# TSM2307CX

30V P-Channel MOSFET

**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 | mΩ |
| | $V_{GS}$ = -4.5V | 140 | |
| $Q_g$ | | 10 | nC |

## Features

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

## Application

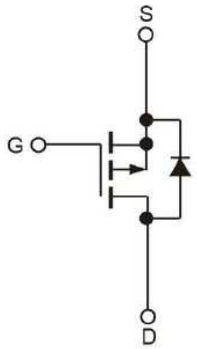
- Load Switch
- PA Switch

## 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℃ 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 | $T_a$ = 25℃ | $P_D$ | 1.25 | W |
| | $T_a$ = 75℃ | | 0.8 | |
| Operating Junction Temperature | | $T_J$ | +150 | ℃ |
| Storage Temperature Range | | $T_{STG}$ | -50 to +150 | ℃ |

## Thermal Performance

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Thermal Resistance - Junction to Case | $R_{\Theta JC}$ | 75 | ℃/W |
| Thermal Resistance - Junction to Ambient | $R_{\Theta JA}$ | 130 | ℃/W |

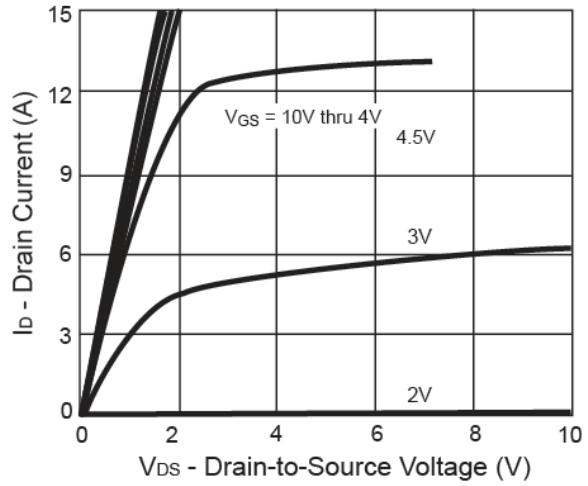
## Electrical Specifications ($T_C$ = 25℃ unless otherwise noted)

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

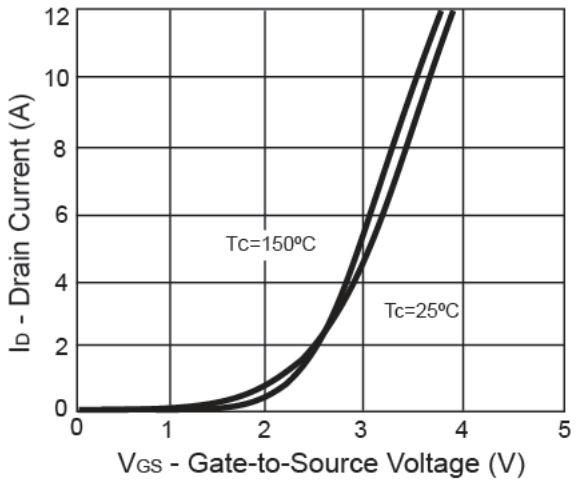
**Note:**
1.Limited by maximum junction temperature
2.Pulse width limited by safe operating area
3.Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%
4.Switching time is essentially independent of operating temperature.

## Electrical Characteristics Curve

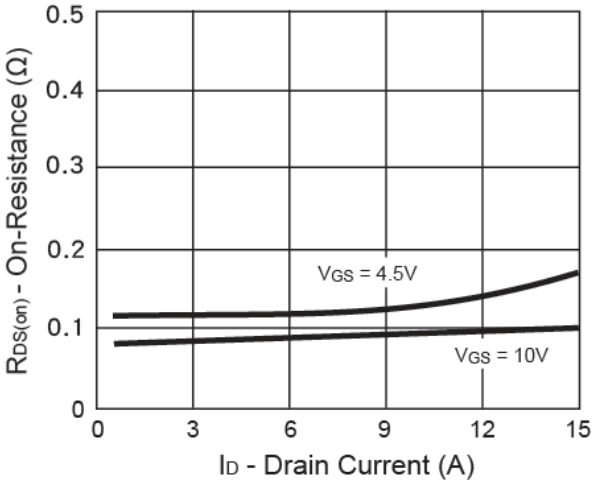
### Output Characteristics



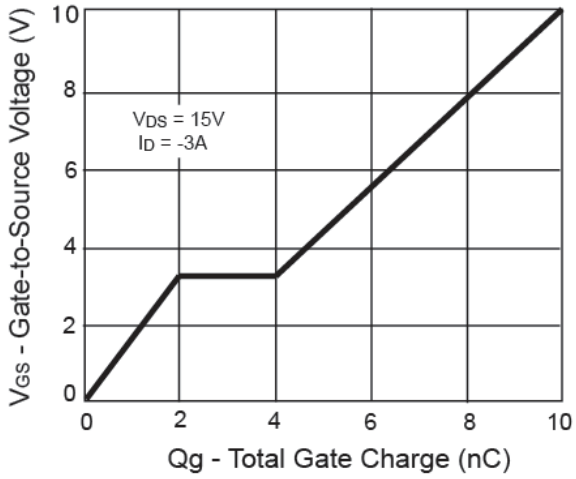

### Transfer Characteristics



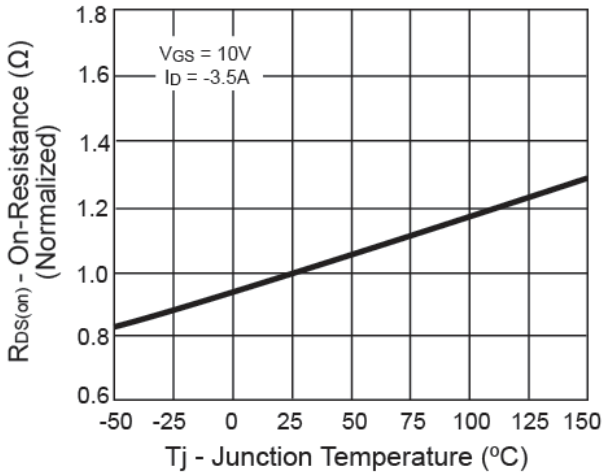

### On-Resistance vs. Drain Current



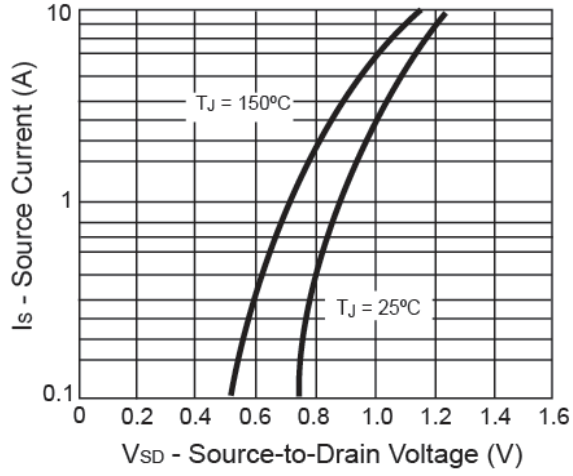

### Gate Charge




### On-Resistance vs. Junction Temperature

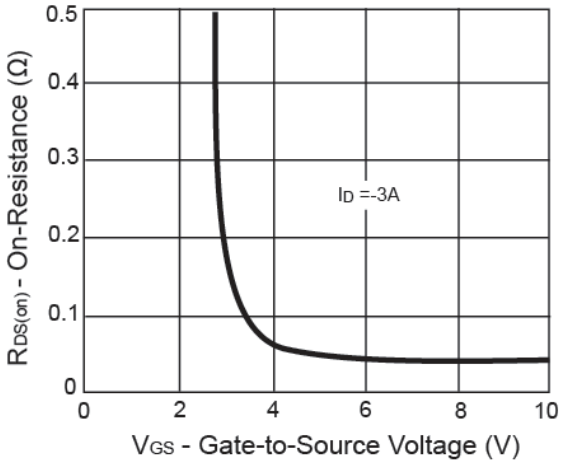



### Source-Drain Diode Forward Voltage

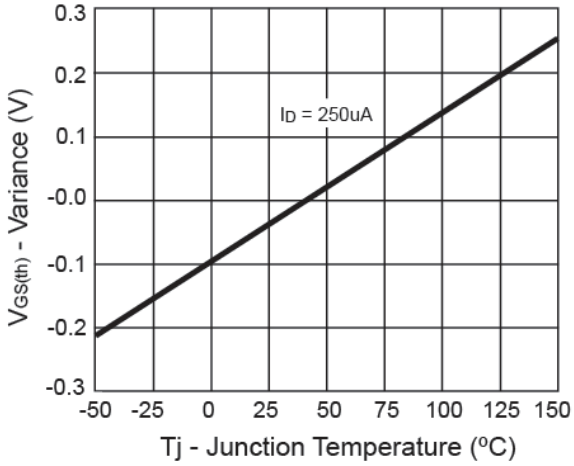


## Electrical Characteristics Curve

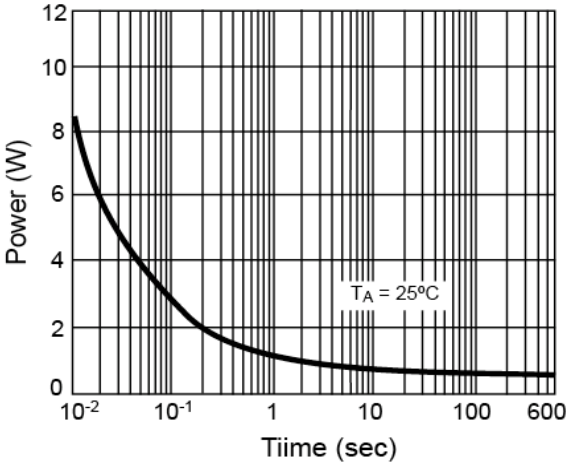
### On-Resistance vs. Gate-Source Voltage



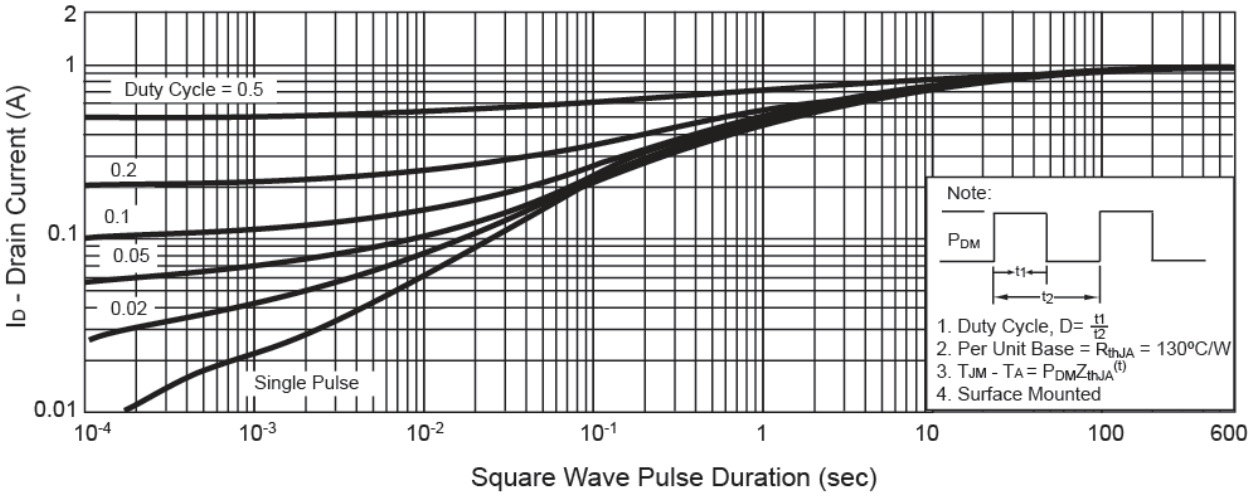

### Threshold Voltage



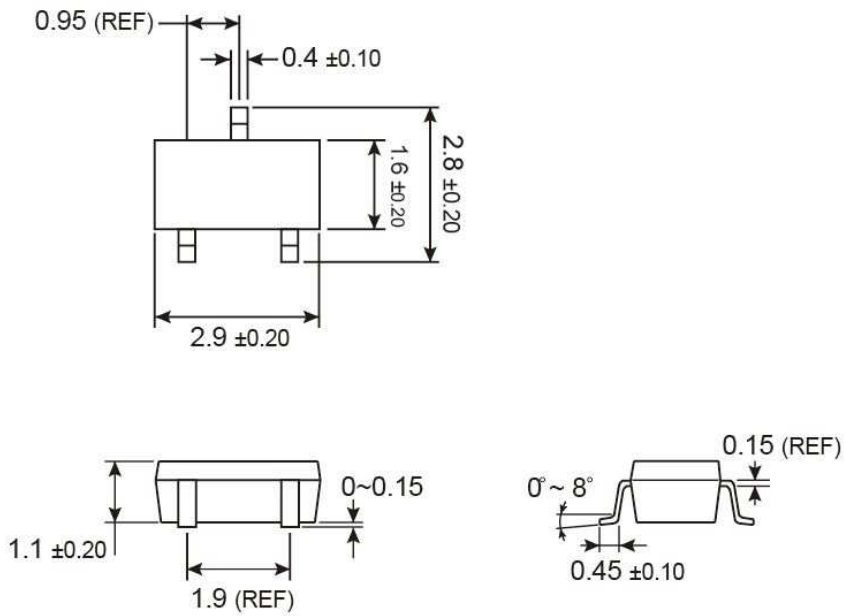

### Single Pulse Power




### Normalized Thermal Transient Impedance, Junction-to-Ambient

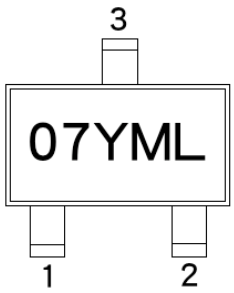


## SOT-23 Mechanical Drawing




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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