# N-Channel 60-V (D-S) MOSFET

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

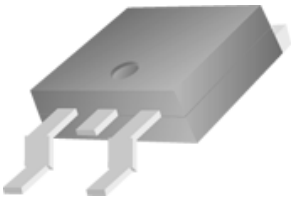
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ m(Ω) | $I_D$ (A) |
| 60 | 28 @ $V_{GS}$ = 10V | 35 |
| | 30 @ $V_{GS}$ = 4.5V | 34 |

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DPAK saves board space
- Fast switching speed
- High performance trench technology

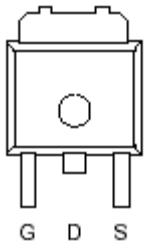
Pb-free

RoHS COMPLIANT

HALOGEN FREE



TO-252




Top View

| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C UNLESS OTHERWISE NOTED) | | | | |
|---|---|---|---|---|
| Parameter | | Symbol | Limit | Units |
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current[a] | $T_C$=25°C | $I_D$ | 35 | A |
| Pulsed Drain Current[b] | | $I_{DM}$ | 140 | |
| Continuous Source Current (Diode Conduction)[a] | | $I_S$ | 35 | A |
| Power Dissipation[a] | $T_C$=25°C | $P_D$ | 50 | W |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 175 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|---|---|---|---|
| Parameter | Symbol | Maximum | Units |
| Maximum Junction-to-Ambient[a] | $R_{\theta JA}$ | 50 | °C/W |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 3.0 | °C/W |

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

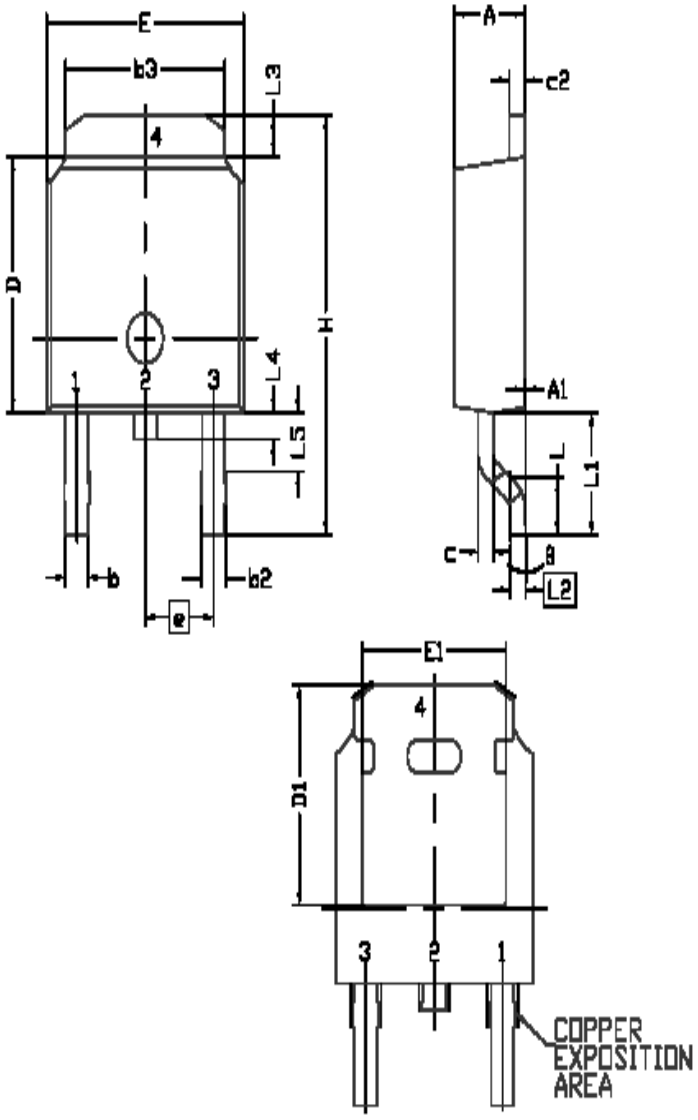
| SPECIFICATIONS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Limits** | | | **Unit** |
| | | | **Min** | **Typ** | **Max** | |
| **Static** | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 uA | 1 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = 20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 48 V, $V_{GS}$ = 0 V | | | 1 | uA |
| | | $V_{DS}$ = 48 V, $V_{GS}$ = 0 V, $T_J$ = 55°C | | | 25 | |
| On-State Drain Current[A] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 10 V | 35 | | | A |
| Drain-Source On-Resistance[A] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 3 A | | | 28 | mΩ |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 2 A | | | 30 | |
| Forward Tranconductance[A] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 3 A | | 25 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 2 A, $V_{GS}$ = 0 V | | 1.1 | | V |
| **Dynamic[b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 15 V, $V_{GS}$ = 4.5 V, $I_D$ = 30 A | | 26 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 5 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 13 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 25 V, $R_L$ = 25 Ω , $I_D$ = 30 A, $V_{GEN}$ = 10 V | | 6 | | nS |
| Rise Time | $t_r$ | | | 6 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 50 | | |
| Fall-Time | $t_f$ | | | 20 | | |

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

# Package Information




| SYMBOL | DIMENSIONAL REQMTS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| E | 6.40 | 6.60 | 6.731 |
| L | 1.40 | 1.52 | 1.77 |
| L1 | 2.743 REF | | |
| L2 | 0.508 BSC | | |
| L3 | 0.89 | --- | 1.27 |
| L4 | 0.64 | --- | 1.01 |
| L5 | --- | --- | --- |
| D | 6.00 | 6.10 | 6.223 |
| H | 9.40 | 10.00 | 10.40 |
| b | 0.64 | 0.76 | 0.88 |
| b2 | 0.77 | 0.84 | 1.14 |
| b3 | 5.21 | 5.34 | 5.46 |
| e | 2.286 BSC | | |
| A | 2.20 | 2.30 | 2.38 |
| A1 | 0 | --- | 0.127 |
| c | 0.45 | 0.50 | 0.60 |
| c2 | 0.45 | 0.50 | 0.58 |
| D1 | 5.30 | --- | --- |
| E1 | 4.40 | --- | --- |
| θ | 0° | --- | 10° |