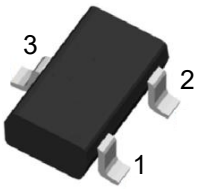
# TN123KNSI

## N-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS}$= 100V,$I_D$= 0.3A
- $R_{DS(on)}$< 5.5Ω @$V_{GS}$= 10V
- $R_{DS(on)}$< 5.7Ω @$V_{GS}$= 4.5V

**SOT-323**




**(Top View)**

| Pin | Description |
|---|---|
| 1 | Gate |
| 2 | Source |
| 3 | Drain |

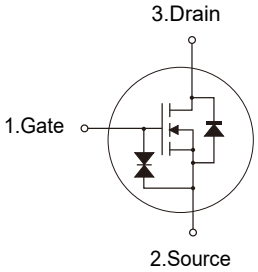
### Features

- ESD Protected(HBM) up to 2KV
- Advanced Trench Technology
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

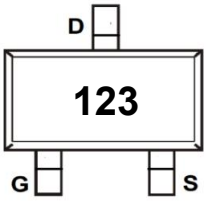
### Application

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

### Schematic Diagram




### Marking Code




### Absolute Maximum Ratings

(Ta=25℃ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | 0.3 | A |
| Drain Current-Pulsed Note1 | $I_{DM}$ | 0.8 | A |
| Maximum Power Dissipation | $P_D$ | 0.15 | W |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |

### Thermal Characteristics

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient Note2 | $R_{\theta JA}$ | 833 | °C/W |

## Electrical Characteristics

($T_J$=25℃ unless o therwise s pecified)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=250μA | 100 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V,$V_{GS}$=0V | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS1}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | | | ±100 | nA |
| | $I_{GSS2}$ | $V_{GS}$= ±10V, $V_{DS}$=0V | | | ±50 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.0 | 1.8 | 2.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= 10V, $I_D$=200mA | | 3.0 | 5.5 | Ω |
| | | $V_{GS}$= 4.5V, $I_D$=200mA | | 3.5 | 5.7 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=200mA,$V_{GS}$=0V | | | 1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 200 | mA |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=50V,$V_{GS}$=0V,f=1MHZ | | 32 | | pF |
| Output Capacitance | $C_{oss}$ | | | 10 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 7 | | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V,$V_{DS}$=50V,$I_D$=0.2A | | 1.61 | | nC |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=10V,$V_{DD}$=50V, $I_D$=0.2A, $R_{GEN}$=6Ω | | 1.8 | | ns |
| Turn-on Rise Time | $t_r$ | | | 9.2 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 17.5 | | |
| Turn-off fall Time | $t_f$ | | | 7.6 | | |

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.
B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Characteristic Curves

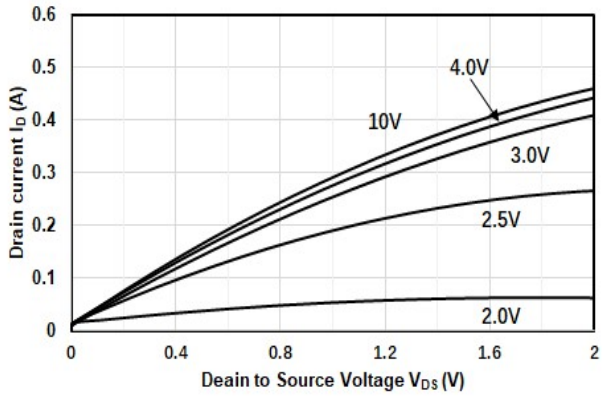



Figure1. Output Characteristics

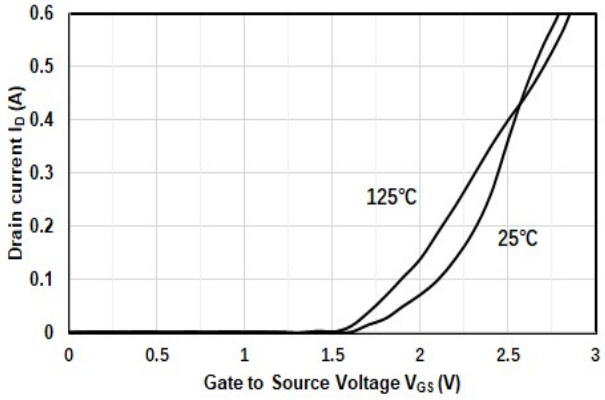



Figure2. Transfer Characteristics

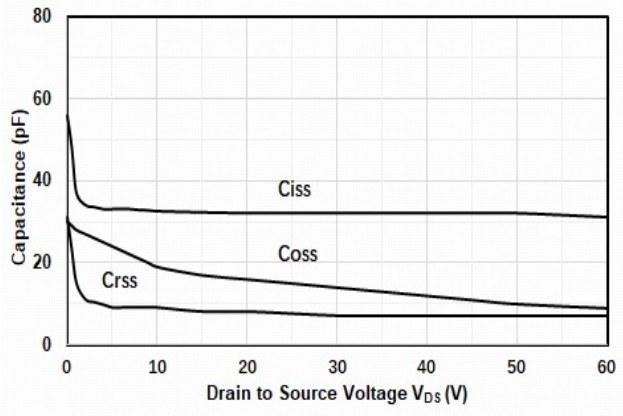



Figure3. Capacitance Characteristics

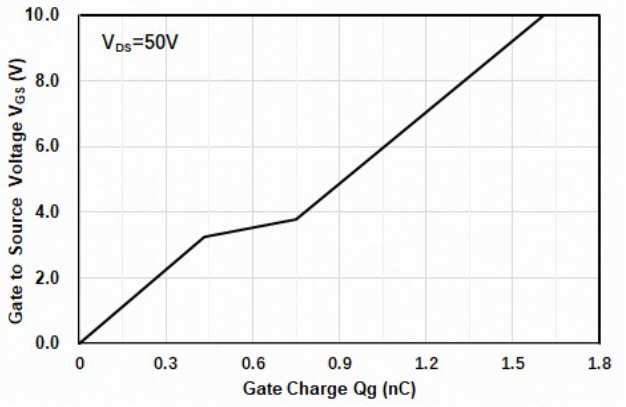



Figure4. Gate Charge

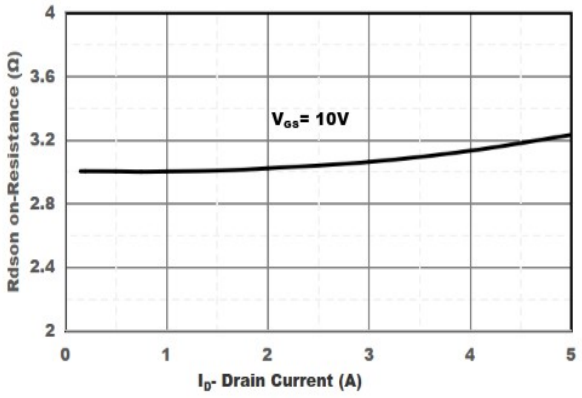



Figure5. Drain-Source on Resistance

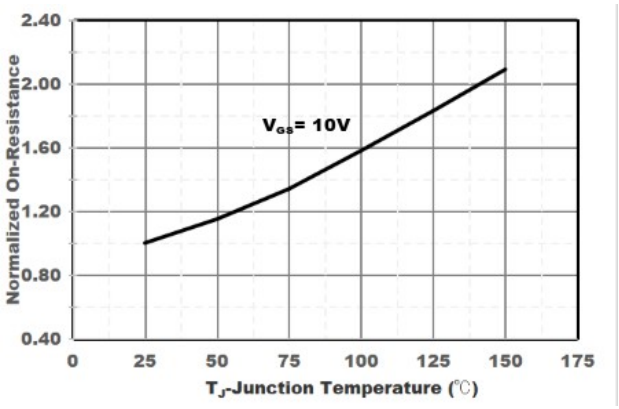



Figure6. Drain-Source on Resistance

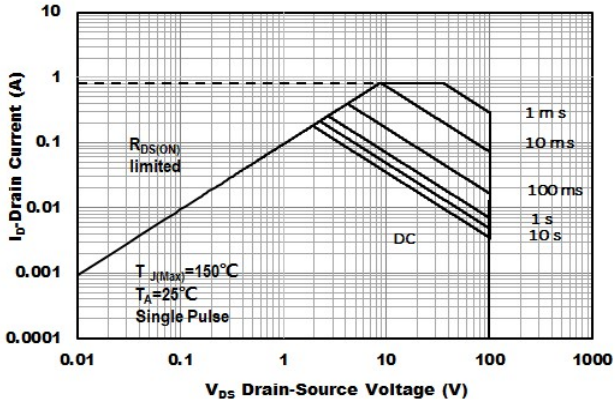



Figure7. Safe Operation Area

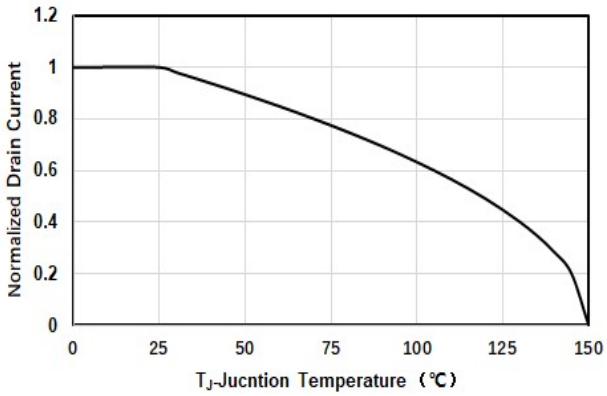
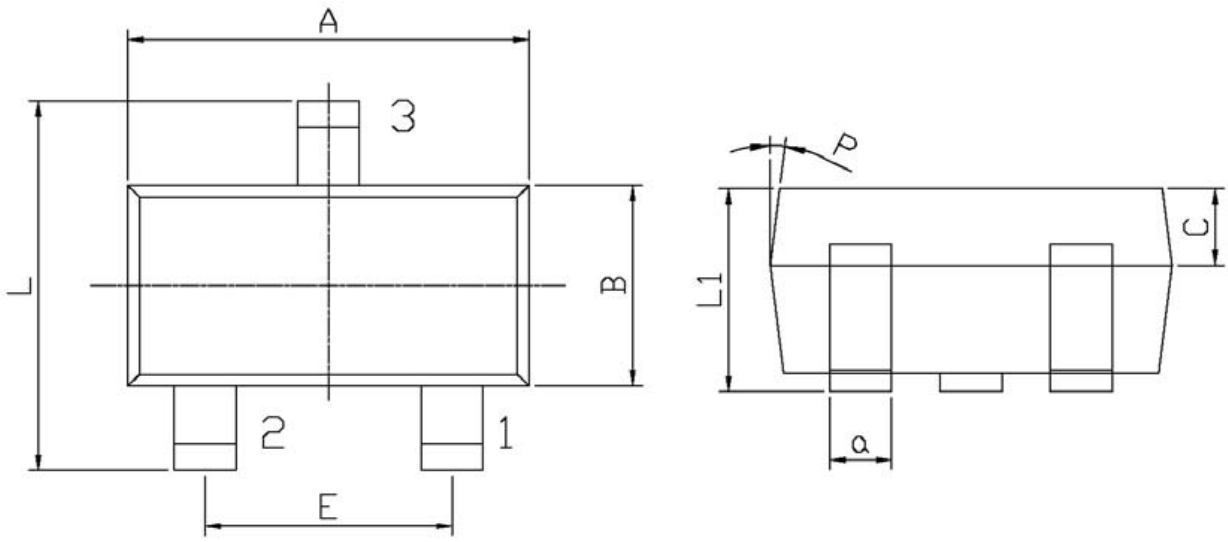



Figure8. Drain-Source Current

## Package Outline

SOT-323

Dimensions in mm



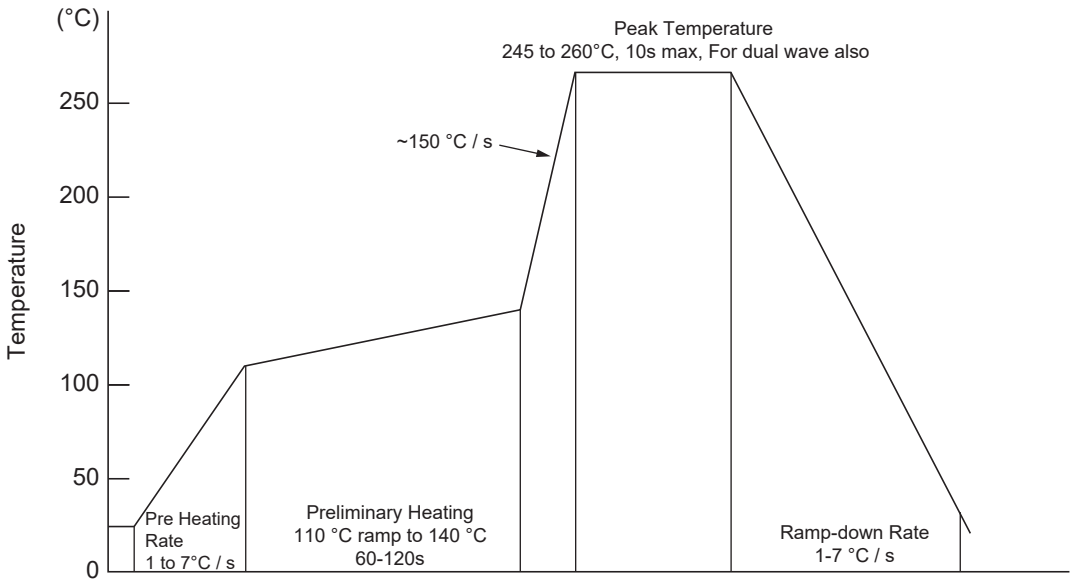

| Symbol | Dimensions | | Symbol | Dimensions | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 1.95 | 2.35 | C | 0.30 | 0.50 |
| L | 2.00 | 2.20 | L1 | 0.85 | 1.15 |
| E | 1.20 | 1.40 | a | 0.20 | 0.40 |
| B | 1.15 | 1.35 | P | 7° | |

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| TN123KNSI | 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.