NTK3134N

Power MOSFET

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

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Features

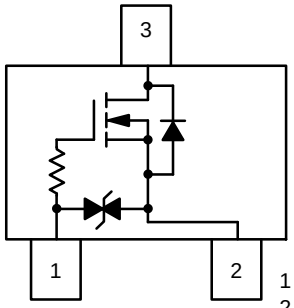
- N−Channel Switch with Low $R_{DS(on)}$
- 44% Smaller Footprint and 38% Thinner than SC89
- Low Threshold Levels Allowing 1.5 V $R_{DS(on)}$ Rating
- Operated at Low Logic Level Gate Drive
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

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

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



Top View

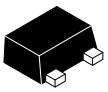
1 − Gate
2 − Source
3 − Drain

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

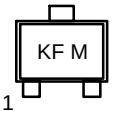
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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



SOT−723
CASE 631AA
STYLE 5

MARKING DIAGRAM



KF = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTK3134NT1G	SOT−723*	4000 / Tape & Reel
NTK3134NT5G	SOT−723*	8000 / 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.

*These packages are inherently Pb−Free.

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THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction−to−Ambient – Steady State (Note 3)	$R_{\theta JA}$	280	°C/W
Junction−to−Ambient – t = 5 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°C unless otherwise specified)

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
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA, Reference to 25°C			18		mV/°C
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			2.0	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±4.5 V				±0.5	μA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		0.45		1.2	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				2.4		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 890 mA			0.20	0.35	Ω
		V_{GS} = 2.5 V, I_D = 780 mA			0.26	0.45	
		V_{GS} = 1.8 V, I_D = 700 mA			0.43	0.65	
		V_{GS} = 1.5 V, I_D = 200 mA			0.56	1.2	
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 800 mA			1.6		S
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 16 V			79	120	pF
Output Capacitance	C_{OSS}				13	20	
Reverse Transfer Capacitance	C_{RSS}				9.0	15	
SWITCHING CHARACTERISTICS, V_{GS} = 4.5 V (Note 6)							
Turn On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 500 mA, R_G = 10 Ω			6.7		ns
Rise Time	t_r				4.8		
TurnOff Delay Time	$t_{d(OFF)}$				17.3		
Fall Time	t_f				7.4		
DRAIN SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 350 mA	T_J = 25°C		0.75	1.2	V
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, d_{ISD}/d_t = 100 A/μs, I_S = 1.0 A, V_{DD} = 20 V			8.1		ns
Charge Time	t_a				6.4		
Discharge Time	t_b				1.7		
Reverse Recovery Charge	Q_{RR}				3.0		nC

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.

5. Pulse Test: pulse width = 300 μs, duty cycle = 2%
6. Switching characteristics are independent of operating junction temperatures

TYPICAL CHARACTERISTICS

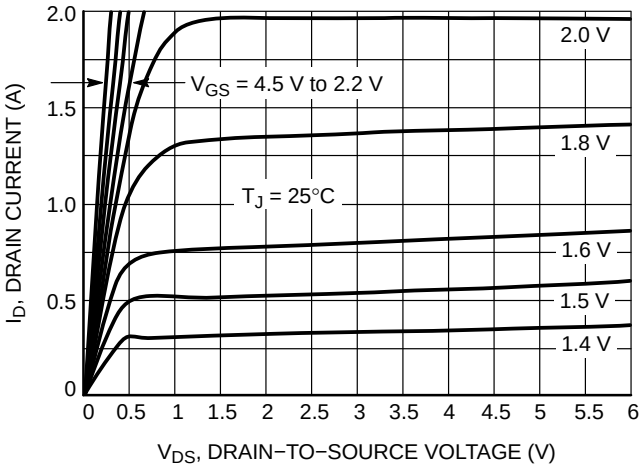


Figure 1. On−Region Characteristics

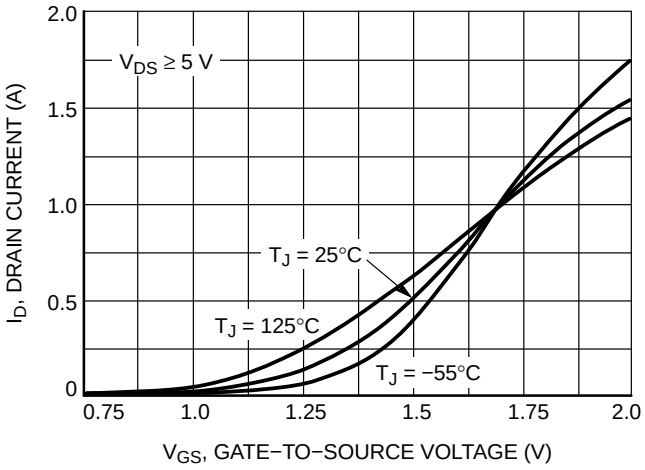


Figure 2. Transfer Characteristics

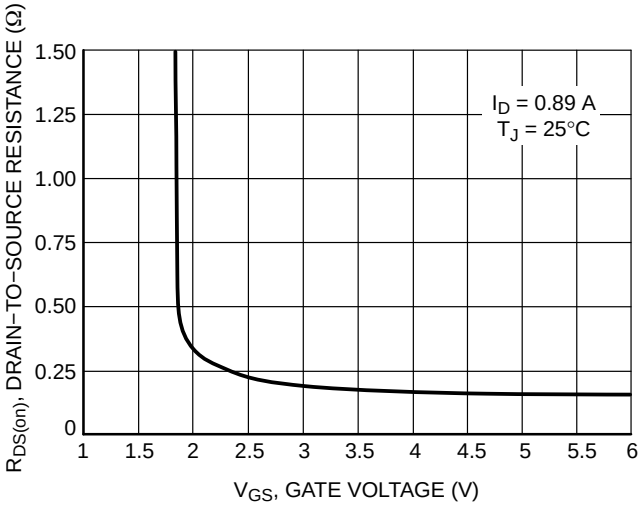


Figure 3. On−Resistance vs. Gate−to−Source Voltage

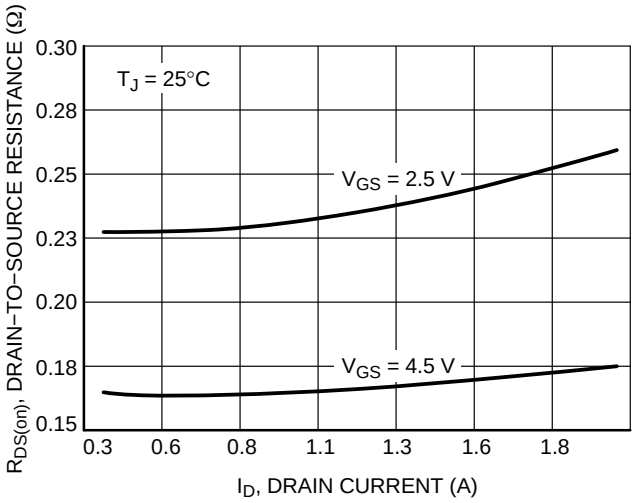


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

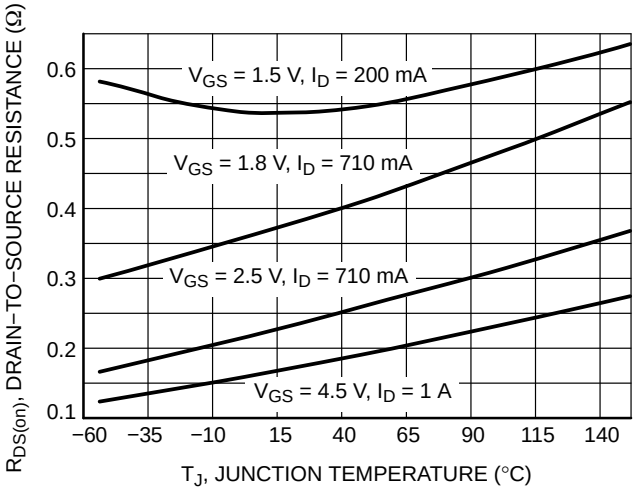


Figure 5. On−Resistance Variation with Temperature

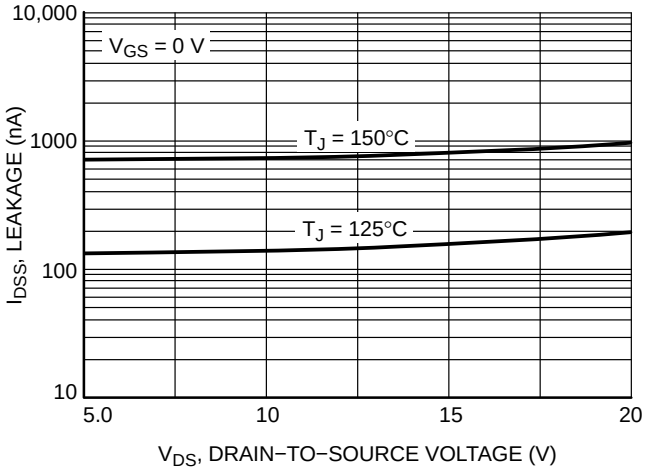


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

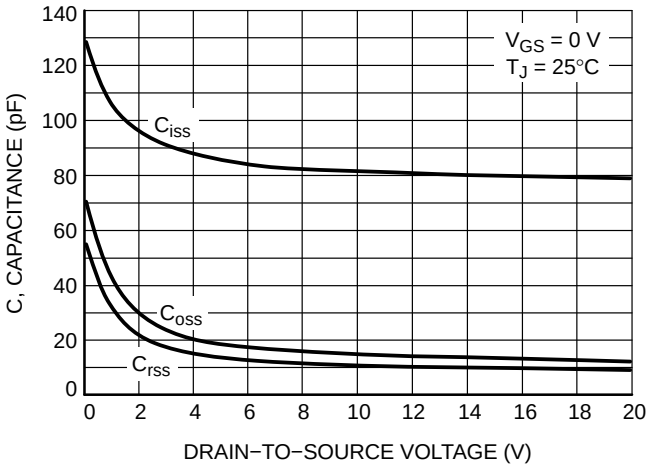


Figure 7. Capacitance Variation

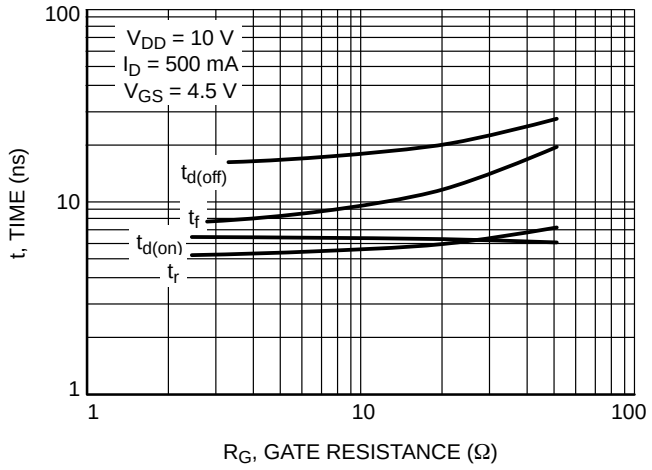


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

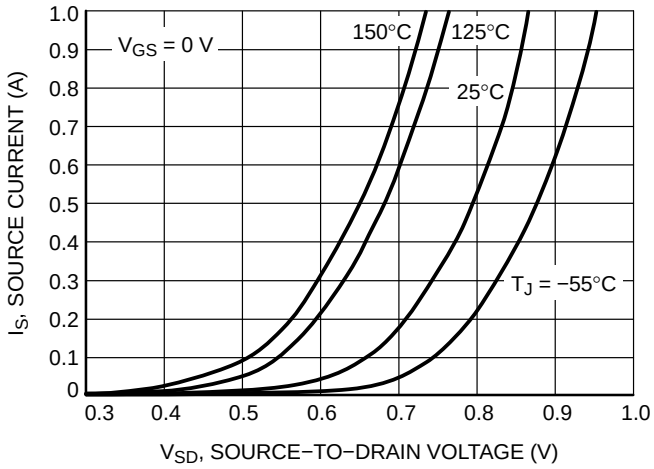
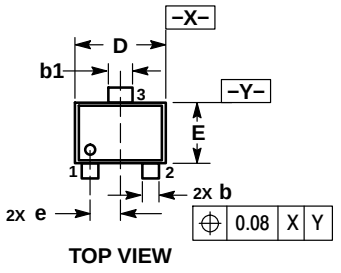


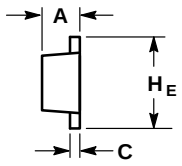
Figure 9. Diode Forward Voltage vs. Current

PACKAGE DIMENSIONS

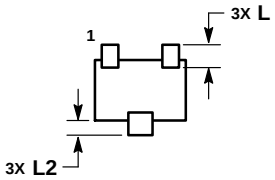
SOT−723
CASE 631AA
ISSUE D



TOP VIEW



SIDE VIEW



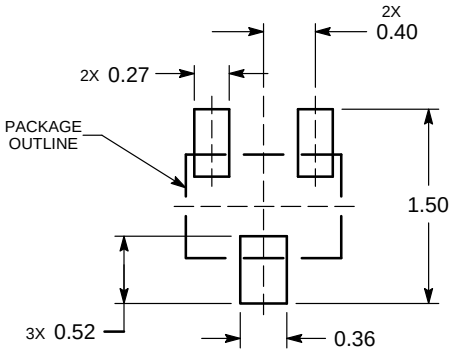
BOTTOM VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

	MILLIMETERS		
DIM	MIN	NOM	MAX
A	0.45	0.50	0.55
b	0.15	0.21	0.27
b1	0.25	0.31	0.37
C	0.07	0.12	0.17
D	1.15	1.20	1.25
E	0.75	0.80	0.85
e	0.40 BSC		
H E	1.15	1.20	1.25
L	0.29 REF		
L2	0.15	0.20	0.25

STYLE 5:
PIN 1. GATE
2. SOURCE
3. DRAIN

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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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