# P-Channel MOSFET
# 60V 180mA 225mW SOT-23

MFT6PA18S23E

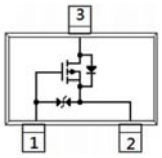
MERITEK

## FEATURE

- $R_{DS(ON)}$<10Ω, $V_{GS}$=-5V, $I_D$=100mA
- Fast Switching Speed
- Low Gate Threshold Voltage
- Low Input Capacitance
- Application: Power Management in Note book, Battery Powered System

## MECHANICAL DATA

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



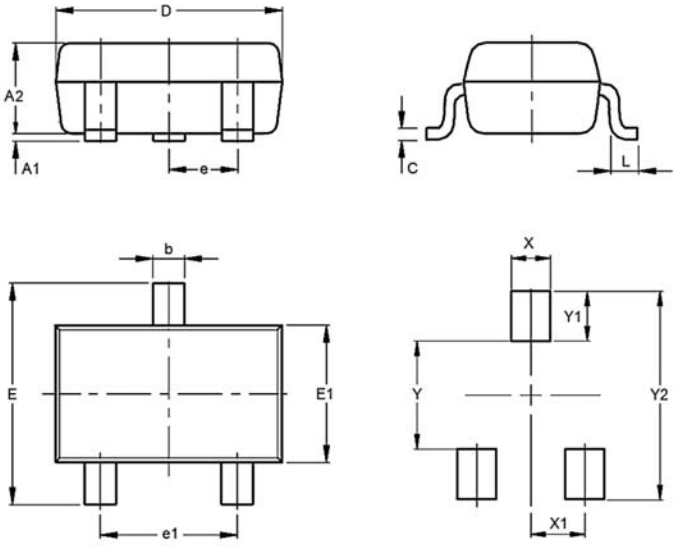

RoHS

## MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current – Continuous | | $I_D$ | -180 | mA |
| Drain Current – Pulsed | | $I_{DM}$ | -700 | mA |
| Power Dissipation | | $P_D$ | 225 | mW |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 556 | °C / W |
| | (Note 4) | $R_{\theta JA}$ | 265 | |
| Operating Junction, Storage Temperature | | $T_J$,$T_{stg}$ | -55 to 150 | °C |

## DIMENSIONS

| Items | Min (mm) | Max (mm) |
|---|---|---|
| A1 | 0.00 | 0.10 |
| A2 | 0.79 | 1.30 |
| b | 0.30 | 0.50 |
| C | 0.08 | 0.20 |
| D | 2.70 | 3.10 |
| e | 0.89 | 1.02 |
| e1 | 1.78 | 2.04 |
| E | 2.10 | 2.80 |
| E1 | 1.20 | 1.60 |
| L | 0.15 | -- |
| X | 0.80 | |
| X1 | 0.95 | |
| Y | 1.40 | |
| Y1 | 1.00 | |
| Y2 | 3.40 | |

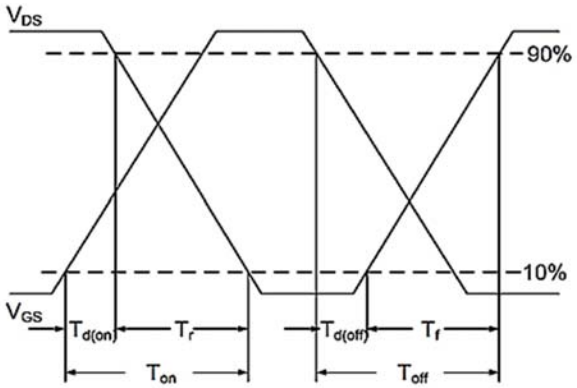


## ELECTRICAL CHARACTERISTICS

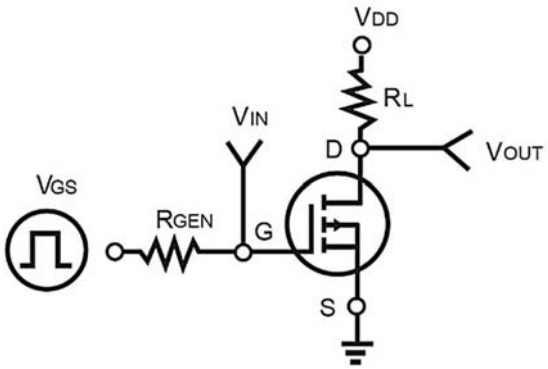
| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$= -250μA | $BV_{DSS}$ | -50 | -- | -- | V |
| Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$= -250μA | $V_{GS(th)}$ | -0.9 | -- | -2.0 | V |
| Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±20V | $I_{GSS}$ | -- | -- | ±10 | μA |
| Zero Gate Voltage Drain Current | $V_{DS}$= -25V, $V_{GS}$=0V | $I_{DSS}$ | -- | -- | -0.1 | |
| | $V_{DS}$= -60V, $V_{GS}$=0V | | -- | -- | -1.0 | μA |
| **On Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Static Drain-Source On-Resistance | $V_{GS}$= -5V, $I_D$= -100mA | $R_{DS(ON)}$ | -- | 2.6 | 10.0 | Ω |
| **Dynamic Characteristics** | **Conditions** | **Symbol** | **--** | **Typ.** | **Max** | **Unit** |
| Input Capacitance | $V_{DS}$=-30V, $V_{GS}$=0V F=1.0MHz | $C_{iss}$ | -- | 38 | -- | pF |
| Output Capacitance | | $C_{oss}$ | -- | 9 | -- | |
| Reverse Transfer Capacitance | | $C_{rss}$ | -- | 6 | -- | |
| Turn-On Delay Time | $V_{DS}$ = -25V, $I_D$ =-0.1A, $V_{GS}$ =-10V, $R_G$= 6.8Ω | $T_{d(on)}$ | -- | 14 | -- | nS |
| Rise Time | | $T_r$ | -- | 4 | -- | |
| Turn-Off Delay Time | | $T_{d(off)}$ | -- | 15 | -- | |
| Fall Time | | $T_f$ | -- | 77 | -- | |
| Total Gate Charge | $V_{DS}$=-25V, $V_{GS}$=-4.5V, $I_D$=-0.1A | $Q_g$ | -- | 1.1 | -- | nC |
| Gate-Source Charge | | $Q_{gs}$ | -- | 0.3 | -- | |
| Gate-Drain Charge | | $Q_{gd}$ | -- | 0.2 | -- | |
| **Drain-Source Body Diode** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Diode Forward Voltage | $I_S$= -500mA,$V_{GS}$=0V | $V_{SD}$ | -- | -- | -1.2 | V |
| Forward Transconductance | $V_{DS}$= -25V,$I_D$= -100mA | $g_{FS}$ | 50 | -- | -- | mS |
| Reverse Recovery Time | $I_F$=-0.1A, dI/dt=100A/μs | $t_{rr}$ | -- | 60 | -- | nS |
| Reverse Recovery Charge | | $Q_{rr}$ | -- | 58 | -- | nC |

Note:
1. $T_A$ = 25°C Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability
2. Pulse width<100us, Duty cycle<2%,Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃
3. $R_{\theta JA}$ 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 PCB described in Note 4&5.
4. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout..
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch$^2$ copper plate.

**Switching Time Waveform**

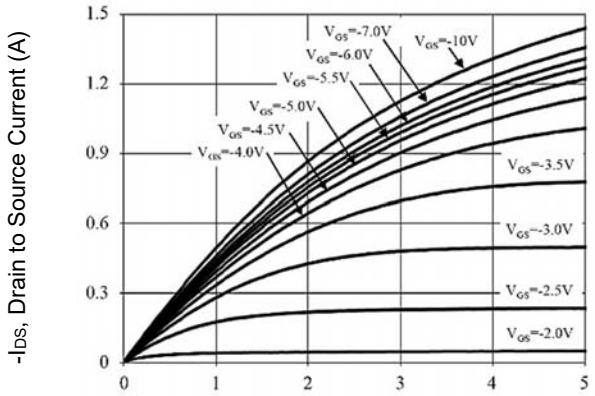



**Switching Test Circuit**



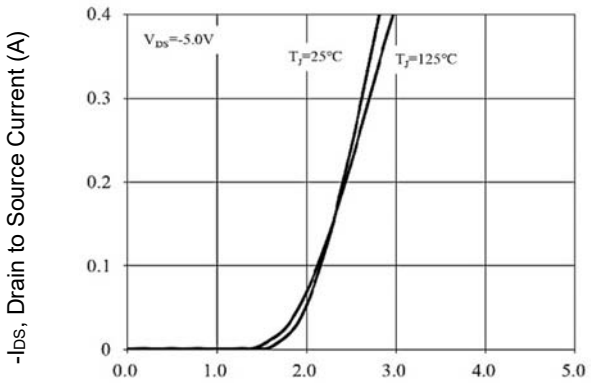
## CHARACTERISTIC CURVES

**On Region Characteristics**



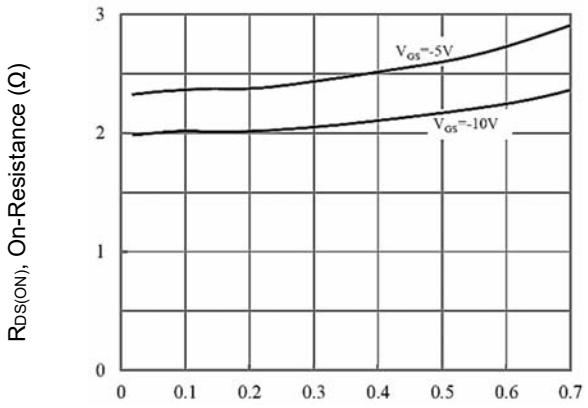

-VDS, Drain-to-Source Voltage (V)

**Transfer Characteristics**



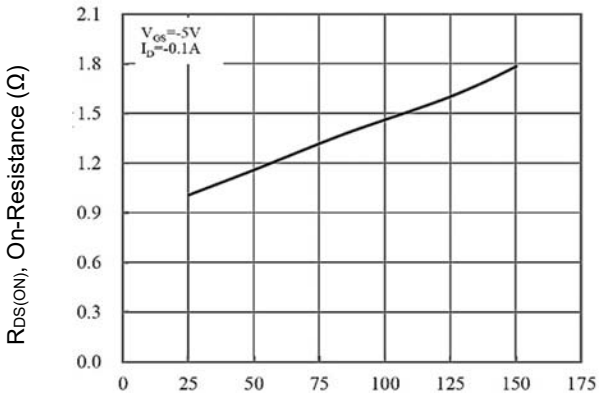

-VGS, Gate-to-Source Voltage (V)

**On-Resistance vs. Drain Current**



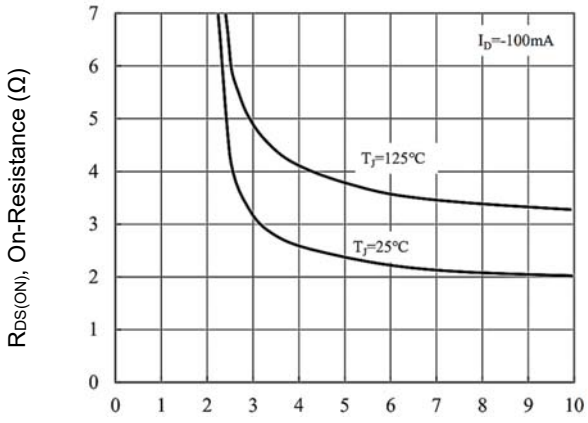

-IDS, Drain to Source Current (A)

**On-Resistance vs. Junction Temperature**



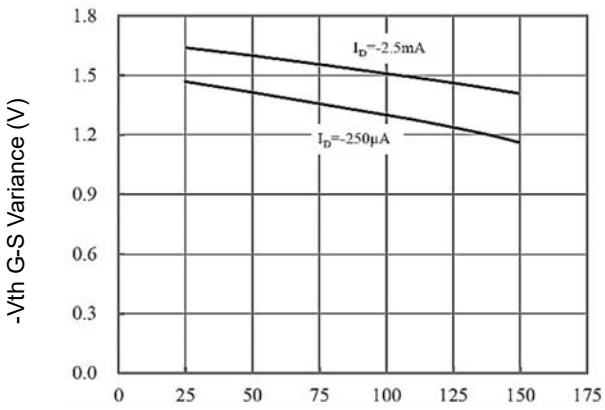

Temperature (°C)

**On-Resistance Variation with VGS**




-VGS, Gate-Source Voltage (V)

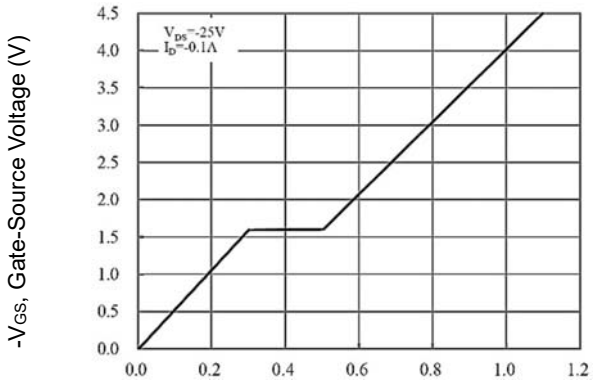
**Threshold Voltage Variance vs. Temperature**



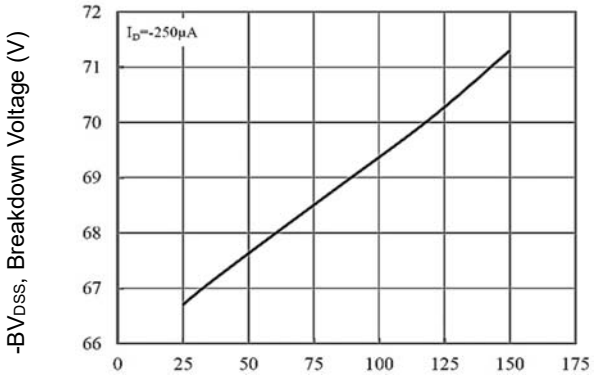

Temperature (°C)

## CHARACTERISTIC CURVES

**Gate Charge Characteristics**




**Breakdown Voltage vs Temperature**




**Capacitance vs. Drain-Source Voltage**