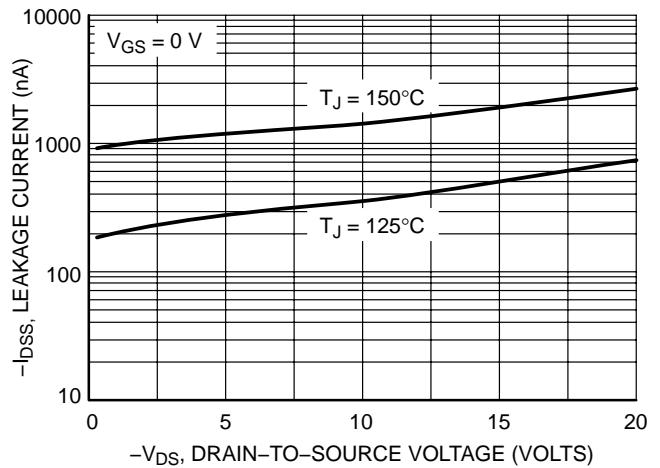


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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

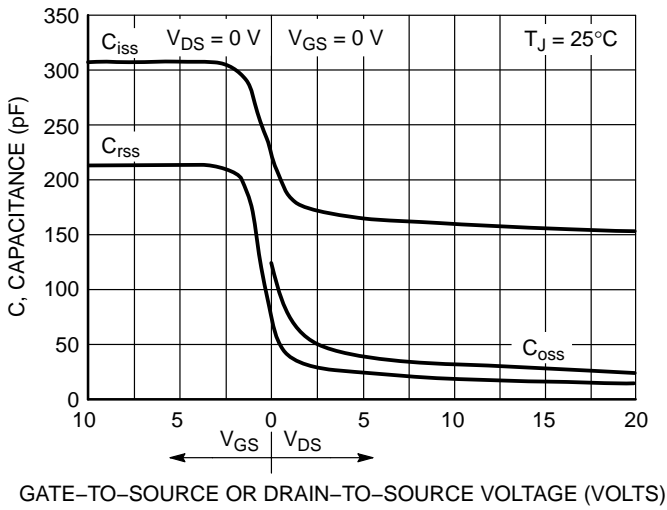


Figure 7. Capacitance Variation

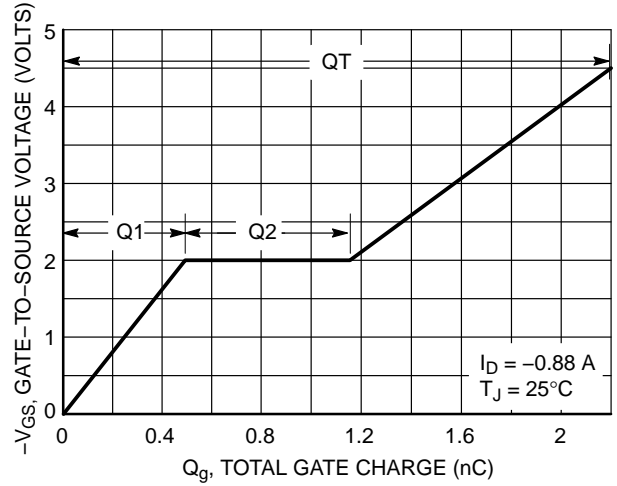


Figure 8. Gate-to-Source Voltage vs. Total Gate Charge

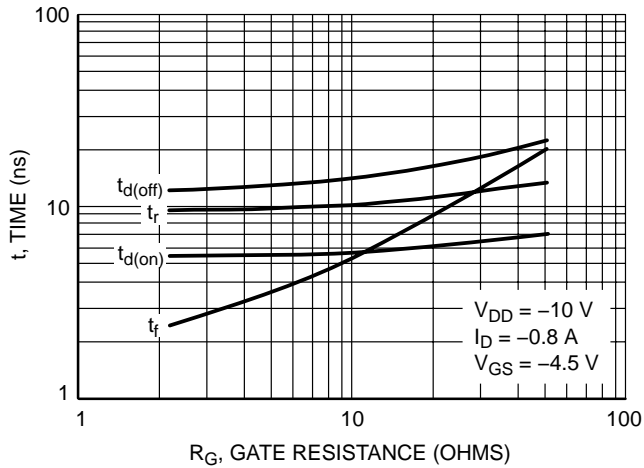


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

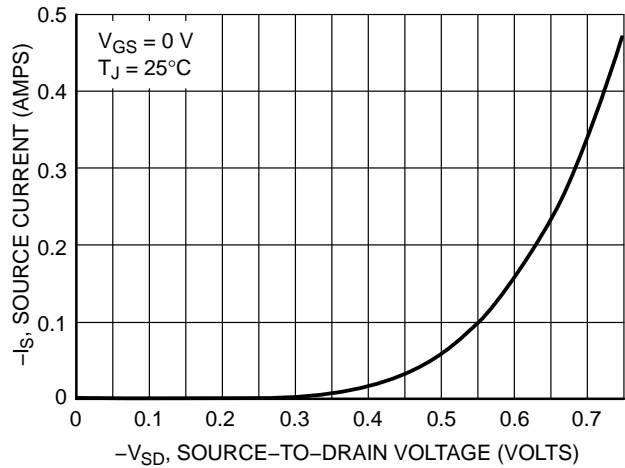


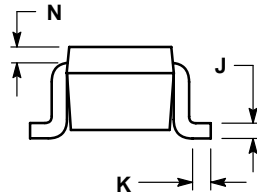
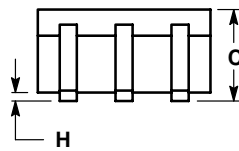
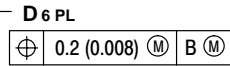
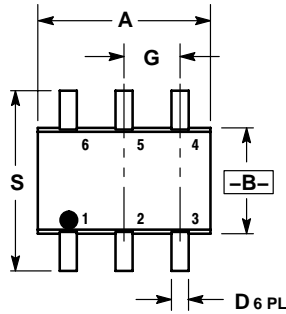
Figure 10. Diode Forward Voltage vs. Current

NTJD4152P

PACKAGE DIMENSIONS

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

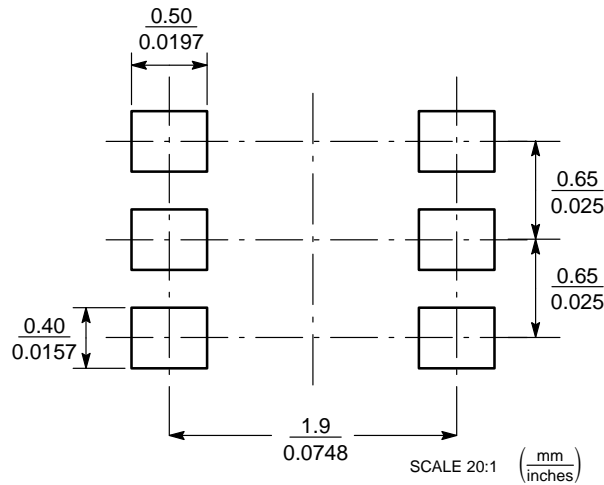
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.



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


- STYLE 26:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

SOLDERING FOOTPRINT*



SC-88/SC70-6/SOT-363

*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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