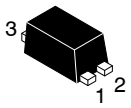
MOSFET – Single P-Channel, Small Signal, SOT-1123, 1.0 x 0.6 mm
-20 V, -200 mA

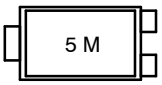
NTNUS3171PZ

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D Max
−20 V	3.5 Ω @ −4.5 V	−0.20 A
	4.0 Ω @ −2.5 V	
	5.5 Ω @ −1.8 V	
	7.0 Ω @ −1.5 V	



SOT−1123
CASE 524AA

MARKING DIAGRAM

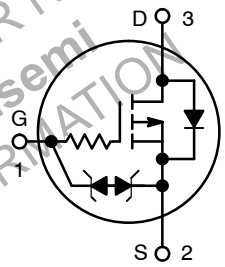


5 = Specific Device Code (Rotated 90° Clockwise)
M = Date Code

Features
- Single P−Channel MOSFET
- Offers a Low $R_{DS(on)}$ Solution in the Ultra Small 1.0 x 0.6 mm Package
- 1.5 V Gate Voltage Rating
- Ultra Thin Profile (< 0.5 mm) Allows It to Fit Easily into Extremely Thin Environments such as Portable Electronics.
- This is a Pb−Free Device

Applications
- High Side Switch
- High Speed Interfacing
- Optimized for Power Management in Ultra Portable Equipment

P−Channel MOSFET



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

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	−20	V
Gate−to−Source Voltage			V_{GS}	±8	V
Continuous Drain Current (Note 1)	Steady State	T_A = 25°C	I_D	−150	mA
		T_A = 85°C		−110	
	t ≤ 5 s	T_A = 25°C		−200	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	−125	mW
	t ≤ 5 s			−200	
Pulsed Drain Current		t_p = 10 μs	I_{DM}	−600	mA
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
Source Current (Body Diode) (Note 2)			I_S	−200	mA
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 the minimum recommended pad size, or 2 mm^2, 1 oz Cu.
2. Pulse Test: pulse width ≤300 μs, duty cycle ≤2%

ORDERING INFORMATION

Device	Package	Shipping†
NTNUS3171PZT5G	SOT−1123 (Pb−Free)	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.

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction−to−Ambient − Steady State (Note 3)	$R_{\theta JA}$	1000	°C/W
Junction−to−Ambient − t = 5 s (Note 3)	$R_{\theta JA}$	600	

3. Surface−mounted on FR4 board using the minimum recommended pad size, or 2 mm^2, 1 oz Cu.

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
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = −5.0 V	T_J = 25°C			−50	nA
		V_{GS} = 0 V, V_{DS} = −5.0 V	T_J = 85°C			−100	
		V_{GS} = 0 V, V_{DS} = −16 V	T_J = 25°C			−200	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±5.0 V				±100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = −250 μA		−0.4	−0.7	−1.0	V
Drain−to−Source On Resistance	$R_{DS(ON)}$	V_{GS} = −4.5 V, I_D = −100 mA			2.0	3.5	Ω
		V_{GS} = −2.5 V, I_D = −50 mA			2.6	4.0	
		V_{GS} = −1.8 V, I_D = −20 mA			3.4	5.5	
		V_{GS} = −1.5 V, I_D = −10 mA			4.0	7.0	
		V_{GS} = −1.2 V, I_D = −1.0 mA			6.0		
Forward Transconductance	g_{FS}	V_{DS} = −5.0 V, I_D = −125 mA			0.26		S
Source−Drain Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = −200 mA		−0.5		−1.4	V
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance	C_{ISS}	f = 1 MHz, V_{GS} = 0 V V_{DS} = −15 V			13		pF
Output Capacitance	C_{OSS}				3.4		
Reverse Transfer Capacitance	C_{RSS}				1.6		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V; I_D = 200 mA			0.7		nC
Threshold Gate Charge	$Q_{G(TH)}$				0.1		
Gate−to−Source Charge	Q_{GS}				0.2		
Gate−to−Drain Charge	Q_{GD}				0.1		
SWITCHING CHARACTERISTICS, V_{GS} = 4.5 V (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = −4.5 V, V_{DD} = −15 V, I_D = −200 mA, R_G = 2.0 Ω			30		ns
Rise Time	t_r				56		
Turn−Off Delay Time	$t_{d(OFF)}$				196		
Fall Time	t_f				145		

4. Switching characteristics are independent of operating junction temperatures

TYPICAL CHARACTERISTICS

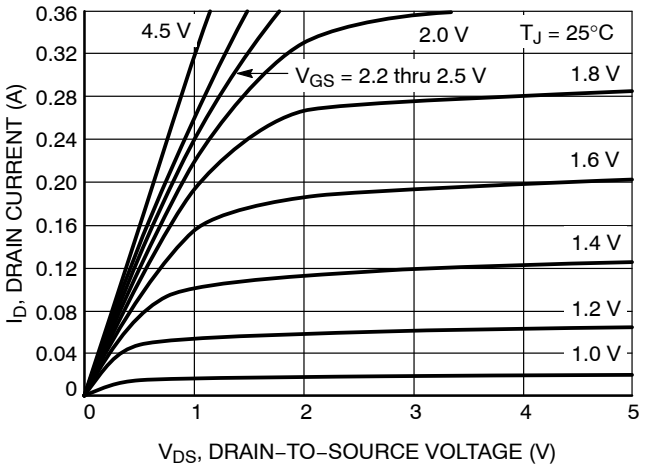


Figure 1. On−Region Characteristics

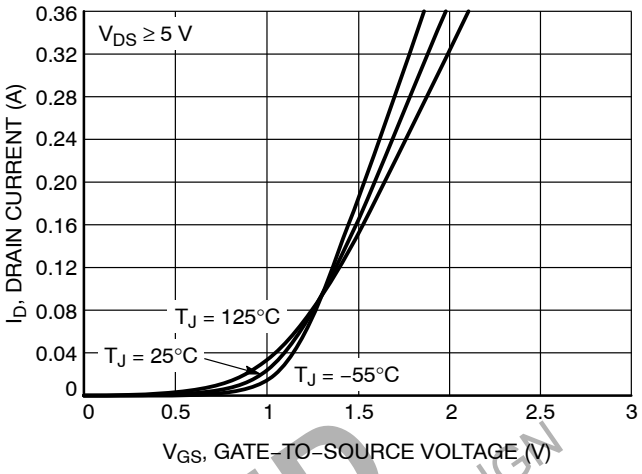


Figure 2. Transfer Characteristics

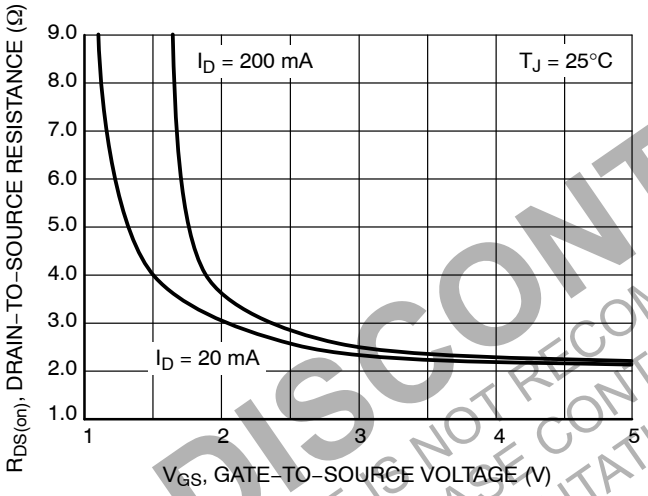


Figure 3. On−Resistance vs. Gate Voltage

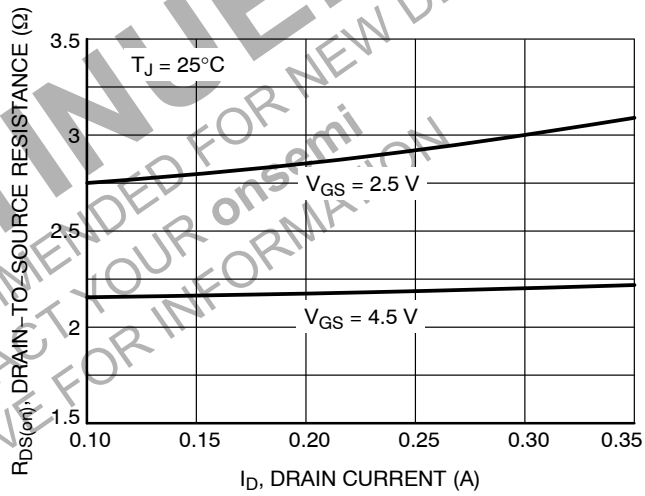


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

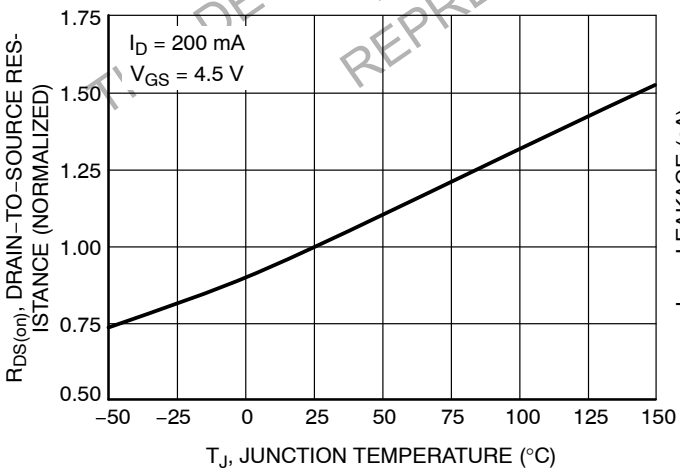


Figure 5. On−Resistance Variation with Temperature

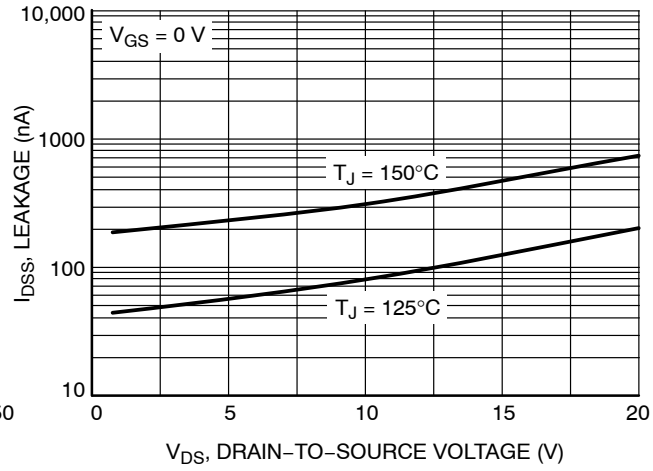


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

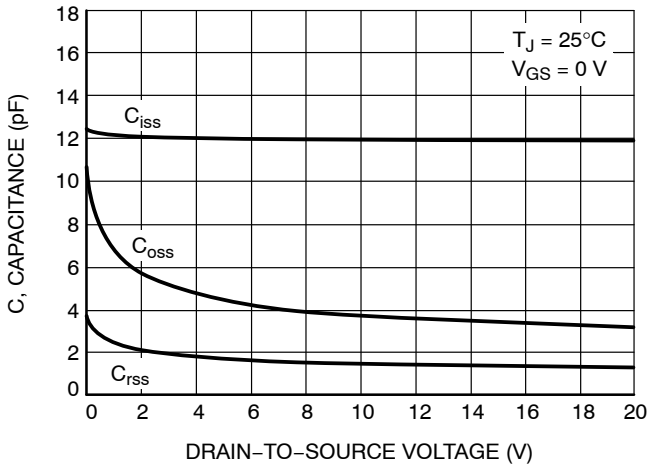


Figure 7. Capacitance Variation

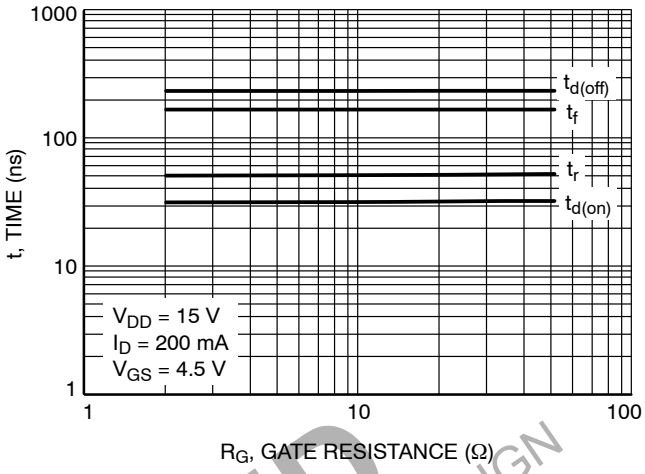


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

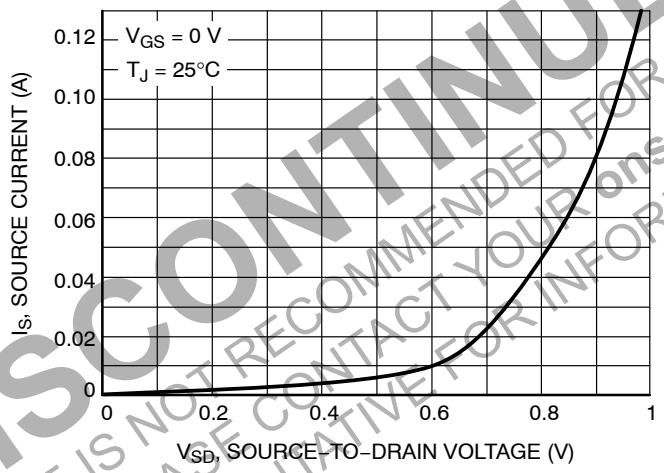
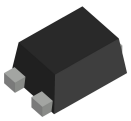
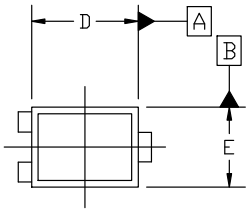


Figure 9. Diode Forward Voltage vs. Current

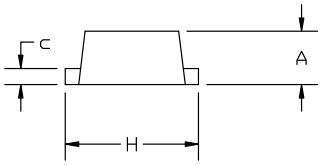


SOT−1123 0.80x0.60x0.37, 0.35P
CASE 524AA
ISSUE D

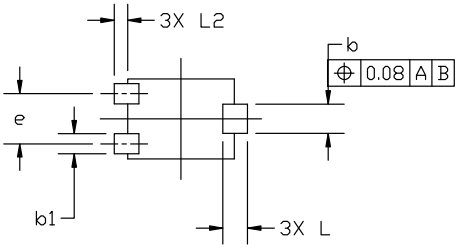
DATE 18 JAN 2024



TOP VIEW



SIDE VIEW



BOTTOM VIEW

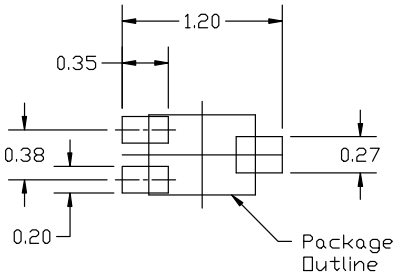
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.34	0.37	0.40
b	0.15	0.22	0.28
b1	0.10	0.15	0.20
c	0.07	0.12	0.17
D	0.75	0.80	0.85
E	0.55	0.60	0.65
e	0.35	0.38	0.40
H	0.950	1.000	1.050
L	0.185 REF		
L2	0.05	0.10	0.15

GENERIC MARKING DIAGRAM*

X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

*For additional information on our Pb−Free strategy and soldering details, please download th e ON Semiconductor Soldering and Mounting Techniques Reference manual, SOLDERRM/D.

STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 2:
PIN 1. ANODE
2. N/C
3. CATHODE

STYLE 3:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

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

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