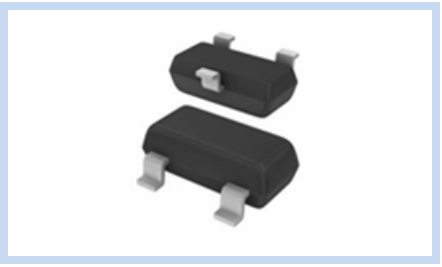
# P-Channel MOSFET
# 20V 4.5A SOT-23 AEC-Q101

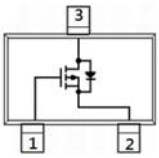
**MFT2P4A5S23A**

**MERITEK**

## FEATURE



- $R_{DS(ON)}$ <48mΩ, $V_{GS}$=-4.5V, $I_D$=-4.5A
- $R_{DS(ON)}$ <60mΩ, $V_{GS}$=-2.5V, $I_D$=-3A
- $R_{DS(ON)}$ <88mΩ, $V_{GS}$=-1.8V, $I_D$=-1.5A
- Advanced Trench Process Technology
- Application: Switch Load, PWM Application, etc.
- AEC-Q101 Qualified




RoHS

## MECHANICAL DATA

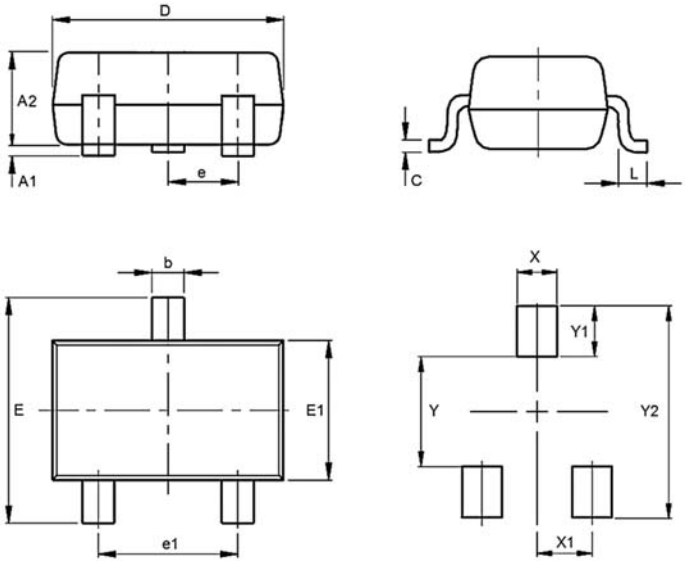
- Case: SOT-23 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

## MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Drain Current – Continuous | $T_A$=25°C | $I_D$ | -4.5 | A |
| Drain Current – Pulsed | | $I_{DM}$ | -18 | A |
| Power Dissipation | $T_A$=25°C | $P_D$ | 1.25 | W |
| | Derate above 25°C | | 10 | mW/°C |
| Thermal Resistance Junction to Ambient | | $R_{\theta JA}$ | 100 | °C/W |
| Operating Junction and Storage Temperature | | $T_J$ ,$T_{STG}$ | -55 to 150 | °C |

## DIMENSIONS

| Item | Min (mm) | Max (mm) |
|---|---|---|
| A1 | 0.00 | 0.10 |
| A2 | 0.90 | 1.10 |
| b | 0.35 | 0.50 |
| C | 0.08 | 0.20 |
| D | 2.80 | 3.04 |
| e | 0.90 | 1.00 |
| e1 | 1.80 | 2.00 |
| E | 2.20 | 2.60 |
| E1 | 1.20 | 1.40 |
| L | 0.15 | |
| X | 0.80 | |
| X1 | 0.95 | |
| Y | 1.10 | |
| Y1 | 0.90 | |
| Y2 | 2.90 | |

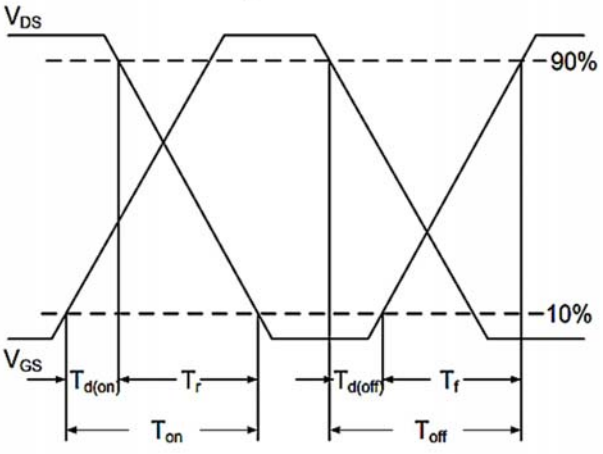


## ELECTRICAL CHARACTERISTICS

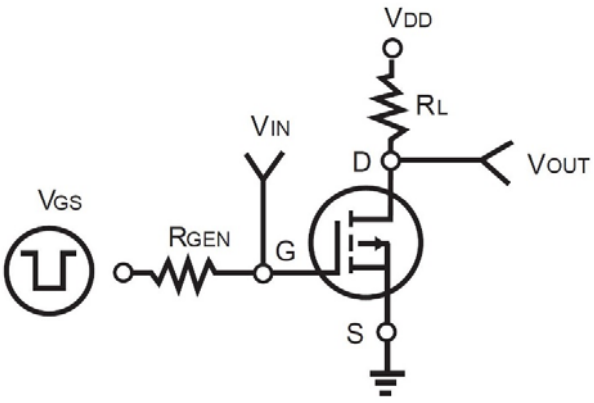
| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=-250μA | $BV_{DSS}$ | -20 | -- | -- | V |
| Drain-Source Leakage Current | $V_{DS}$=-16V, $V_{GS}$=0V | $I_{DSS}$ | -- | -- | -1 | μA |
| Gate-Source Leakage Current | $V_{GS}$=±12V, $V_{DS}$=0V | $I_{GSS}$ | -- | -- | ±100 | nA |
| **On Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Static Drain-Source On-Resistance | $V_{GS}$=-4.5V, $I_D$=-4.5A | $R_{DS(ON)}$ | -- | 40 | 48 | mΩ |
| | $V_{GS}$=-2.5V, $I_D$=-3.0A | | -- | 50 | 60 | |
| | $V_{GS}$=-1.8V, $I_D$=-1.5A | | -- | 75 | 88 | |
| Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=-250μA | $V_{GS(th)}$ | -0.5 | -0.74 | -1.3 | V |
| **Dynamic Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Total Gate Charge | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $I_D$=-4.5A | $Q_g$ | -- | 10 | -- | nC |
| Gate-Source Charge | | $Q_{gs}$ | -- | 1.7 | -- | |
| Gate-Drain Charge | | $Q_{gd}$ | -- | 2.4 | -- | |
| Turn-On Delay Time | $V_{DD}$=-10V, $V_{GS}$= -4.5V, $R_G$=6Ω $I_D$=-4.5A | $T_{d(on)}$ | -- | 9.8 | -- | ns |
| Rise Time | | $T_r$ | -- | 54 | -- | |
| Turn-Off Delay Time | | $T_{d(off)}$ | -- | 44 | -- | |
| Fall Time | | $T_f$ | -- | 31 | -- | |
| Input Capacitance | $V_{DS}$=-10V, ,$V_{GS}$=0V, F=1MHz | $C_{iss}$ | -- | 980 | -- | pF |
| Output Capacitance | | $C_{oss}$ | -- | 100 | -- | |
| Reverse Transfer Capacitance | | $C_{rss}$ | -- | 81 | -- | |
| **Drain-Source Body Diode** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Continuous Source Current | $V_G$=$V_D$=0V, Force Current | $I_S$ | -- | -- | -1.5 | A |
| Diode Forward Voltage | $V_{GS}$=0V, $I_S$=-1.0A | $V_{SD}$ | -- | -0.78 | -1.2 | V |

Note:
1. Pulse width≤300us, Duty cycle≤2%
2. Essentially independent of operating temperature typical characteristics
3. Maximum current rating is package limited
4. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch$^2$ with 2oz square pad of copper.
5. Guaranteed by design, not subject to production testing.

**Switching Time Waveform**

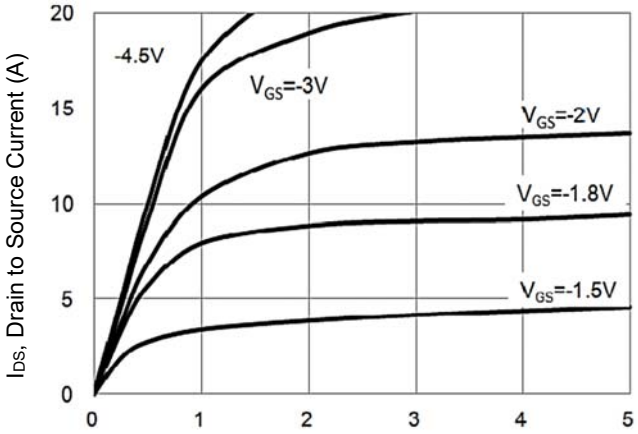



**Switching Test Circuit**

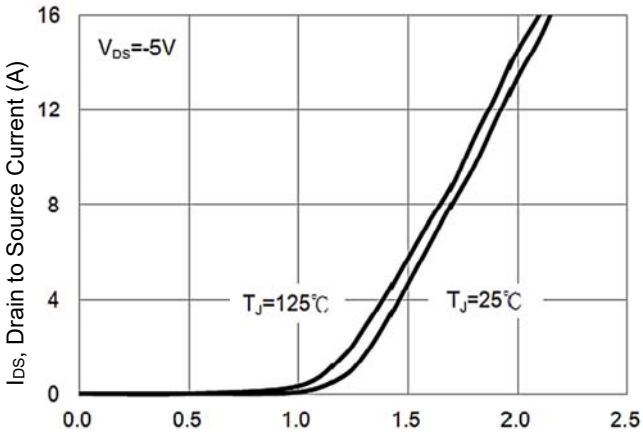


## CHARACTERISTIC CURVES

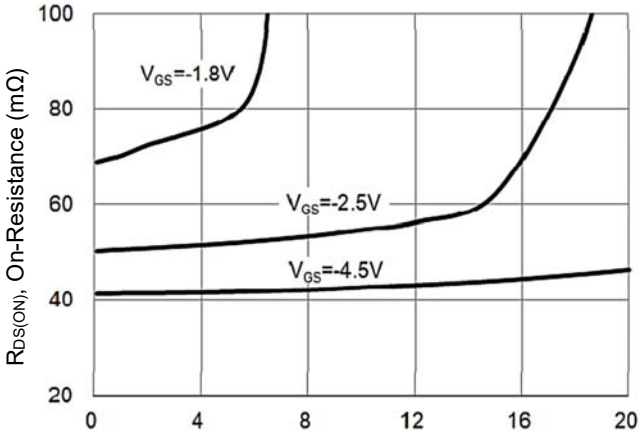
**On-Region Characteristics**



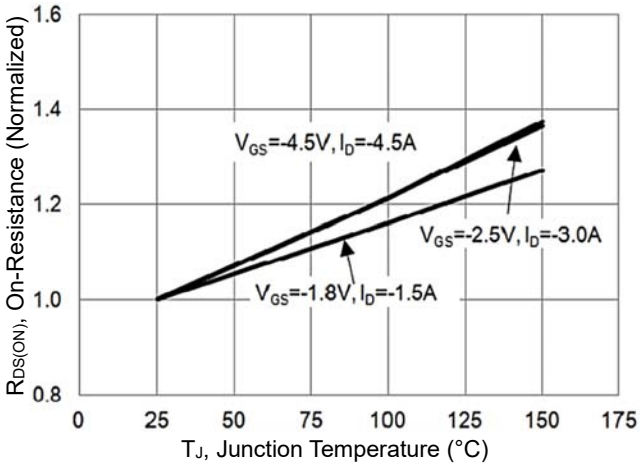

**Transfer Characteristics**



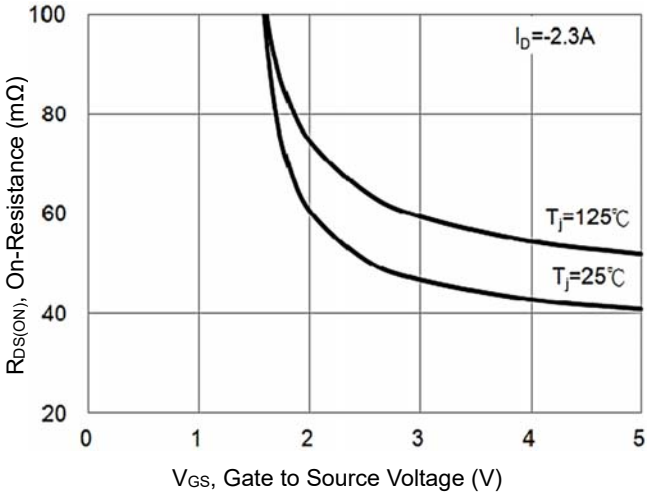

**On-Resistance vs. Drain Current**



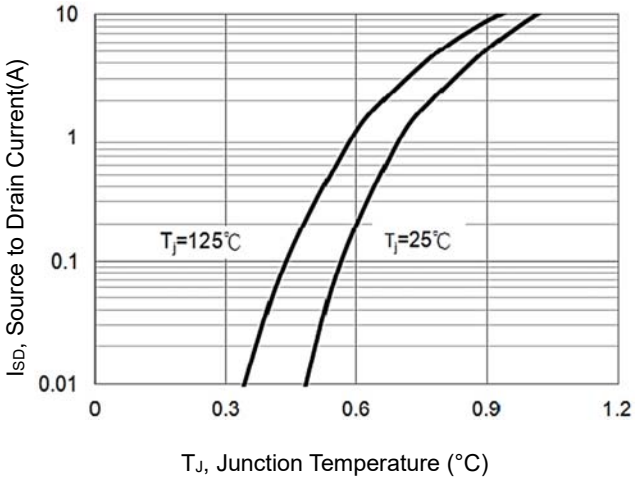

**On-Resistance vs. Junction Temperature**




**On-Resistance Variation with $V_{GS}$**

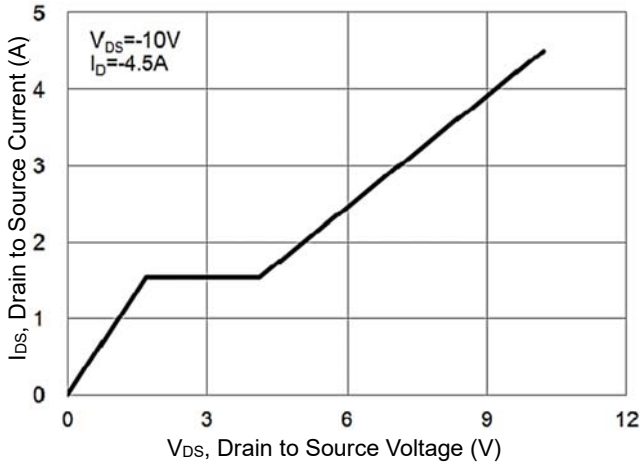



**Bode Diode Characteristics**

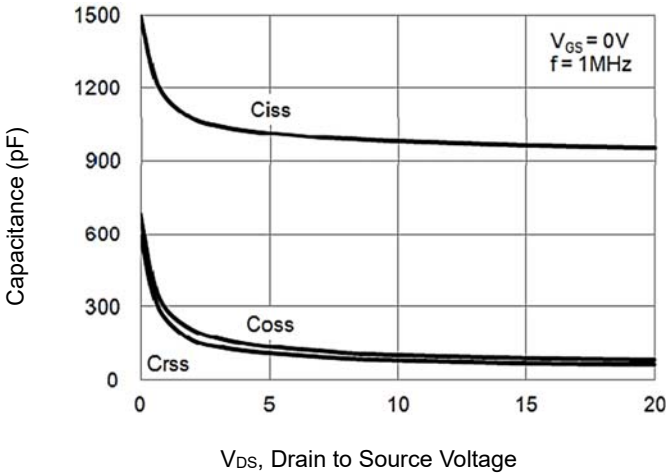


## CHARACTERISTICS CURVES

**Gate-Charge Characteristics**




**Capacitance vs. Drain to Source Voltage**




**Threshold Voltage Variation with Temperature**