SILIKRON

# SSF1030D

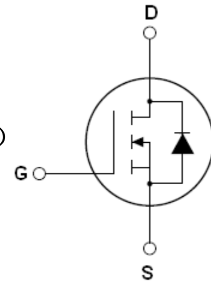
**Feathers:**

- Advanced trench process technology
- Ultra low Rdson, typical 23mohm
- High avalanche energy, 100% test
- Fully characterized avalanche voltage and current

**ID =45A**

**BV=100V**

**Rdson=23mΩ（typ.）**

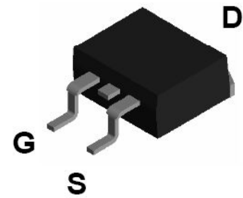



**Description:**

The SSF1030D is a new generation of middle voltage and high current N–Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF1030D is assembled in high reliability and qualified assembly house.

**Application:**

- Power switching application




**SSF1030D TOP View (DPAK)**

**Absolute Maximum Ratings**

| | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$@$T_c$=25 ℃ | Continuous drain current,VGS@10V | 45 | A |
| $I_D$@$T_c$=100℃ | Continuous drain current,VGS@10V | 35 | |
| $I_{DM}$ | Pulsed drain current ① | 180 | |
| $P_D$@$T_C$=25℃ | Power dissipation | 84 | W |
| | Linear derating factor | 1.5 | W/ ℃ |
| $V_{GS}$ | Gate-to-Source voltage | ±20 | V |
| $E_{AS}$ | Single pulse avalanche energy ② | 168 | mJ |
| $E_{AR}$ | Repetitive avalanche energy | TBD | |
| $T_J$<br>$T_{STG}$ | Operating Junction and<br>Storage Temperature Range | –55 to +175 | ℃ |

**Thermal Resistance**

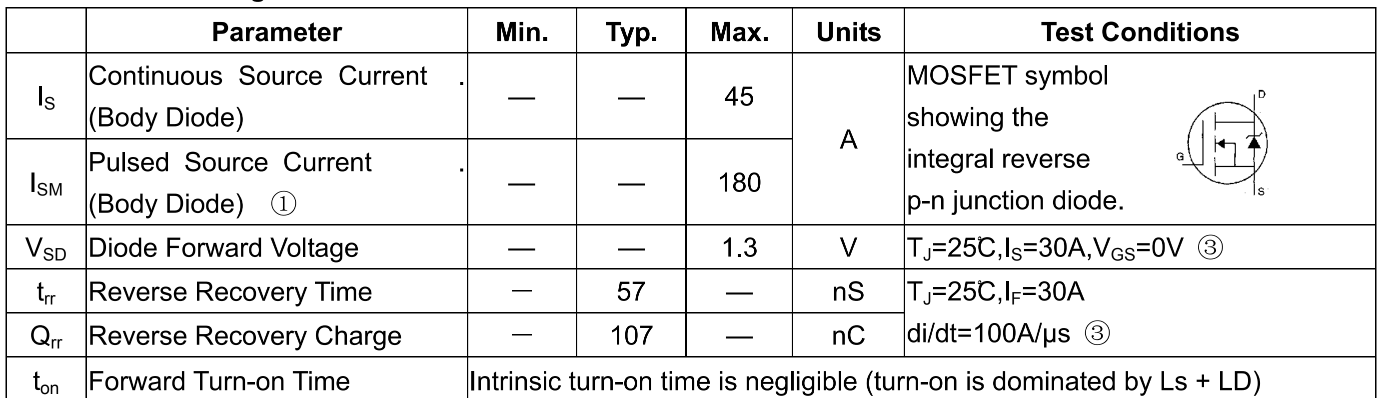
| | Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $R_{θJC}$ | Junction-to-case | — | 1.78 | — | ℃/W |
| $R_{θJA}$ | Junction-to-ambient | — | — | 62 | |

**Electrical Characteristics @TJ=25 ℃(unless otherwise specified)**

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-to-Source breakdown voltage | 100 | — | — | V | $V_{GS}$=0V,$I_D$=250μA |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 23 | 25 | mΩ | $V_{GS}$=10V,$I_D$=30A |
| $V_{GS(th)}$ | Gate threshold voltage | 2.0 | 3.1 | 4.0 | V | $V_{DS}$=$V_{GS}$,$I_D$=250μA |
| $g_{fs}$ | Forward transconductance | - | 50 | — | S | $V_{DS}$=5V,$I_D$=30A |
| $I_{DSS}$ | Drain-to-Source leakage current | — | — | 1 | μA | $V_{DS}$=100V,$V_{GS}$=0V |
| | | — | — | 10 | | $V_{DS}$=100V,<br>$V_{GS}$=0V,$T_J$=150℃ |

| $I_{GSS}$ | Gate-to-Source forward leakage | — | — | 100 | nA | $V_{GS}$=20V |
|---|---|---|---|---|---|---|
| | Gate-to-Source reverse leakage | — | — | -100 | | $V_{GS}$=-20V |
| $Q_g$ | Total gate charge | — | 4.2 | — | nC | $I_D$=30A |
| $Q_{gs}$ | Gate-to-Source charge | — | 15 | — | | $V_{DD}$=30V |
| $Q_{gd}$ | Gate-to-Drain("Miller") charge | — | 14.6 | — | | $V_{GS}$=10V |
| $t_{d(on)}$ | Turn-on delay time | — | 14.2 | — | nS | $V_{DD}$=30V |
| $t_r$ | Rise time | — | 40 | — | | $I_D$=2A ,$R_L$=15Ω |
| $t_{d(off)}$ | Turn-Off delay time | — | 7.3 | — | | $R_G$=2.5Ω |
| $t_f$ | Fall time | — | 14.8 | — | | $V_{GS}$=10V |
| $C_{iss}$ | Input capacitance | — | 190 | — | pF | $V_{GS}$=0V |
| $C_{oss}$ | Output capacitance | — | 135 | — | | $V_{DS}$=25V |
| $C_{rss}$ | Reverse transfer capacitance | — | 4.2 | — | | f=1.0MHZ |

**Source-Drain Ratings and Characteristics**



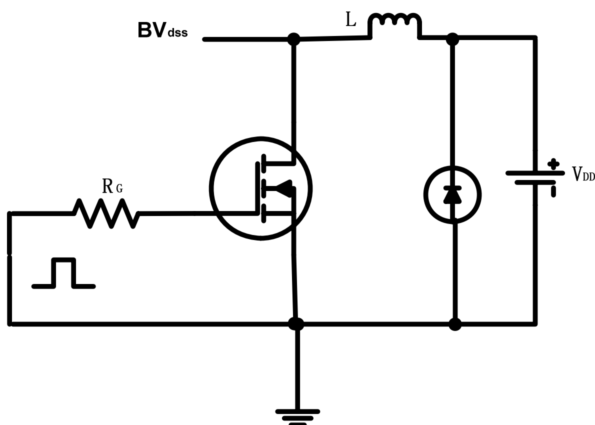
| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 45 | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ① | — | — | 180 | | |
| $V_{SD}$ | Diode Forward Voltage | — | — | 1.3 | V | $T_J$=25℃,$I_S$=30A,$V_{GS}$=0V ③ |
| $t_{rr}$ | Reverse Recovery Time | – | 57 | — | nS | $T_J$=25℃,$I_F$=30A di/dt=100A/μs ③ |
| $Q_{rr}$ | Reverse Recovery Charge | – | 107 | — | nC | |
| $t_{on}$ | Forward Turn-on Time | Intrinsic turn-on time is negligible (turn-on is dominated by Ls + LD) | | | | |

Notes:

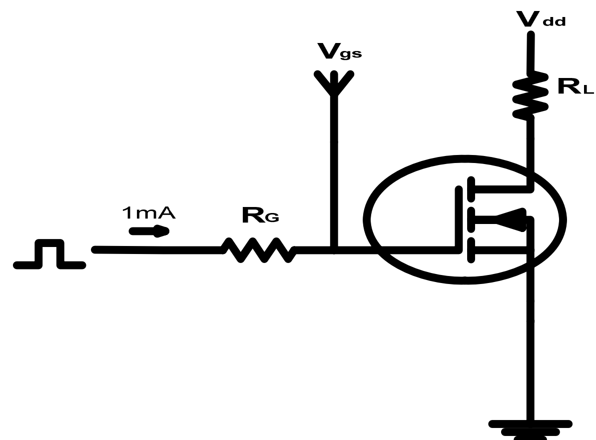
① Repetitive rating; pulse width limited by max junction temperature.

② Test condition: L =0.3mH, ID = 33.5A, VDD = 50V

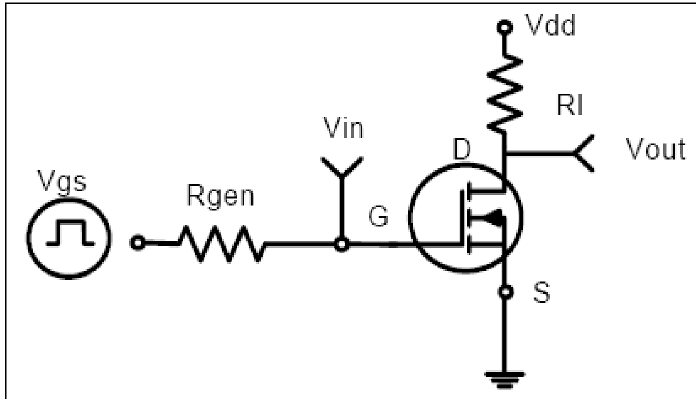
③ Pulse width≤300μS, duty cycle≤1.5% ; RG = 25Ω Starting TJ = 25°C



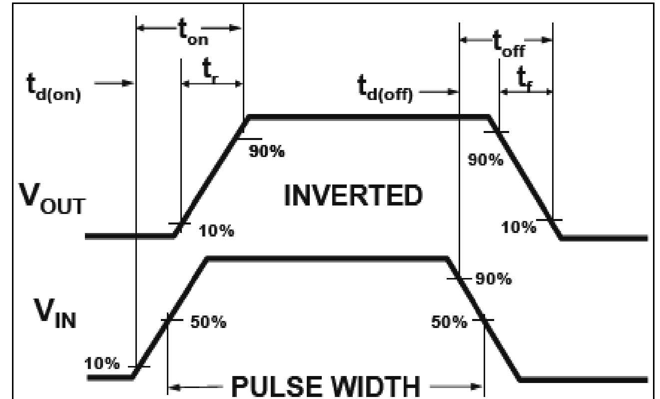

**EAS test circuit**



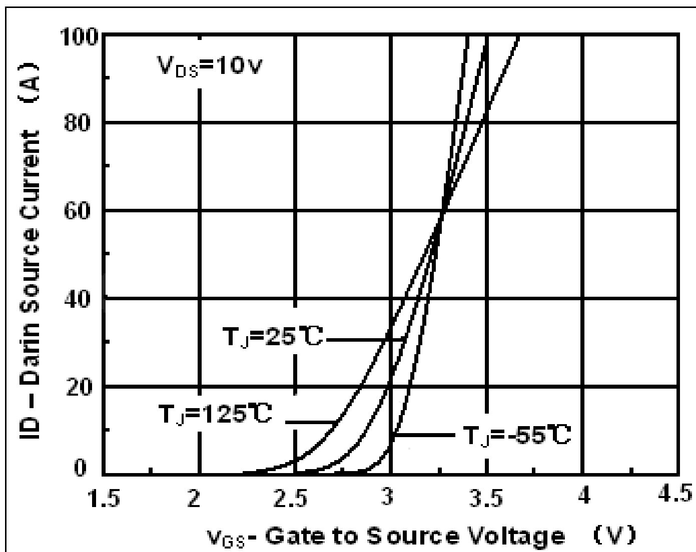

**Gate charge test circuit**



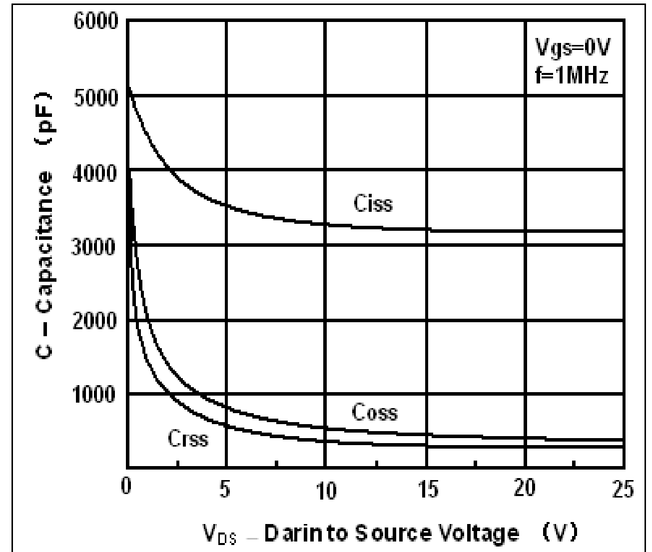

**Switch Time Test Circuit:**



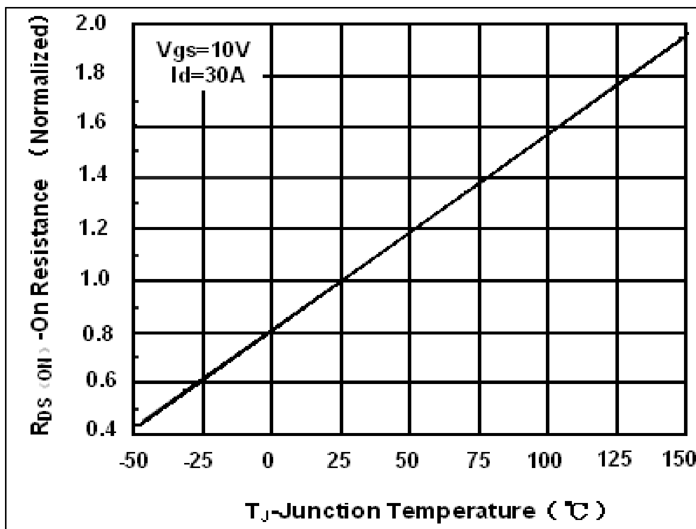

**Switch Waveforms:**



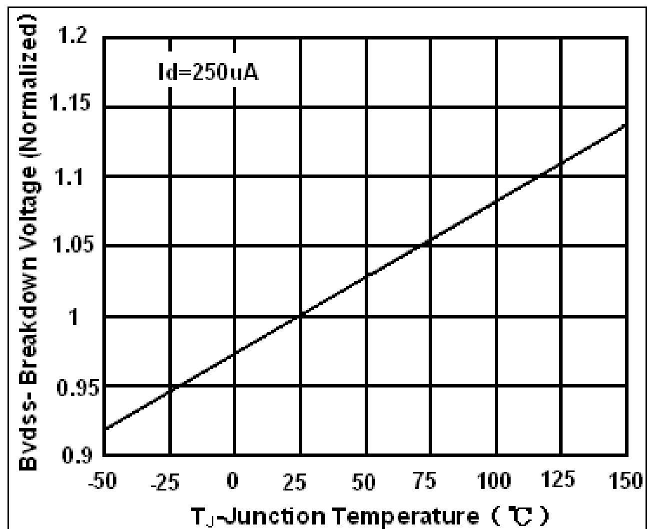

**Transfer Characteristic**



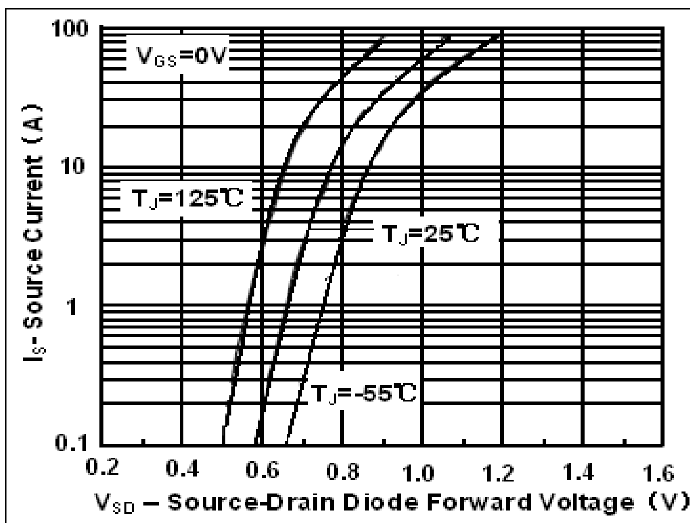

**Capacitance:**



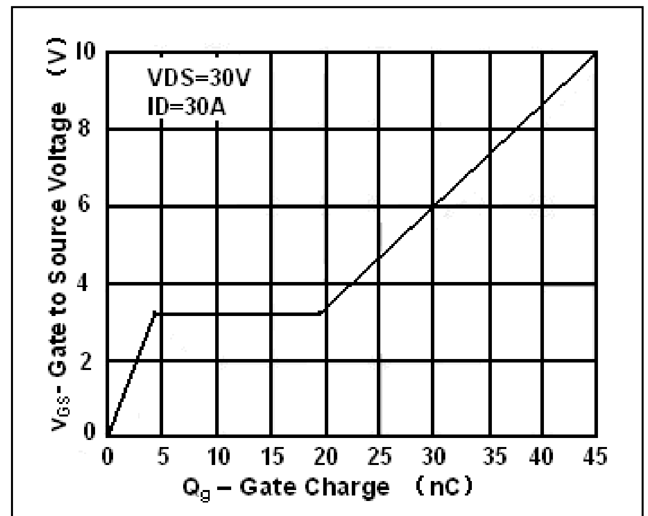

**On Resistance vs. Junction Temperature**



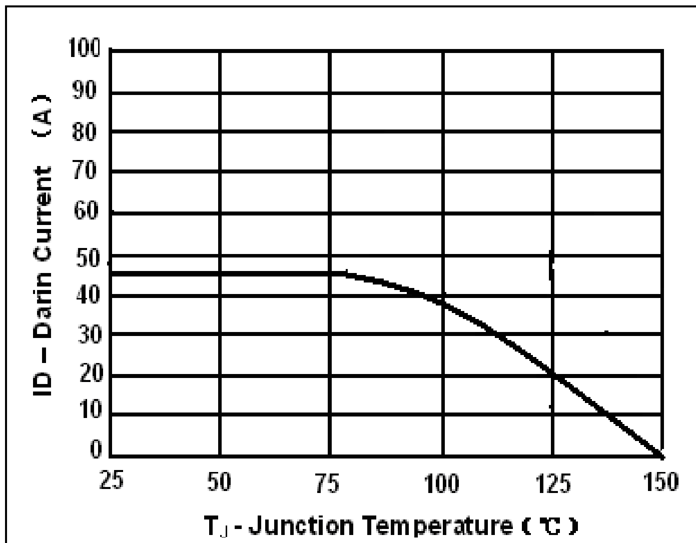

**Breakdown Voltage vs. Junction Temperature**



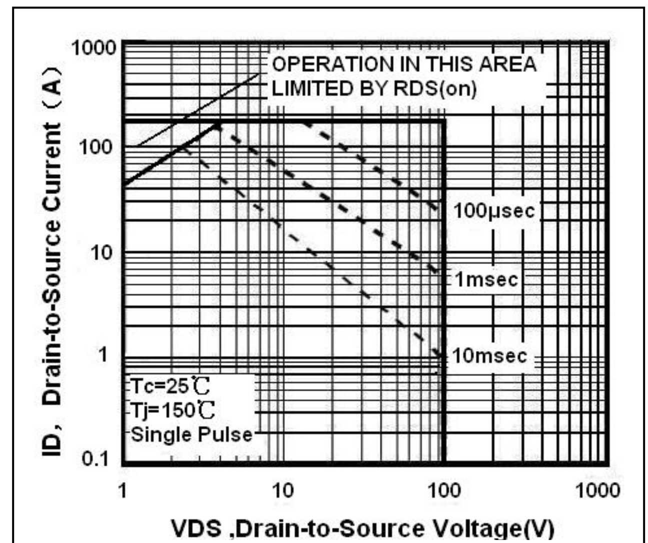

Source-Drain Diode Forward Voltage



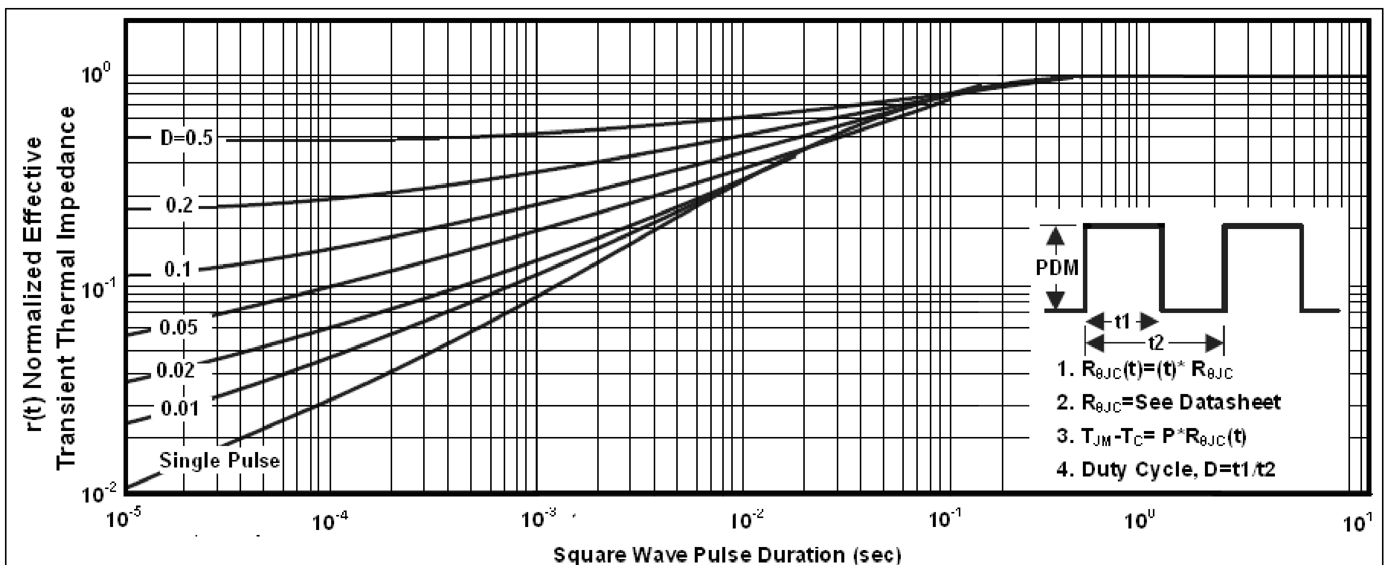

Gate Charge




Max Drain Current vs. Junction Temperature

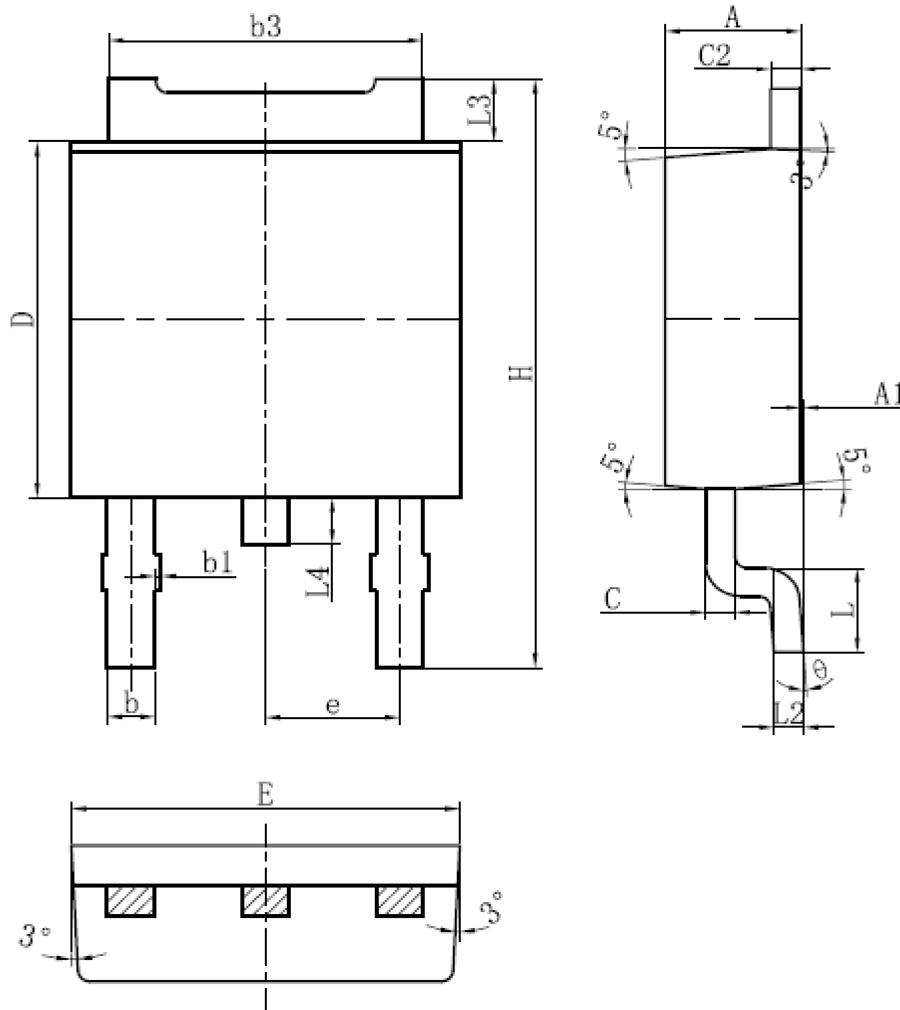



Safe Operation Area




Transient Thermal Impedance Curve

**DPAK MECHANICAL DATA:**




| Symbol | Min. | Normal | Max. |
|---|---|---|---|
| E | 6.55 | 6.6 | 6.65 |
| L | 1.40 | 1.5 | 1.60 |
| L2 | – | 0.51BSC | – |
| L3 | 0.93 | 1.08 | 1.23 |
| L4 | 0.7 | 0.8 | 0.9 |
| D | 6.05 | 6.1 | 6.15 |
| H | 9.9 | 10.1 | 10.3 |
| b | 0.763 | 0.813 | 0.863 |
| b1 | 0 | – | 0.1 |
| b3 | 5.28 | 5.33 | 5.38 |
| e | 2.23 | 2.28 | 2.33 |
| A | 2.25 | 2.3 | 2.35 |
| A1 | 0 | 0.05 | 0.10 |
| C | 0.498 | 0.508 | 0.518 |
| C2 | 0.498 | 0.508 | 0.518 |
| θ | 0 | – | 8° |

NOTE:
1.Package body size exclude flash and gate burrs.
2.Dimension L is measured in gage plane.
3.Tolerance 0.10mm unless otherwise specified.
4.Controlling dimension is millimeter.Converted inch dimension are not necessarily exact.