

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

Key Parameter Performance

| Parameter | Value | Unit |
|--------------------|------------------|------|
| V_{DS} | -30 | V |
| $R_{DS(on)}$ (max) | $V_{GS} = -10V$ | 95 |
| | $V_{GS} = -4.5V$ | 140 |
| Q_g | 10 | nC |

Features

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

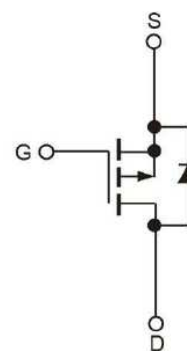
- Load Switch
- PA Switch

Ordering Information

| Part No. | Package | Packing |
|---------------|---------|-----------------|
| TSM2307CX RFG | SOT-23 | 3kpcs / 7" Reel |

Note: "G" denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

Block Diagram



P-Channel MOSFET

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

| Parameter | Symbol | Limit | Unit |
|--|-----------|--------------------------|------------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^(Note 1) | I_D | -3 | A |
| Pulsed Drain Current ^(Note 2) | I_{DM} | -20 | A |
| Continuous Source Current (Diode Conduction) | I_S | -1.7 | A |
| Power Dissipation | P_D | $T_a = 25^\circ\text{C}$ | 1.25 |
| | | $T_a = 75^\circ\text{C}$ | 0.8 |
| Operating Junction Temperature | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -50 to +150 | $^\circ\text{C}$ |

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|-----------------|-------|----------------------|
| Thermal Resistance - Junction to Case | $R_{\theta JC}$ | 75 | $^{\circ}\text{C/W}$ |
| Thermal Resistance - Junction to Ambient | $R_{\theta JA}$ | 130 | $^{\circ}\text{C/W}$ |

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

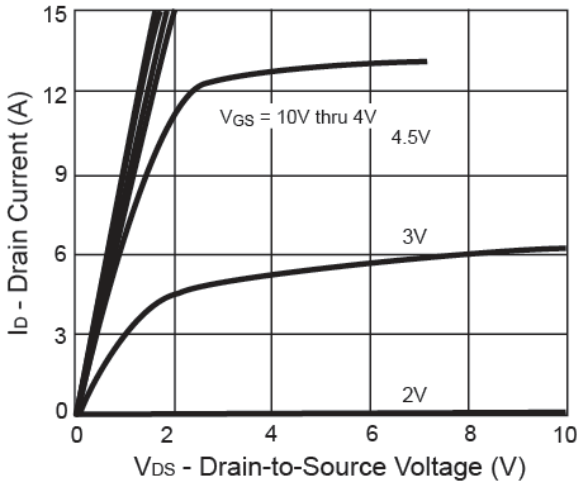
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|--|--|--------------|-----|-----|-----------|------------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$ | BV_{DSS} | -30 | -- | -- | V |
| Drain-Source On-State Resistance | $V_{GS} = -10\text{V}, I_D = -3\text{A}$ | $R_{DS(ON)}$ | -- | 76 | 95 | $\text{m}\Omega$ |
| | $V_{GS} = -4.5\text{V}, I_D = -2\text{A}$ | | -- | 103 | 140 | $\text{m}\Omega$ |
| Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ | $V_{GS(TH)}$ | -1 | -- | -3 | V |
| Zero Gate Voltage Drain Current | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$ | I_{DSS} | -- | -- | -1.0 | μA |
| Gate Body Leakage | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ | I_{GSS} | -- | -- | ± 100 | nA |
| Forward Transconductance ^(Note 4) | $V_{DS} = -10\text{V}, I_D = -6\text{A}$ | g_{fs} | -- | 5 | -- | S |
| Diode Forward Voltage | $I_S = -1.7\text{V}, V_{GS} = 0\text{V}$ | V_{SD} | | | -1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge ^(Note 3,4) | $V_{DS} = -15\text{V}, I_D = -3\text{A},$ $V_{GS} = -10\text{V}$ | Q_g | -- | 10 | 15 | nC |
| Gate-Source Charge ^(Note 3,4) | | Q_{gs} | -- | 1.9 | -- | |
| Gate-Drain Charge ^(Note 3,4) | | Q_{gd} | -- | 2 | -- | |
| Input Capacitance | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$ | C_{iss} | -- | 565 | -- | pF |
| Output Capacitance | | C_{oss} | -- | 126 | -- | |
| Reverse Transfer Capacitance | | C_{rss} | -- | 75 | -- | |
| Switching | | | | | | |
| Turn-On Delay Time ^(Note 3,4) | $V_{DD} = -15\text{V}, R_L = 15\Omega,$ $I_D = -1\text{A}, V_{GEN} = -10\text{V},$ $R_G = 6\Omega$ | $t_{d(on)}$ | -- | 10 | 20 | ns |
| Turn-On Rise Time ^(Note 3,4) | | t_r | -- | 9 | 20 | |
| Turn-Off Delay Time ^(Note 3,4) | | $t_{d(off)}$ | -- | 27 | 50 | |
| Turn-Off Fall Time ^(Note 3,4) | | t_f | -- | 7 | 16 | |

Note:

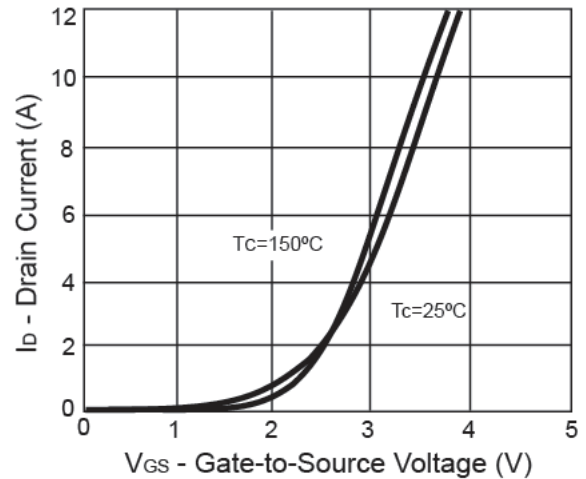
- Limited by maximum junction temperature
- Pulse width limited by safe operating area
- Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

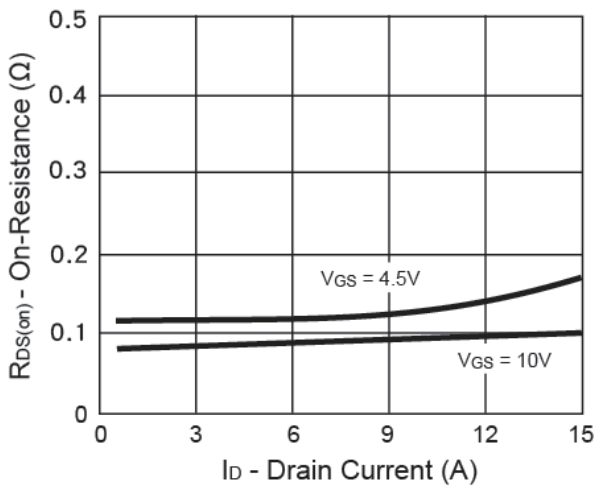
Output Characteristics



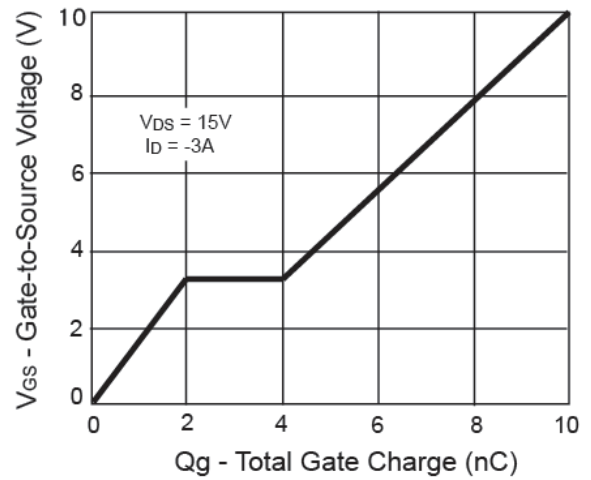
Transfer Characteristics



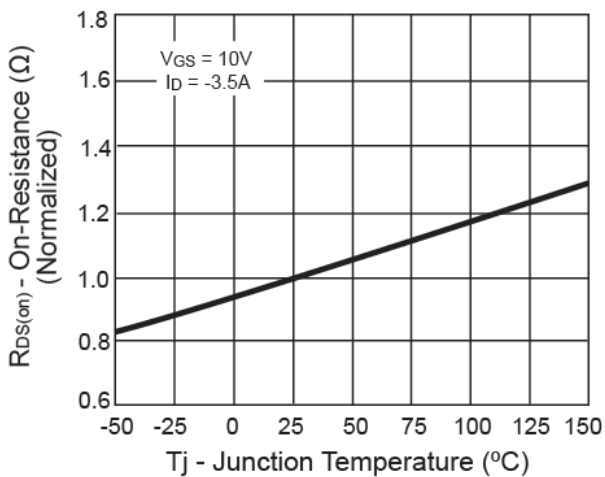
On-Resistance vs. Drain Current



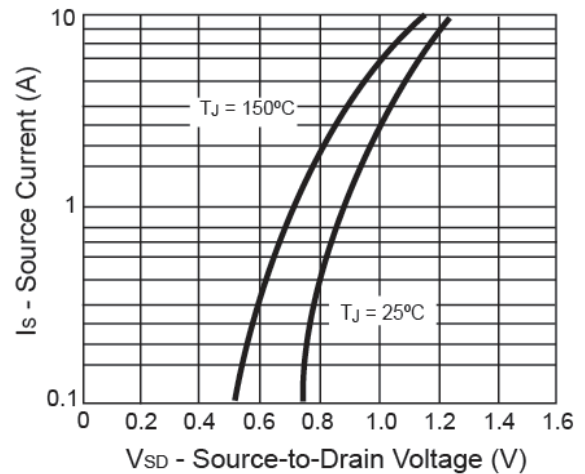
Gate Charge



On-Resistance vs. Junction Temperature

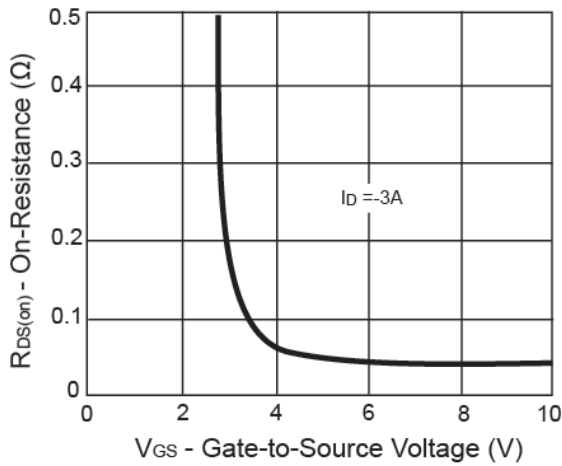


Source-Drain Diode Forward Voltage

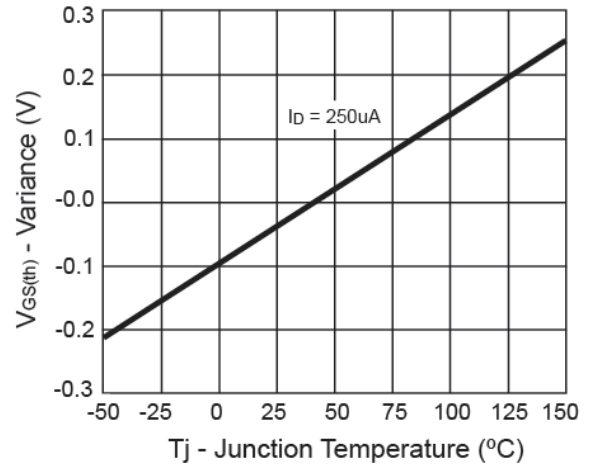


Electrical Characteristics Curve

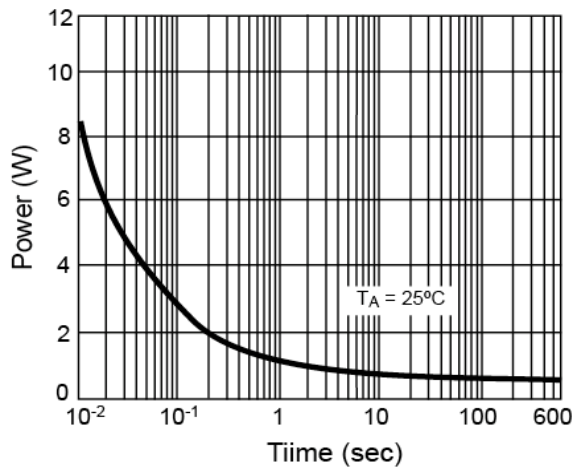
On-Resistance vs. Gate-Source Voltage



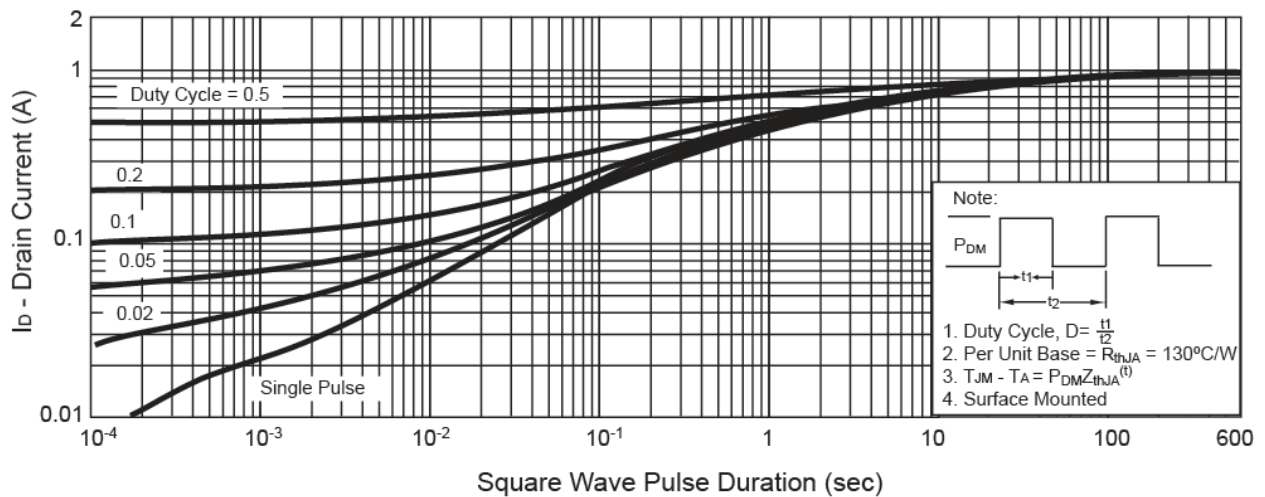
Threshold Voltage



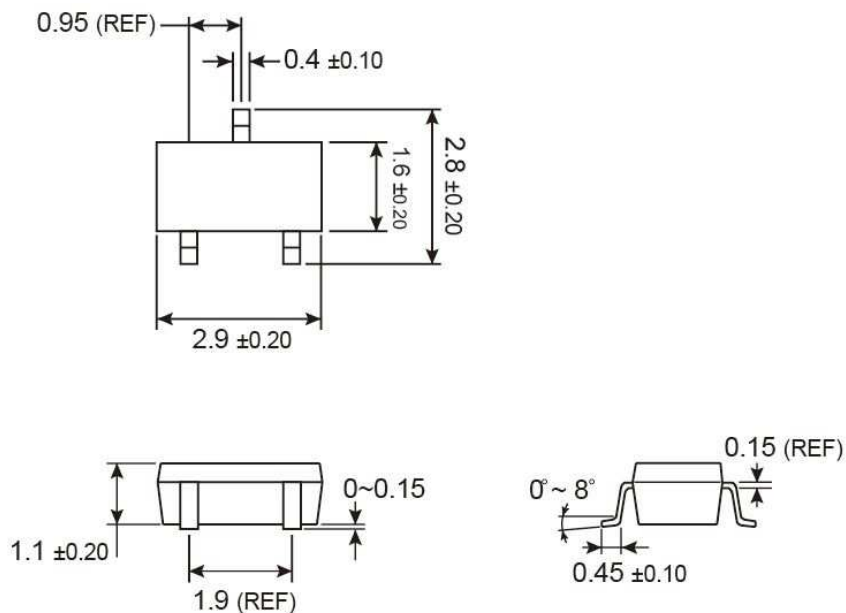
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

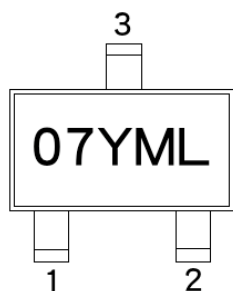


SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- 07** = Device Code
- Y** = Year Code
- M** = Month Code for Halogen Free Product
 - O** =Jan **P** =Feb **Q** =Mar **R** =Apr
 - S** =May **T** =Jun **U** =Jul **V** =Aug
 - W** =Sep **X** =Oct **Y** =Nov **Z** =Dec
- L** = Lot Code

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