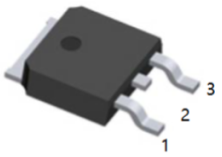
**30V N-Channel MOSFET**

## Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses

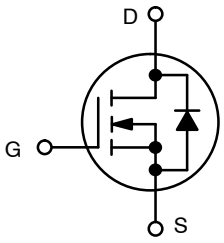



1.G 2.D 3.S

**TO-252(DPAK) top view**

## Applications

- VCORE Applications
- DC−DC Converters
- High/Low Side Switching
- $V_{(BR)DSS}$ = 30 V
- $R_{DS(ON)}$<6.2 mΩ($V_{GS}$= 10V)
- $R_{DS(ON)}$ < 9.3 mΩ ($V_{GS}$= 4.5V)
- $I_D$ = 73 A




## MAXIMUM RATINGS ($T_J$ = 25°C unless otherwise stated)

| Parameter | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain- to- Source Voltage | | | $V_{DSS}$ | 30 | V |
| Gate−to−Source Voltage | | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current $R_{\theta JA}$ (Note 1) | Steady State | $T_A$ = 25°C | $I_D$ | 14 | A |
| | | $T_A$ = 85°C | | 10.9 | |
| Power Dissipation $R_{\theta JA}$ (Note 1) | | $T_A$ = 25°C | $P_D$ | 2.0 | W |
| Continuous Drain Current $R_{\theta JA}$ (Note 2) | | $T_A$ = 25°C | ID | 11.2 | A |
| | | $T_A$ = 85°C | | 8.7 | |
| Power Dissipation $R_{\theta JA}$ (Note 2) | | $T_A$ = 25°C | $P_D$ | 1.3 | W |
| Continuous Drain Current $R_{\theta JC}$ (Note 1) | | $T_C$ = 25°C | $I_D$ | 73 | A |
| | | $T_C$ = 85°C | | 56 | |
| Power Dissipation $R_{\theta JC}$ (Note 1) | | $T_C$ = 25°C | $P_D$ | 54.5 | W |
| Pulsed Drain Current | $t_p$=10μs | $T_A$ = 25°C | $I_{DM}$ | 146 | A |
| Current Limited by Package | | $T_A$ = 25°C | $I_{DmaxPkg}$ | 45 | A |
| Operating Junction and Storage Temperature | | | $T_J$, $T_{STG}$ | −55 to +175 | °C |
| Source Current (Body Diode) | | | $I_S$ | 45 | A |
| Drain to Source dV/dt | | | dV/dt | 6 | V/ns |
| Single Pulse Drain−to−Source Avalanche Energy ($T_J$ = 25°C, $V_{DD}$ = 50 V, $V_{GS}$ = 10 V, $I_L$ = 15 $A_{pk}$, L = 1.0 mH, $R_G$ = 25 Ω) | | | EAS | 112.5 | mJ |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s) | | | $T_L$ | 260 | °C |

## THERMAL RESISTANCE MAXIMUM RATINGS

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction−to−Case (Drain) | $R_{\theta JC}$ | 2.75 | °C/W |
| Junction−to−TAB (Drain) | $R_{\theta JC-TAB}$ | 3.5 | |
| Junction−to−Ambient − Steady State (Note 1) | $R_{\theta JA}$ | 73.5 | |
| Junction−to−Ambient − Steady State (Note 2) | $R_{\theta JA}$ | 116 | |

## ELECTRICAL CHARACTERISTICS (TJ = 25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Drain−to−Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 μA | | 30 | | | V |
| Drain−to−Source Breakdown Voltage Temperature Coefficient | $V_{(BR)DSS}/T_J$ | | | | 22 | | mV/°C |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 20 V | $T_J$ = 25°C | | | 1.0 | μA |
| | | | $T_J$ = 125°C | | | 10 | |
| Gate−to−Source Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250 μA | | 1.45 | | 2.5 | V |
| Negative Threshold Temperature Coefficient | $V_{GS(TH)}/T_J$ | | | | 5.3 | | mV/°C |
| Drain−to−Source On Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10 V | $I_D$ = 30 A | | 5.2 | 6.2 | mΩ |
| | | $V_{GS}$ = 4.5 V | $I_D$ = 30 A | | 7.3 | 9.3 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 1.5 V, $I_D$ = 15 A | | | 55 | | S |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$ = 0 V, f = 1.0 MHz, $V_{DS}$ = 12 V | | | 1563 | | pF |
| Output Capacitance | $C_{OSS}$ | | | | 405 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | | 200 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$ = 4.5 V, $V_{DS}$ = 15 V, $I_D$ = 30 A | | | 12.8 | 19.2 | nC |
| Threshold Gate Charge | $Q_{G(TH)}$ | | | | 1.3 | | |
| Gate−to−Source Charge | $Q_{GS}$ | | | | 4.7 | | |
| Gate−to−Drain Charge | $Q_{GD}$ | | | | 5.2 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 15 V, $I_D$ = 30 A | | | 25.7 | | nC |

1. Surface−mounted on FR4 board using 1 sq−in pad, 1 oz Cu.
2. Surface−mounted on FR4 board using the minimum recommended pad size.

## SWITCHING CHARACTERISTICS (Note 4)

| | | | | | | |
|---|---|---|---|---|---|---|
| Turn−On Delay Time | $t_{d(ON)}$ | $V_{GS}$ = 4.5 V, $V_{DS}$ = 15 V, $I_D$ = 15 A, $R_G$ = 3.0 Ω | | 12.6 | | ns |
| Rise Time | $t_r$ | | | 20.2 | | |
| Turn−Off Delay Time | $t_{d(OFF)}$ | | | 16.4 | | |
| Fall Time | $t_f$ | | | 5.1 | | |
| Turn−On Delay Time | $t_{d(ON)}$ | $V_{GS}$ = 11.5 V, $V_{DS}$ = 15 V, $I_D$ = 15 A, $R_G$ = 3.0 Ω | | 7.7 | | ns |
| Rise Time | $t_r$ | | | 17.3 | | |
| Turn−Off Delay Time | $t_{d(OFF)}$ | | | 23.8 | | |
| Fall Time | $t_f$ | | | 2.8 | | |

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

## ELECTRICAL CHARACTERISTICS ($T_J$ = 25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|

## DRAIN−SOURCE DIODE CHARACTERISTICS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Forward Diode Voltage | $V_{SD}$ | $V_{GS}$ = 0 V, $I_S$ = 30 A | $T_J$ = 25°C | | 0.87 | 1.2 | V |
| | | | $T_J$ = 125°C | | 0.73 | | |
| Reverse Recovery Time | $t_{RR}$ | $V_{GS}$ = 0 V, dIS/dt = 100 A/μs, $I_S$ = 30 A | | | 11.6 | | ns |
| Charge Time | $t_a$ | | | | 7.8 | | |
| Discharge Time | $t_b$ | | | | 3.7 | | |
| Reverse Recovery Charge | $Q_{RR}$ | | | | 3.0 | | nC |

## PACKAGE PARASITIC VALUES

| | | | | | | |
|---|---|---|---|---|---|---|
| Source Inductance | $L_S$ | $T_A$ = 25°C | | 2.49 | | nH |
| Drain Inductance, DPAK | $L_D$ | | | 0.0164 | | |
| Drain Inductance, IPAK | $L_D$ | | | 1.88 | | |
| Gate Inductance | $L_G$ | | | 3.46 | | |
| Gate Resistance | $R_G$ | | | 0.7 | | Ω |

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

## TYPICAL PERFORMANCE CURVES

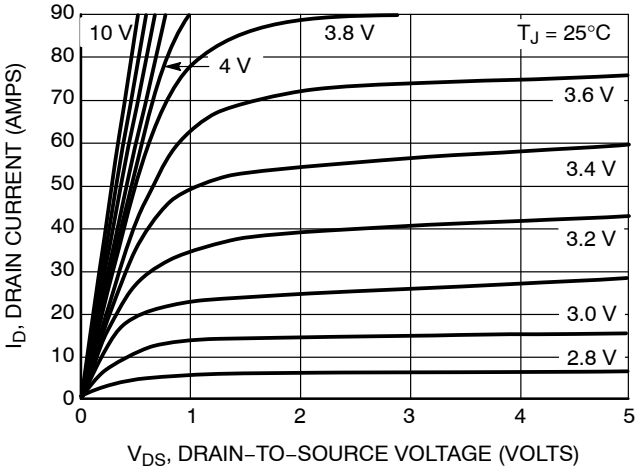



**Figure 1. On−Region Characteristics**

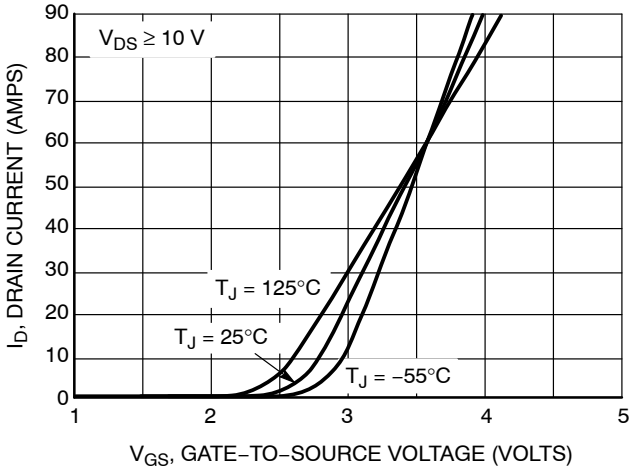



**Figure 2. Transfer Characteristics**

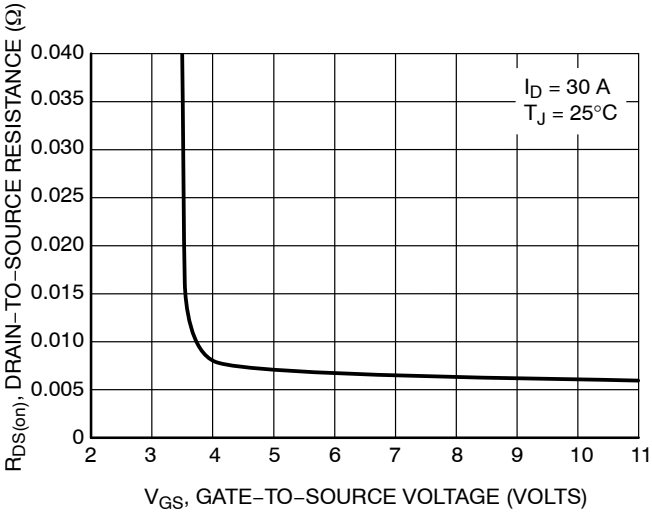



**Figure 3. On−Resistance vs. Gate−to−Source Voltage**

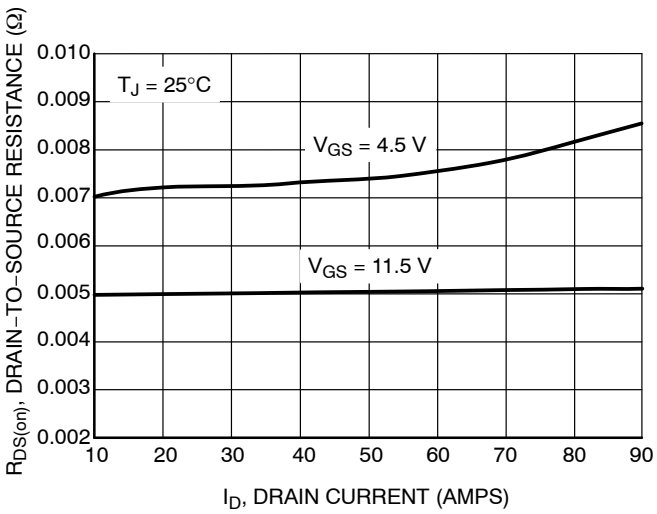



**Figure 4. On−Resistance vs. Drain Current and Gate Voltage**

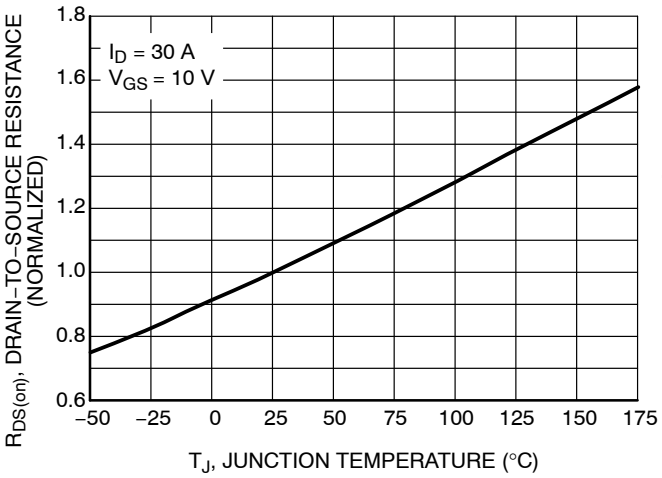



**Figure 5. On−Resistance Variation with Temperature**

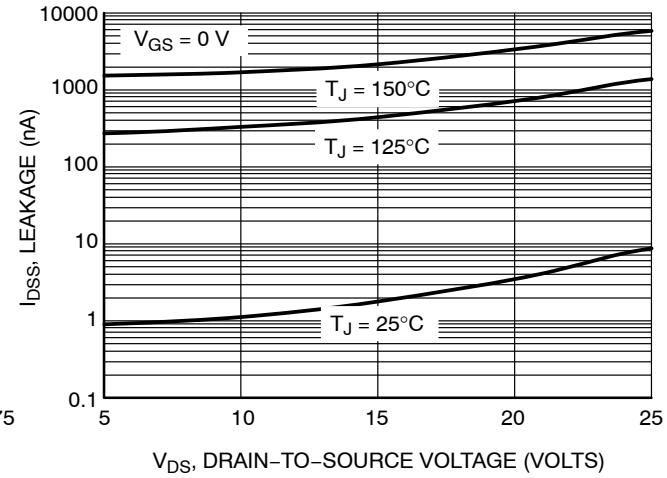



**Figure 6. Drain−to−Source Leakage Current vs. Drain Voltage**

## TYPICAL PERFORMANCE CURVES

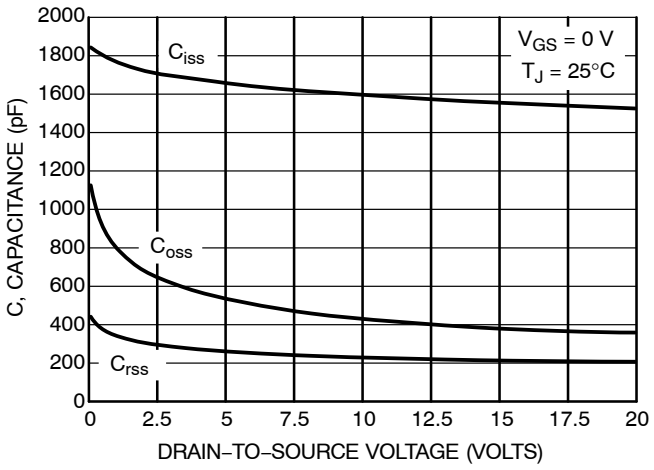



**Figure 7. Capacitance Variation**

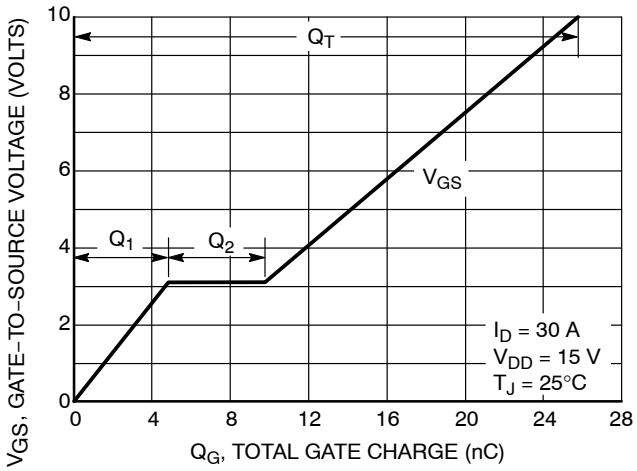



**Figure 8. Gate–To–Source and Drain–To–Source Voltage vs. Total Charge**

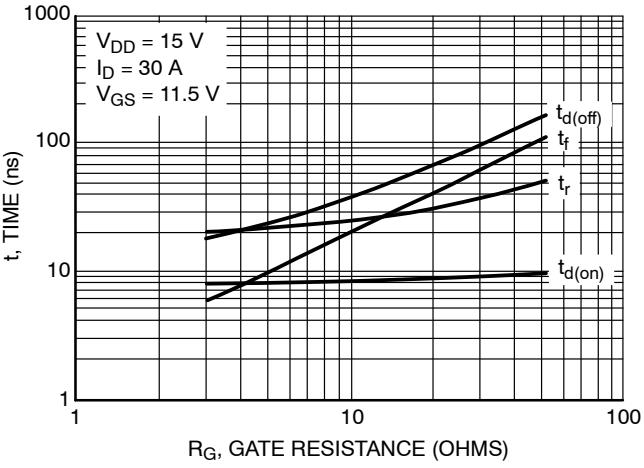



**Figure 9. Resistive Switching Time Variation vs. Gate Resistance**

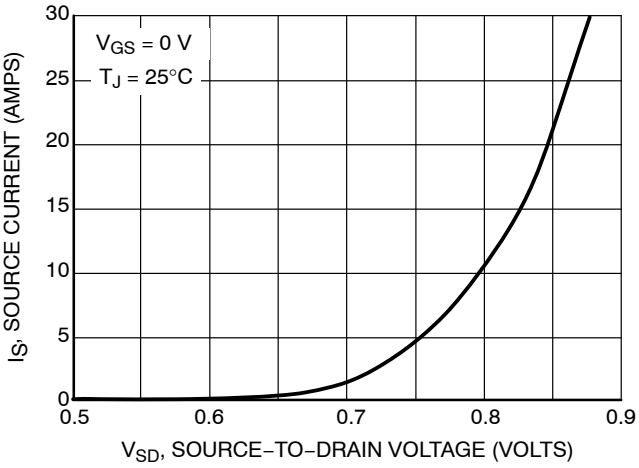



**Figure 10. Diode Forward Voltage vs. Current**

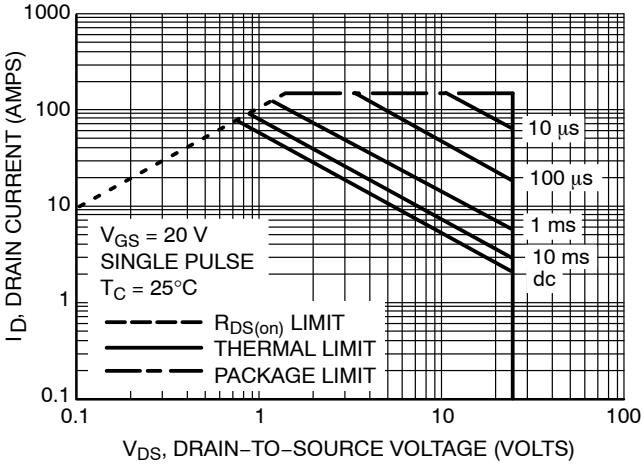



**Figure 11. Maximum Rated Forward Biased Safe Operating Area**

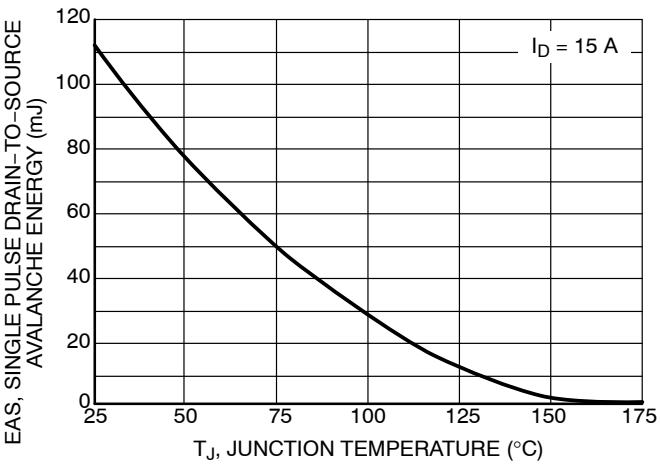



**Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature**

## TYPICAL PERFORMANCE CURVES

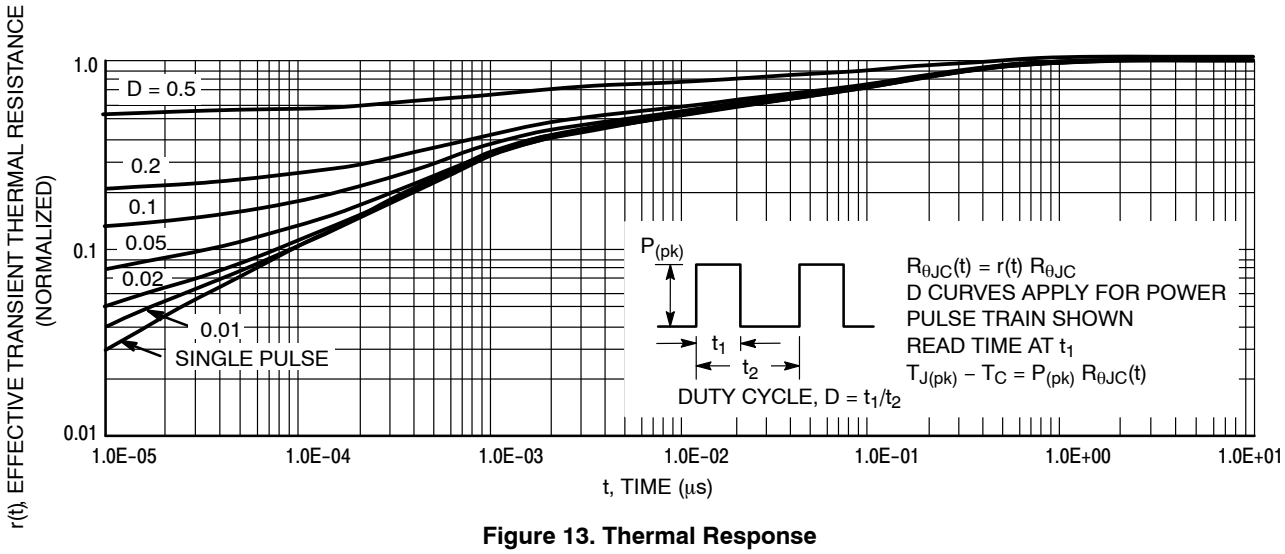
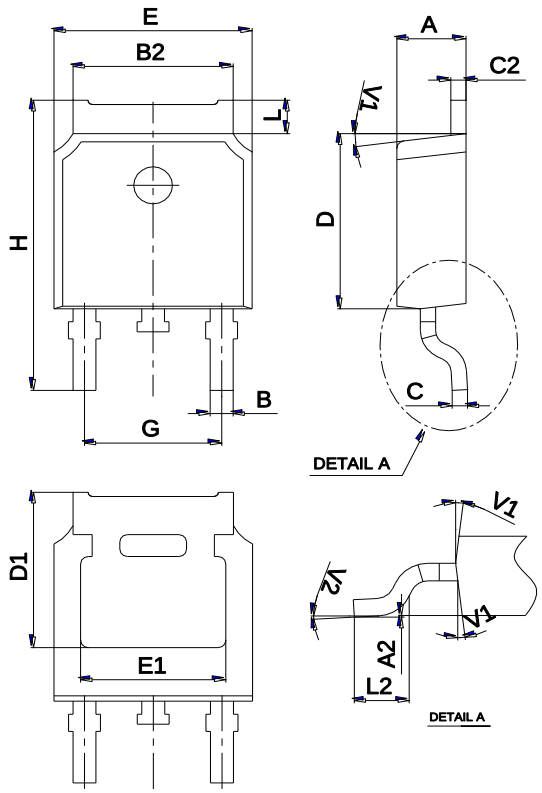


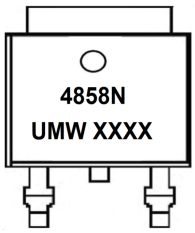

**Figure 13. Thermal Response**

## Package Mechanical Data TO-252




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |

## Marking




## Ordering information

| Order code | Package | Baseqty | Deliverymode |
|---|---|---|---|
| UMW NTD4858NT4G | TO-252 | 2500 | Tape and reel |

单击下面可查看定价，库存，交付和生命周期等信息

>>UMW(友台半导体)