

TPCS8201-VB Datasheet

Dual N-Channel 25-V (D-S) MOSFET

PRODUCT SUMMARY

| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 25 | 0.022 at $V_{GS} = 4.5$ V | 6.6 |
| | 0.032 at $V_{GS} = 2.5$ V | 5.5 |

FEATURES

- Halogen-free Option Available
- Trench Power MOSFETs



RoHS*
COMPLIANT



ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

| Parameter | Symbol | 10 s | Steady State | Unit |
|---|----------------|-------------|--------------|------------------|
| Drain-Source Voltage | V_{DS} | 25 | | V |
| Gate-Source Voltage | V_{GS} | ± 12 | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a | I_D | 6.6 | 5.2 | A |
| | | 5.5 | 3.5 | |
| Pulsed Drain Current | I_{DM} | 30 | | |
| Continuous Source Current (Diode Conduction) ^a | I_S | 1.5 | 1.0 | |
| Maximum Power Dissipation ^a | P_D | 1.5 | 1.0 | W |
| | | 0.96 | 0.64 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 150 | | $^\circ\text{C}$ |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Typ. | Max. | Unit |
|--|------------|------|------|--------------------|
| Maximum Junction-to-Ambient ^a | R_{thJA} | 72 | 83 | $^\circ\text{C/W}$ |
| | | 100 | 120 | |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | 55 | 70 | |

Notes:

a. Surface Mounted on FR4 board, $t \leq 10$ s.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

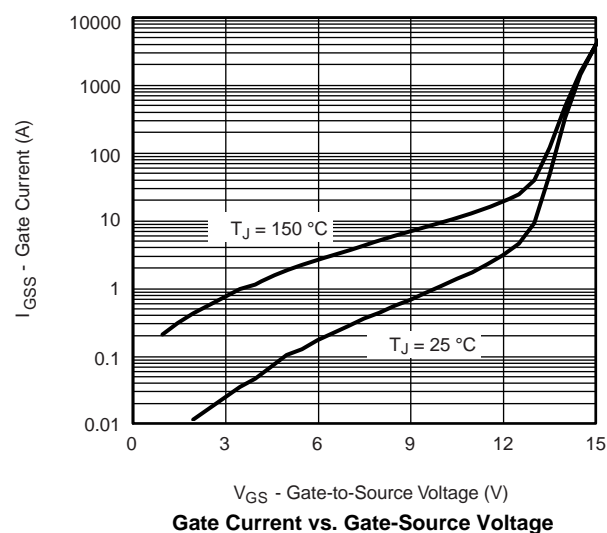
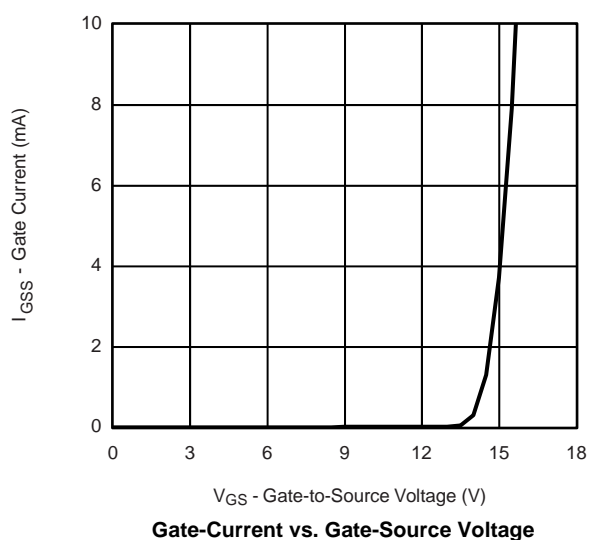
| SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted | | | | | | |
|---|--------------|--|------|-------------------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
| Static | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$ | 0.5 | | 1.0 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}$, $V_{GS} = \pm 4.5\text{ V}$ | | | ± 200 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 70\text{ }^{\circ}\text{C}$ | | | 25 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} \leq 5\text{ V}$, $V_{GS} = 4.5\text{ V}$ | 30 | | | A |
| Drain-Source On-State Resistance ^b | $R_{DS(on)}$ | $V_{GS} = 4.5\text{ V}$, $I_D = 6.5\text{ A}$ | | 0.022 | | Ω |
| | | $V_{GS} = 2.5\text{ V}$, $I_D = 5.5\text{ A}$ | | 0.032 | | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 10\text{ V}$, $I_D = 6.5\text{ A}$ | | 30 | | S |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 1.5\text{ A}$, $V_{GS} = 0\text{ V}$ | | 0.71 | 1.2 | V |
| Dynamic^a | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 10\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 6.5\text{ A}$ | | 12 | 18 | nC |
| Gate-Source Charge | Q_{gs} | | | 2.2 | | |
| Gate-Drain Charge | Q_{gd} | | | 3.6 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 10\text{ V}$, $R_L = 10\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_G = 6\text{ }\Omega$ | | 245 | 365 | ns |
| Rise Time | t_r | | | 330 | 495 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 860 | 1300 | |
| Fall Time | t_f | | | 510 | 765 | |

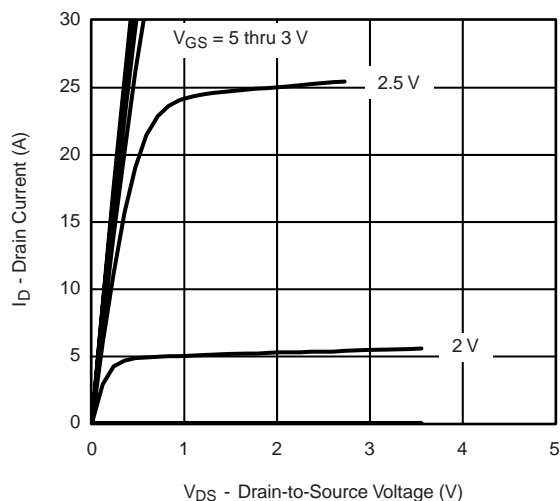
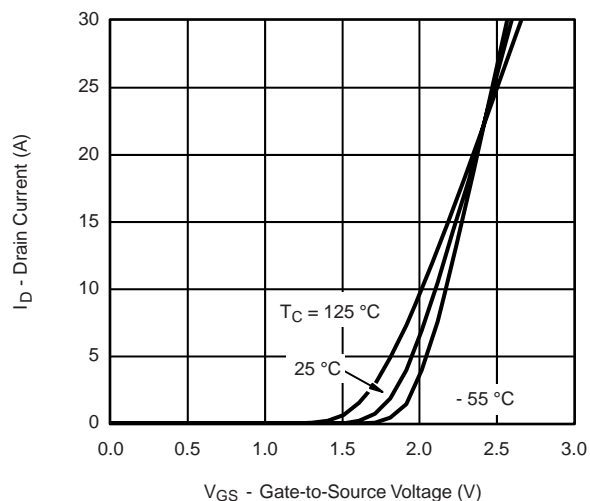
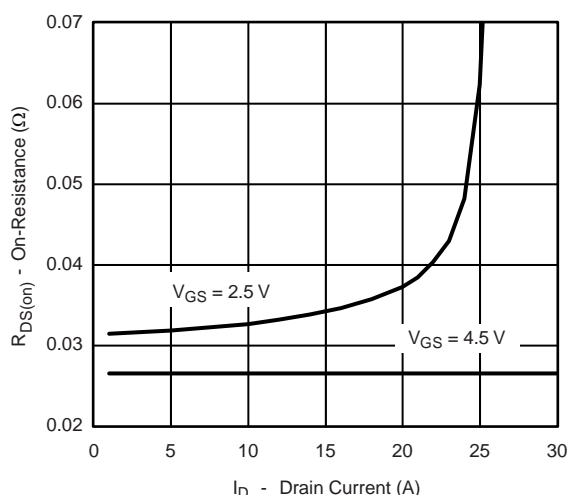
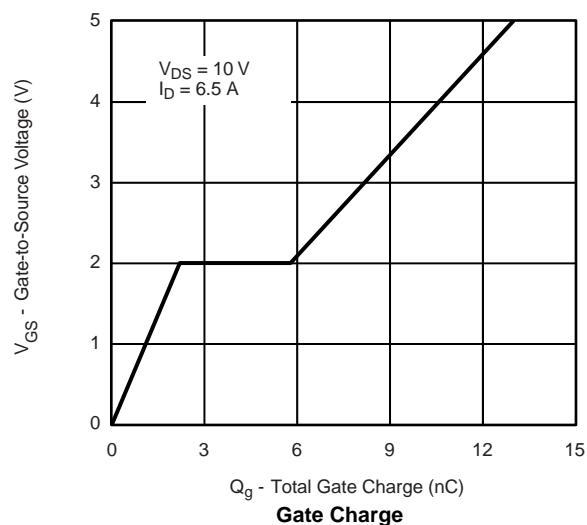
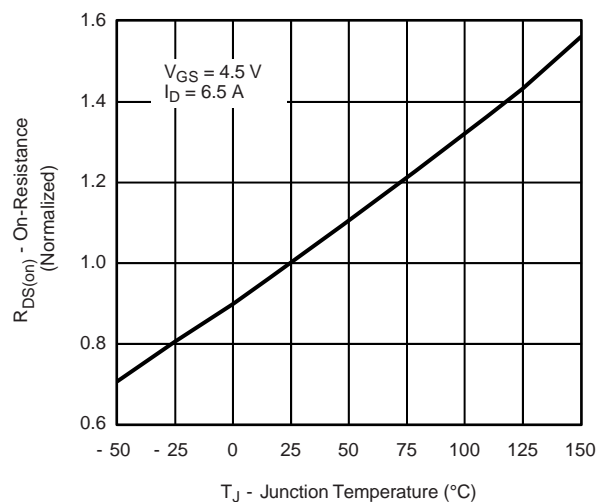
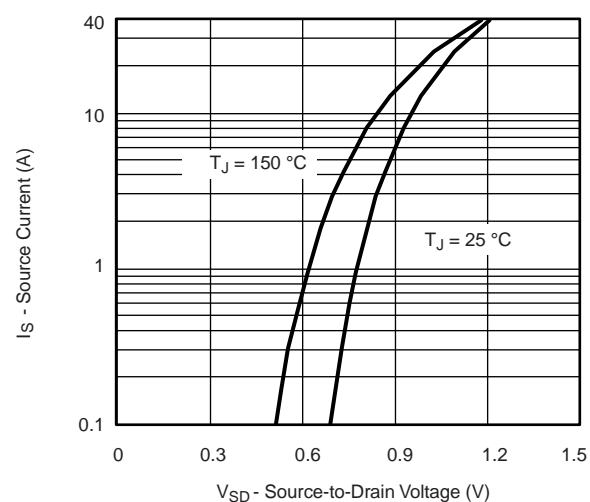
Notes:

a. For design aid only; not subject to production testing.

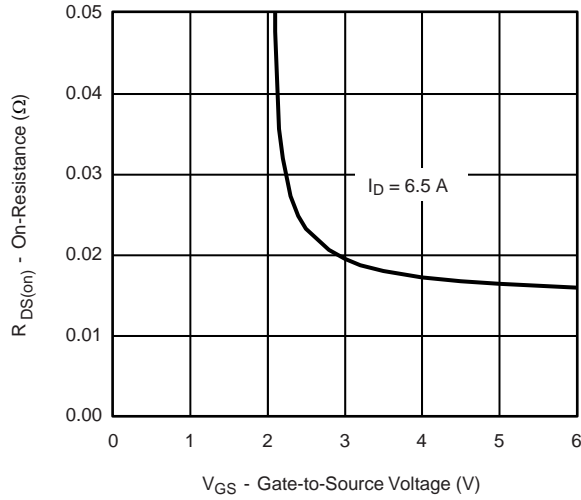
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

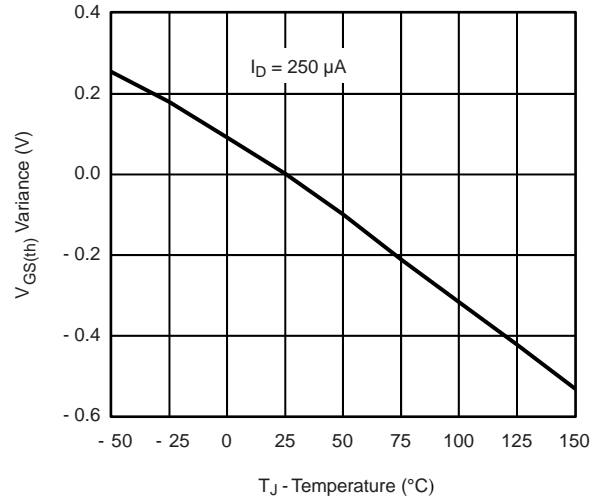
TYPICAL CHARACTERISTICS $25\text{ }^{\circ}\text{C}$, unless otherwise noted

TYPICAL CHARACTERISTICS 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

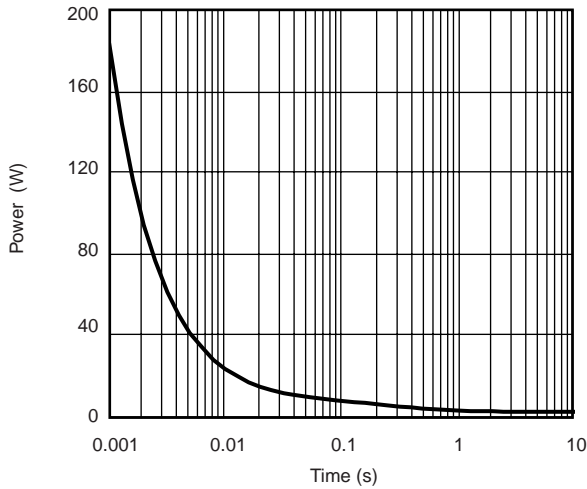
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



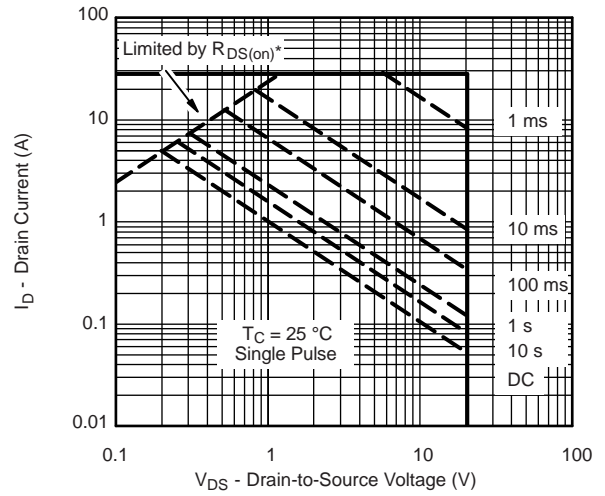
On-Resistance vs. Gate-to-Source Voltage



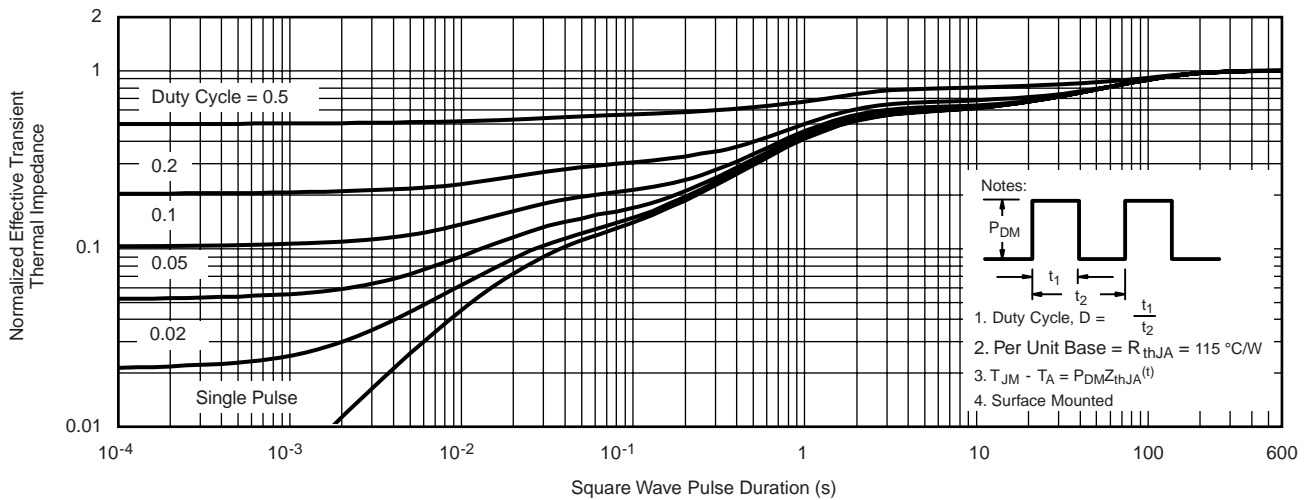
Threshold Voltage



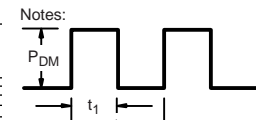
Single Pulse Power



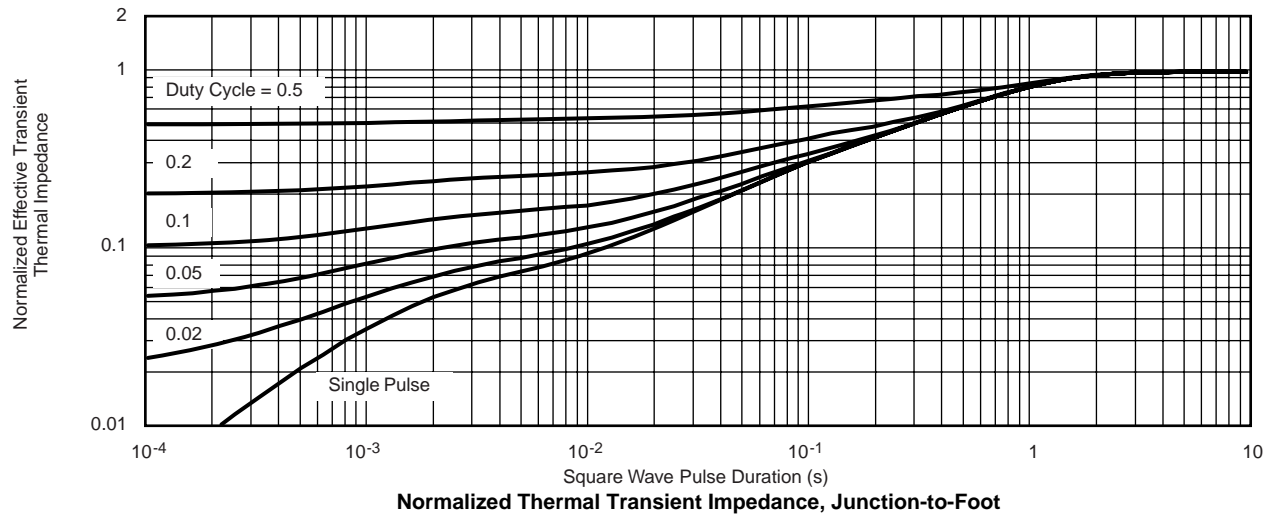
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient

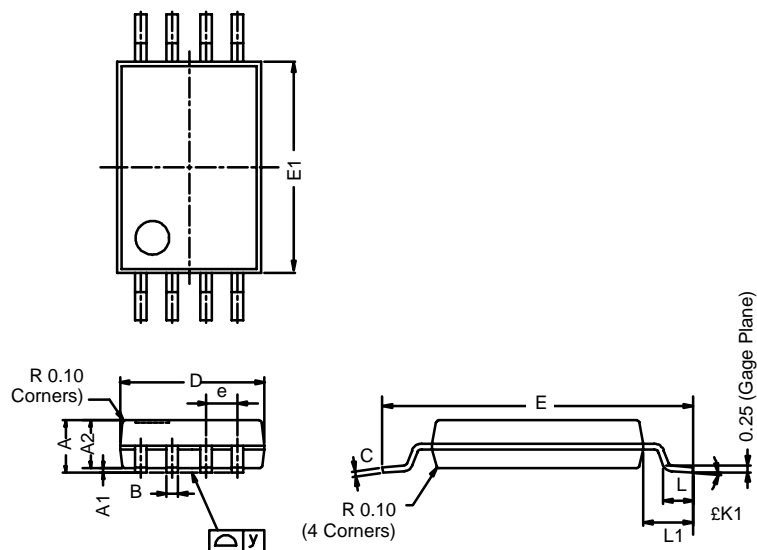


1. Duty Cycle, $D = \frac{t_1}{t_2}$
2. Per Unit Base = $R_{thJA} = 115$ °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}(t)$
4. Surface Mounted

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

TSSOP: 8-LEAD

JEDEC Part Number: MO-153



| Dim | MILLIMETERS | | |
|---|-------------|-------|------|
| | Min | Nom | Max |
| A | — | — | 1.20 |
| A₁ | 0.05 | 0.10 | 0.15 |
| A₂ | 0.80 | 1.00 | 1.05 |
| B | 0.19 | 0.28 | 0.30 |
| C | — | 0.127 | — |
| D | 2.90 | 3.00 | 3.10 |
| E | 6.20 | 6.40 | 6.60 |
| E₁ | 4.30 | 4.40 | 4.50 |
| e | — | 0.65 | — |
| L | 0.45 | 0.60 | 0.75 |
| L₁ | 0.90 | 1.00 | 1.10 |
| Y | — | — | 0.10 |
| °K1 | 0° | 3° | 6° |
| ECN: S-03946—Rev. G, 09-Jul-01 DWG: 5844 | | | |

RECOMMENDED MINIMUM PADS FOR TSSOP-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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