

NTA4151P

Small Signal MOSFET

-20 V, -540 mA, Single P-Channel,
Gate Zener, SC-75

Features

- Low $R_{DS(on)}$ for Higher Efficiency and Longer Battery Life
- Small Outline Package (1.6 x 1.6 mm)
- SC-75 Standard Gullwing Package
- ESD Protected Gate
- Pb-Free Package is Available*

Applications

- High Side Load Switch
- DC-DC Conversion
- Small Drive Circuits
- Battery Operated Systems such as Cell Phones, PDAs, Digital Cameras, etc.

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

Parameter		Symbol	Value	Units
Drain-to-Source Voltage		V_{DSS}	-20	V
Gate-to-Source Voltage		V_{GS}	± 6.0	V
Continuous Drain Current (Note 1)	Steady State	I_D	-540	mA
Power Dissipation (Note 1)	Steady State	P_D	150	mW
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	± 1000	mA
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Continuous Source Current (Body Diode)		I_S	-250	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction-to-Ambient - $t \leq 5$ s (Note 1)	$R_{\theta JA}$	715	

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. Surface mounted on FR4 board using 1 in sq. pad size (Cu area = 1.127 in sq. [1 oz] including traces).

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

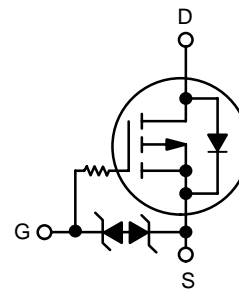


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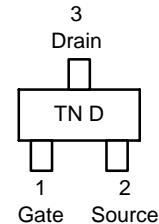
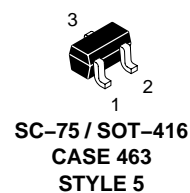
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
-20 V	0.26 Ω @ -4.5 V	-540 mA
	0.35 Ω @ -2.5 V	
	0.49 Ω @ -1.8 V	

P-Channel MOSFET



MARKING DIAGRAM & PIN ASSIGNMENT



TN = Specific Device Code
D = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTA4151PT1	SC-75	3000/Tape & Reel
NTA4151PT1G	SC-75 (Pb-Free)	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

NTA4151P

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

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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		-1.0	-100	nA
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±4.5 V		± 1.0	± 10	μA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = -250 μA	-0.45			V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -350 mA		0.26	0.36	Ω
		V _{GS} = -2.5 V, I _D = -300 mA		0.35	0.45	
		V _{GS} = -1.8 V, I _D = -150 mA		0.49	1.0	
Forward Transconductance	g _{FS}	V _{DS} = -10 V, I _D = -250 mA		0.4		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = -5.0 V		156		pF
Output Capacitance	C _{OSS}			28		
Reverse Transfer Capacitance	C _{RSS}			18		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DD} = -10 V, I _D = -0.3 A		2.1		nC
Threshold Gate Charge	Q _{G(TH)}			0.125		
Gate-to-Source Charge	Q _{GS}			0.325		
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} = -10 V, I _D = -200 mA, R _G = 10 Ω		8.0		ns
Rise Time	t _r			8.2		
Turn-Off Delay Time	t _{d(OFF)}			29		
Fall Time	t _f			20.4		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -250 mA		-0.72	-1.1	V
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- Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Switching characteristics are independent of operating junction temperatures.

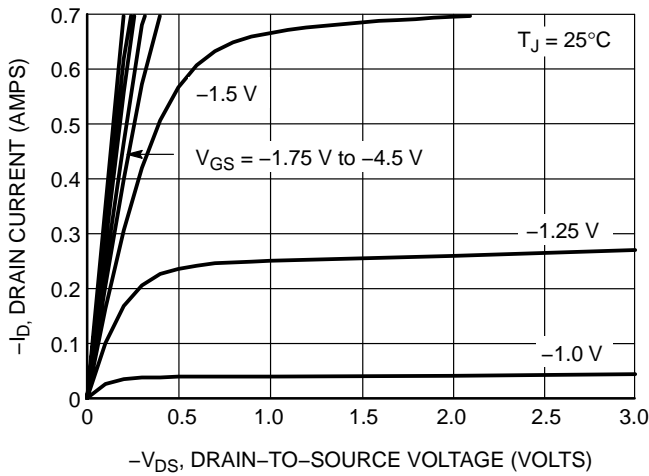


Figure 1. On-Region Characteristics

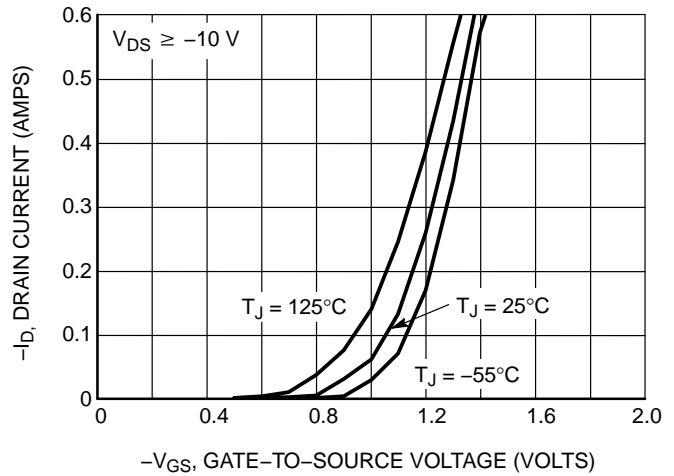


Figure 2. Transfer Characteristics

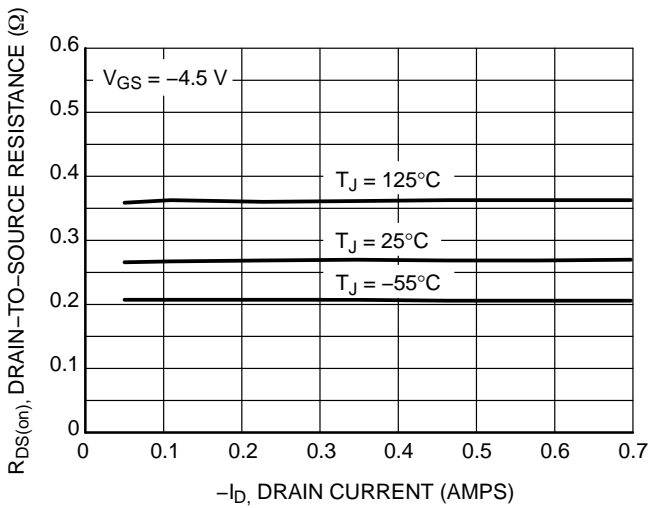


Figure 3. On-Resistance vs. Drain Current and Temperature

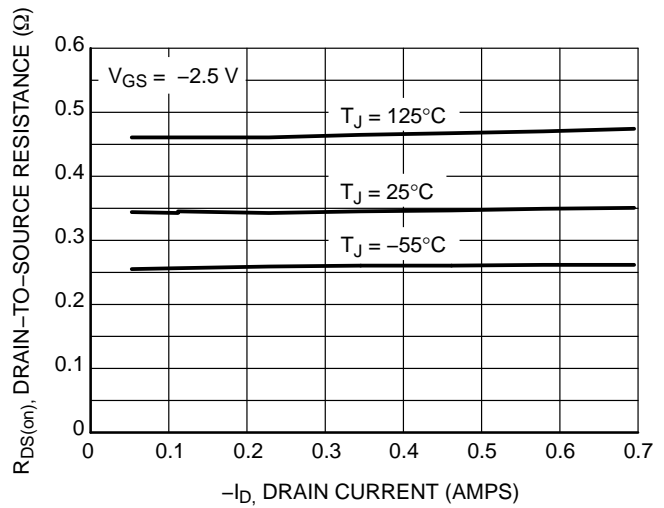


Figure 4. On-Resistance vs. Drain Current and Temperature

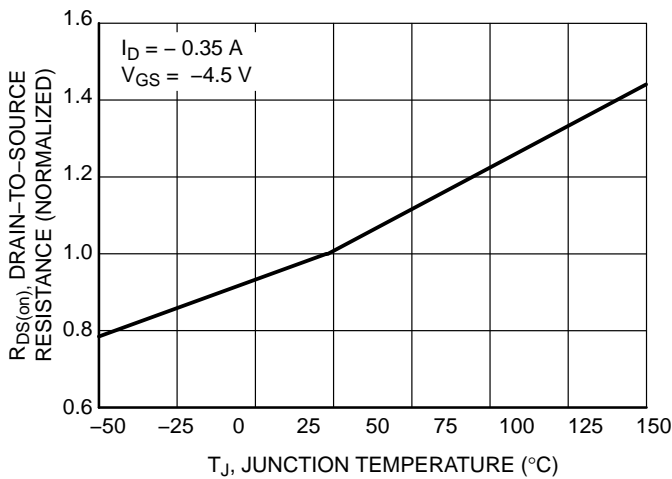


Figure 5. On-Resistance Variation with Temperature

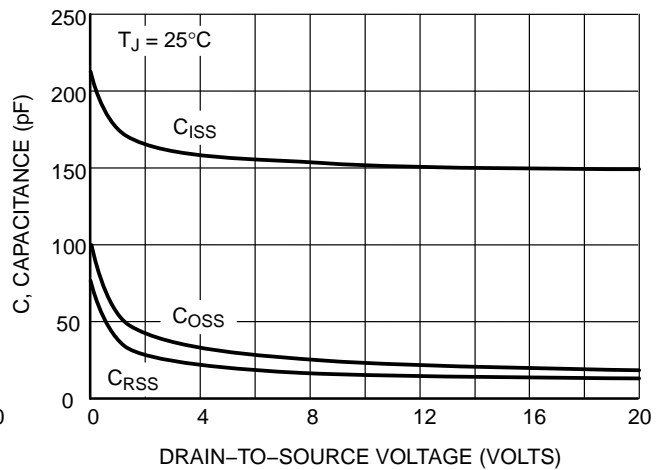


Figure 6. Capacitance Variation

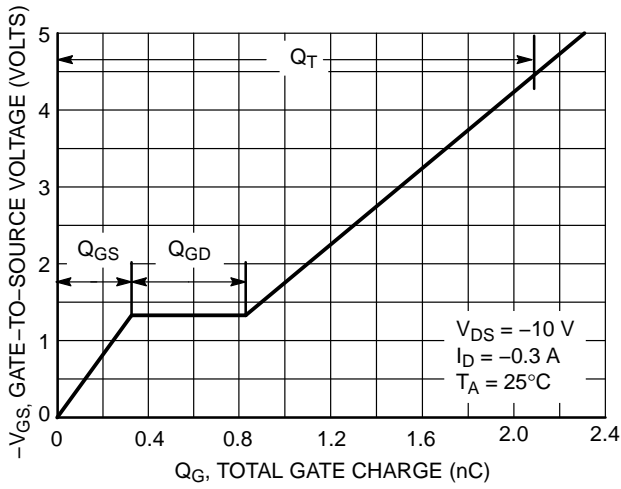


Figure 7. Gate-to-Source Voltage vs. Total Gate Charge

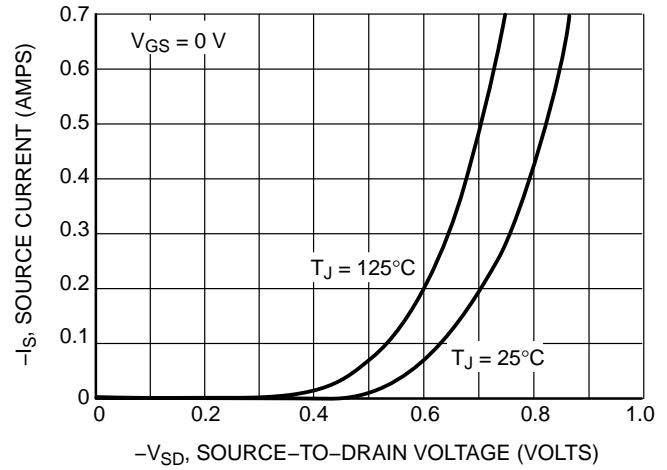


Figure 8. Diode Forward Voltage vs. Current

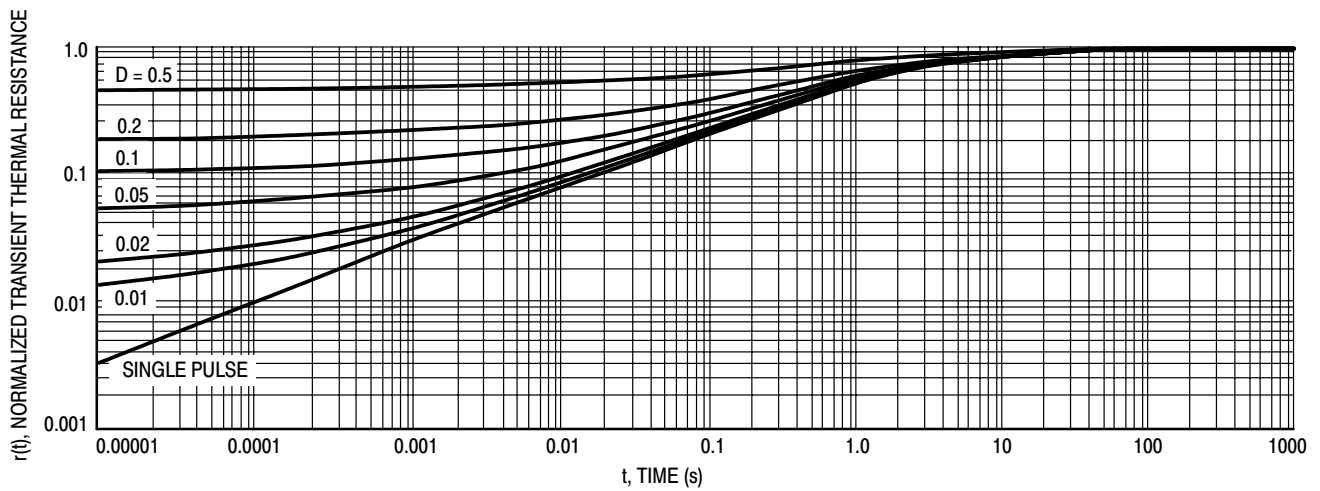


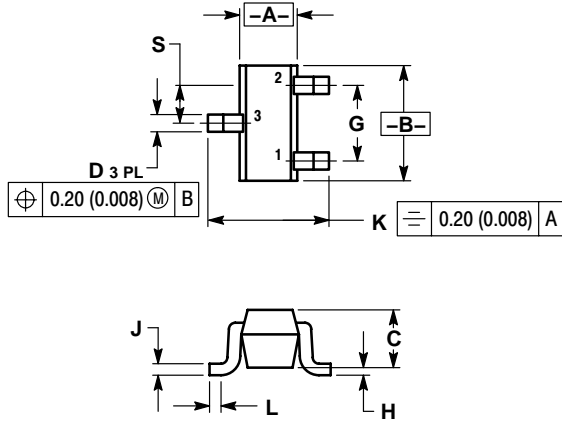
Figure 9. Normalized Thermal Response

NTA4151P

PACKAGE DIMENSIONS

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SC-75 / SOT-416
CASE 463-01
ISSUE C




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
B	1.40	1.80	0.055	0.071
C	0.60	0.90	0.024	0.035
D	0.15	0.30	0.006	0.012
G	1.00 BSC		0.039 BSC	
H	---	0.10	---	0.004
J	0.10	0.25	0.004	0.010
K	1.45	1.75	0.057	0.069
L	0.10	0.20	0.004	0.008
S	0.50 BSC		0.020 BSC	

STYLE 5:

- PIN 1. GATE
- SOURCE
- DRAIN

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