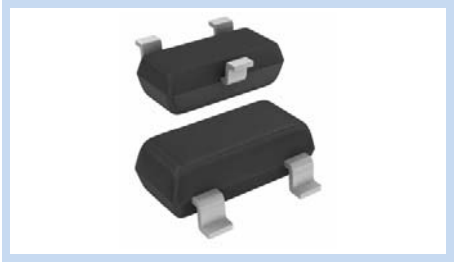
# N-Channel MOSFET
# 20V 0.7A 300mW SOT-523 ESD

MFT2NA70S523E

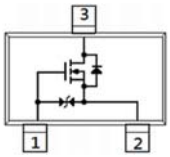
MERITEK

## FEATURE



- $R_{DS(ON)}$<150mΩ, $V_{GS}$=4.5V, $I_D$=0.7A
- $R_{DS(ON)}$<220mΩ, $V_{GS}$=2.5V, $I_D$=0.5A
- $R_{DS(ON)}$<400mΩ, $V_{GS}$=1.8V, $I_D$=0.2A
- ESD Protected
- Low Voltage Drive
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application,etc

## MECHANICAL DATA




RoHS

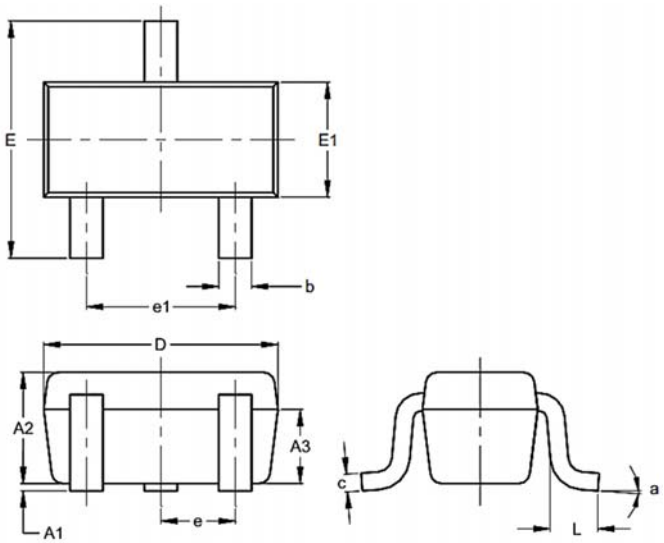
- Case: SOT-523 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

## MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | |
| Continuous Drain Current | | $I_D$ | 0.7 | A |
| Pulsed Drain Current | | $I_{DM}$ | 2.8 | |
| Power Dissipation | $T_A$= 25°C | $P_D$ | 300 | W |
| | Derate above 25°C | | 2.4 | mW/°C |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | - 55 to + 150 | °C |
| Typical Thermal Junction to Ambient | | $R_{\theta JA}$ | 417 | °C/W |

## DIMENSIONS

| Item | Min (mm) | Max (mm) |
|---|---|---|
| A1 | - | 0.10 |
| A2 | 0.60 | 0.80 |
| A3 | 0.45 | 0.65 |
| b | 0.15 | 0.30 |
| C | 0.10 | 0.20 |
| D | 1.50 | 1.70 |
| E | 1.45 | 1.75 |
| E1 | 0.75 | 0.85 |
| e | 0.50 BSC | |
| e1 | 0.90 | 1.10 |
| L | 0.20 | 0.40 |
| a | 0° | 8° |

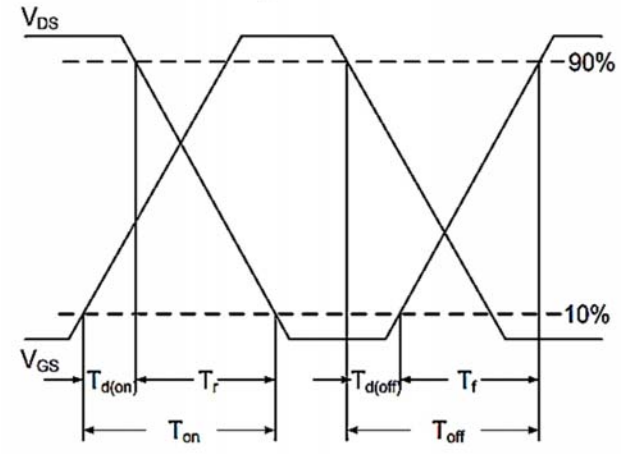


## ELECTRICAL CHARACTERISTICS

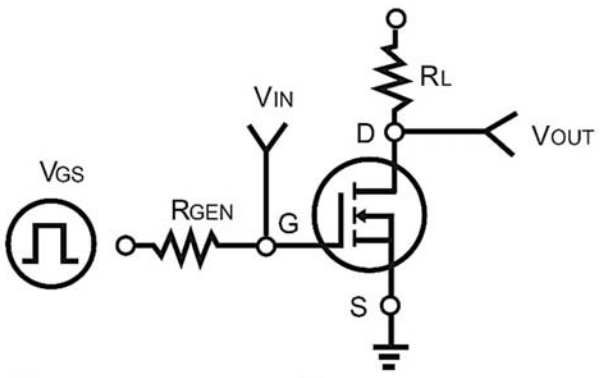
| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250uA | $BV_{DSS}$ | 20 | - | - | V |
| Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=20V | $I_{DSS}$ | - | 0.01 | 1 | μA |
| Gate-Body Leakage Current | $V_{GS}$=±8V, $V_{DS}$=0V | $I_{GSS}$ | - | ±2 | ±10 | |
| **On Characteristics** | Conditions | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250uA | $V_{GS(th)}$ | 0.5 | 0.78 | 1.0 | |
| Static Drain Source On-Resistance | $V_{GS}$=4.5V, $I_D$=700mA | $R_{DS(ON)}$ | - | 129 | 150 | mΩ |
| | $V_{GS}$=2.5V, $I_D$=500mA | | - | 167 | 220 | |
| | $V_{GS}$=1.8V, $I_D$=200mA | | - | 260 | 400 | |
| **Dynamic Characteristics** | Conditions | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Total Gate Charge | $V_{GS}$=4.5V, $V_{DS}$=10V, $I_D$=0.7A | $Q_g$ | - | 1.6 | - | nC |
| Gate-Source Charge | | $Q_{gs}$ | - | 0.3 | - | |
| Gate-Drain Charge | | $Q_{gd}$ | - | 0.4 | - | |
| Input Capacitance | $V_{GS}$=0V, $V_{DS}$=10V, f=1MHz | $C_{iss}$ | - | 92 | - | pF |
| Output Capacitance | | $C_{oss}$ | - | 25 | - | |
| Reverse Transfer Capacitance | | $C_{rss}$ | - | 9 | - | |
| Turn-On Delay Time | $V_{GS}$=4.5V,$V_{DD}$=10V, $I_D$=0.7A, $R_G$=6Ω | $t_{d(on)}$ | - | 6 | - | ns |
| Rise Time | | $t_r$ | - | 26 | - | |
| Turn-Off Delay Time | | $t_{d(off)}$ | - | 41 | - | |
| Fall Time | | $t_f$ | - | 31 | - | |
| **Drain-Source Body Diode** | Conditions | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Drain-Source Foward Current | - | $I_S$ | - | - | 0.4 | mA |
| Diode Forward Voltage | $V_{GS}$= 0V, $I_S$= 1A | $V_{SD}$ | - | 0.89 | 1.2 | V |

Note:
1. Pulse width ≤ 300us, Duty cycle ≤ 2%
2. Essentially independent of operating temperature
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 1 inch FR-4 with 2oz. Square pad of copper
4. The maximum current rating is package limited

**Switching Time Waveform**

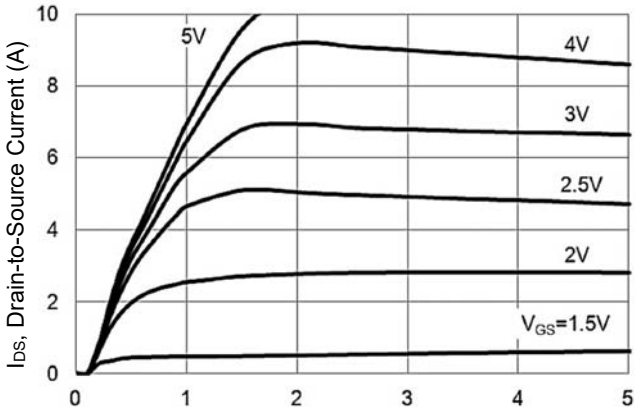



**Switching Test Circuit**

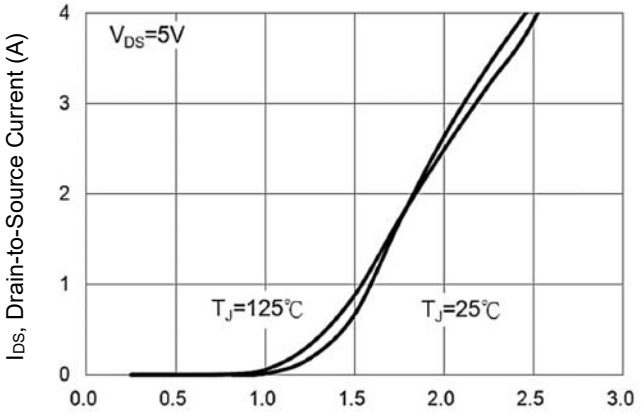


## CHARACTERISTIC CURVES

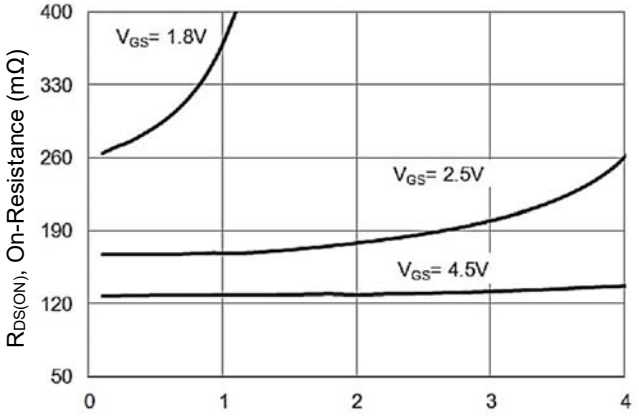
### On-Region Characteristics



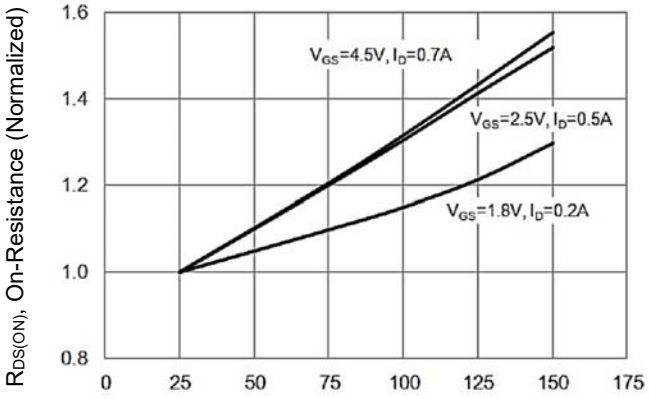

### Transfer Characteristics



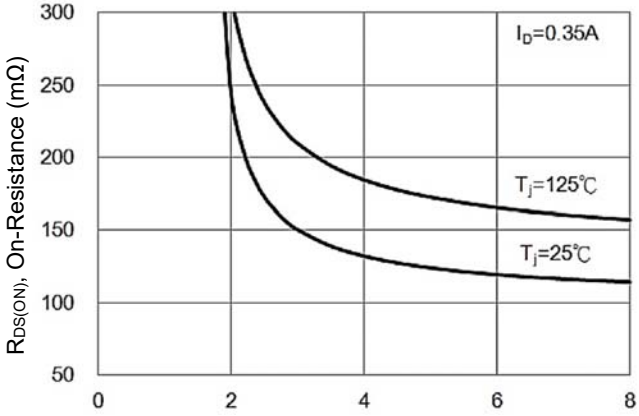

### On-Resistance vs Drain Current



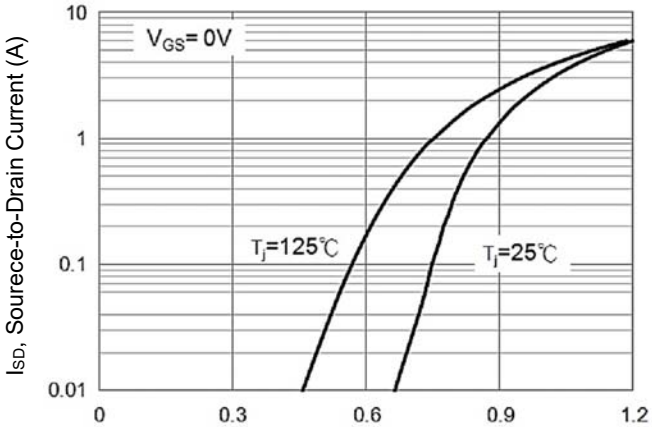

### On-Resistance vs Junction Temperature




### On-Resistance Variation with VGS

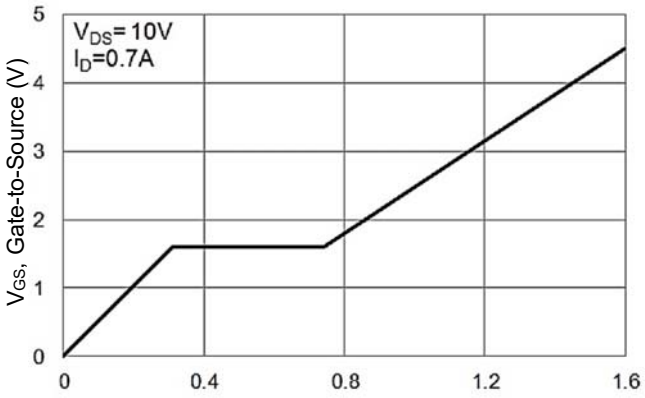



### Body Diode Characteristics

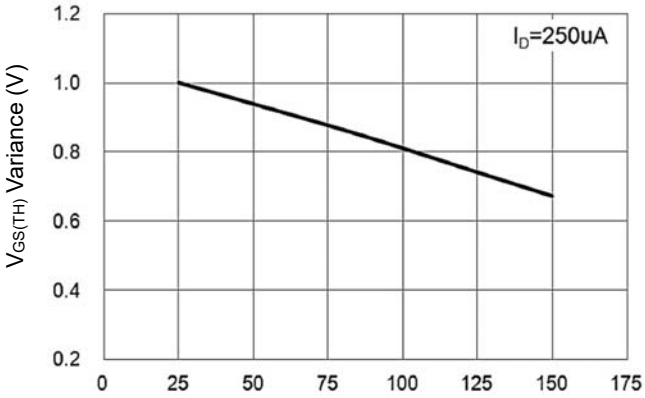


## CHARACTERISTIC CURVES

**Gate-Charge Characteristics**




**Thershold Voltage Variation with Temperature**




**Capacitance vs Drain-Source Voltage**