

NTZD3154N

Small Signal MOSFET

20 V, 540 mA, Dual N-Channel

Features

- Low $R_{DS(on)}$ Improving System Efficiency
- Low Threshold Voltage
- Small Footprint 1.6 x 1.6 mm
- ESD Protected Gate
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Load/Power Switches
- Power Supply Converter Circuits
- Battery Management
- Cell Phones, Digital Cameras, PDAs, Pagers, etc.

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

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DSS}	20	V
Gate-to-Source Voltage		V_{GS}	± 7.0	V
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$ 540	mA
			$T_A = 85^\circ\text{C}$ 390	
Power Dissipation (Note 1)	Steady State	P_D	250	mW
Continuous Drain Current (Note 1)	$t \leq 5\text{ s}$	I_D	$T_A = 25^\circ\text{C}$ 570	mA
			$T_A = 85^\circ\text{C}$ 410	
Power Dissipation (Note 1)	$t \leq 5\text{ s}$	P_D	280	mW
Pulsed Drain Current	$t_p = 10\text{ }\mu\text{s}$	I_{DM}	1.5	A
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Source Current (Body Diode)		I_S	350	mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	500	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 5\text{ s}$ (Note 1)		447	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

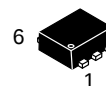
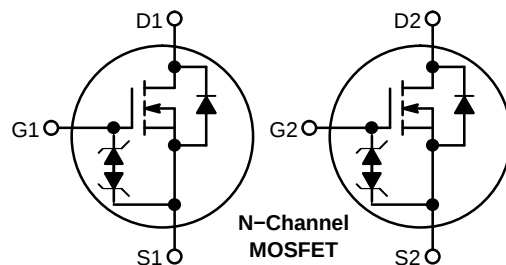
1. Surface mounted on FR4 board using 1 in sq pad size (Cu. area = 1.127 in sq [1 oz] including traces).



ON Semiconductor®

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$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max (Note 1)
20	400 m Ω @ 4.5 V	540 mA
	500 m Ω @ 2.5 V	
	700 m Ω @ 1.8 V	



SOT-563-6
CASE 463A

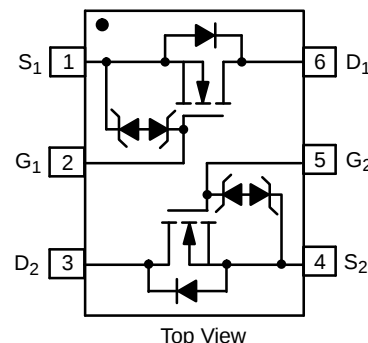
TV = Specific Device Code
M = Date Code
■ = Pb-Free Package

(Note: Microdot may be in either location)

MARKING DIAGRAM



PINOUT: SOT-563



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

NTZD3154N

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20	–	–	V	
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	–	–	14	–	mV/°C	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$ $V_{DS} = 16\text{ V}$	$T_J = 25^\circ\text{C}$	–	–	1.0	μA
			$T_J = 125^\circ\text{C}$	–	–	5.0	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 4.5\text{ V}$	–	–	± 5.0	μA	

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	0.45	–	1.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	–	–	2.0	–	mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 540\text{ mA}$	–	0.4	0.55	Ω
		$V_{GS} = 2.5\text{ V}, I_D = 500\text{ mA}$	–	0.5	0.7	
		$V_{GS} = 1.8\text{ V}, I_D = 350\text{ mA}$	–	0.7	0.9	
Forward Transconductance	g_{FS}	$V_{DS} = 10\text{ V}, I_D = 540\text{ mA}$	–	1.0	–	S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 16\text{ V}$	–	80	150	pF
Output Capacitance	C_{OSS}		–	13	25	
Reverse Transfer Capacitance	C_{RSS}		–	10	20	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}; I_D = 540\text{ mA}$	–	1.5	2.5	nC
Threshold Gate Charge	$Q_{G(TH)}$		–	0.1	–	
Gate-to-Source Charge	Q_{GS}		–	0.2	–	
Gate-to-Drain Charge	Q_{GD}		–	0.35	–	

SWITCHING CHARACTERISTICS, $V_{GS} = V$ (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DD} = 10\text{ V}, I_D = 540\text{ mA},$ $R_G = 10\text{ }\Omega$	–	6.0	–	ns
Rise Time	t_r		–	4.0	–	
Turn-Off Delay Time	$t_{d(OFF)}$		–	16	–	
Fall Time	t_f		–	8.0	–	

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V},$ $I_S = 350\text{ mA}$	$T_J = 25^\circ\text{C}$	–	0.7	1.2	V
			$T_J = 125^\circ\text{C}$	–	0.6	–	
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}, I_S = 350\text{ mA}$	–	6.5	–	ns	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- Surface-mounted on FR4 board using 1 in. sq. pad size (Cu. area = 1.127 in sq [1 oz] including traces).
- Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Switching characteristics are independent of operating junction temperatures.

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

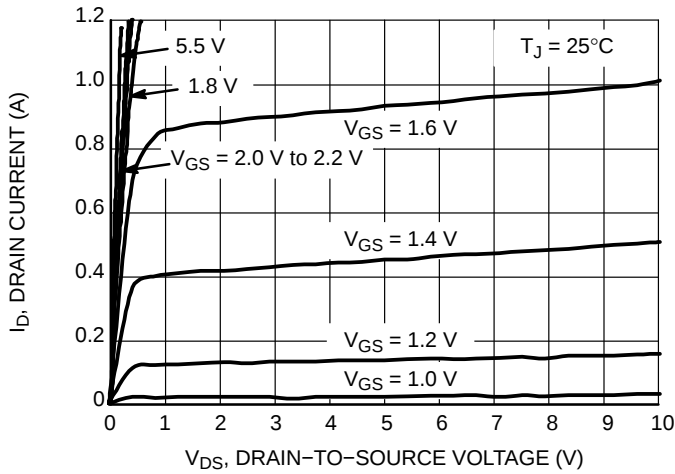


Figure 1. On-Region Characteristics

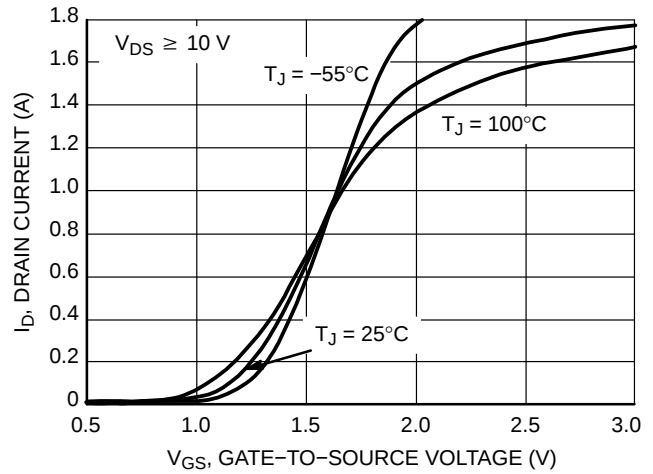


Figure 2. Transfer Characteristics

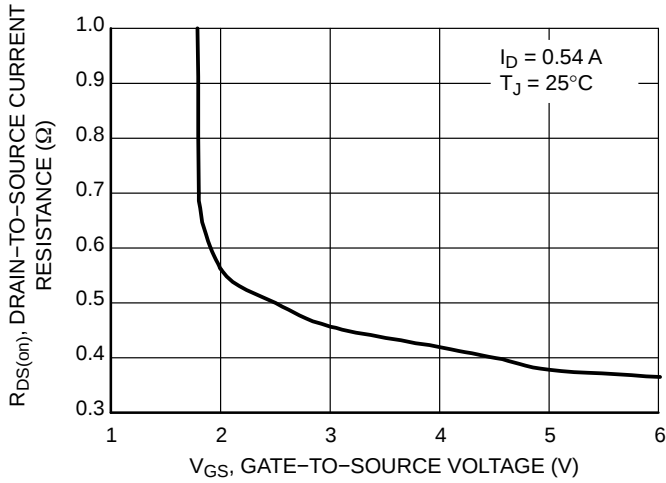


Figure 3. On-Resistance versus Gate-to-Source Voltage

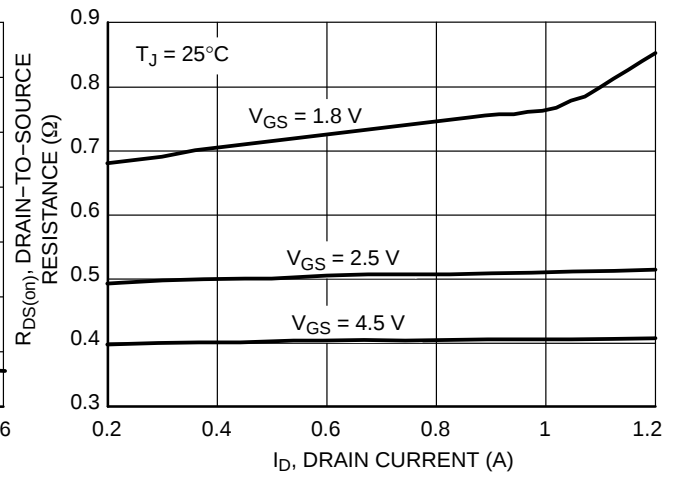


Figure 4. On-Resistance versus Drain Current and Gate Voltage

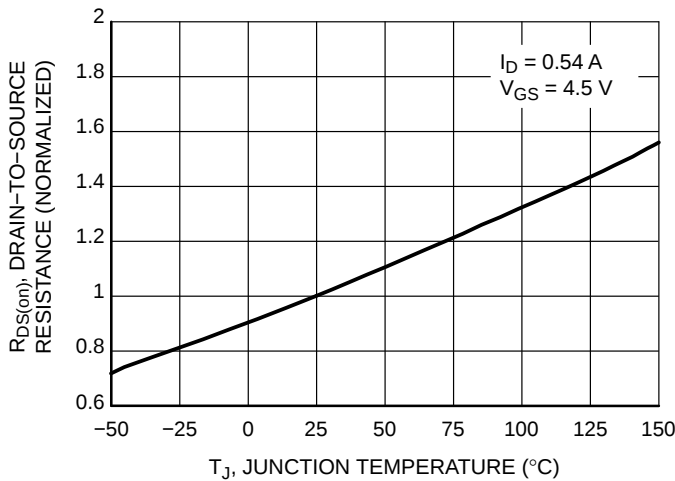


Figure 5. On-Resistance Variation with Temperature

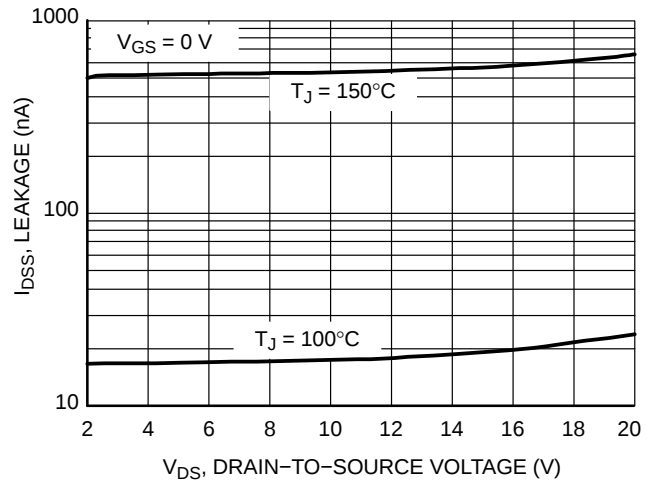
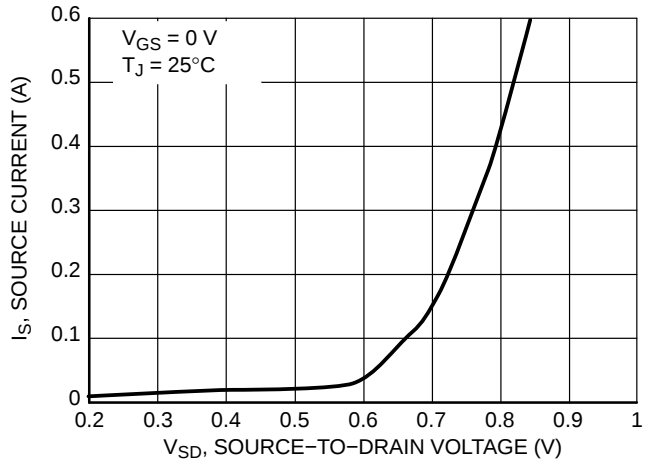
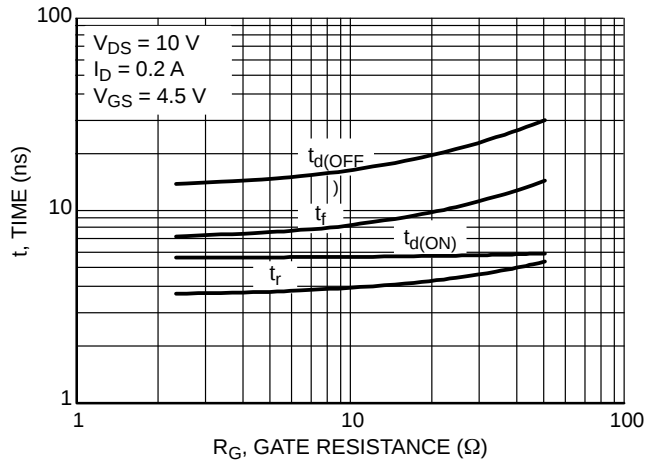
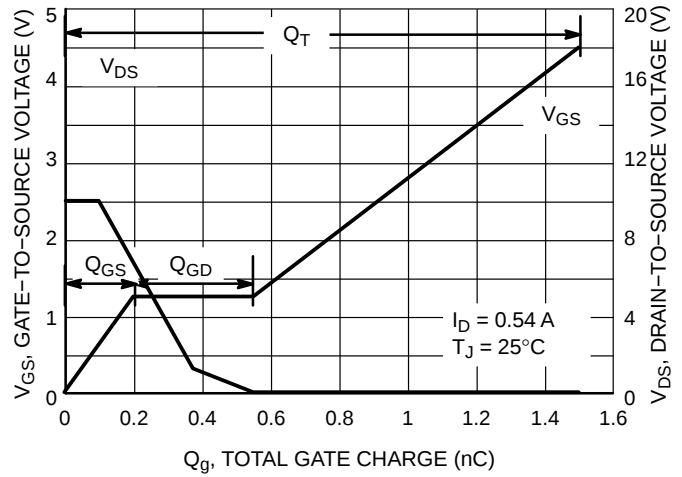
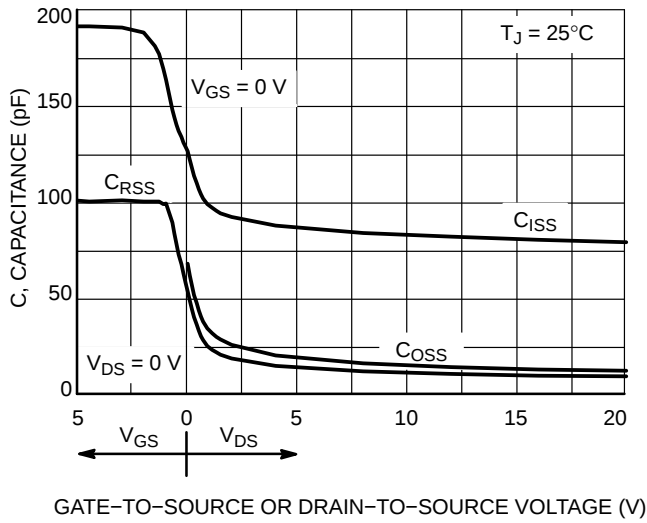


Figure 6. Drain-to-Source Leakage Current versus Voltage

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



ORDERING INFORMATION

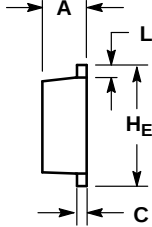
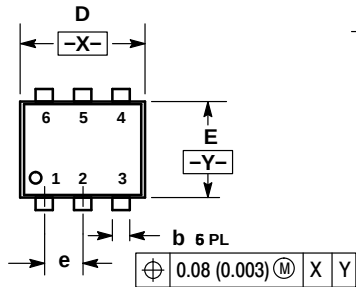
Device	Package	Shipping
NTZD3154NT1G	SOT-563 (Pb-Free)	4000 / Tape & Reel
NTZD3154NT1H		
NTZD3154NT2G		
NTZD3154NT2H		
NTZD3154NT5G		8000 / Tape & Reel
NTZD3154NT5H		

†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.

NTZD3154N

PACKAGE DIMENSIONS

SOT-563, 6 LEAD CASE 463A ISSUE F

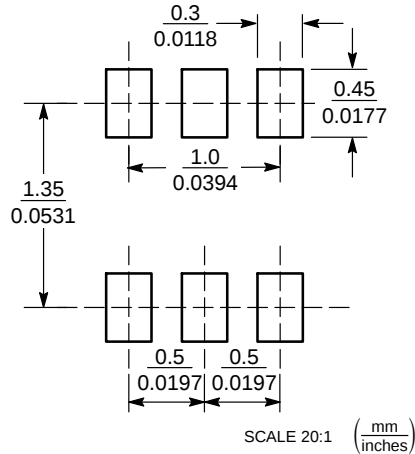


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.021	0.023
b	0.17	0.22	0.27	0.007	0.009	0.011
C	0.08	0.12	0.18	0.003	0.005	0.007
D	1.50	1.60	1.70	0.059	0.062	0.066
E	1.10	1.20	1.30	0.043	0.047	0.051
e	0.5 BSC			0.02 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	1.50	1.60	1.70	0.059	0.062	0.066

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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