# LMP2165X5F 20V P-Channel Enhancement MOSFET

## Features

- -20V/-1.5A, $R_{DS(ON)}$ =70mΩ@$V_{GS}$ = -4.5V
- -20V/-1.2A, $R_{DS(ON)}$ =90mΩ@$V_{GS}$ = -2.5V
- -20V/-0.8A, $R_{DS(ON)}$ =130mΩ@$V_{GS}$ = -1.8V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability

These devices are particularly suited for low Voltage power management, such as smart Phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

## Product Description

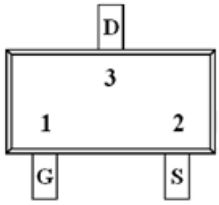
LMP2165, P-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

## Applications

- Portable Equipment
- Battery Powered System
- Net Working System

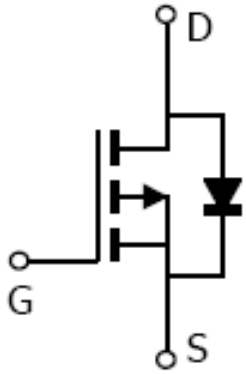
## Pin Configuration

**LMP2165X5F (SOT-323)**




Top Views

| Pin | Description |
|---|---|
| 1 | Gate |
| 2 | Source |
| 3 | Drain |



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## Ordering Information

| Part Number | P/N | PKG Code | Pb Free Code | Package | Quantity Reel |
|---|---|---|---|---|---|
| LMP2165X5F | LMP2165 | X5 | F | SOT-323 | 3000 pcs |

## Marking Information

| Part Marking | Part Number | LFC code |
|---|---|---|
| P1 WMM | P1 | WMM |

## Absolute Maximum Ratings

($T_A$=25ºC Unless otherwise noted)

| Symbol | Parameter | | Typical | Unit |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±12 | V |
| $I_D$ | Continuous Drain Current | $T_A$=25ºC | -2.1 | A |
| | | $T_A$=70ºC | -1.7 | |
| $I_{DM}$ | Pulsed Drain Current | | -8 | A |
| $P_D$ | Power Dissipation | | 0.46 | W |
| $T_J$ | Operating Junction Temperature Range | | -55 to +150 | ºC |
| $T_{STG}$ | Storage Temperature Range | | -55 to +150 | ºC |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient[1] | | 270 | ºC/W |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient[2] | | 205 | ºC/W |

Note:
1. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
2. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.


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## Electrical Characteristics

($T_A$=25ºC Unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=-250uA | -20 | | | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=-250uA | -0.4 | | -0.9 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±12V | | | ±100 | nA |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-16V, $V_{GS}$=0V | | | -1 | uA |
| $R_{DS(on)}$ | Drain-Source On-Resistance | $V_{GS}$=-4.5V, $I_D$=-1.5A | | 65 | 70 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-1.2A | | 87 | 90 | |
| | | $V_{GS}$=-1.8V, $I_D$=-0.8A | | 120 | 130 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=-10V, $I_D$=-1.5A | | 4 | | S |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V, $I_S$=-1.6A | | -0.8 | -1.2 | V |
| **Dynamic** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-10V, $V_{GS}$=0V, f=1MHz | | 600 | | pF |
| $C_{oss}$ | Output Capacitance | | | 60 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 52 | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $I_D$=-1.6A | | 8 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 1.7 | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-10V, $I_D$=-1A, $V_{GS}$=-4.5V, $R_L$=2.7Ω, $R_G$=3.3Ω | | 4 | | ns |
| $T_r$ | Turn-On Rise Time | | | 20 | | |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 50 | | |
| $T_f$ | Turn-Off Fall Time | | | 5.2 | | |


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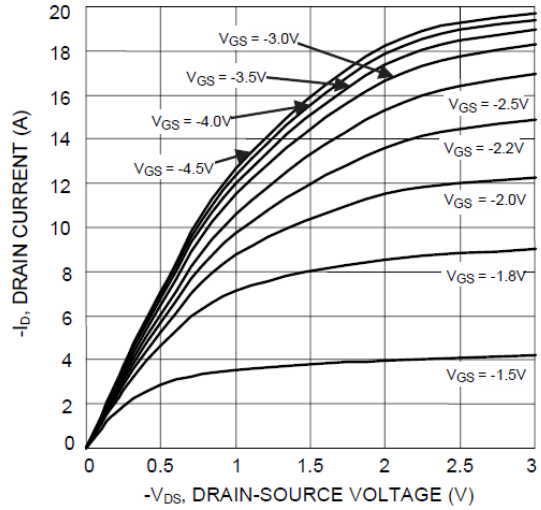
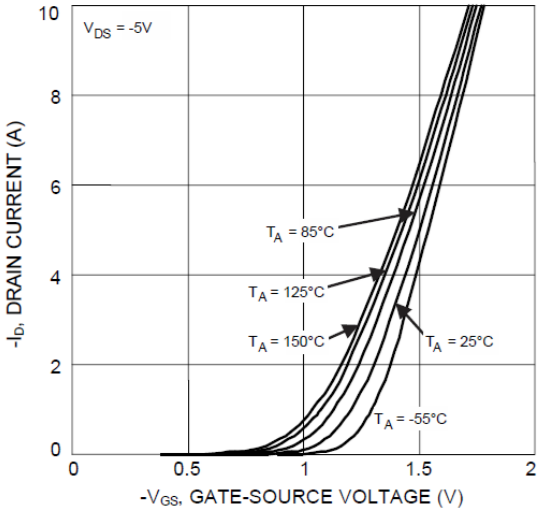
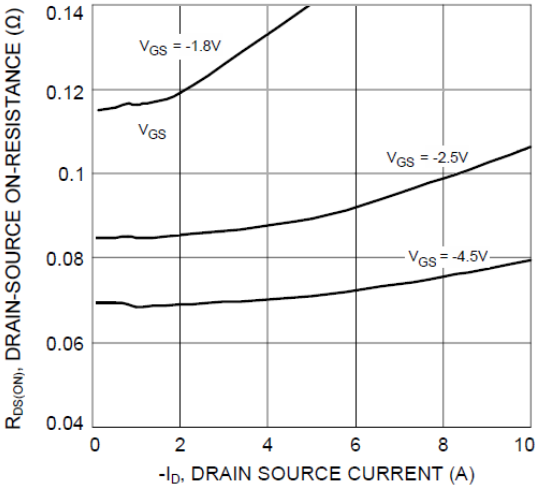
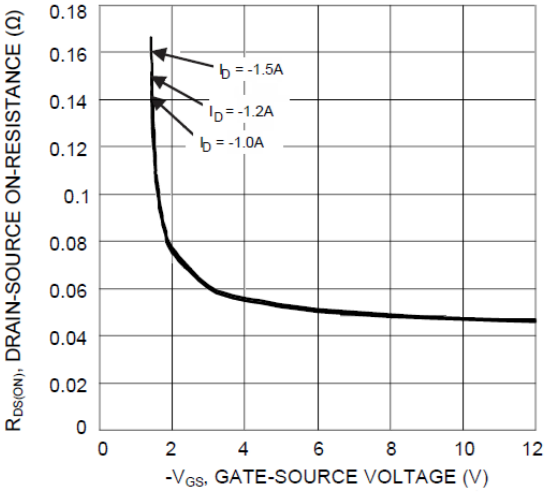
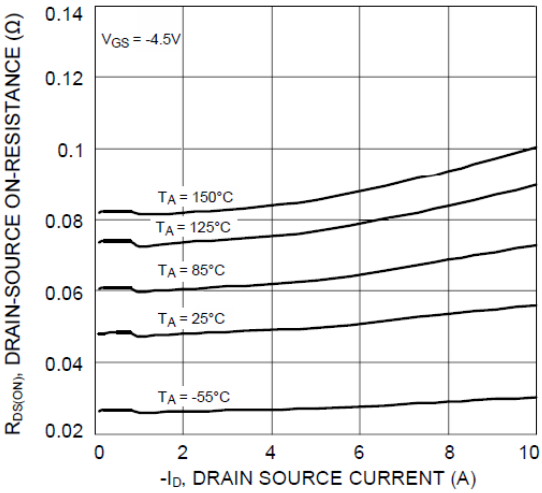
## Typical Performance Characteristics

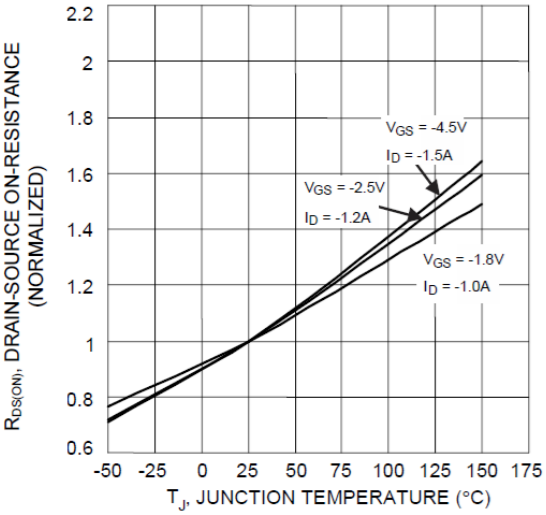


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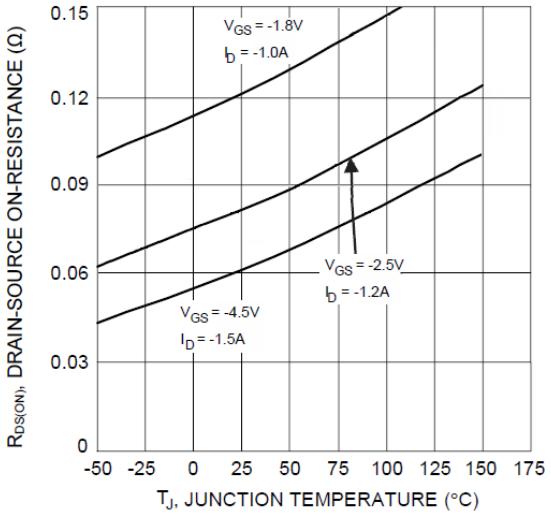
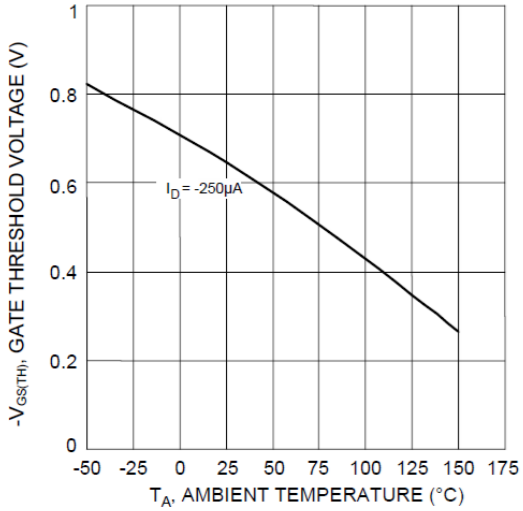
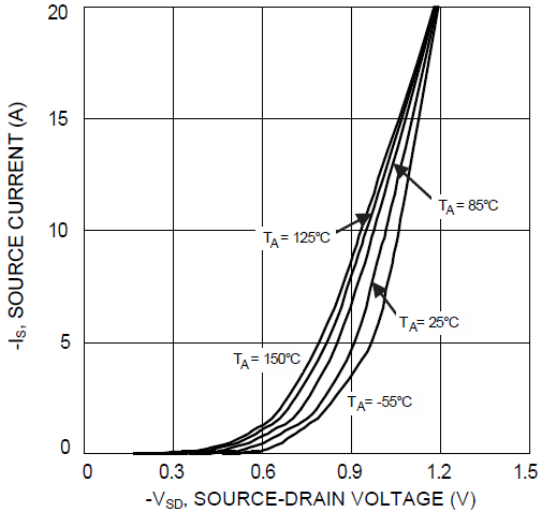
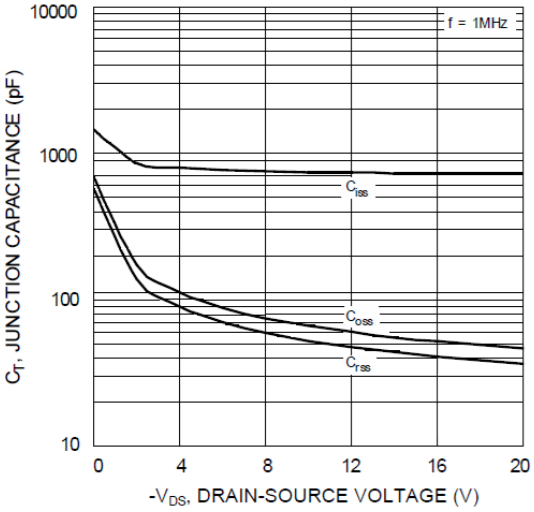
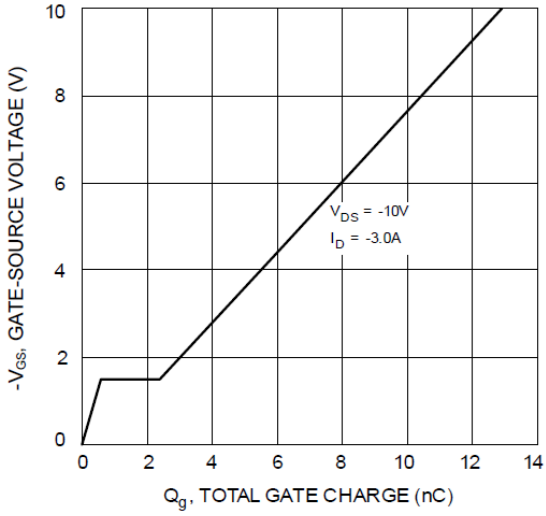
## Typical Performance Characteristics (continue.)





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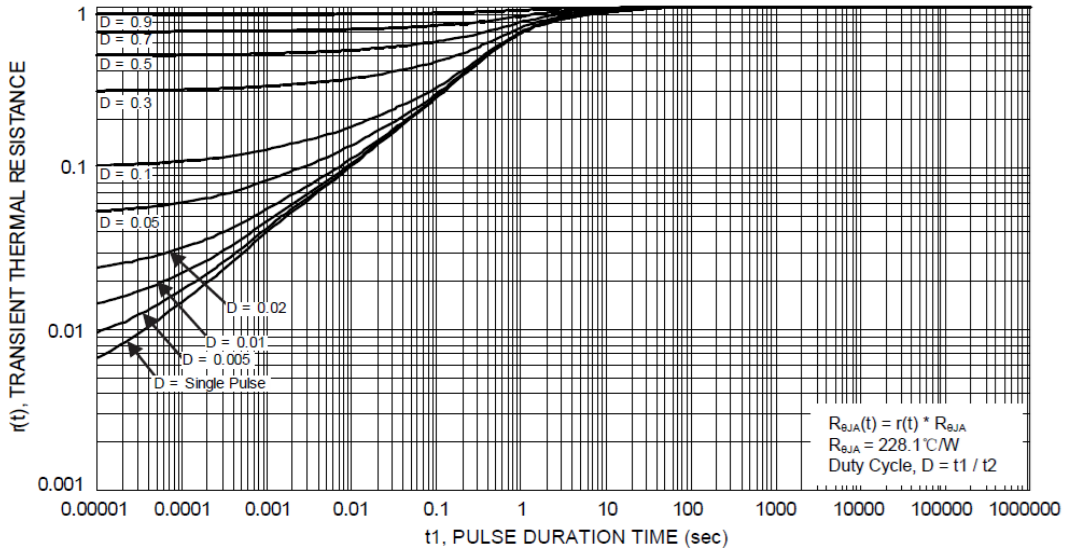



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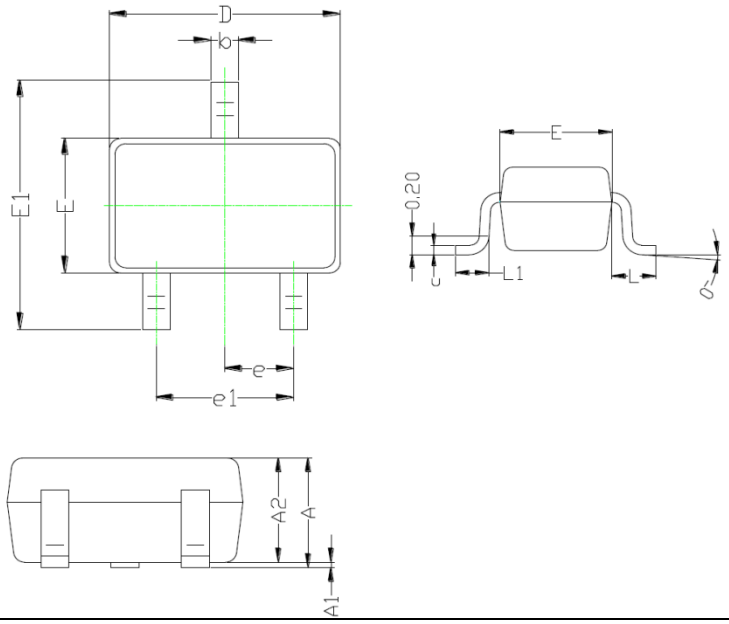
## Package Dimension

# SOT-323




| Dimensions | | | | |
|---|---|---|---|---|
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.900 | 1.000 | 0.035 | 0.039 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.200 | 0.400 | 0.008 | 0.015 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.086 |
| E | 1.150 | 1.350 | 0.059 | 0.053 |
| E1 | 2.150 | 2.400 | 0.084 | 0.094 |
| e | 0.650 TYP | | 0.025 TYP | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF | | 0.021 REF | |
| L1 | 0.260 | 0.450 | 0.010 | 0.017 |
| θ | 0º | 8º | 0º | 8º |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