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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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N-Channel Power MOSFET

60V, 300mA, 2Ω

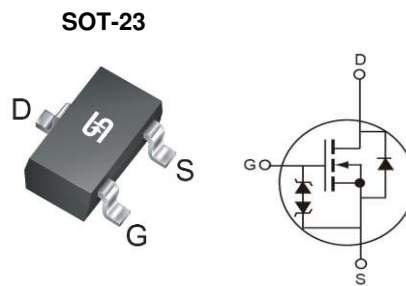
FEATURES

- Low On-Resistance
- ESD Protected 2KV
- High Speed Switching
- Low Voltage Drive

APPLICATION

- Logic Level translators
- DC-DC Converter

| KEY PERFORMANCE PARAMETERS | | |
|----------------------------|-----------------|------|
| PARAMETER | VALUE | UNIT |
| V_{DS} | 60 | V |
| $R_{DS(on)}$ (max) | $V_{GS} = 10V$ | 2 |
| | $V_{GS} = 4.5V$ | 4 |
| Q_g | 0.4 | nC |



Notes: Moisture sensitivity level: level 3. Per J-STD-020

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | |
|---|----------------|---------------------------|------------------|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^(Note 1) | I_D | $T_A = 25^\circ\text{C}$ | 300 |
| | | $T_A = 100^\circ\text{C}$ | 180 |
| Pulsed Drain Current ^(Note 2) | I_{DM} | 800 | mA |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_{DTOT} | 300 | mW |
| Single Pulsed Avalanche Energy ^(Note 3) | E_{AS} | 0.2 | mJ |
| Single Pulsed Avalanche Current ^(Note 3) | I_{AS} | 2 | A |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | - 55 to +150 | $^\circ\text{C}$ |

| THERMAL PERFORMANCE | | | |
|--|-----------------|-------|--------------------|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Junction to Ambient Thermal Resistance | $R_{\theta JA}$ | 350 | $^\circ\text{C/W}$ |

Notes: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JA}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 PCB in still air

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|---|--------------|-----|-----|----------|----------|
| PARAMETER | CONDITIONS | SYMBOL | MIN | TYP | MAX | UNIT |
| Static (Note 4) | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 10\mu A$ | BV_{DSS} | 60 | -- | -- | V |
| Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | $V_{GS(TH)}$ | 1.0 | 1.5 | 2.5 | V |
| Gate Body Leakage | $V_{GS} = \pm 20V, V_{DS} = 0V$ | I_{GSS} | -- | -- | ± 10 | μA |
| Zero Gate Voltage Drain Current | $V_{DS} = 60V, V_{GS} = 0V$ | I_{DSS} | -- | -- | 1.0 | μA |
| Drain-Source On-State Resistance | $V_{GS} = 10V, I_D = 300mA$ | $R_{DS(ON)}$ | -- | 1.2 | 2 | Ω |
| | $V_{GS} = 4.5V, I_D = 200mA$ | | -- | 2 | 4 | |
| Forward Transconductance | $V_{DS} = 10V, I_D = 200mA$ | g_{fs} | 100 | -- | -- | mS |
| Diode Forward Voltage | $I_S = 300mA, V_{GS} = 0V$ | V_{SD} | -- | 0.8 | 1.4 | V |
| Dynamic (Note 5) | | | | | | |
| Total Gate Charge | $V_{DS} = 10V, I_D = 250mA,$ $V_{GS} = 4.5V$ | Q_g | -- | 0.4 | 0.6 | nC |
| Input Capacitance | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$ | C_{ISS} | -- | 30 | -- | μF |
| Output Capacitance | | C_{OSS} | -- | 6 | -- | |
| Reverse Transfer Capacitance | | C_{RSS} | -- | 2.5 | -- | |
| Gate Resistance | $F = 1MHz, \text{open drain}$ | R_g | -- | 70 | -- | Ω |
| Switching (Note 6) | | | | | | |
| Turn-On Delay Time | $V_{DD} = 30V, R_G = 10\Omega$ $I_D = 200mA, V_{GEN} = 10V,$ | $t_{d(on)}$ | -- | 25 | -- | ns |
| Turn-Off Delay Time | | $t_{d(off)}$ | -- | 35 | -- | |
| Source-Drain Diode (Note 4) | | | | | | |
| Diode Forward Voltage | $I_S = 300mA, V_{GS} = 0V$ | V_{SD} | -- | 0.8 | 1.4 | |
| Reverse Recovery Time | $I_S = 0.5A$ | t_{rr} | -- | 40 | -- | ns |
| Reverse Recovery Charge | $di_f/dt = 100A/\mu s$ | Q_{rr} | -- | 39 | -- | nC |

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. $L = 0.1mH, I_{AS} = 2A, V_{DD} = 25V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
4. Pulse test: $PW \leq 300\mu s, \text{duty cycle} \leq 2\%$
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

| PART NO. | PACKAGE | PACKING |
|------------------|----------------|--------------------|
| TSM2N7002KCX RFG | SOT-23 | 3,000pcs / 7" Reel |

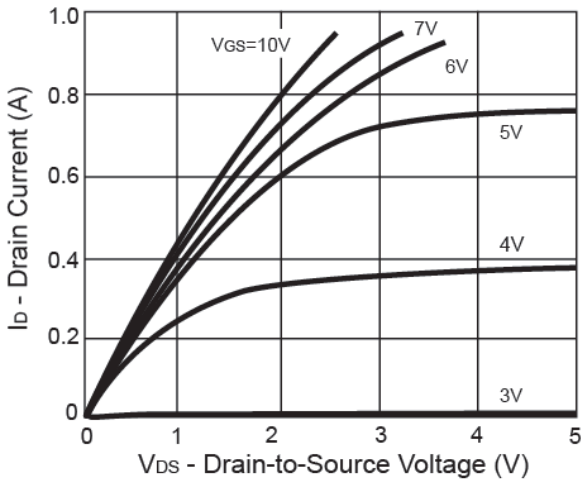
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

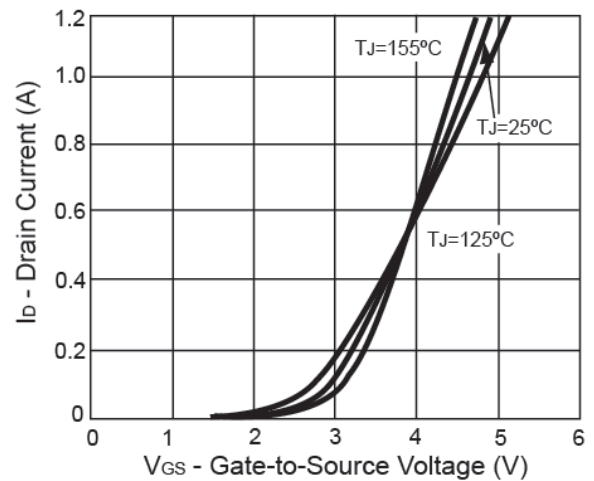
CHARACTERISTICS CURVES

($T_C = 25^\circ\text{C}$ unless otherwise noted)

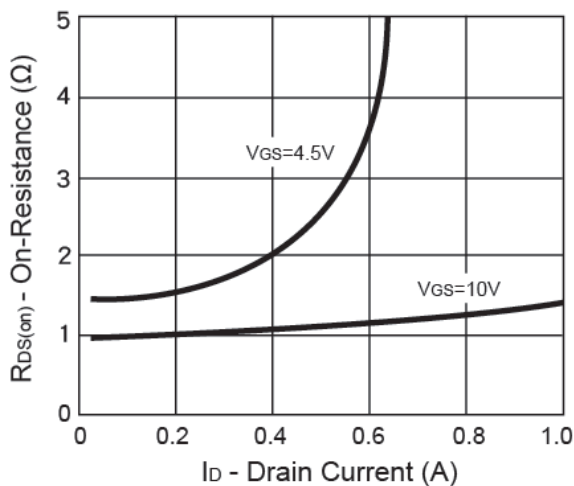
Output Characteristics



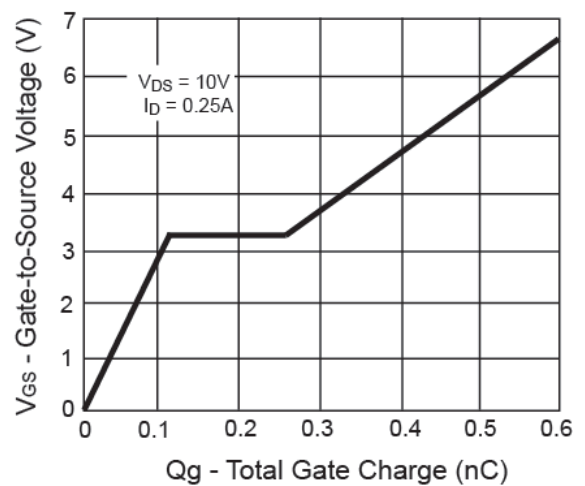
Transfer Characteristics



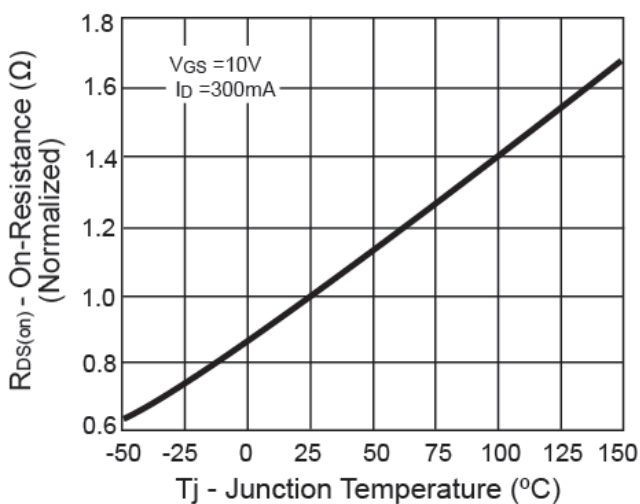
On-Resistance vs. Drain Current



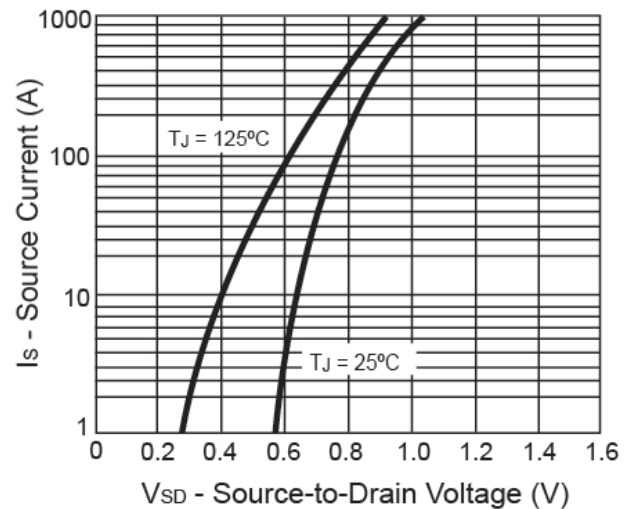
Gate Charge



On-Resistance vs. Junction Temperature



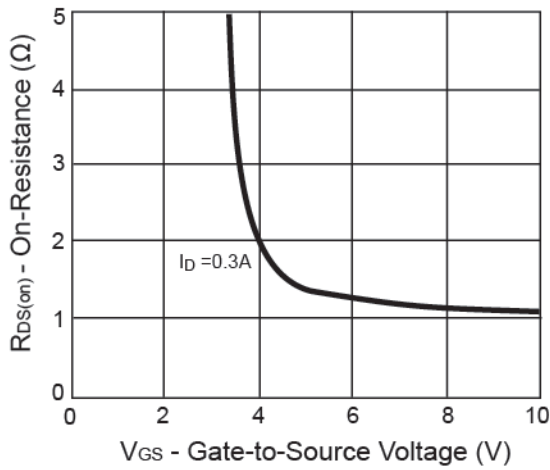
Source-Drain Diode Forward Voltage



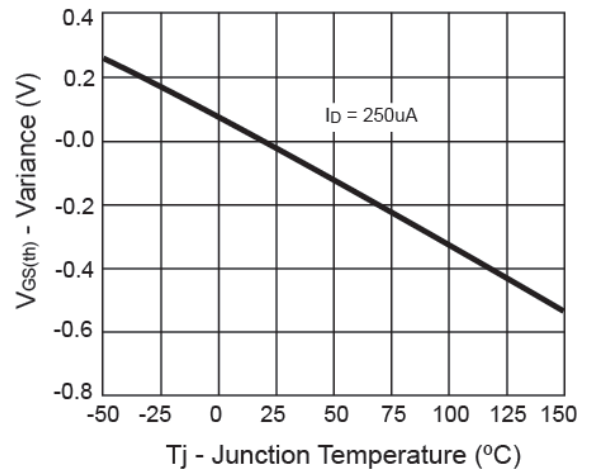
CHARACTERISTICS CURVES

($T_C = 25^\circ\text{C}$ unless otherwise noted)

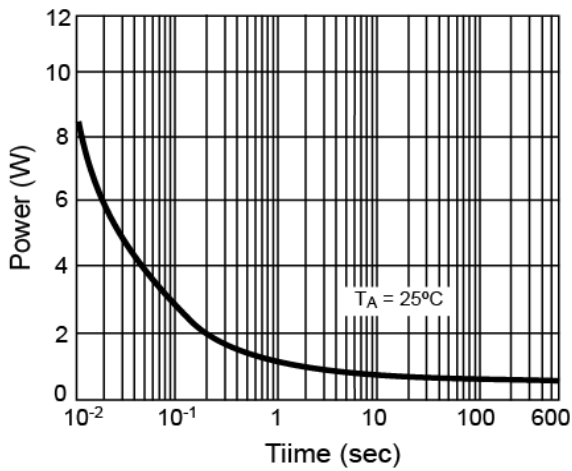
On-Resistance vs. Gate-Source Voltage



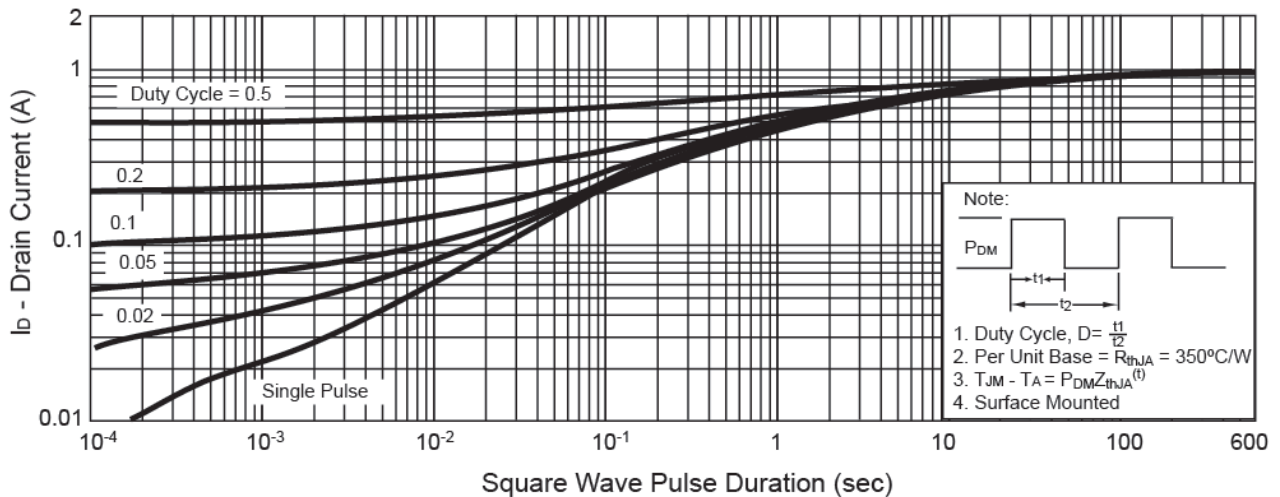
Threshold Voltage



Single Pulse Power

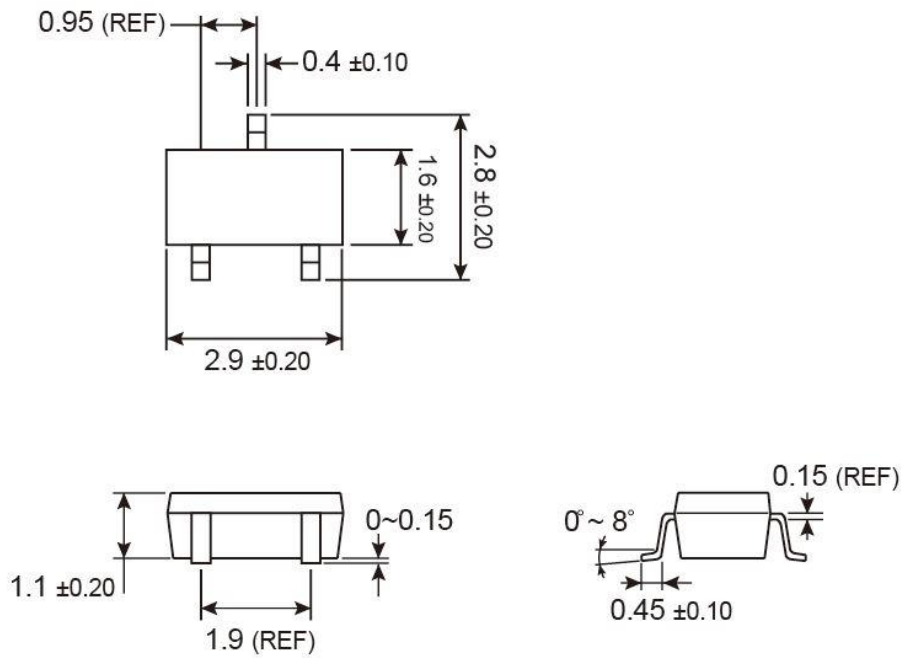


Normalized Thermal Transient Impedance, Junction-to-Ambient

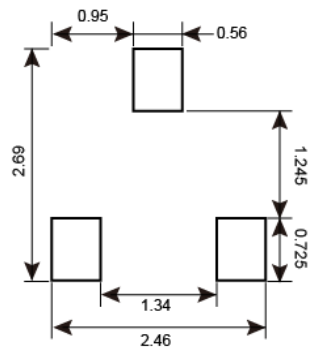


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

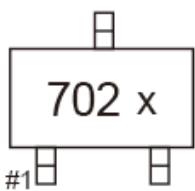
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



702 = TSM2N7002KCX Device Code
X = Internal Code

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