TN138NSI

N-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= 50V,I_D= 0.34A
- $R_{DS(on)}$< 905mΩ @V_{GS}= 10V
- $R_{DS(on)}$<1010mΩ @V_{GS}= 45V

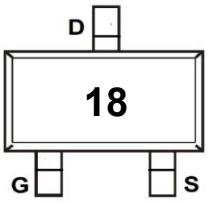
Features

- Advanced Trench Technology
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

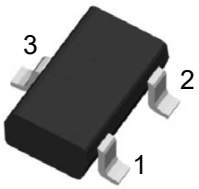
Application

- Battery Operated Systems
- Direct Logic-level Interface:TTL/CMOS
- Solid-State Relays

Marking Code



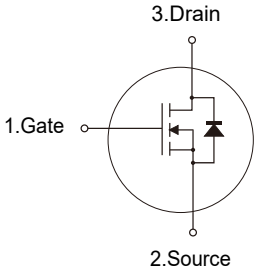
SOT-323



(Top View)

Pin	Description
1	Gate
2	Source
3	Drain

Schematic Diagram



Absolute Maximum Ratings

(Ta=25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	0.34	A
Drain Current-Pulsed Note1	I_{DM}	1	A
Maximum Power Dissipation	P_D	0.28	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

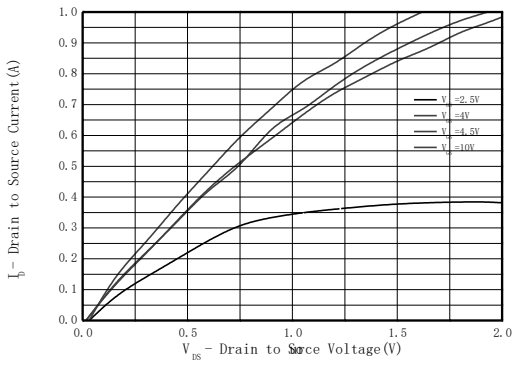
Thermal Resistance,Junction-to-Ambient Note2	$R_{\theta JA}$	340	°C/W

Electrical Characteristics

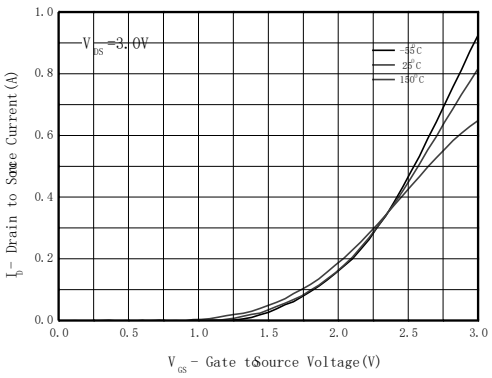
(T_J=25℃ unless o therwise s pecified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	50			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} =±20V			±5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D =250uA	0.7	1.0	1.5	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} =10V, I_D =0.45A		1.2	3	Ω
		V_{GS} =4.5V, I_D = 0.25A		1.3	4	
		V_{GS} =2.5V, I_D = 0.01A		1.9	6	
		V_{GS} =1.8V, I_D = 0.01A		5.4	15	
Forward Trans conductance	g_{fs}	V_{DS} = 15V, I_D =0.1A		0.5		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, F = 1.0 MHz, V_{DS} = 5 V		36		pF
Output Capacitance	C_{OSS}			22		
Reverse Transfer Capacitance	C_{RSS}			12		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DD} = 30 V, I_D = 0.1 A		1.6		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.25		
Gate-to-Source Charge	Q_{GS}			0.4		
Gate-to-Drain Charge	Q_{GD}			0.45		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 5 V, V_{DD} = 5 V, R_L=500 Ω, R_G=10 Ω, I_D =10m A		8.6		ns
Rise Time	tr			4		
Turn-Off Delay Time	td(OFF)			23.8		
Fall Time	tf			14.2		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 0.25A		0.8	1.5	V

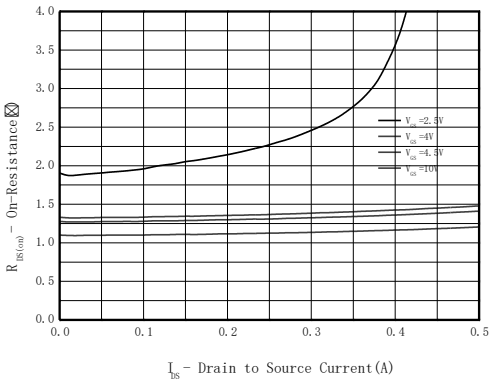
Typical Characteristic Curves



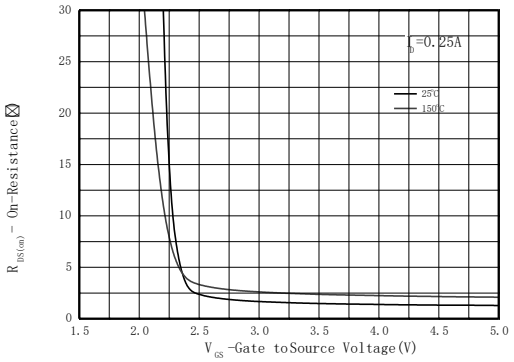
Output characteristics



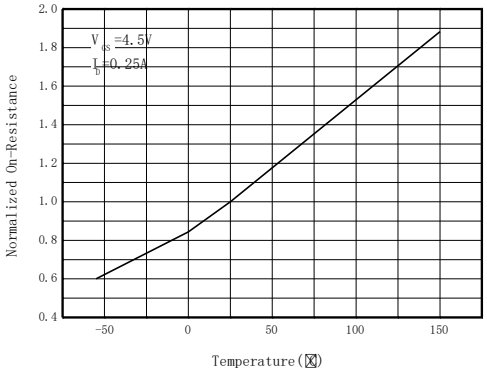
Transfer characteristics



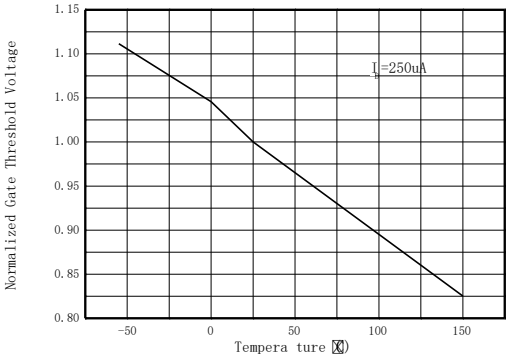
On-Resistance vs. Drain current



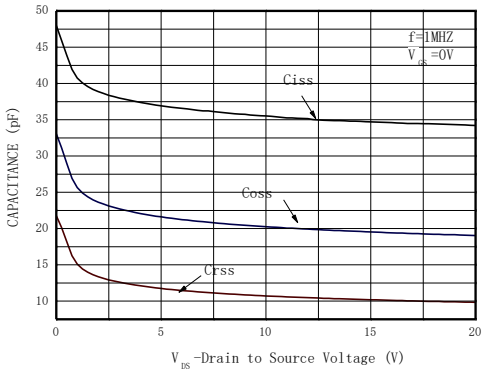
On-Resistance vs. Gate-to-Source voltage



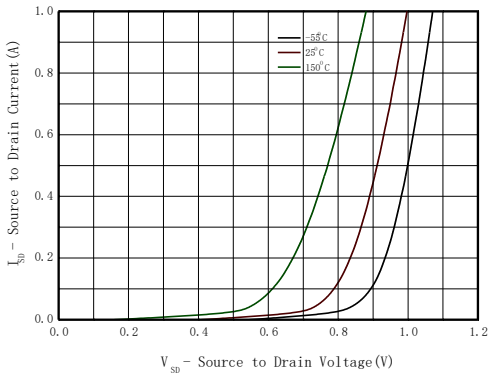
On-Resistance vs. Junction temperature



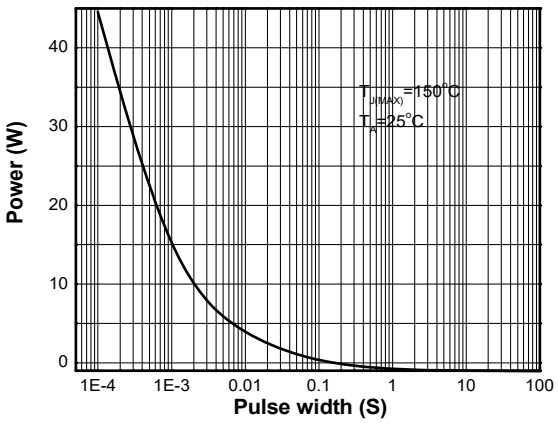
Threshold voltage vs. Temperature



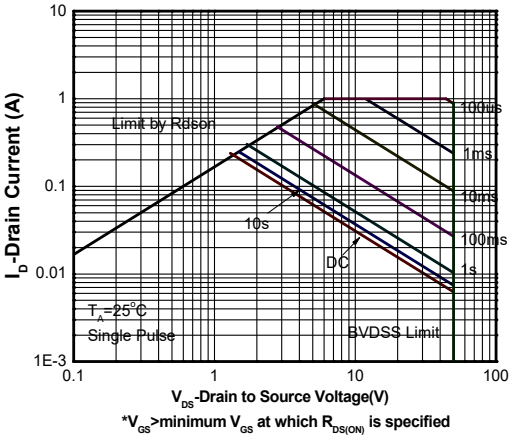
Capacitance



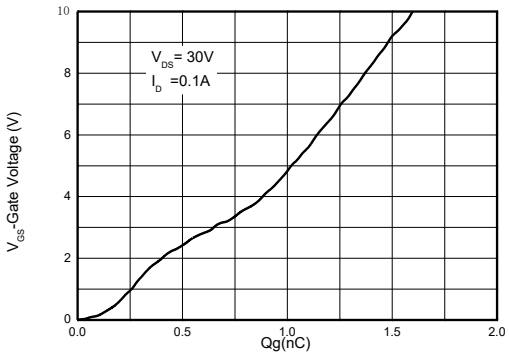
Body diode forward voltage



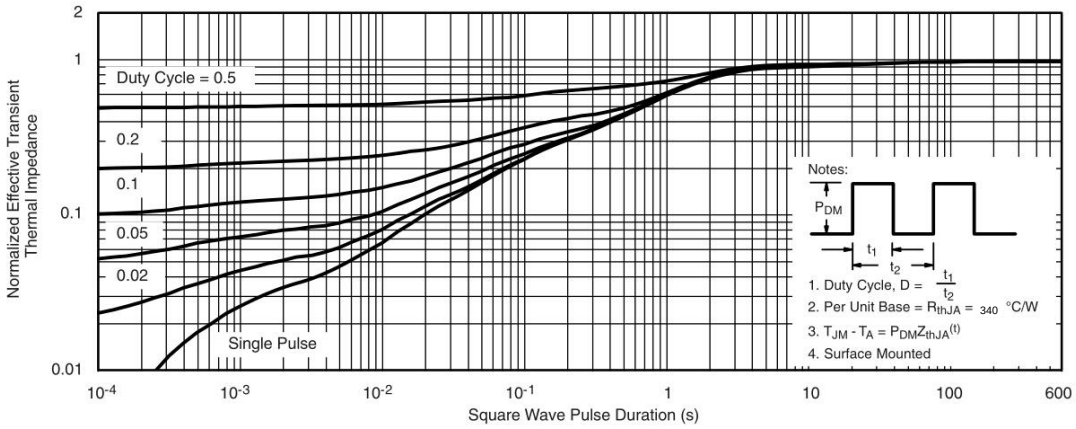
Single pulse power



Safe operating power



Gate charge Characteristics

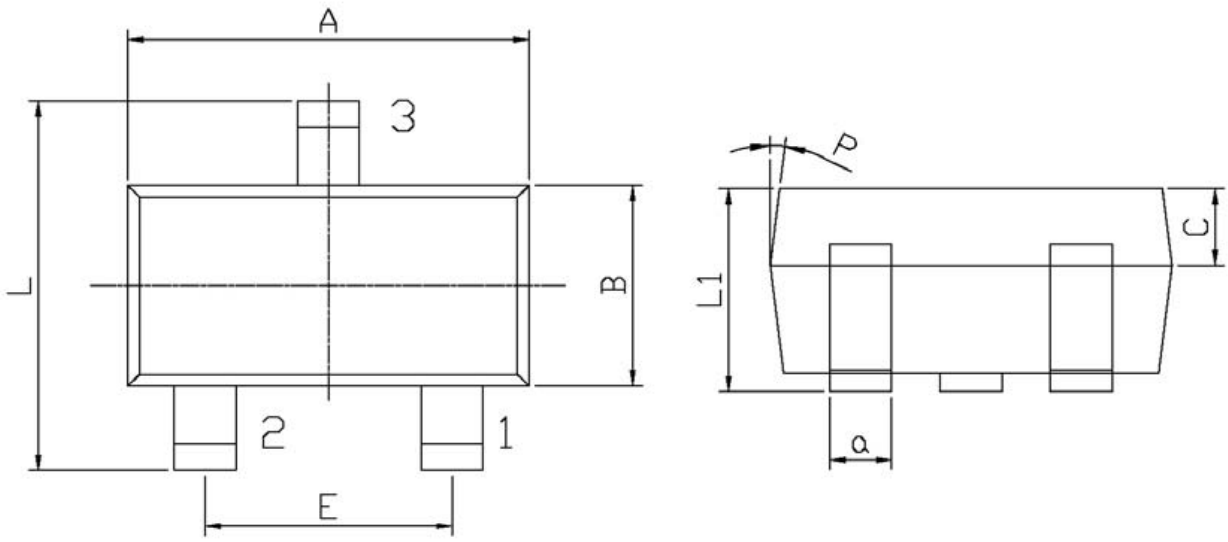


Transient thermal response (Junction-to-Ambient)

Package Outline

SOT-323

Dimensions in mm



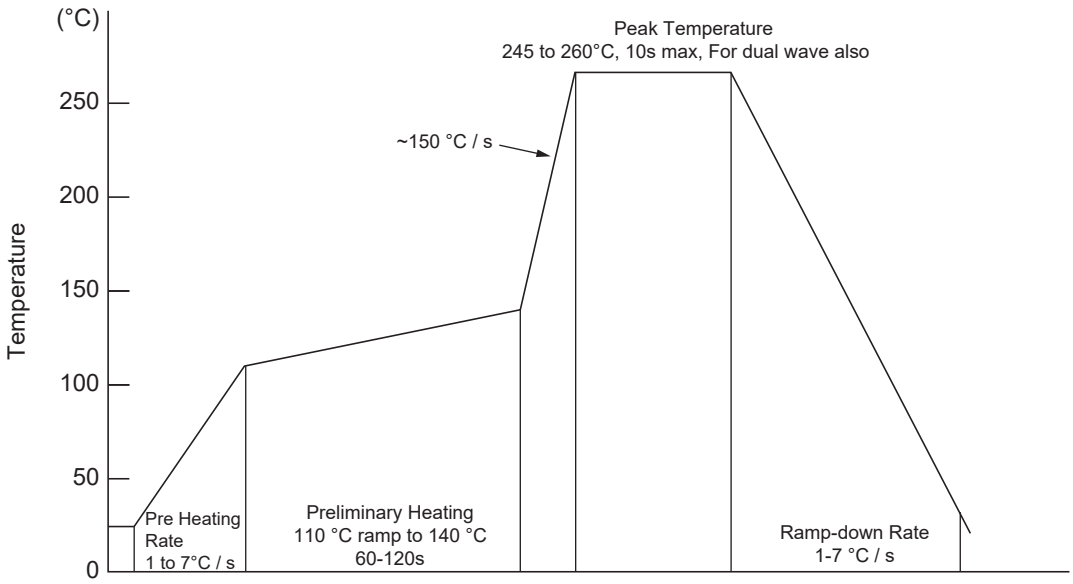
Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.95	2.35	C	0.30	0.50
L	2.00	2.20	L1	0.85	1.15
E	1.20	1.40	a	0.20	0.40
B	1.15	1.35	P	7°	

Ordering Information

Device	Package	Shipping
TN138NSI	SOT-323	3,000PCS/Reel&7inches

Conditions of Soldering and Storage

◆ Wave Soldering



◆ Conditions of hand soldering

- Temperature: 360°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

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The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to-date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

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