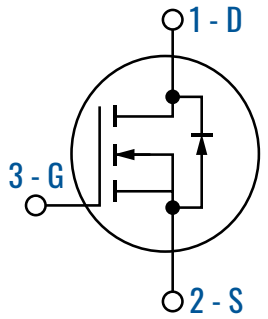
## KEY FEATURES

- $I_D$ 10A
- $R_{DS(on)}$ 300mΩ
- FAST RECOVERY DIODE
- AVALANCHE RATED
- TO-254 HERMETIC PACKAGE
- BACKSIDE ISOLATION
- JANTX, JANTXV SCREENING AVAILABLE




$V_{DS}$ = 650V
$I_D$ @ 25°C = 10A
$R_{DS(on)}$ = 300mΩ

## ORDERING GUIDE

**Part Number** SMF460
**Description** 650V N-Channel Power MOSFET

## ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25°C unless otherwise specified)

| PARAMETER | SYMBOL | VALUE | TEST CONDITIONS |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSmax}$ | 650V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Gate-Source Voltage (dynamic) | $V_{GSM}$ | ±30V | Transient |
| Gate-Source Voltage | $V_{GSS}$ | ±20V | Continuous |
| Drain Current, continous | $I_{D25}$ | 10A | $T_C$ = 25°C |
| Drain Current, pulsed | $I_{D(PULSE)}$ | 40A | Pulse width $T_p$ limited by $T_{Jmax}$ |
| Power Dissipation | $P_D$ | 116W | $T_C$ = 25°C |
| Junction Temperature Range, Operating<br>Junction Temperature Range, Storage | $T_J$<br>$T_{STG}$ | -55°C to 150°C | |

## ELECTRICAL SPECIFICATIONS ($T_J$ = 25°C unless otherwise noted)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250µA | $V_{(BR)DSS}$ | 650 | | | V |
| Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA, $T_J$ = 25°C | $V_{GS(th)}$ | 3 | | 5 | V |
| Off -State Drain Current | $V_{DS}$ = 650V, $V_{GS}$ = 0V, $T_J$ = 25°C | $I_{DSS}$ | | | 10 | µA |
| | $V_{DS}$ = 520V, $V_{GS}$ = 0V, $T_J$ = 125°C | | | | 100 | mA |
| Gate-Source Leakage Current | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | $I_{GSS}$ | | | ±100 | nA |
| Drain-Source On-state Resistance | $V_{GS}$ = 10V, $I_D$ = 6A, $T_J$ = 25°C | $R_{DS(on)}$ | | 260 | 300 | mΩ |
| Transconductance | $V_{DS}$ = 10V, $I_D$ = 6A, $T_J$ = 25°C | $G_{fs}$ | 6.5 | | | S |
| Total Gate Charge<br>Gate to Source Charge<br>Gate to Drain Charge | $V_{GS}$ = 10V, $V_{DS}$ = 325V, $I_D$ = 6A | $Q_{g(on)}$<br>$Q_{gs}$<br>$Q_{gd}$ | | | 17<br>4.7<br>6.1 | nC |
| Turn On Delay Time<br>Rx Time<br>Turn Off Delay Time<br>Fail Time | $V_{DD}$ = 325V, $I_D$ = 6A, $R_G$ = 4.3Ω | $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$ | | 23<br>24<br>47<br>15 | | ns |
| Thermal Resistance | | $R_{thJC}$ | | | 1.08 | °C/W |

## BODY DIODE CHARACTERISTICS ($T_J$ = 25°C unless otherwise noted)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Body Diode Forward Voltage | $I_S$ = 10A, $V_{GS}$ = 0V | $V_{SD}$ | | 1.4 | | V |

## TYPICAL PERFORMANCE

Fig. 1 Maximum Power Dissipation vs.Case Temperature

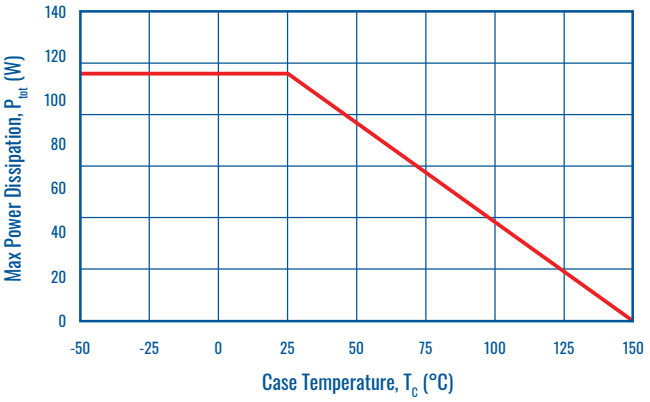
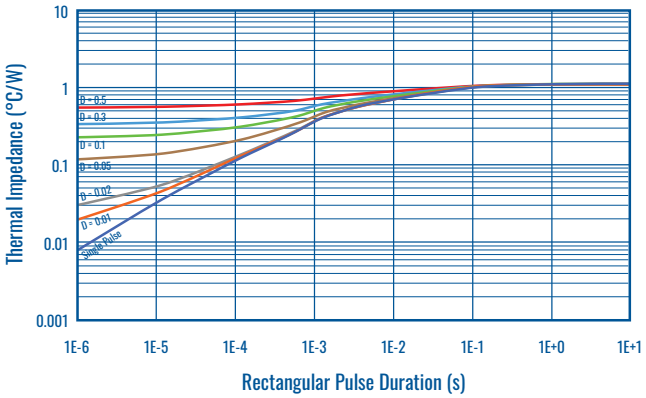
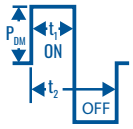



Figure 2. MOSFET Junction to case Transient Thermal Impedance, Zth $J_C$ (°C/W)

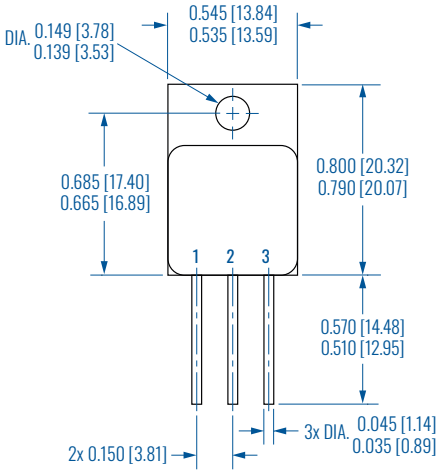


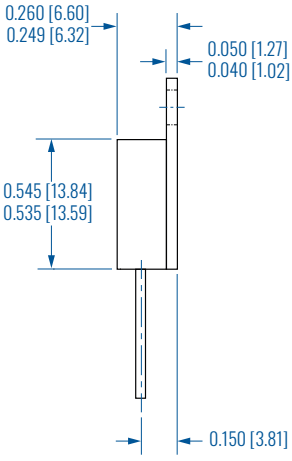

$T_{J(Pk)} = (P_{DM}\ P \times Z_{thJC}) + Z_C$




Duty Factor D = $t_1/t_2$

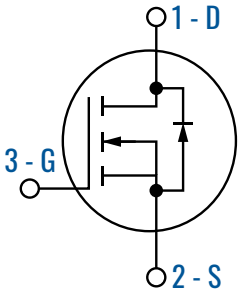
## OUTLINE DIMENSION




All dimensions in inches (mm) minimum maximum

## SCHEMATIC

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