NTJD4152P

Trench Small Signal MOSFET

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

ON Semiconductor®

http://onsemi.com

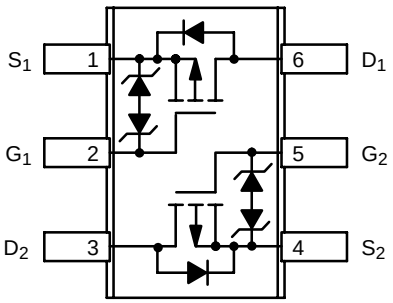
$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max
−20 V	215 mΩ @ −4.5 V	−0.88 A
	345 mΩ @ −2.5 V	
	600 mΩ @ −1.8 V	

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



Top View

SOT−363 (SC−88−6)

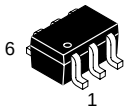
MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

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	T_A = 25°C	I_D	−0.88	A
		T_A = 85°C		−0.63	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	0.272	W
		T_A = 85°C		0.141	
Continuous Drain Current (Note 2)	t ≤ 5 s	T_A = 25°C	I_D	−1.0	A
		T_A = 85°C		−0.72	
Power Dissipation (Note 2)	t ≤ 5 s	T_A = 25°C	P_D	0.35	W
		T_A = 85°C		0.181	
Pulsed Drain Current		t ≤ 10 μs	I_{DM}	±3.0	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°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	°C

THERMAL RESISTANCE RATINGS (Note 1)

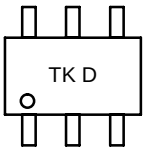
Parameter	Symbol	Max	Unit
Junction−to−Ambient – Steady State	$R_{\theta JA}$	460	°C/W
Junction−to−Ambient − t ≤ 5 s	$R_{\theta JA}$	357	
Junction−to−Lead – Steady State	$R_{\theta JL}$	226	

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 ≤ 5 s.



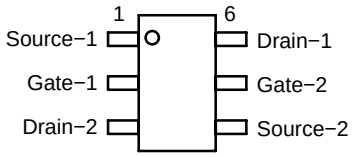
SOT−363 / SC−88
CASE 419B
STYLE 26

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.

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		−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}, ID = −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°C unless otherwise noted)

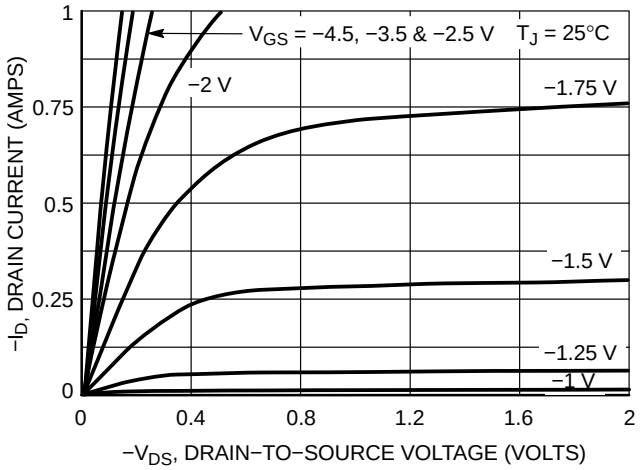


Figure 1. On−Region Characteristics

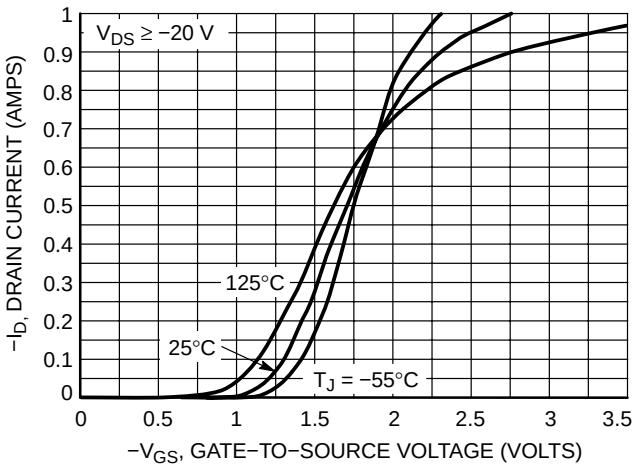


Figure 2. Transfer Characteristics

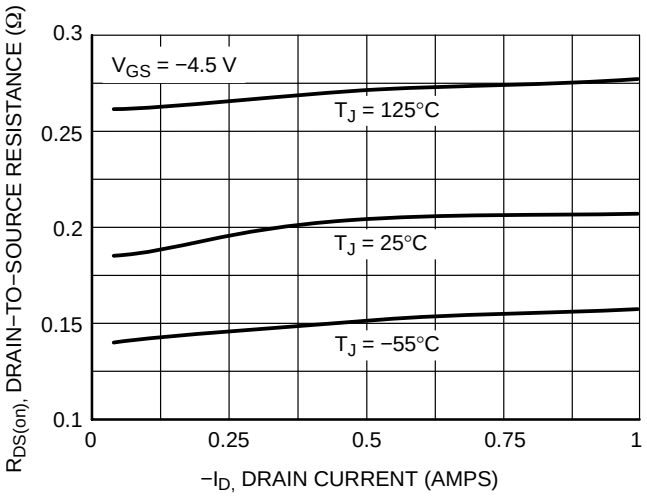


Figure 3. On−Resistance vs. Drain Current and Temperature

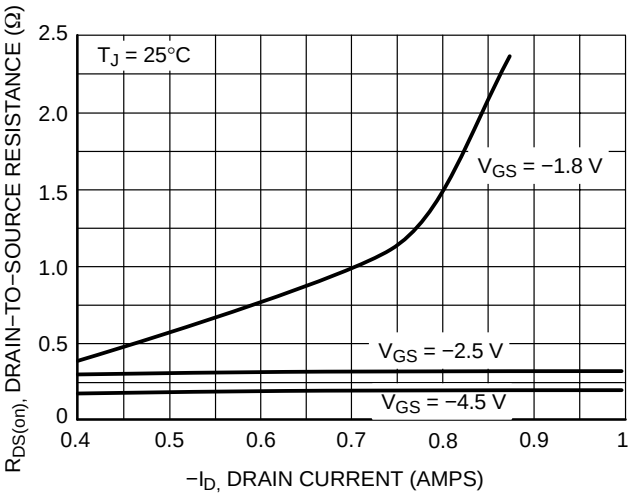


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

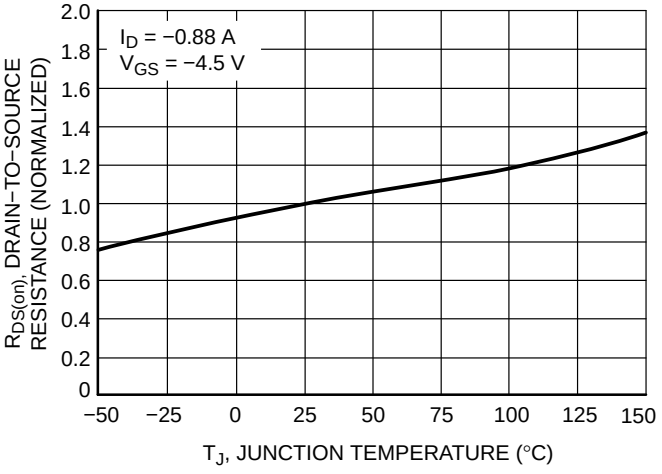


Figure 5. On−Resistance Variation with Temperature

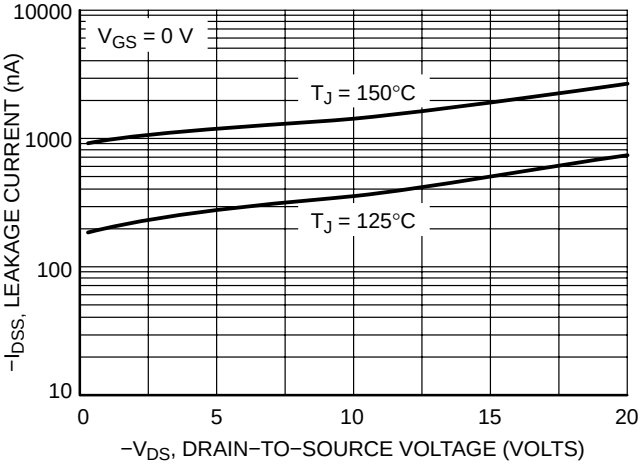


Figure 6. Drain−to−Source Leakage Current vs. Voltage

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

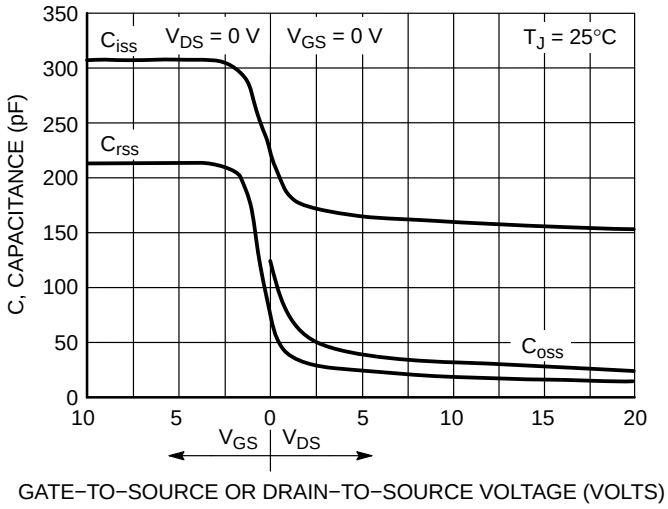


Figure 7. Capacitance Variation

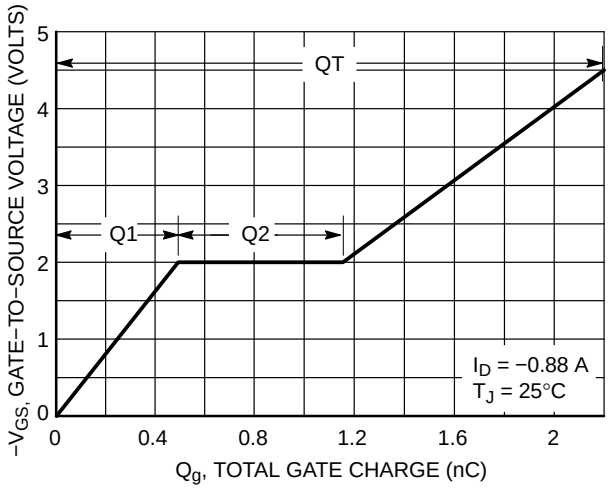


Figure 8. Gate−to−Source Voltage vs. Total Gate Charge

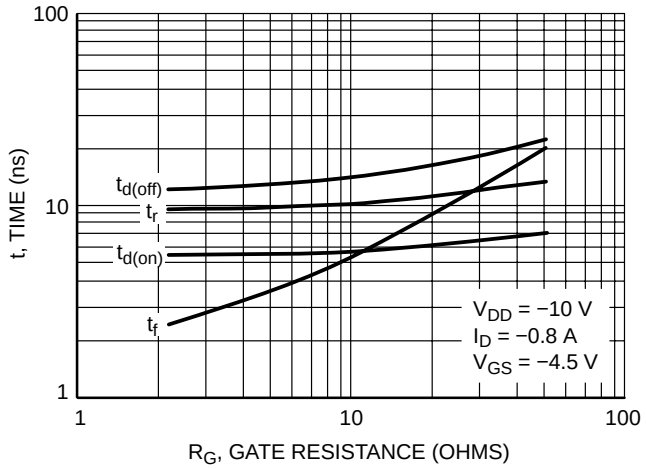


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

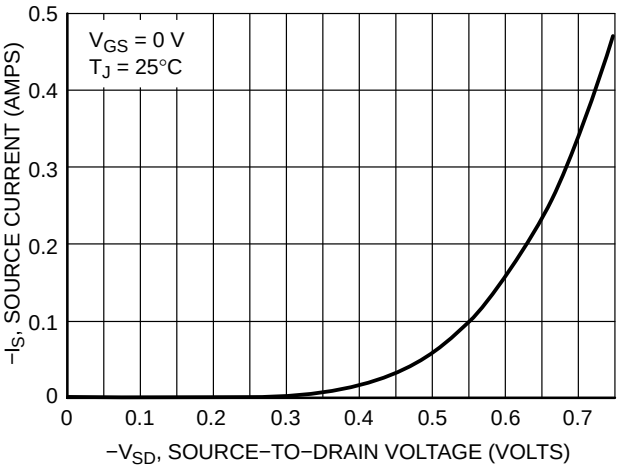
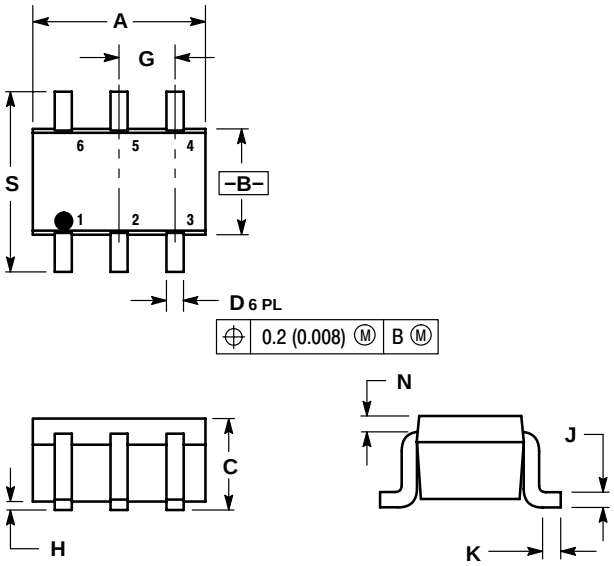


Figure 10. Diode Forward Voltage vs. Current

PACKAGE DIMENSIONS

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

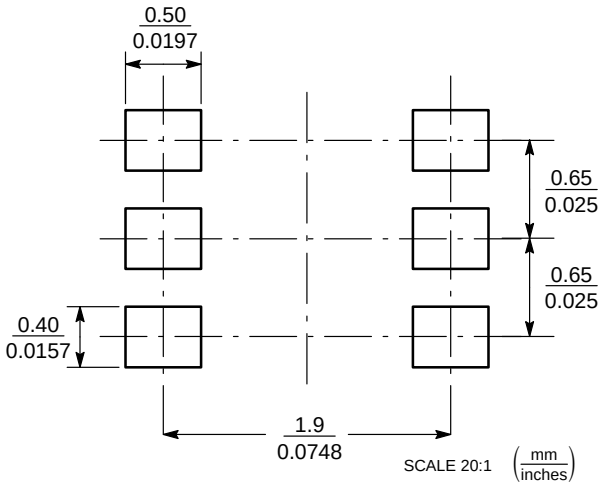


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	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

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.

PUBLICATION ORDERING INFORMATION

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