

# N-Channel MOSFET

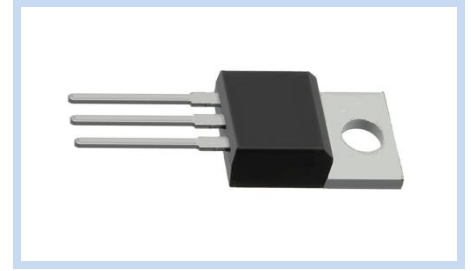
## 1000V 4A 166W TO-220

MFT100N4T220

MERITEK

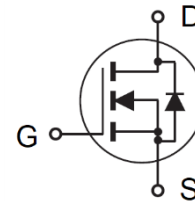
### FEATURE

- $R_{DS(ON)}=3.8\Omega$  at  $V_{GS}=10V$ ,  $I_D=4A$
- High Power and Current Handling Capability
- Super High Dense Cell Design for Extremely Low  $R_{DS(ON)}$



### MECHANICAL DATA

- Case: TO-220 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

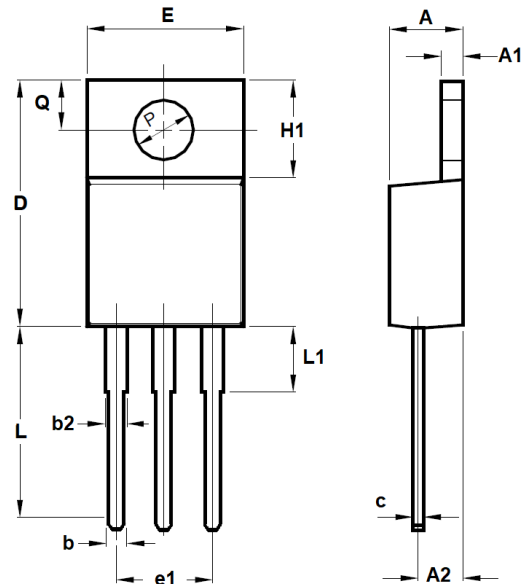


### MAXIMUM RATINGS

| Parameter                                  |                                 | Symbol          | Value      | Unit               |
|--------------------------------------------|---------------------------------|-----------------|------------|--------------------|
| Drain-Source Voltage                       |                                 | $V_{DS}$        | 1000       | V                  |
| Gate-Source Voltage                        |                                 | $V_{GS}$        | $\pm 30$   | V                  |
| Drain Current – Continuous                 | $T_C=25^\circ\text{C}$          | $I_D$           | 4          | A                  |
| Drain Current – Pulsed                     | $T_C=25^\circ\text{C}$          | $I_{DM}$        | 16         | A                  |
| Power Dissipation                          | $T_C=25^\circ\text{C}$          | $P_D$           | 166        | W                  |
|                                            | Derate above $25^\circ\text{C}$ |                 | 1.3        | W                  |
| Thermal Resistance Junction to Ambient     |                                 | $R_{\theta JA}$ | 62.5       | $^\circ\text{C/W}$ |
| Thermal Resistance Junction to Case        |                                 | $R_{\theta JC}$ | 0.75       | $^\circ\text{C/W}$ |
| Operating Junction and Storage Temperature |                                 | $T_J, T_{STG}$  | -55 to 150 | $^\circ\text{C}$   |

### DIMENSIONS

| Item | Min. (mm) | Max. (mm) |
|------|-----------|-----------|
| A    | 4.320     | 4.826     |
| A1   | 1.220     | 1.397     |
| A2   | 2.032     | 2.921     |
| b    | 0.610     | 0.910     |
| b2   | 1.143     | 1.778     |
| c    | 0.356     | 0.530     |
| D    | 14.224    | 16.510    |
| E    | 9.652     | 10.668    |
| e1   | 5.080     | 5.080     |
| H1   | 5.842     | 6.858     |
| L    | 12.700    | 14.732    |
| L1   | 3.400     | 4.000     |
| Q    | 2.540     | 3.429     |



# N-Channel MOSFET

## 1000V 4A 166W TO-220

MFT100N4T220

MERITEK

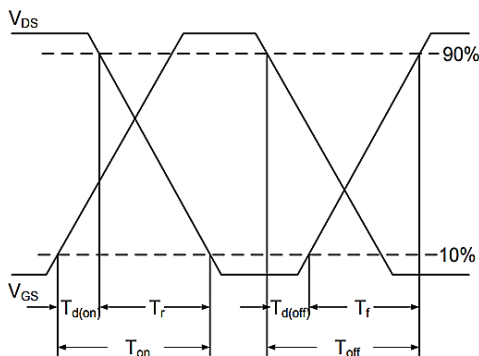
### ELECTRICAL CHARACTERISTICS

| Off Characteristics                | Conditions                                      | Symbol       | Min  | Typ. | Max  | Unit     |
|------------------------------------|-------------------------------------------------|--------------|------|------|------|----------|
| Drain-Source Breakdown Voltage     | $V_{GS}=0V, I_D=250\mu A$                       | $BV_{DSS}$   | 1000 | --   | --   | V        |
| Drain-Source Leakage Current       | $V_{DS}=1000V, V_{GS}=0V$                       | $I_{bss}$    | --   | --   | 1    | $\mu A$  |
| 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  | $V_{GS}=10V, I_D=4A$                            | $R_{DS(ON)}$ | --   | 3    | 3.8  | $\Omega$ |
| Gate Threshold Voltage             | $V_{GS}=V_{DS}, I_D=250\mu A$                   | $V_{GS(th)}$ | 2    | --   | 4    | V        |
| Dynamic Characteristics            | Conditions                                      | Symbol       | Min  | Typ. | Max  | Unit     |
| Total Gate Charge                  | $V_{DS}=480V, V_{GS}=10V, I_D=4A$               | $Q_g$        | --   | 27   | --   | nC       |
| Gate-Source Charge                 |                                                 | $Q_{gs}$     | --   | 7    | --   |          |
| Gate-Drain Charge                  |                                                 | $Q_{gd}$     | --   | 7    | --   |          |
| Turn-On Delay Time                 | $V_{DD}=300V, V_{GS}=10V, R_G=25\Omega, I_D=4A$ | $T_{d(on)}$  | --   | 33   | --   | ns       |
| Rise Time                          |                                                 | $T_r$        | --   | 17   | --   |          |
| Turn-Off Delay Time                |                                                 | $T_{d(off)}$ | --   | 82   | --   |          |
| Fall Time                          |                                                 | $T_f$        | --   | 25   | --   |          |
| Input Capacitance                  | $V_{DS}=25V, V_{GS}=0V, F=1MHz$                 | $C_{iss}$    | --   | 1390 | --   | pF       |
| Output Capacitance                 |                                                 | $C_{oss}$    | --   | 115  | --   |          |
| Reverse Transfer Capacitance       |                                                 | $C_{rss}$    | --   | 15   | --   |          |
| Drain-Source Body Diode            | Conditions                                      | Symbol       | Min  | Typ. | Max  | Unit     |
| Drain-Source Diode Forward Current | --                                              | $I_S$        | --   | --   | 4    | A        |
| Diode Forward Voltage              | $V_{GS}=0V, I_S=4A, T_J=25^\circ C$             | $V_{SD}$     | --   | --   | 1.4  | V        |

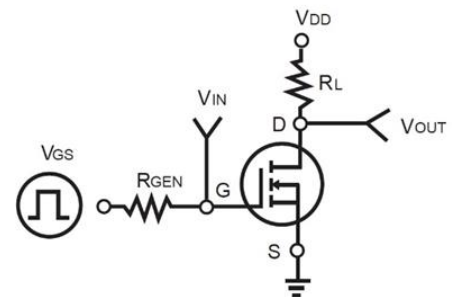
#### Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
3. Guaranteed by design, not subject to production testing.
4. Limited only by maximum temperature allowed.
5. Pulse Width Limited by safe operating area.
6. Full Package  $I_{S(MAX)}=2.2A$
7. Full Package  $V_{SD}$  test condition  $I_S = 2.2A$

Switching Time Waveform



Switching Test Circuit



# N-Channel MOSFET

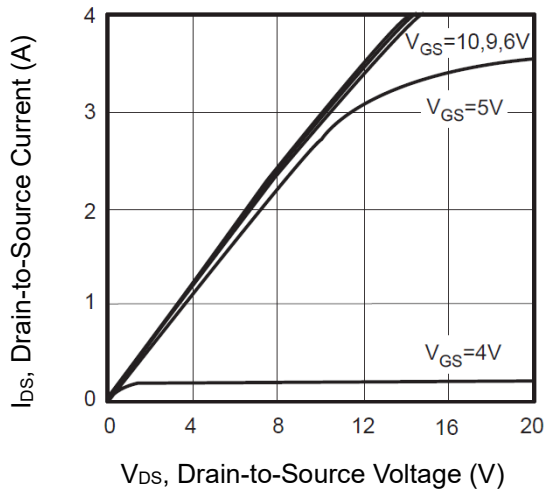
## 1000V 4A 166W TO-220

MFT100N4T220

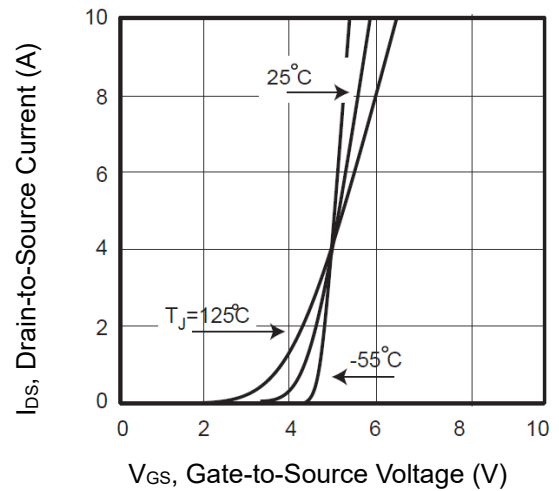
MERITEK

### CHARACTERISTIC CURVES

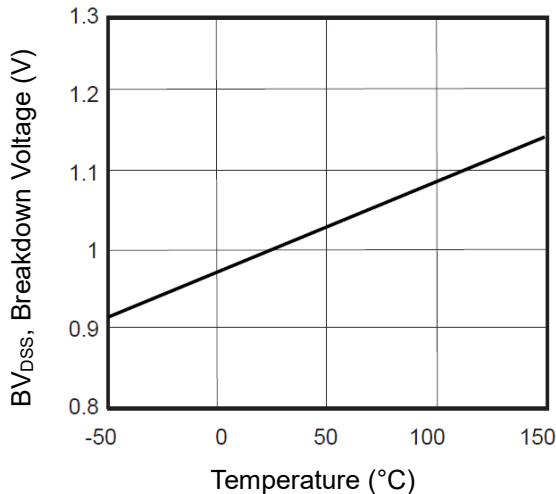
Output Characteristics



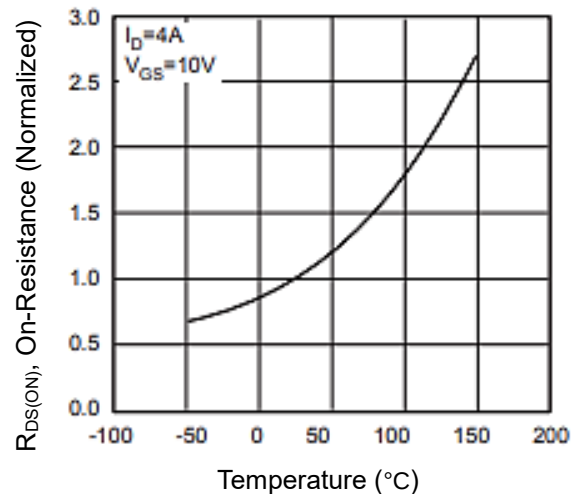
Transfer Characteristics



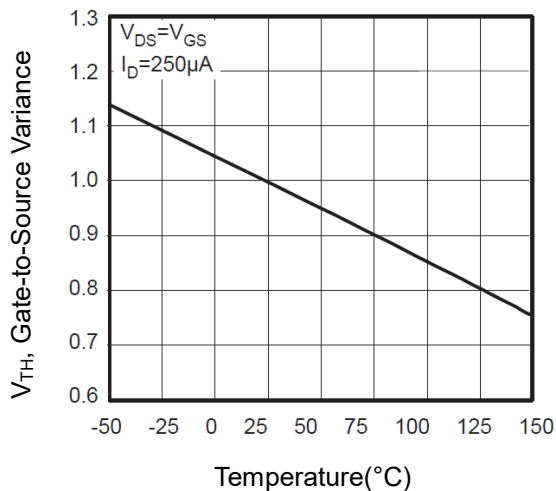
Breakdown Voltage vs. Temperature



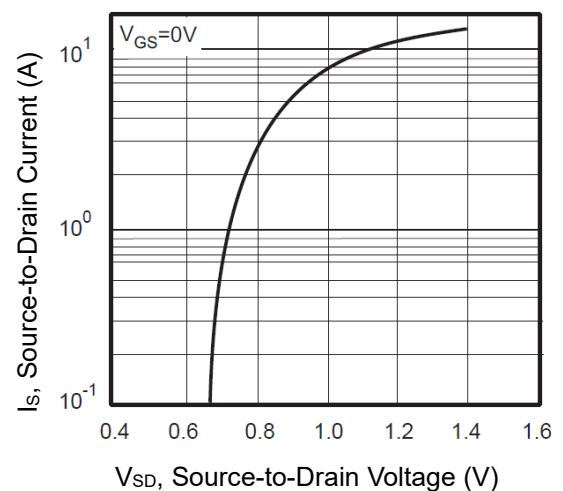
On-Resistance vs. Junction temperature



Threshold Voltage Variation with Temperature



Body Diode Characteristics



# N-Channel MOSFET

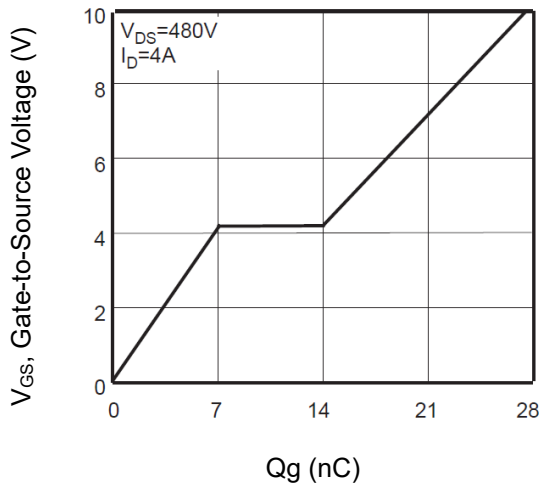
## 1000V 4A 166W TO-220

MFT100N4T220

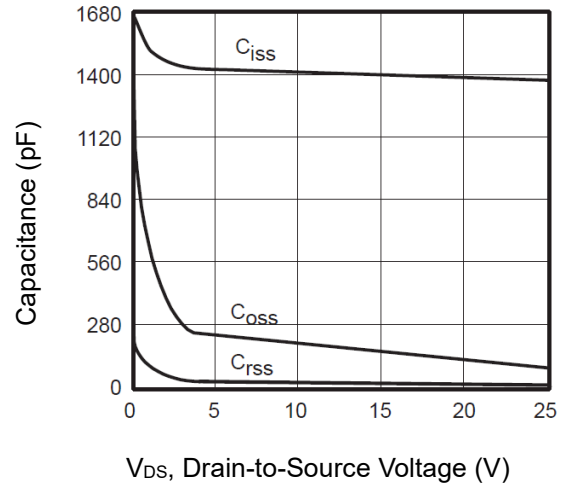
MERITEK

### CHARACTERISTIC CURVES

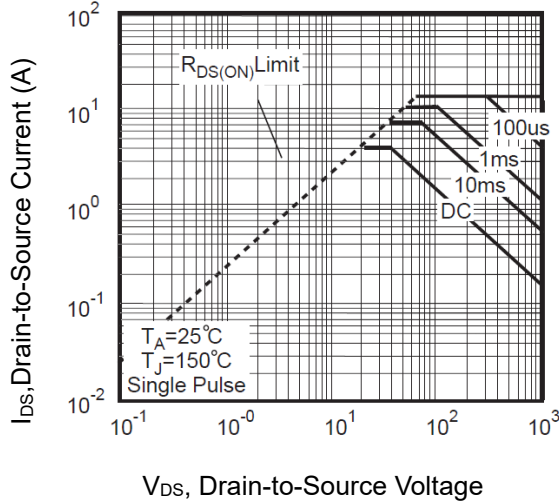
Gate-Charge Characteristics



Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width

