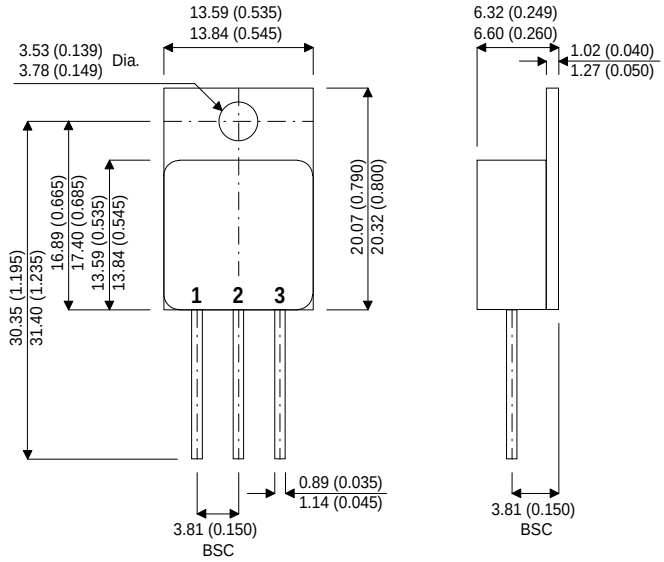
# 2N7228

## MECHANICAL DATA
Dimensions in mm (inches)




**TO–254AA – Metal Package**

Pin 1 – Drain Pin 2 – Source Pin 3 – Gate

# N–CHANNEL POWER MOSFET

| | |
|---|---|
| $V_{DSS}$ | 500V |
| $I_{D(cont)}$ | 12A |
| $R_{DS(on)}$ | 0.415Ω |

## FEATURES

- **HERMETICALLY SEALED ISOLATED PACKAGE**
- **AVALANCHE ENERGY RATING**
- **SIMPLE DRIVE REQUIREMENTS**
- **ALSO AVAILABLE IN A SURFACE MOUNT PACKAGE**
- **EASE OF PARALLELING**

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | | | |
|---|---|---|---|
| $V_{GS}$ | Gate – Source Voltage | | ±20V |
| $I_D$ | Continuous Drain Current | ($V_{GS}$ = 10V , $T_{case}$ = 25°C) | 12A |
| $I_D$ | Continuous Drain Current | ($V_{GS}$ = 10V , $T_{case}$ = 100°C) | 8A |
| $I_{DM}$ | Pulsed Drain Current [1] | | 48A |
| $P_D$ | Power Dissipation @ $T_{case}$ = 25°C | | 150W |
| | Linear Derating Factor | | 1.2W/°C |
| $E_{AS}$ | Single Pulse Avalanche Energy [2] | | 750mJ |
| $I_{AR}$ | Avalanche Current [1] | | 12A |
| $E_{AR}$ | Repetitive Avalanche Energy [1] | | 15mJ |
| dv/dt | Peak Diode Recovery [3] | | 3.5V/ns |
| $T_J$ , $T_{stg}$ | Operating and Storage Temperature Range | | –55 to 150°C |
| $T_L$ | Lead Temperature measured $^1/_{16}$" (1.6mm) from case for 10 sec. | | 300°C |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | | 0.83°C/W |
| $R_{\theta CS}$ | Thermal Resistance Case to Sink (Typical) | | 0.21°C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | | 48°C/W |

**Notes**

1) Repetitive Rating – Pulse width limited by Maximum Junction Temperature
2) @ $V_{DD}$ = 50V , L ≥ 9.4mH , $R_G$ = 25Ω , Peak $I_L$ = 12A , Starting $T_J$ = 25°C
3) @ $I_{SD}$ ≤ 12A , di/dt ≤ 130A/µs , $V_{DD}$ ≤ $BV_{DSS}$ , $T_J$ ≤ 150°C , Suggested $R_G$ = 2.35Ω

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SEME LAB

# 2N7228

## ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | **STATIC ELECTRICAL RATINGS** | | | | | | |
| $BV_{DSS}$ | Drain – Source Breakdown Voltage | $V_{GS}$ = 0 | $I_D$ = 1mA | 500 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Temperature Coefficient of Breakdown Voltage | Reference to 25°C<br>$I_D$ = 1mA | | | 0.68 | | V/°C |
| $R_{DS(on)}$ | Static Drain – Source On–State Resistance [2] | $V_{GS}$ = 10V | $I_D$ = 8A | | | 0.415 | Ω |
| | | $V_{GS}$ = 10V | $I_D$ = 12A | | | 0.515 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}$ | $I_D$ = 250µA | 2 | | 4 | V |
| $g_{fs}$ | Forward Transconductance [2] | $V_{DS} \geq 15V$ | $I_{DS}$ = 8A | 6.5 | | | S(℧) |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$ = 0 | $V_{DS} = 0.8BV_{DSS}$ | | | 25 | µA |
| | | | $T_J$ = 125°C | | | 250 | |
| $I_{GSS}$ | Forward Gate – Source Leakage | $V_{GS}$ = 20V | | | | 100 | nA |
| $I_{GSS}$ | Reverse Gate – Source Leakage | $V_{GS}$ = –20V | | | | –100 | |
| | **DYNAMIC CHARACTERISTICS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0<br>$V_{DS}$ = 25V<br>f = 1MHz | | | 2700 | | pF |
| $C_{oss}$ | Output Capacitance | | | | 600 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | | 240 | | |
| $C_{DC}$ | Drain – Case Capacitance | | | | 12 | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 10V<br>$I_D$ = 12A<br>$V_{DS} = 0.5BV_{DSS}$ | | 55 | | 120 | nC |
| $Q_{gs}$ | Gate – Source Charge | | | 5 | | 19 | |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge | | | 27 | | 70 | |
| $t_{d(on)}$ | Turn– On Delay Time | $V_{DD}$ = 250V<br>$I_D$ = 12A<br>$R_G$ = 2.35Ω | | | | 35 | ns |
| $t_r$ | Rise Time | | | | | 190 | |
| $t_{d(off)}$ | Turn–Off Delay Time | | | | | 170 | |
| $t_f$ | Fall Time | | | | | 130 | |
| | **SOURCE – DRAIN DIODE CHARACTERISTICS** | | | | | | |
| $I_S$ | Continuous Source Current | | | | | 12 | A |
| $I_{SM}$ | Pulse Source Current [1] | | | | | 48 | |
| $V_{SD}$ | Diode Forward Voltage [2] | $I_S$ = 12A<br>$V_{GS}$ = 0 | $T_J$ = 25°C | | | 1.7 | V |
| $t_{rr}$ | Reverse Recovery Time [2] | $I_F$ = 12A | $T_J$ = 25°C | | | 1600 | ns |
| $Q_{rr}$ | Reverse Recovery Charge [2] | $d_i / d_t \leq 100A/\mu s$ | $V_{DD} \leq 50V$ | | | 14 | µC |
| $t_{on}$ | Forward Turn–On Time | | | | Negligible | | |
| | **PACKAGE CHARACTERISTICS** | | | | | | |
| $L_D$ | Internal Drain Inductance Measured from 6mm down drain lead to centre of die | | | | 8.7 | | nH |
| $L_S$ | Internal Source Inductance Measured from 6mm down source lead to source bond pad | | | | 8.7 | | |

**Notes**

1) Repetitive Rating – Pulse width limited by Maximum Junction Temperature

2) Pulse Test: Pulse Width ≤ 300µs, δ ≤ 2%

* $I_S$ Current limited by pin diameter.

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