

TSM180P03CS

30V P-Channel Power MOSFET



Pin Definition:

- | | |
|-----------|----------|
| 1. Source | 8. Drain |
| 2. Source | 7. Drain |
| 3. Source | 6. Drain |
| 4. Gate | 5. Drain |

Key Parameter Performance

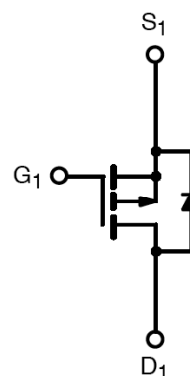
| Parameter | Value | Unit |
|--------------------|------------------|------|
| V_{DS} | -30 | V |
| $R_{DS(on)}$ (max) | $V_{GS} = -10V$ | 18 |
| | $V_{GS} = -4.5V$ | 30 |
| Q_g | 14.6 | nC |

Ordering Information

| Part No. | Package | Packing |
|-----------------|---------|--------------------|
| TSM180P03CS RLG | SOP-8 | 2.5kpcs / 13" 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 ($T_C=25^{\circ}C$ 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 | $T_C=25^{\circ}C$ | -10 |
| | | $T_C=100^{\circ}C$ | -6.3 |
| Pulsed Drain Current (Note 1) | I_{DM} | -40 | A |
| Power Dissipation @ $T_C = 25^{\circ}C$ | P_D | 2.5 | W |
| Operating Junction Temperature | T_J | 150 | $^{\circ}C$ |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^{\circ}C$ |

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|-----------------|-------|---------------|
| Thermal Resistance - Junction to Ambient | $R_{\theta JA}$ | 50 | $^{\circ}C/W$ |

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

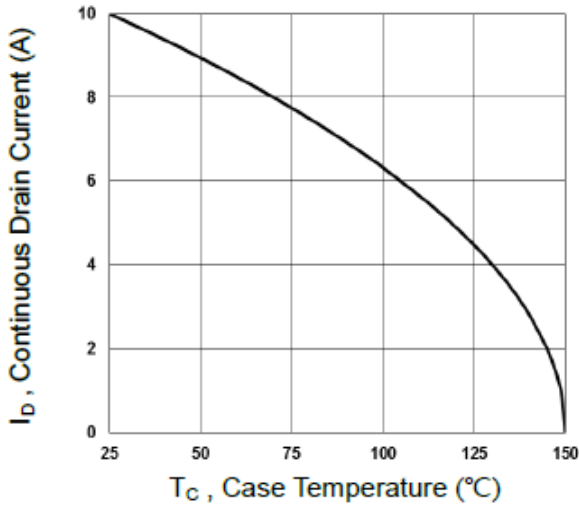
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|---|--|---------------------|------|------|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{GS} = 0V, I _D = -250μA | BV _{DSS} | -30 | -- | -- | V |
| Drain-Source On-State Resistance | V _{GS} = -10V, I _D = -8A | R _{DS(ON)} | -- | 14 | 18 | mΩ |
| | V _{GS} = -4.5V, I _D = -6A | | -- | 23 | 30 | |
| Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = -250μA | V _{GS(TH)} | -1.2 | -1.6 | -2.5 | V |
| Zero Gate Voltage Drain Current | V _{DS} = -30V, V _{GS} = 0V | I _{DSS} | -- | -- | -1 | μA |
| | V _{DS} = -24V, T _J = 125°C | | -- | -- | -10 | |
| Gate Body Leakage | V _{GS} = ±20V, V _{DS} = 0V | I _{GSS} | -- | -- | ±100 | nA |
| Forward Transconductance ^(Note 2) | V _{DS} = -10V, I _D = -8A | g _{fs} | -- | 10.5 | -- | S |
| Dynamic | | | | | | |
| Total Gate Charge ^(Note 2,3) | V _{DS} = -15V, I _D = -8A, V _{GS} = -4.5V | Q _g | -- | 14.6 | -- | nC |
| Gate-Source Charge ^(Note 2,3) | | Q _{gs} | -- | 4.1 | -- | |
| Gate-Drain Charge ^(Note 2,3) | | Q _{gd} | -- | 6.3 | -- | |
| Input Capacitance | V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz | C _{iss} | -- | 1730 | -- | pF |
| Output Capacitance | | C _{oss} | -- | 180 | -- | |
| Reverse Transfer Capacitance | | C _{rss} | -- | 125 | -- | |
| Switching | | | | | | |
| Turn-On Delay Time ^(Note 2,3) | V _{DD} = -15V, I _D = -1A, V _{GS} = -10V, R _{GEN} = 6Ω | t _{d(on)} | -- | 9 | -- | ns |
| Turn-On Rise Time ^(Note 2,3) | | t _r | -- | 21.8 | -- | |
| Turn-Off Delay Time ^(Note 2,3) | | t _{d(off)} | -- | 59.8 | -- | |
| Turn-Off Fall Time ^(Note 2,3) | | t _f | -- | 14.4 | -- | |
| Source-Drain Diode Ratings and Characteristic | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | Integral reverse diode in the MOSFET | I _S | -- | -- | -10 | A |
| Maximum Pulse Drain-Source Diode Forward Current | | I _{SM} | -- | -- | -40 | A |
| Diode-Source Forward Voltage | V _{GS} = 0V, I _S = -1A | V _{SD} | -- | -- | -1 | V |

Note:

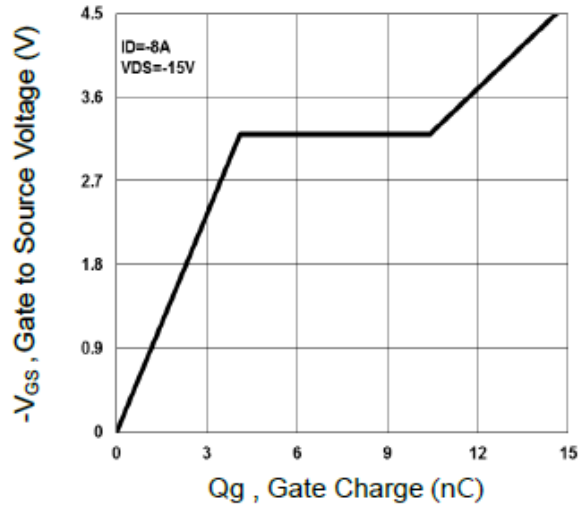
1. Pulse width limited by safe operating area
2. Pulse test: pulse width ≤300μs, duty cycle ≤2%
3. Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

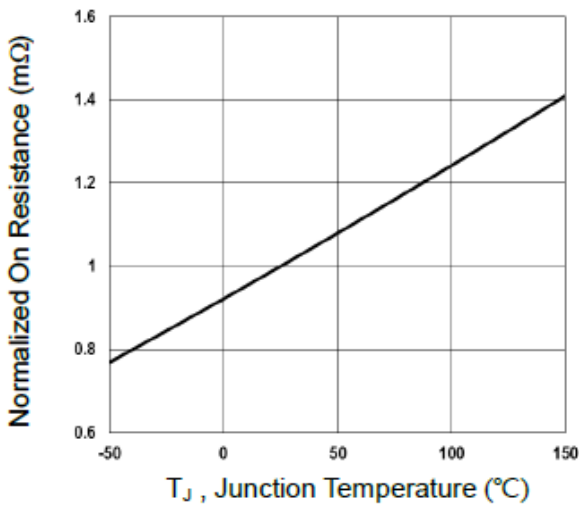
Continuous Drain Current vs. T_C



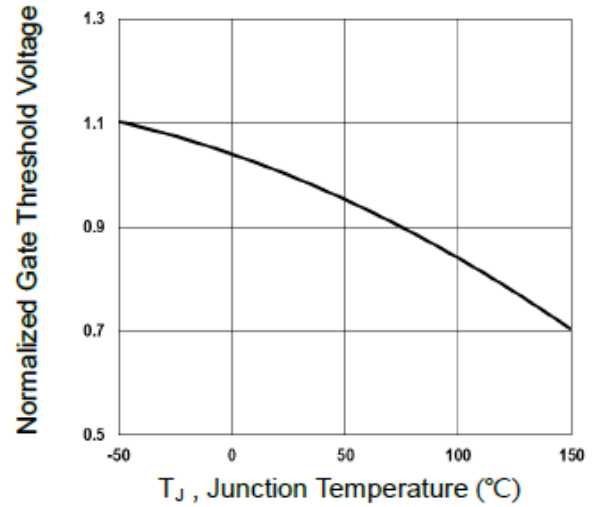
Gate Charge



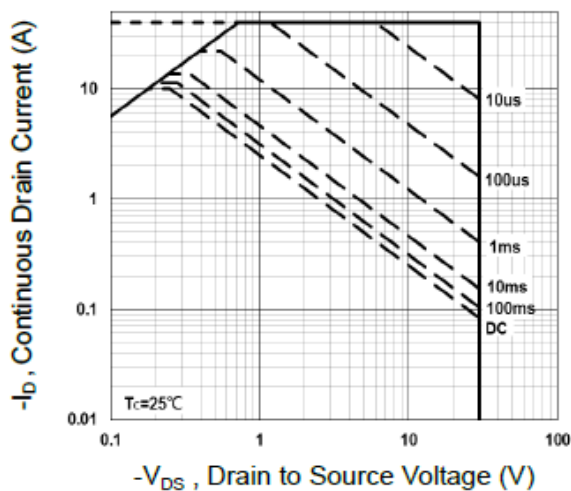
On-Resistance vs. Junction Temperature



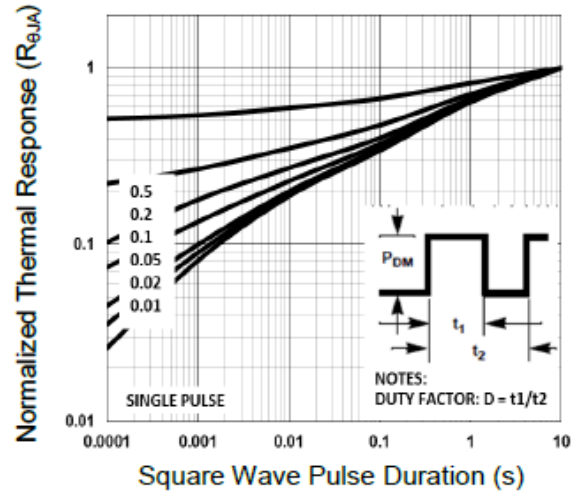
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area

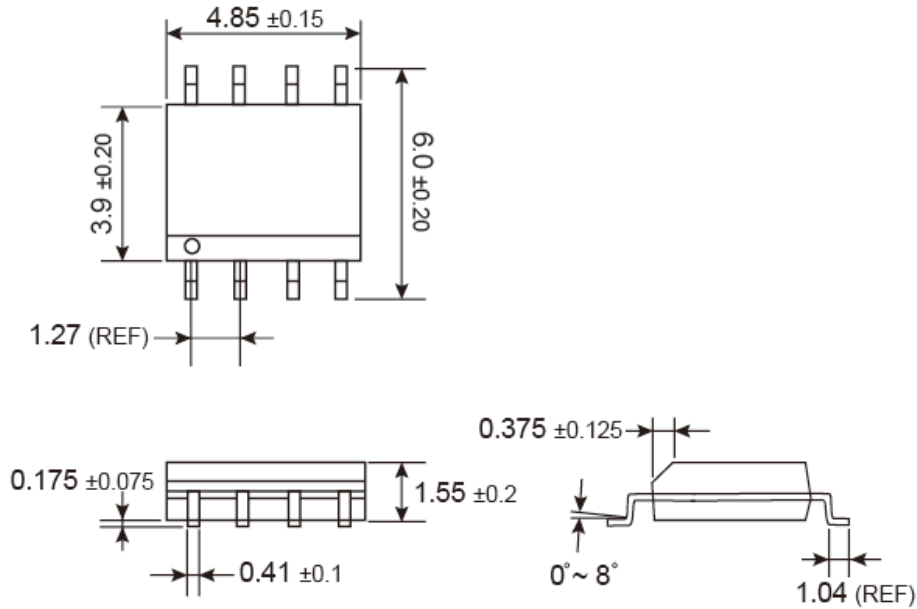


Normalized Thermal Transient Impedance Curve



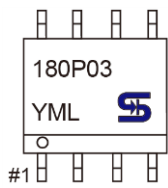


SOP-8 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- 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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