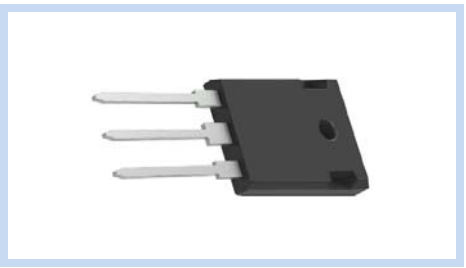
# N-Channel MOSFET
# 500V 18A 208W TO-247

MFT50N18T247

MERITEK

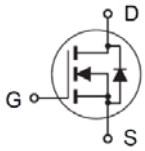
## FEATURE

- $R_{DS(ON)}$<0.27Ω at $V_{GS}$=10V, $I_D$=18A
- High Power and Current Handing Capability
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$



## MECHANICAL DATA

- Case: TO-247 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



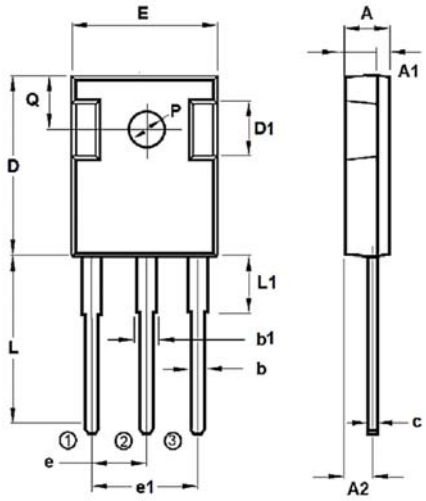

RoHS

## MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 500 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | V |
| Drain Current – Continuous | $T_C$=25°C | $I_D$ | 18 | A |
| | $T_C$=100°C | | 11 | A |
| Drain Current – Pulsed | | $I_{DM}$ | 72 | A |
| Power Dissipation | $T_C$=25°C | $P_D$ | 208 | W |
| | Derate above 25°C | | 1.6 | W/°C |
| Single Pulsed Avalanche Energy | | $E_{AS}$ | 859 | mJ |
| Single Pulsed Avalanche Current | | $I_{AS}$ | 18 | A |
| Thermal Resistance Junction to Ambient | | $R_{\theta JA}$ | 62.5 | °C/W |
| Thermal Resistance Junction to Case | | $R_{\theta JC}$ | 0.6 | °C/W |
| Operating Junction and Storage Temperature | | $T_J$, $T_{STG}$ | -55 to 150 | °C |

## DIMENSIONS

| Item | Min (mm) | Max (mm) |
|---|---|---|
| A | 4.830 | 5.210 |
| A1 | 2.310 | 2.510 |
| A2 | 1.900 | 2.160 |
| b | 1.140 | 1.400 |
| b1 | 1.910 | 2.200 |
| c | 0.590 | 0.800 |
| D | 20.800 | 21.340 |
| D1 | 4.320 | 5.100 |
| E | 15.700 | 16.130 |
| e | 5.450 | |
| e1 | 10.900 | |
| L | 19.800 | 20.570 |
| L1 | 3.810 | 4.320 |
| P | 3.500 | 3.700 |
| Q | 5.590 | 6.200 |

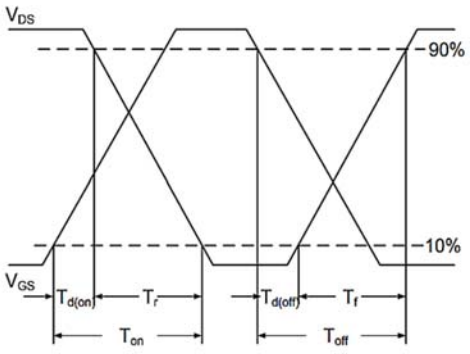


## ELECTRICAL CHARACTERISTICS

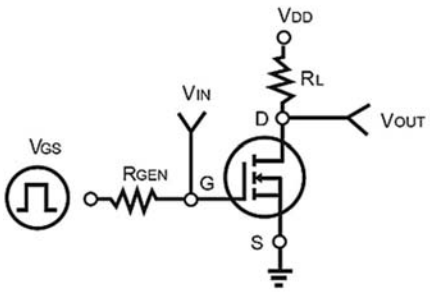
| Off Characteristics | Conditions | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | $BV_{DSS}$ | 500 | -- | -- | V |
| Drain-Source Leakage Current | $V_{DS}$=500V, $V_{GS}$=0V | $I_{DSS}$ | -- | -- | 1 | μA |
| Gate-Body Leakage Current, Forward | $V_{GS}$=30V, $V_{DS}$=0V | $I_{GSSF}$ | -- | -- | 100 | nA |
| Gate-Body Leakage Current, Reverse | $V_{GS}$=-30V, $V_{DS}$=0V | $I_{GSSR}$ | -- | -- | -100 | nA |
| **On Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=10A | $R_{DS(ON)}$ | -- | 0.24 | 0.27 | Ω |
| Gate Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μA | $V_{GS(th)}$ | 2 | -- | 4 | V |
| **Dynamic Characteristics** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Total Gate Charge | $V_{DS}$=400V, $V_{GS}$=10V, $I_D$=18A | $Q_g$ | -- | 58 | -- | nC |
| Gate-Source Charge | | $Q_{gs}$ | -- | 11 | -- | |
| Gate-Drain Charge | | $Q_{gd}$ | -- | 23 | -- | |
| Turn-On Delay Time | $V_{DD}$=250V, $V_{GS}$=10V, $R_G$=25Ω $I_D$=18A | $T_{d(on)}$ | -- | 36 | -- | ns |
| Rise Time | | $T_r$ | -- | 28 | -- | |
| Turn-Off Delay Time | | $T_{d(off)}$ | -- | 78 | -- | |
| Fall Time | | $T_f$ | -- | 11 | -- | |
| Input Capacitance | $V_{DS}$=25V, $V_{GS}$=0V, F=1MHz | $C_{iss}$ | -- | 2465 | -- | pF |
| Output Capacitance | | $C_{oss}$ | -- | 300 | -- | |
| Reverse Transfer Capacitance | | $C_{rss}$ | -- | 10 | -- | |
| **Drain-Source Body Diode** | **Conditions** | **Symbol** | **Min** | **Typ.** | **Max** | **Unit** |
| Drain-Source Diode Forward Current | -- | $I_S$ | -- | -- | 18 | A |
| Diode Forward Voltage | $V_{GS}$=0V, $I_S$=20A | $V_{SD}$ | -- | -- | 1.4 | V |
| Reverse Recovery Time | $V_R$=25V,$I_D$ =10A,di$_F$/dt = 100A/μs | $T_{rr}$ | -- | 324 | -- | ns |
| Reverse Recovery Charge | | $Q_{rr}$ | -- | 4.2 | -- | μC |
| Peak Reverse Recovery Current | $V_{DS}$=0~400V, $I_{SD}$=20A, $T_J$=25°C | $I_{rr}$ | -- | -- | 1300 | A/μs |

**Notes:**
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
3. Guaranteed by design, not subject to production testing.
4. L=5.3mH, $I_{AS}$ = 18A, $V_{DD}$= 50V, $R_G$=25Ω, Starting $T_J$=25°C

**Switching Time Waveform**

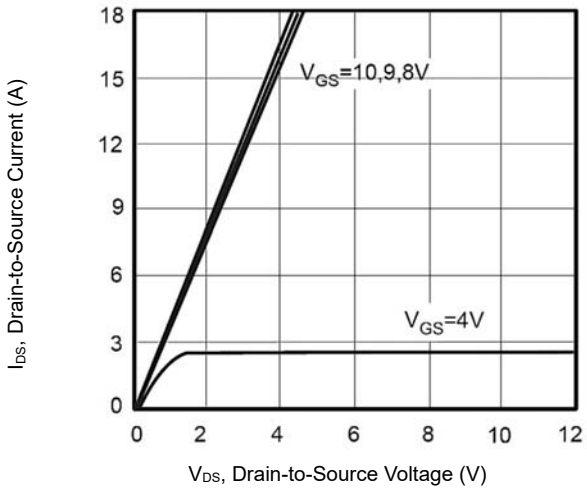



**Switching Test Circuit**

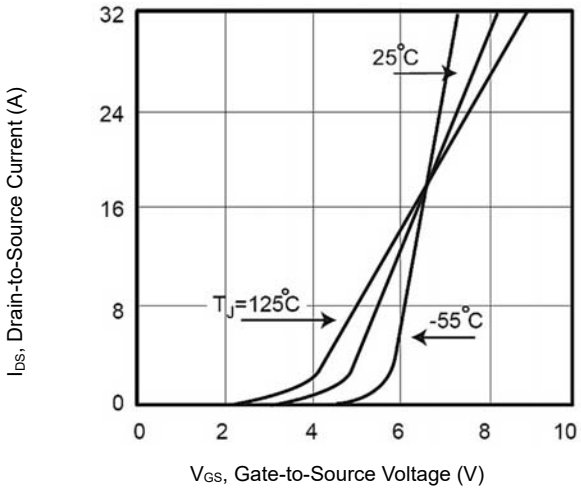


## CHARACTERISTIC CURVES

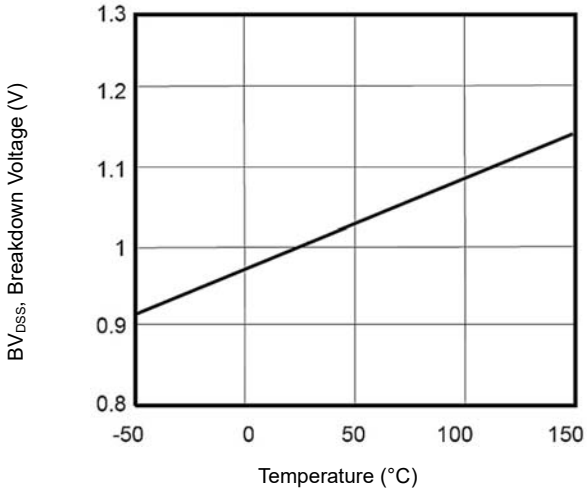
### Output Characteristics



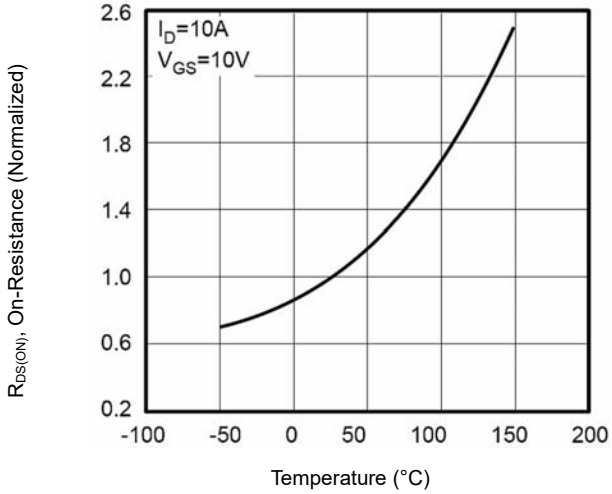

### Transfer Characteristics



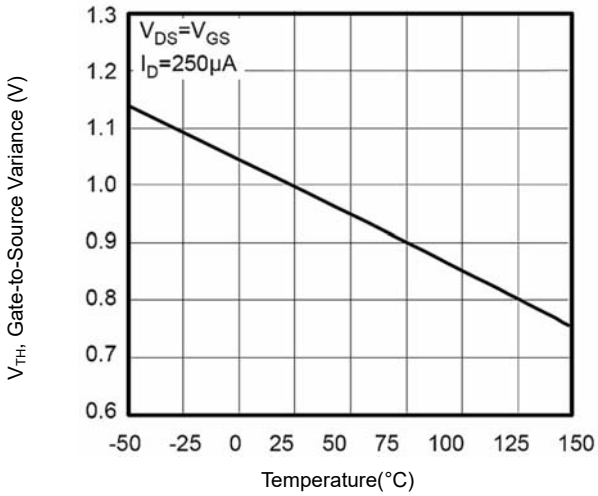

### Breakdown Voltage vs. Temperature



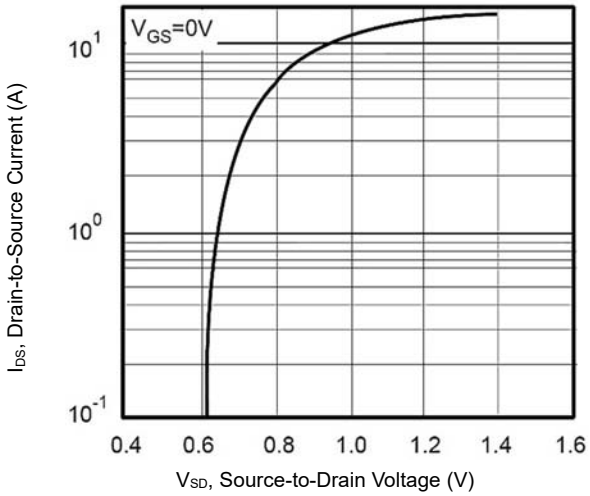

### On-Resistance vs. Junction Temperature




### Threshold Voltage Variation with Temperature

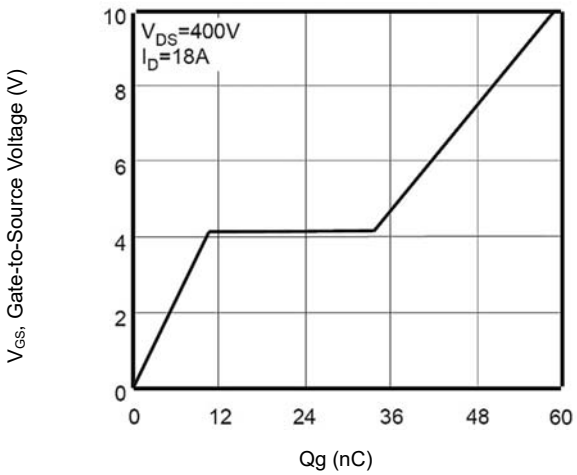



### Body Diode Characteristics

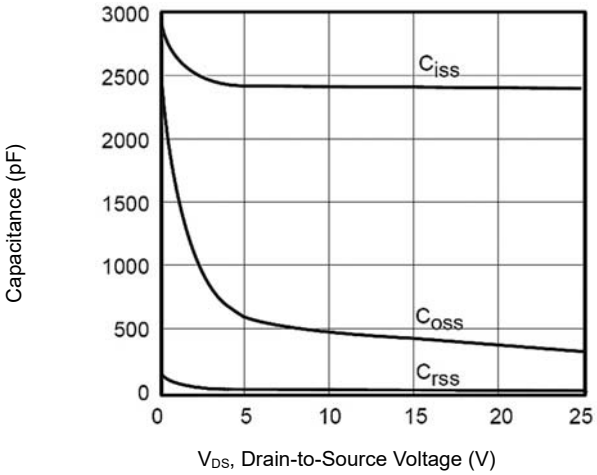


## CHARACTERISTIC CURVES

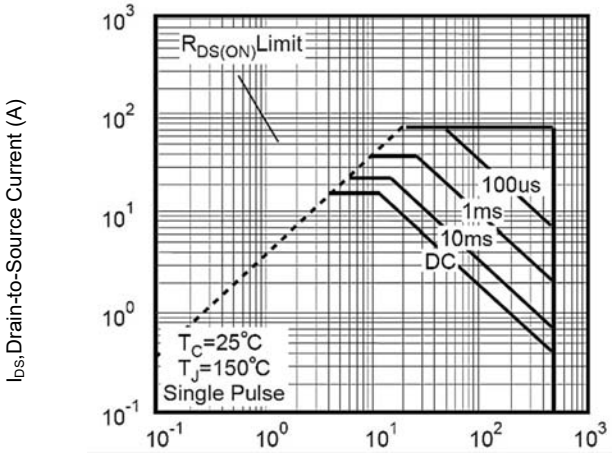
**Gate-Charge Characteristics**




**Capacitance vs. Drain-Source Voltage**




**Maximum Safe Operating Area**




**Normalized Transient Thermal Impedance vs Pulse Width**