

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (m Ω) | I_D (A) |
|--------------|----------------------------|-----------|
| -30 | 80 @ $V_{GS} = -10V$ | -3 |
| | 140 @ $V_{GS} = -4.5V$ | -2 |

Features

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

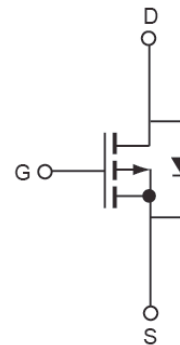
Application

- Load Switch
- PA Switch

Ordering Information

| Part No. | Package | Packing |
|--------------|---------|-----------------|
| TSM2307CX RF | SOT-23 | 3Kpcs / 7" Reel |

Block Diagram



P-Channel MOSFET

Absolute Maximum Rating (Ta = 25°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 | I_D | -3 | A |
| Pulsed Drain Current | I_{DM} | -20 | A |
| Continuous Source Current (Diode Conduction) ^{a,b} | I_S | -1.7 | A |
| Maximum Power Dissipation | P_D | Ta = 25°C | 1.25 |
| | | Ta = 75°C | 0.8 |
| Operating Junction Temperature | T_J | +150 | °C |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | - 55 to +150 | °C |

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|-------------------|-------|------|
| Junction to Case Thermal Resistance | $R_{\theta_{JF}}$ | 75 | °C/W |
| Junction to Ambient Thermal Resistance (PCB mounted) | $R_{\theta_{JA}}$ | 130 | °C/W |

Notes:

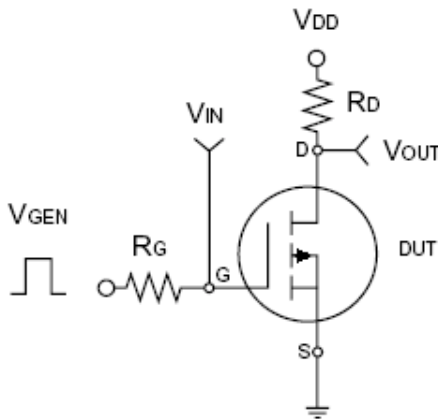
- a. Pulse width limited by the Maximum junction temperature
- b. Surface Mounted on FR4 Board, $t \leq 5$ sec.

Electrical Specifications (Ta = 25°C unless otherwise noted)

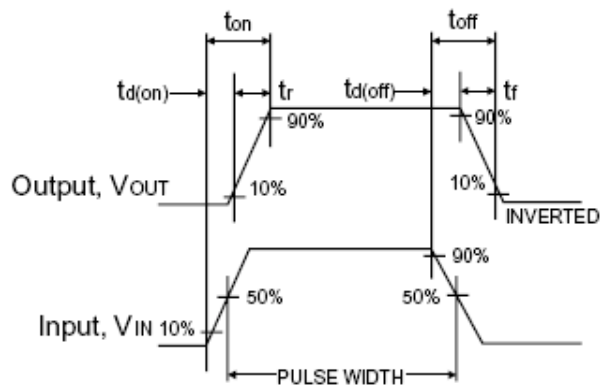
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|--------------|-----|-----|-----------|------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = -250\mu A$ | BV_{DSS} | -30 | -- | -- | V |
| Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = -250\mu A$ | $V_{GS(TH)}$ | -1 | -- | -3 | V |
| Gate Body Leakage | $V_{GS} = \pm 20V, V_{DS} = 0V$ | I_{GSS} | -- | -- | ± 100 | nA |
| Zero Gate Voltage Drain Current | $V_{DS} = -30V, V_{GS} = 0V$ | I_{DSS} | -- | -- | -1.0 | μA |
| On-State Drain Current ^a | $V_{DS} \leq -5V, V_{GS} = -10V$ | $I_{D(ON)}$ | -6 | -- | -- | A |
| Drain-Source On-State Resistance ^a | $V_{GS} = -10V, I_D = -3.0A$ | $R_{DS(ON)}$ | -- | 64 | 80 | m Ω |
| | $V_{GS} = -4.5V, I_D = -2.0A$ | | -- | 103 | 140 | |
| Forward Transconductance ^a | $V_{DS} = -15V, I_D = -3A$ | g_{fs} | -- | 5 | -- | S |
| Diode Forward Voltage | $I_S = -1.7A, V_{GS} = 0V$ | V_{SD} | -- | -- | -1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | $V_{DS} = -15V, I_D = -3A,$ $V_{GS} = -10V$ | Q_g | -- | 10 | 15 | nC |
| Gate-Source Charge | | Q_{gs} | -- | 1.9 | -- | |
| Gate-Drain Charge | | Q_{gd} | -- | 2 | -- | |
| Input Capacitance | $V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0MHz$ | C_{iss} | -- | 565 | -- | pF |
| Output Capacitance | | C_{oss} | -- | 126 | -- | |
| Reverse Transfer Capacitance | | C_{rss} | -- | 75 | -- | |
| Switching^c | | | | | | |
| Turn-On Delay Time | $V_{DD} = -15V, R_L = 15\Omega,$ $I_D = -1A, V_{GEN} = -10V,$ $R_G = 6\Omega$ | $t_{d(on)}$ | -- | 10 | 20 | nS |
| Turn-On Rise Time | | t_r | -- | 9 | 20 | |
| Turn-Off Delay Time | | $t_{d(off)}$ | -- | 27 | 50 | |
| Turn-Off Fall Time | | t_f | -- | 7 | 16 | |

Notes:

- pulse test: PW $\leq 300\mu s$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.



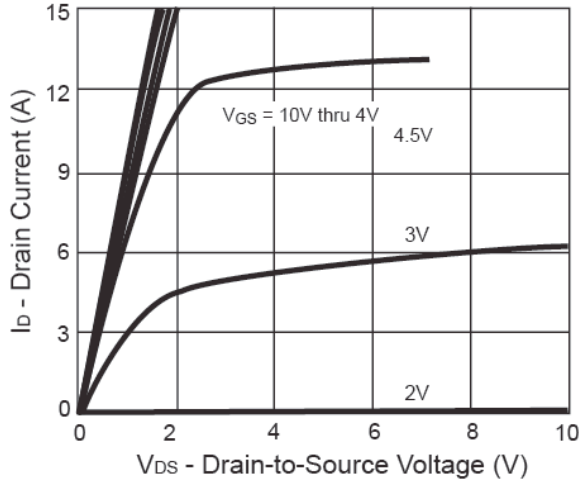
Switching Test Circuit



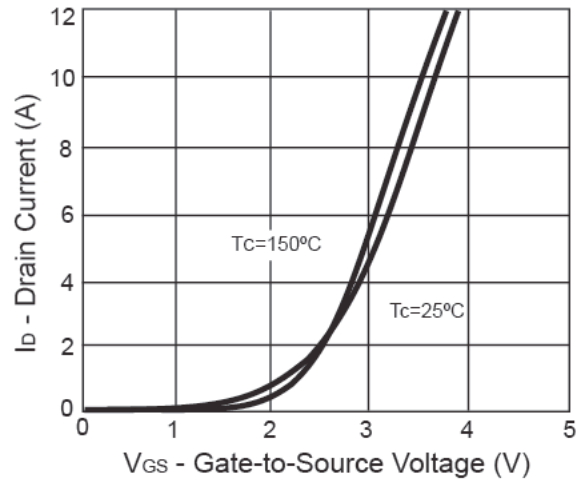
Switchin Waveforms

Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

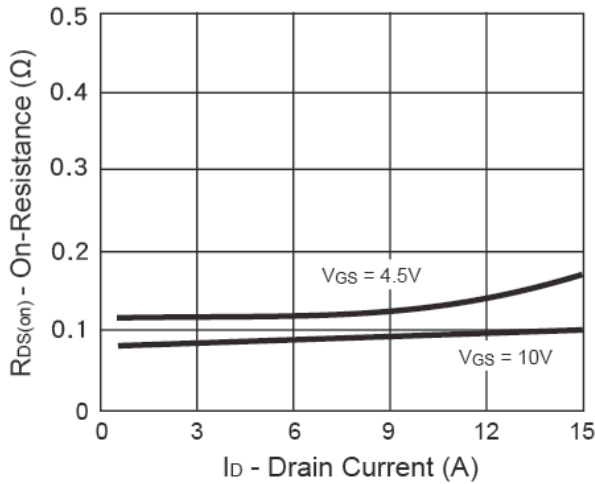
Output Characteristics



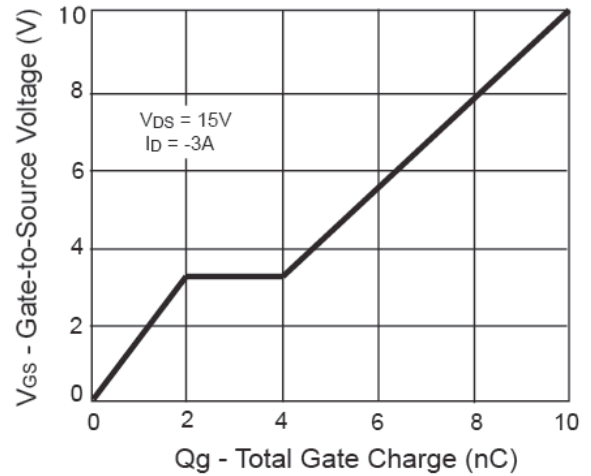
Transfer Characteristics



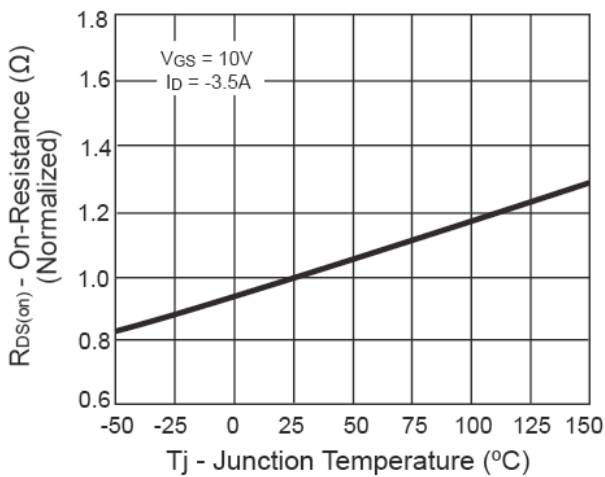
On-Resistance vs. Drain Current



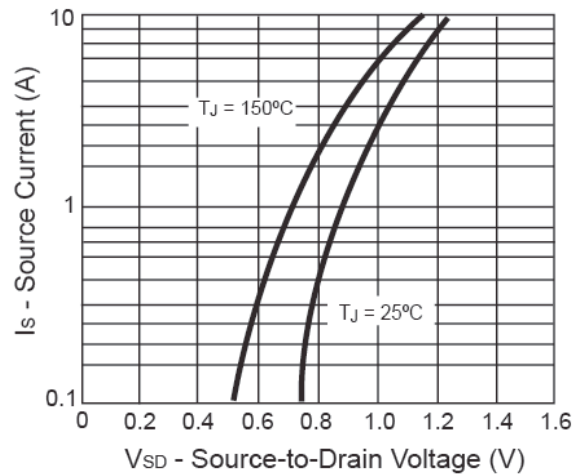
Gate Charge



On-Resistance vs. Junction Temperature

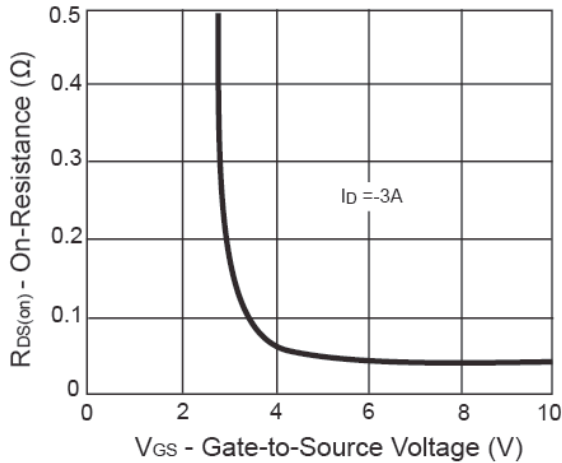


Source-Drain Diode Forward Voltage

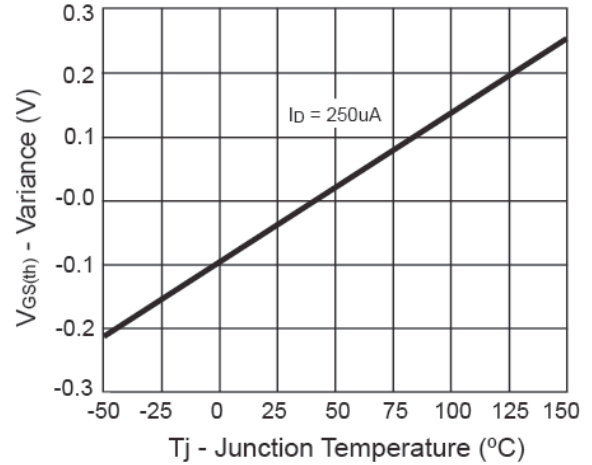


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

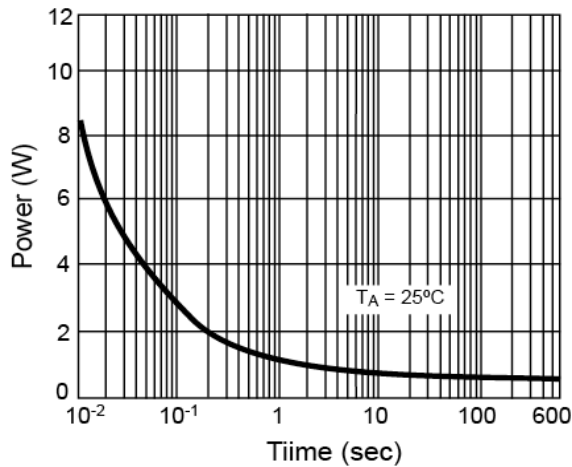
On-Resistance vs. Gate-Source Voltage



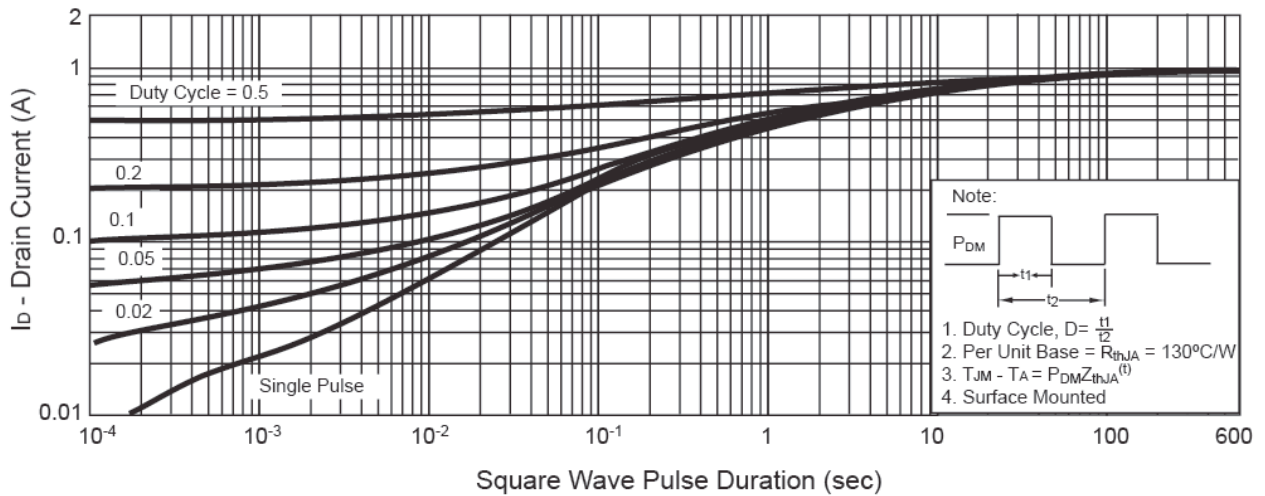
Threshold Voltage



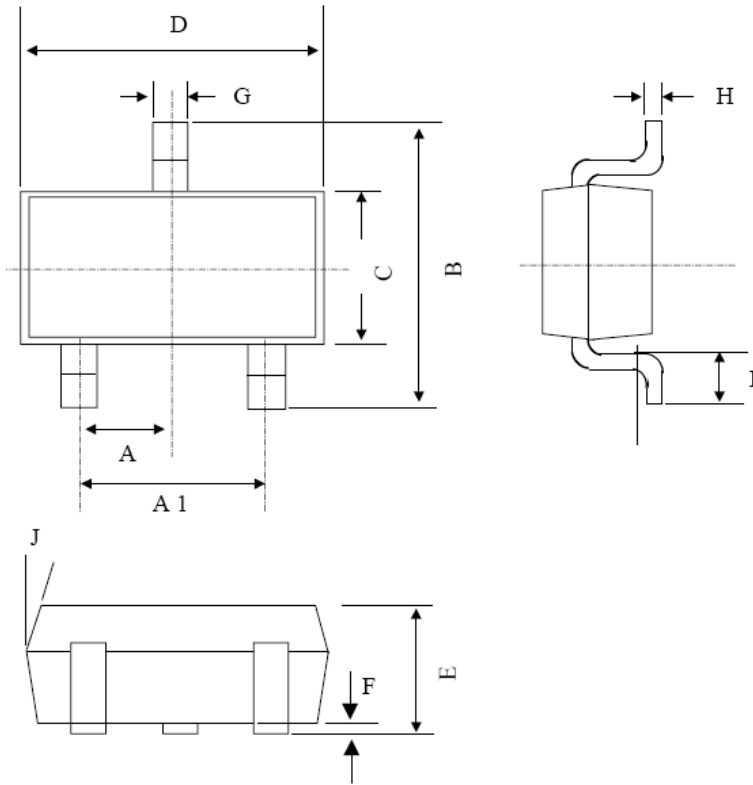
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

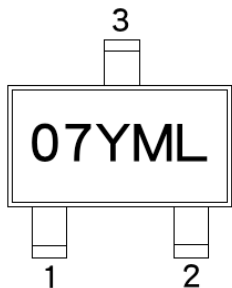


SOT-23 Mechanical Drawing



| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX. |
| A | 0.95 BSC | | 0.037 BSC | |
| A1 | 1.9 BSC | | 0.074 BSC | |
| B | 2.60 | 3.00 | 0.102 | 0.118 |
| C | 1.40 | 1.70 | 0.055 | 0.067 |
| D | 2.80 | 3.10 | 0.110 | 0.122 |
| E | 1.00 | 1.30 | 0.039 | 0.051 |
| F | 0.00 | 0.10 | 0.000 | 0.004 |
| G | 0.35 | 0.50 | 0.014 | 0.020 |
| H | 0.10 | 0.20 | 0.004 | 0.008 |
| I | 0.30 | 0.60 | 0.012 | 0.024 |
| J | 5° | 10° | 5° | 10° |

Marking Diagram



- 07** = Device Code
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code

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