

NTK3134N

Power MOSFET

20 V, 890 mA, Single N-Channel with ESD Protection, SOT-723

Features

- N-Channel Switch with Low $R_{DS(on)}$
- 44% Smaller Footprint and 38% Thinner than SC89
- Low Threshold Levels Allowing 1.5 V $R_{DS(on)}$ Rating
- Operated at Low Logic Level Gate Drive
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Load/Power Switching
- Interface Switching
- Logic Level Shift
- Battery Management for Ultra Small Portable Electronics

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}	± 6	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	890	mA
		$T_A = 85^\circ\text{C}$		640	
	$t \leq 5\text{ s}$	$T_A = 25^\circ\text{C}$		990	
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	450	mW
		$t \leq 5\text{ s}$		550	
Continuous Drain Current (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	I_D	750	mA
		$T_A = 85^\circ\text{C}$		540	
Power Dissipation (Note 2)		$T_A = 25^\circ\text{C}$	P_D	310	mW
Pulsed Drain Current	$t_p = 10\text{ }\mu\text{s}$		I_{DM}	1.8	A
Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^\circ\text{C}$

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)
2. Surface mounted on FR4 board using the minimum recommended pad size

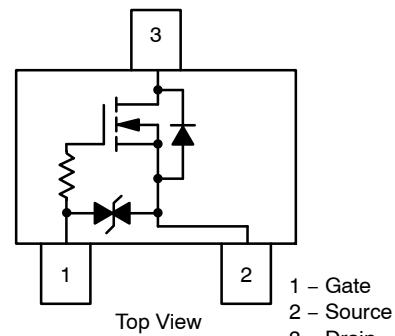


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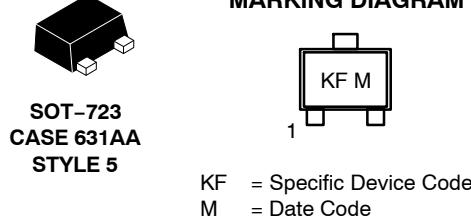
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
20 V	0.20 Ω @ 4.5 V	890 mA
	0.26 Ω @ 2.5 V	790 mA
	0.43 Ω @ 1.8 V	700 mA
	0.56 Ω @ 1.5 V	200 mA

SOT-723 (3-LEAD)



MARKING DIAGRAM



ORDERING INFORMATION

Device	Package	Shipping [†]
NTK3134NT1G	SOT-723*	4000 / Tape & Reel
NTK3134NT1H		
NTK3134NT5G	SOT-723*	8000 / Tape & Reel
NTK3134NT5H		

[†]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.

*These packages are inherently Pb-Free.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	280	$^{\circ}\text{C/W}$
Junction-to-Ambient – $t = 5 \text{ s}$ (Note 3)	$R_{\theta JA}$	228	
Junction-to-Ambient – Steady State Minimum Pad (Note 4)	$R_{\theta JA}$	400	

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

4. Surface mounted on FR4 board using the minimum recommended pad size

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(\text{BR})\text{DSS}/T_J}$	$I_D = 250 \mu\text{A}$, Reference to 25°C		18		$\text{mV/}^{\circ}\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{GS}} = 0 \text{ V}$, $V_{\text{DS}} = 16 \text{ V}$	$T_J = 25^{\circ}\text{C}$		1.0	μA
			$T_J = 125^{\circ}\text{C}$		2.0	
Gate-to-Source Leakage Current	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}$, $V_{\text{GS}} = \pm 4.5 \text{ V}$			± 0.5	μA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{\text{GS}(\text{TH})}$	$V_{\text{GS}} = V_{\text{DS}}$, $I_D = 250 \mu\text{A}$	0.45		1.2	V
Negative Threshold Temperature Coefficient	$V_{\text{GS}(\text{TH})/T_J}$			2.4		$\text{mV/}^{\circ}\text{C}$
Drain-to-Source On Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 4.5 \text{ V}$, $I_D = 890 \text{ mA}$		0.20	0.35	Ω
		$V_{\text{GS}} = 2.5 \text{ V}$, $I_D = 780 \text{ mA}$		0.26	0.45	
		$V_{\text{GS}} = 1.8 \text{ V}$, $I_D = 700 \text{ mA}$		0.43	0.65	
		$V_{\text{GS}} = 1.5 \text{ V}$, $I_D = 200 \text{ mA}$		0.56	1.2	
Forward Transconductance	g_{FS}	$V_{\text{DS}} = 10 \text{ V}$, $I_D = 800 \text{ mA}$		1.6		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{\text{GS}} = 0 \text{ V}$, $f = 1 \text{ MHz}$, $V_{\text{DS}} = 16 \text{ V}$		79	120	pF
Output Capacitance	C_{OSS}			13	20	
Reverse Transfer Capacitance	C_{RSS}			9.0	15	

SWITCHING CHARACTERISTICS, $V_{\text{GS}} = 4.5 \text{ V}$ (Note 6)

Turn On Delay Time	$t_{\text{d}(\text{ON})}$	$V_{\text{GS}} = 4.5 \text{ V}$, $V_{\text{DS}} = 10 \text{ V}$, $I_D = 500 \text{ mA}$, $R_G = 10 \Omega$		6.7		ns
Rise Time	t_r			4.8		
TurnOff Delay Time	$t_{\text{d}(\text{OFF})}$			17.3		
Fall Time	t_f			7.4		

DRAIN SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{\text{GS}} = 0 \text{ V}$, $I_S = 350 \text{ mA}$	$T_J = 25^{\circ}\text{C}$		0.75	1.2	V
Reverse Recovery Time	t_{RR}	$V_{\text{GS}} = 0 \text{ V}$, $dI_{\text{SD}}/dt = 100 \text{ A}/\mu\text{s}$, $I_S = 1.0 \text{ A}$, $V_{\text{DD}} = 20 \text{ V}$			8.1		ns
Charge Time	t_a				6.4		
Discharge Time	t_b				1.7		
Reverse Recovery Charge	Q_{RR}				3.0		nC

5. Pulse Test: pulse width = 300 μs , duty cycle = 2%

6. Switching characteristics are independent of operating junction temperatures

TYPICAL CHARACTERISTICS

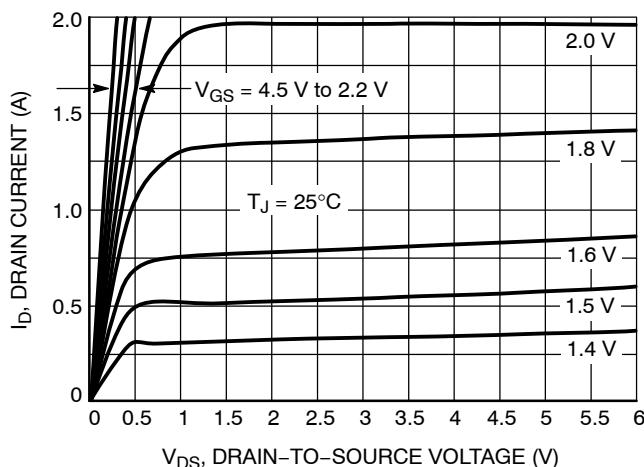


Figure 1. On-Region Characteristics

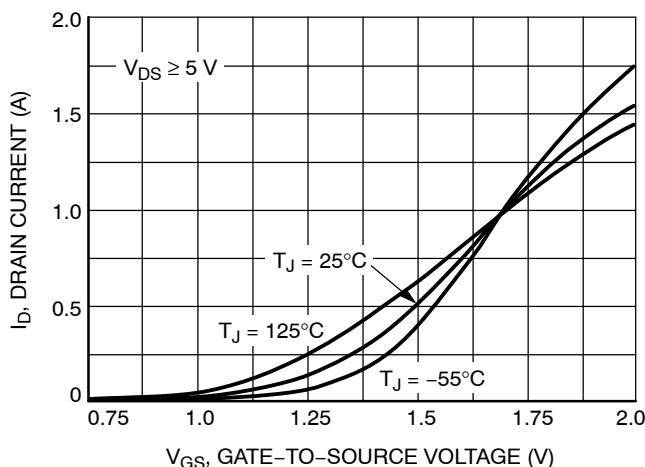


Figure 2. Transfer Characteristics

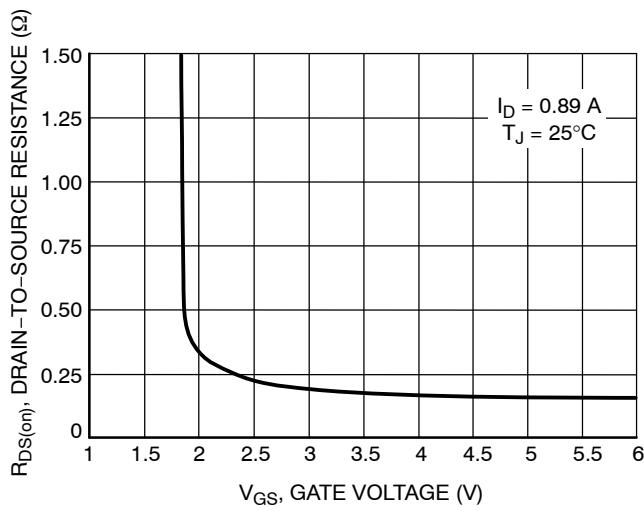


Figure 3. On-Resistance vs. Gate-to-Source Voltage

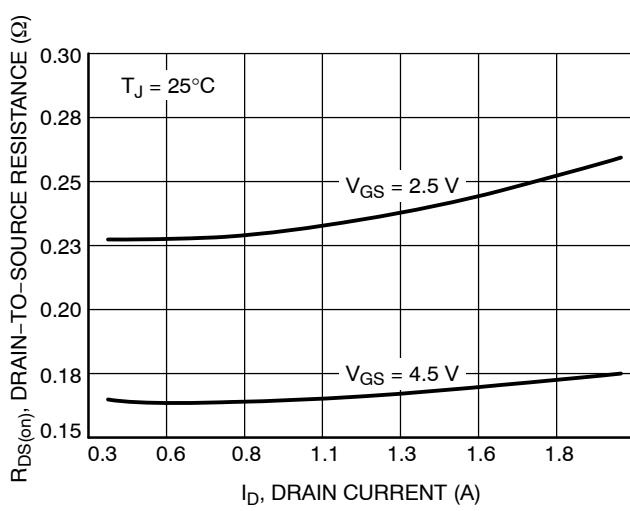


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

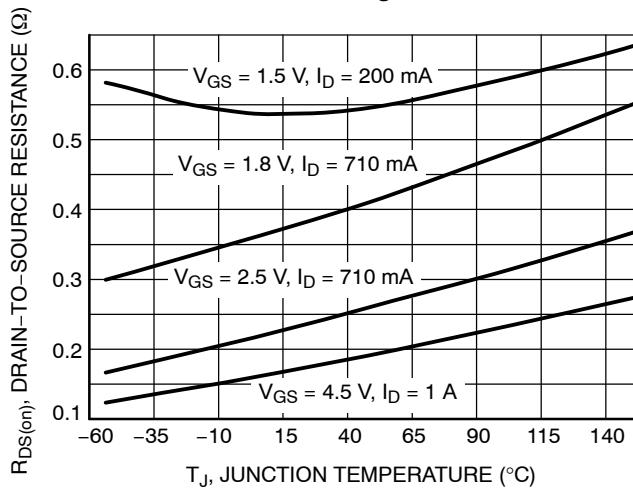


Figure 5. On-Resistance Variation with Temperature

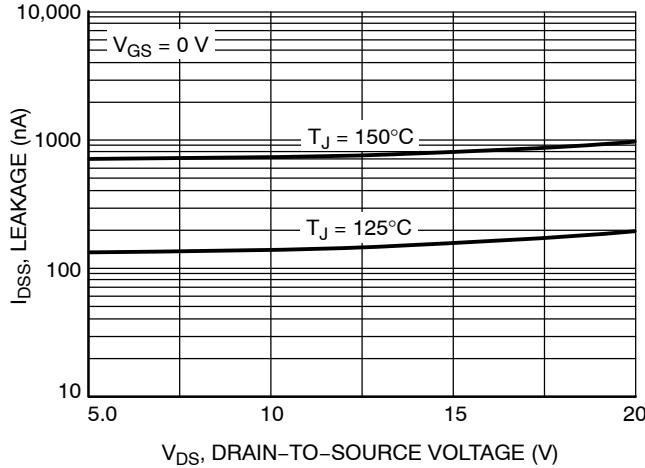


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

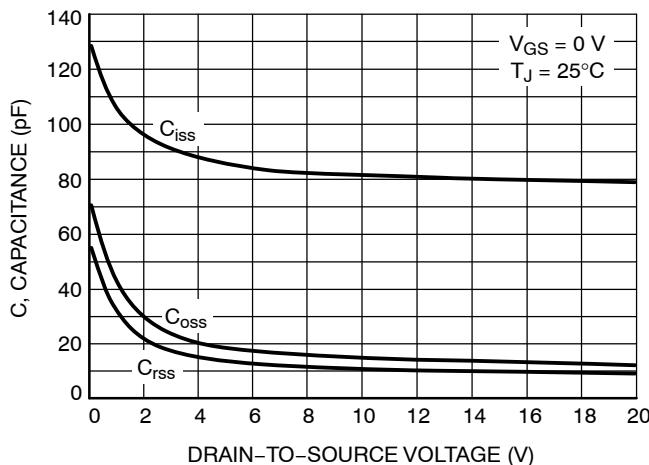


Figure 7. Capacitance Variation

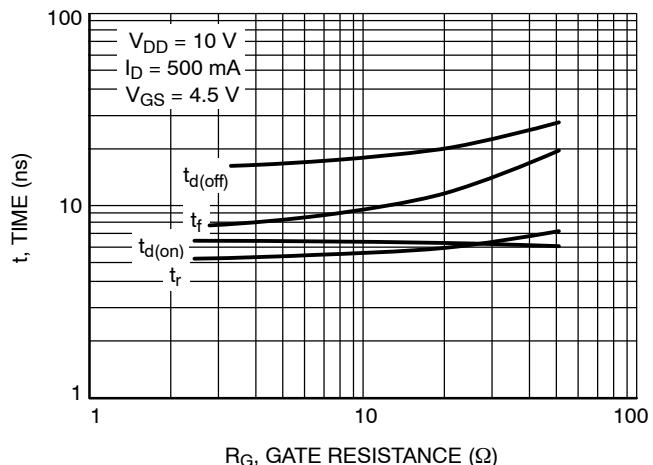


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

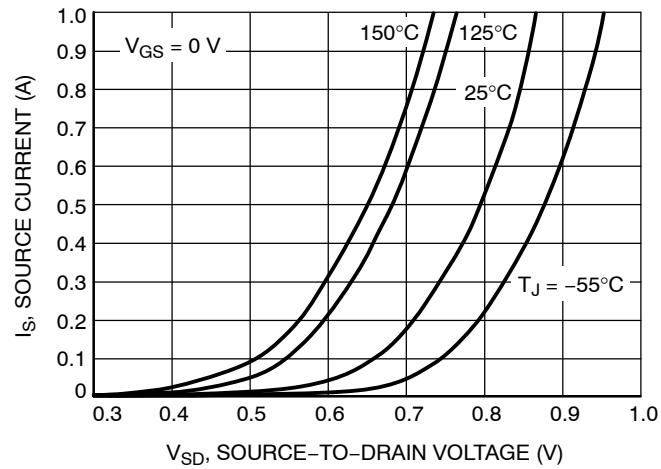
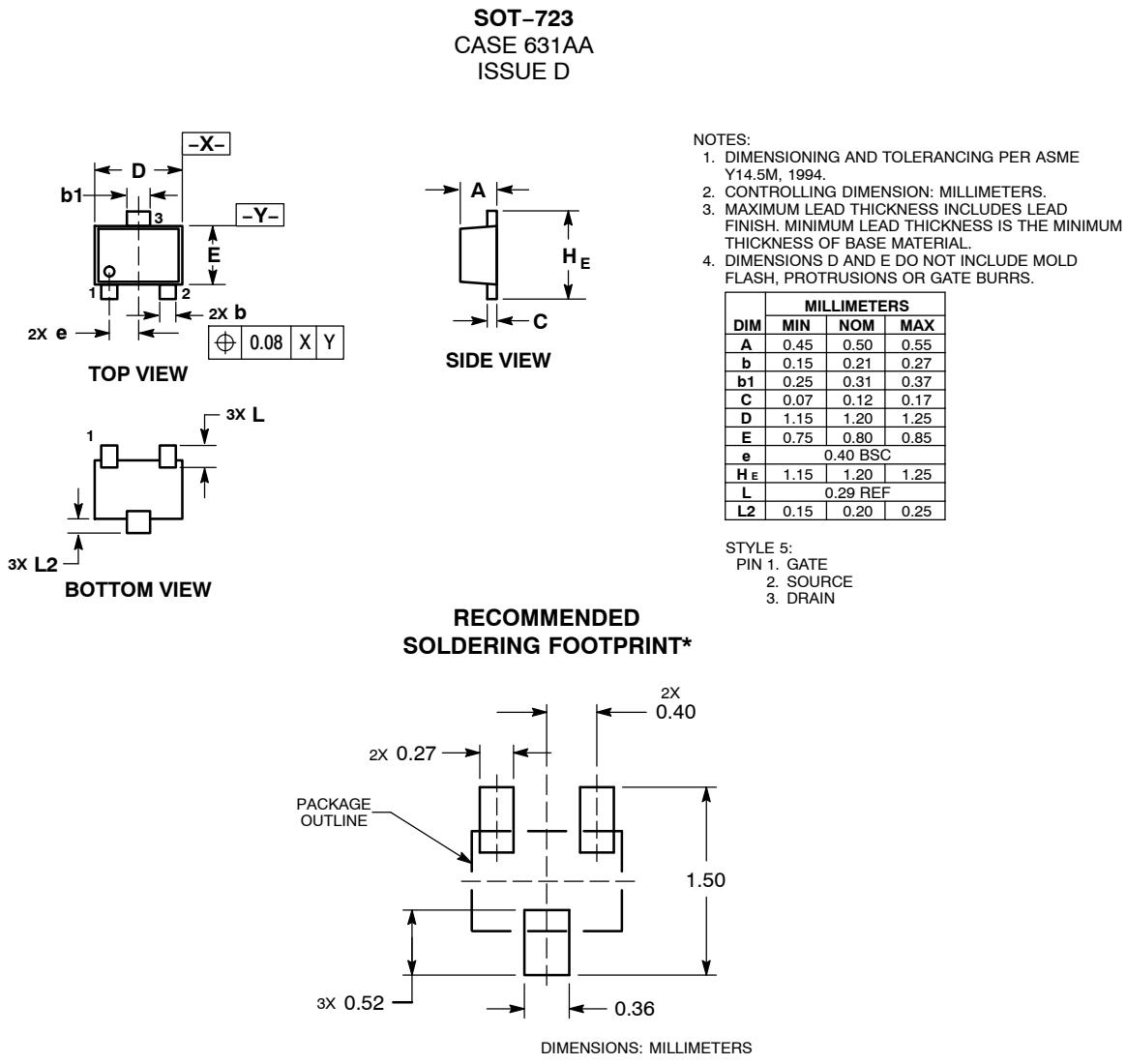


Figure 9. Diode Forward Voltage vs. Current

NTK3134N

PACKAGE DIMENSIONS



*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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