# N-Channel MOSFET
# 60V 360mA 0.35W SOT-23 ESD

MFT6NA36S23E

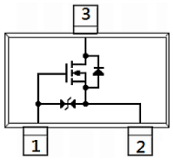
MERITEK

## FEATURE

- $R_{DS(ON)}$=1.6Ω, $V_{GS}$=10V, $I_D$=350mA
- $R_{DS(ON)}$=2.2Ω, $V_{GS}$=4.5V, $I_D$=200mA
- $R_{DS(ON)}$=6.5Ω, $V_{GS}$=2.2V, $I_D$=10mA
- ESD Protection >2KV
- Application: Power Management in Notebook, Battery Powered System

## MECHANICAL DATA

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



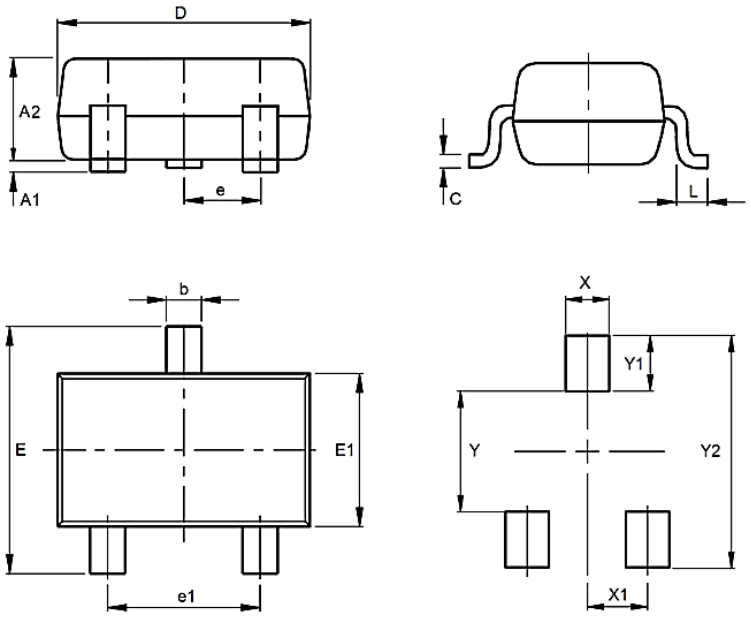

RoHS

## MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current – Continuous | $V_{GS}$=10V,$T_A$=25°C | $I_D$ | 360 | mA |
| | $V_{GS}$=10V,$T_A$=70°C | | 230 | |
| Drain Current – Pulsed | | $I_{DM}$ | 1.2 | A |
| Power Dissipation | (Note 5) | $P_D$ | 350 | mW |
| | (Note 4) | | 420 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | °C |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 370 | °C / W |
| | (Note 4) | | 300 | |

## DIMENSIONS

| SOT-23 | Min (mm) | Max (mm) |
|---|---|---|
| A1 | 0.00 | 0.10 |
| A2 | 0.79 | 1.40 |
| b | 0.30 | 0.50 |
| c | 0.08 | 0.20 |
| D | 2.70 | 3.10 |
| e | 0.955 TYP | |
| 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 | |

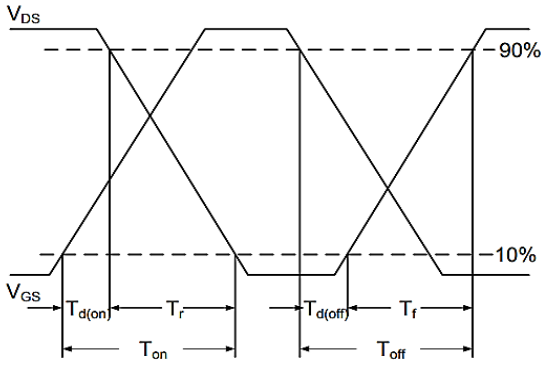


## ELECTRICAL CHARACTERISTICS

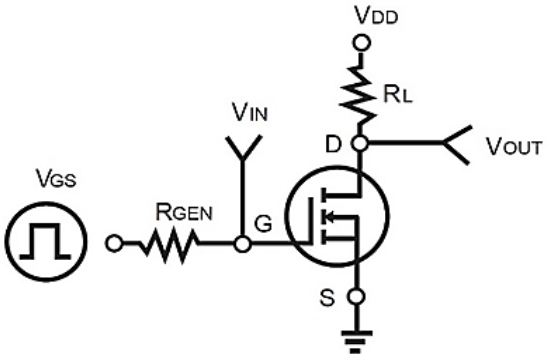
| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$= 250μA | $BV_{DSS}$ | 60 | -- | -- | V |
| Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$= 250μA | $V_{GS(th)}$ | 0.48 | -- | 1.6 | V |
| Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±10V | $I_{GSS}$ | -- | -- | ±1 | μA |
| | $V_{DS}$=0V, $V_{GS}$=±20V | | -- | -- | ±10 | |
| Zero Gate Voltage Drain Current | $V_{DS}$= 60V, $V_{GS}$=0V | $I_{DSS}$ | -- | -- | 1 | μA |
| **On Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Static Drain-Source On-Resistance | $V_{GS}$= 10V, $I_D$= 350mA | $R_{DS(ON)}$ | -- | -- | 1.6 | Ω |
| | $V_{GS}$= 4.5V, $I_D$= 200mA | | -- | -- | 2.2 | |
| | $V_{GS}$= 2.5V, ID=10mA | | -- | -- | 6.5 | |
| **Dynamic Characteristics** | **Conditions** | **Symbol** | **--** | **Typ.** | **Max** | **Unit** |
| Input Capacitance | $V_{DS}$= 10V, $V_{GS}$=0V F=1.0MHz | $C_{iss}$ | -- | -- | 56 | pF |
| Output Capacitance | | $C_{oss}$ | -- | 7 | -- | |
| Reverse Transfer Capacitance | | $C_{rss}$ | -- | 4 | -- | |
| Turn-On Delay Time | $V_{DS}$ = 10V, $I_D$ ≡1A, $V_{GS}$ =4.5V, $R_G$= 51Ω | $T_{d(on)}$ | -- | -- | 10 | nS |
| Rise Time | | $T_r$ | -- | 5 | -- | |
| Turn-Off Delay Time | | $T_{d(off)}$ | -- | 7.8 | 76 | |
| Fall Time | | $T_f$ | -- | 20 | -- | |
| **Drain-Source Body Diode** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Diode Forward Voltage | $I_S$= 0.3A,$V_{GS}$=0V | $V_{SD}$ | 0.47 | -- | 1.2 | V |
| Forward Transconductance | $V_{DS}$= 10V,$I_D$= 200mA | $g_{FS}$ | -- | 0.7 | -- | S |

Notes:
1. $T_A$ = 25°C Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability
2. Pulse width<300us, Duty cycle<2%.
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 an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 1 $cm^2$.
5. Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

### Switching Time Waveform

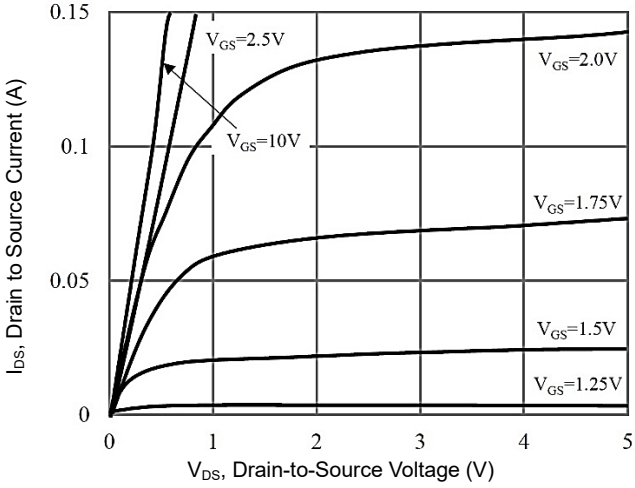



### Switching Test Circuit

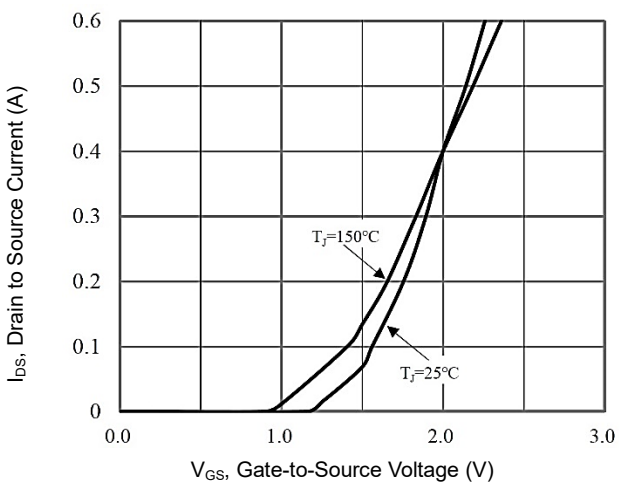


## CHARACTERISTIC CURVES

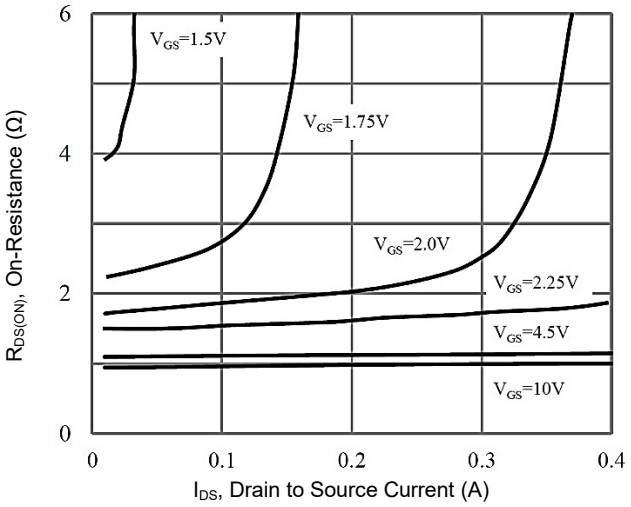
**On Region Characteristics**



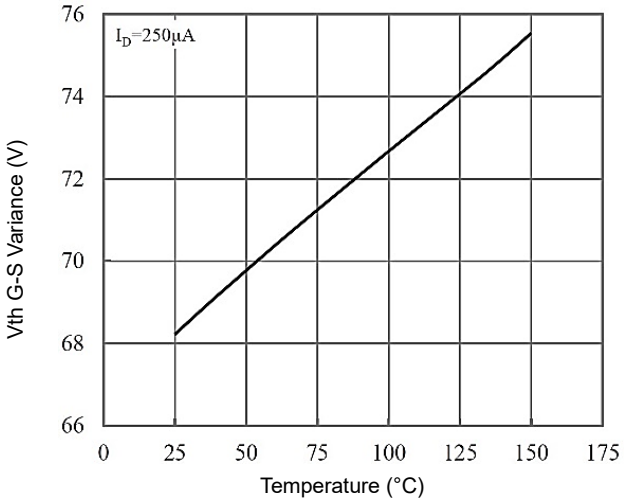

**Transfer Characteristics**




**On-Resistance vs. Drain Current**




**Threshold Voltage Variance vs. Temperature**




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