

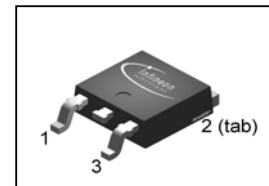
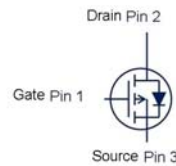
SIPMOS® Power-Transistor
Features

- P-Channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- 175°C operating temperature
- Pb-free lead finishing; RoHS compliant


Product Summary

| | | |
|------------------|------|----------|
| V_{DS} | -60 | V |
| $R_{DS(on),max}$ | 0.3 | Ω |
| I_D | -8.8 | A |

PG-TO252-3



| Type | Package | Tape and reel information | Marking | Lead free | Packing |
|------------|------------|---------------------------|---------|-----------|---------|
| SPD08P06PG | PG-TO252-3 | 1000 pcs / reel | 08P06P | Yes | Non dry |

| Parameter | Symbol | Conditions | Value | Unit |
|---|----------------|---|----------------|-------------------|
| | | | steady state | |
| Continuous drain current | I_D | $T_A=25\text{ °C}$ | -8.83 | A |
| | | $T_A=100\text{ °C}$ | -6.25 | |
| Pulsed drain current | $I_{D,pulse}$ | $T_A=25\text{ °C}$ | -35.32 | |
| Avalanche energy, single pulse | E_{AS} | $I_D=8.83\text{ A}, R_{GS}=25\ \Omega$ | 70 | mJ |
| Avalanche energy, periodic limited by $T_{j,max}$ | E_{AR} | | 4.2 | |
| Reverse diode dv/dt | dv/dt | $I_D=8.83\text{ A}, V_{DS}=48\text{ V}, di/dt=-200\text{ A}/\mu\text{s}, T_{j,max}=175\text{ °C}$ | -6 | kV/ μs |
| Gate source voltage | V_{GS} | | ± 20 | V |
| Power dissipation | P_{tot} | $T_A=25\text{ °C}$ | 42 | W |
| Operating and storage temperature | T_j, T_{stg} | | "-55 ... +175" | °C |
| ESD class | | | | |
| Soldering temperature | | | 260 °C | |
| IEC climatic category; DIN IEC 68-1 | | | 55/175/56 | |

| Parameter | Symbol | Conditions | Values | | | Unit |
|--|-------------------|--|--------|------|------|------|
| | | | min. | typ. | max. | |
| Thermal characteristics | | | | | | |
| Thermal resistance, junction - case | R_{thJC} | | - | - | 3.6 | K/W |
| Thermal resistance, junction - ambient, leaded | R_{thJA} | | - | - | - | K/W |
| SMD version, device on PCB: | R_{thJA} | minimal footprint | - | - | 75 | |
| | | 6 cm ² cooling area ¹⁾ | - | - | 50 | |

Electrical characteristics, at $T_j=25\text{ }^\circ\text{C}$, unless otherwise specified

Static characteristics

| | | | | | | |
|----------------------------------|-----------------------------|---|------|------|------|---------------|
| Drain-source breakdown voltage | $V_{(\text{BR})\text{DSS}}$ | $V_{\text{GS}}=0\text{ V}, I_{\text{D}}=-250\text{ }\mu\text{A}$ | -60 | - | - | V |
| Gate threshold voltage | $V_{\text{GS(th)}}$ | $V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=-250\text{ }\mu\text{A}$ | -2.1 | -3.0 | -4 | |
| Zero gate voltage drain current | I_{DSS} | $V_{\text{DS}}=-60\text{ V}, V_{\text{GS}}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$ | - | -0.1 | -1 | μA |
| | | $V_{\text{DS}}=-60\text{ V}, V_{\text{GS}}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$ | - | -10 | -100 | |
| Gate-source leakage current | I_{GSS} | $V_{\text{GS}}=-20\text{ V}, V_{\text{DS}}=0\text{ V}$ | - | -10 | -100 | nA |
| Drain-source on-state resistance | $R_{\text{DS(on)}}$ | $V_{\text{GS}}=-6.2\text{ V}, I_{\text{D}}=-10\text{ A}$ | - | 230 | 300 | m Ω |
| Transconductance | g_{fs} | $ V_{\text{DS}} >2 I_{\text{D}} R_{\text{DS(on)max}}, I_{\text{D}}=-6.2\text{ A}$ | 2.5 | 4.9 | - | S |

¹⁾ Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm² (one layer, 70 μ , thick) copper area for drain connection. PCB is vertical without blown air.

| Parameter | Symbol | Conditions | Values | | | Unit |
|-----------|--------|------------|--------|------|------|------|
| | | | min. | typ. | max. | |

Dynamic characteristics

| | | | | | | |
|------------------------------|--------------|---|---|------|------|----|
| Input capacitance | C_{iss} | $V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$ | - | 335 | 420 | pF |
| Output capacitance | C_{oss} | | - | 105 | 135 | |
| Reverse transfer capacitance | C_{rss} | | - | 65 | 95 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}=-30\text{ V}, V_{GS}=-$ $10\text{ V}, I_D=-6.2\text{ A},$ $R_G=6\ \Omega$ | - | 16.0 | 24.0 | |
| Rise time | t_r | | - | 46.0 | 69 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 48 | 72 | |
| Fall time | t_f | | - | 14 | 21 | |

Gate Charge Characteristics

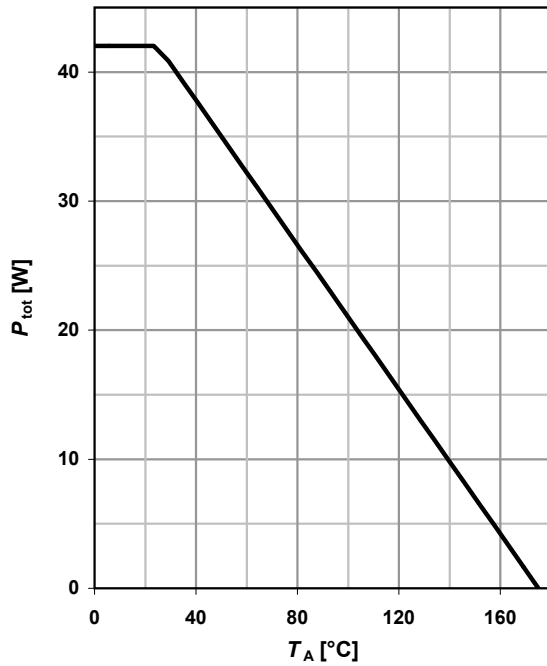
| | | | | | | |
|-----------------------|---------------|--|---|------|------|----|
| Gate to source charge | Q_{gs} | $V_{DD}=-48\text{ V}, I_D=-8.8\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$ | - | -1.9 | -2.6 | nC |
| Gate to drain charge | Q_{gd} | | - | -5 | -8 | |
| Gate charge total | Q_g | | - | -10 | -13 | |
| Gate plateau voltage | $V_{plateau}$ | | - | -6 | - | V |

Reverse Diode

| | | | | | | |
|----------------------------------|---------------|--|---|-------|-------|----|
| Diode continuous forward current | I_S | $T_A=25\text{ }^\circ\text{C}$ | - | - | -8.80 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | -35.3 | |
| Diode forward voltage | V_{SD} | $V_{GS}=0\text{ V}, I_F=-8.83\text{ A},$ $T_j=25\text{ }^\circ\text{C}$ | - | -0.98 | -1.55 | V |
| Reverse recovery time | t_{rr} | $V_R=30\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$ | - | 60 | 90 | ns |
| Reverse recovery charge | Q_{rr} | | - | 100 | 150 | |

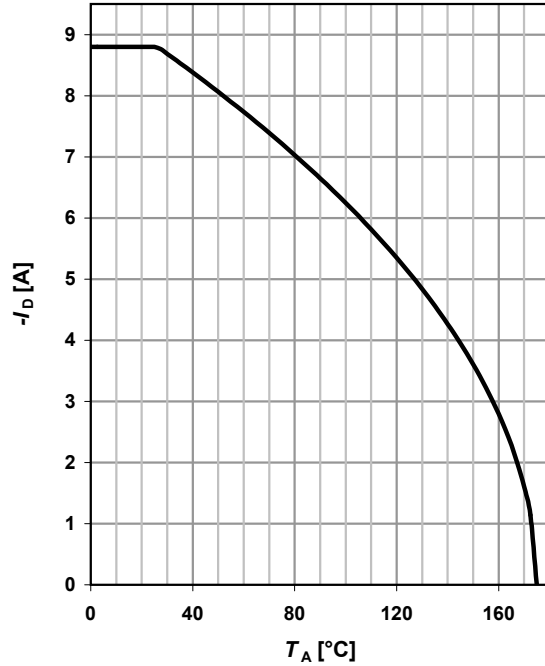
1 Power dissipation

$$P_{tot} = f(T_A)$$



2 Drain current

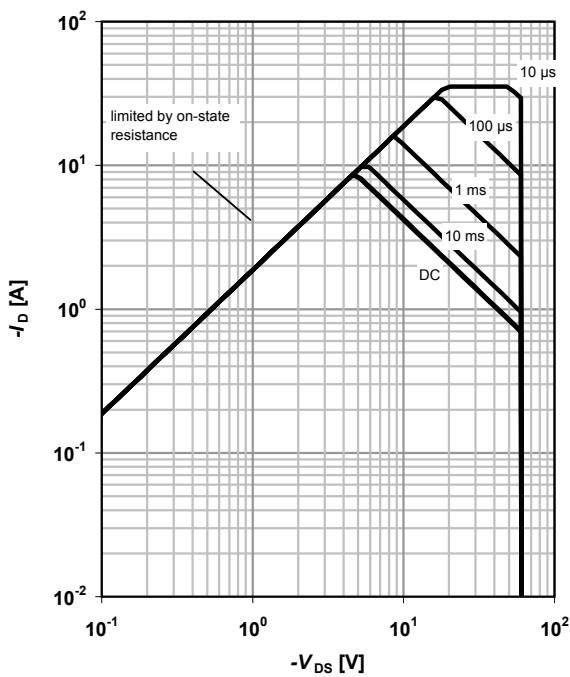
$$I_D = f(T_A); |V_{GS}| \geq 10 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{DS}); T_A = 25 \text{ °C}; D = 0$$

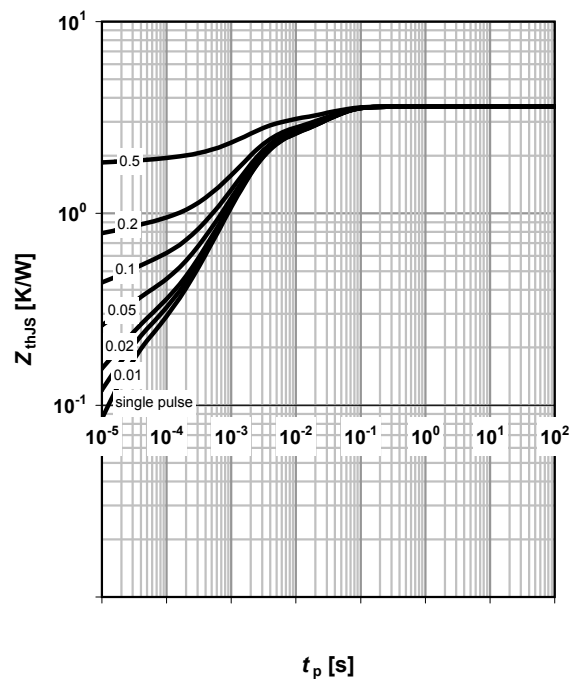
parameter: t_p



4 Max. transient thermal impedance

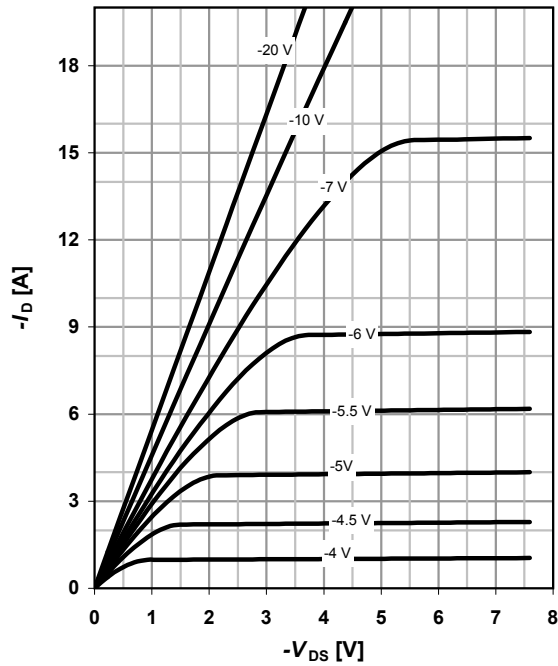
$$Z_{thJA} = f(t_p)$$

parameter: $D = t_p / T$

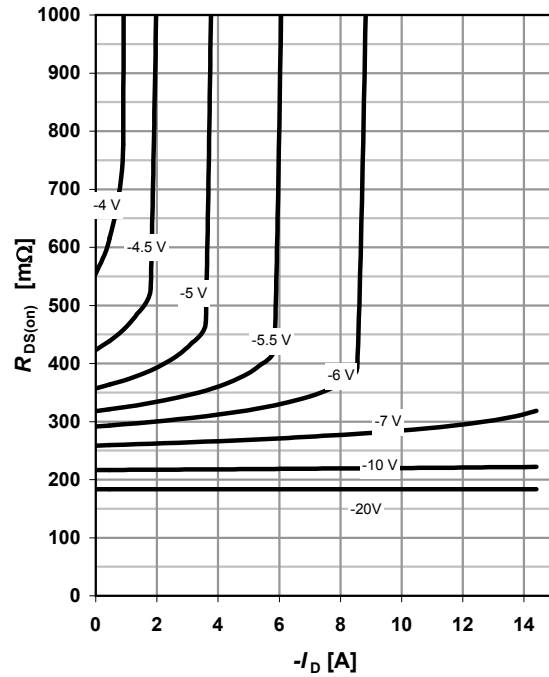


5 Typ. output characteristics

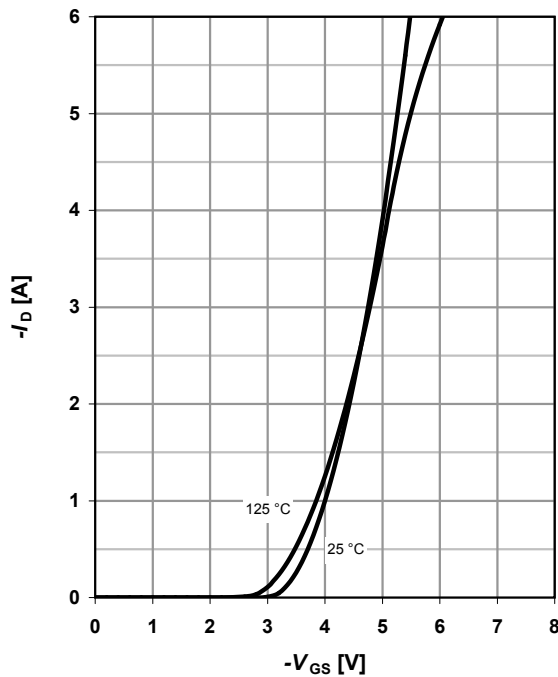
$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

 parameter: V_{GS}

6 Typ. drain-source on resistance

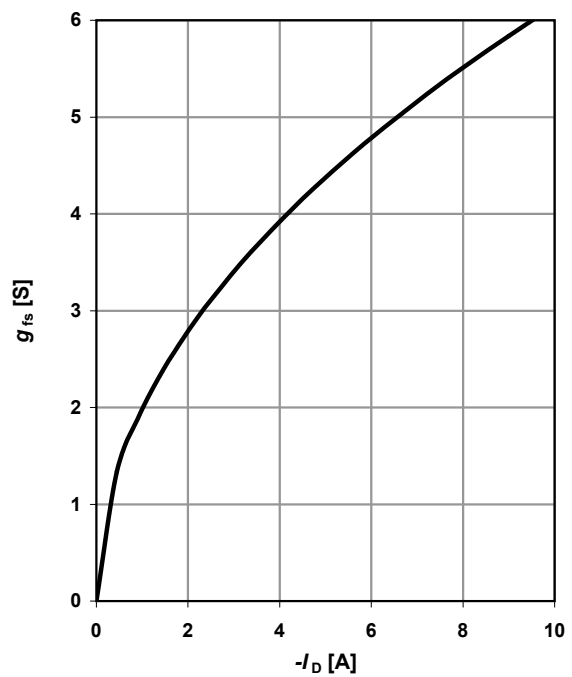
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

 parameter: V_{GS}

7 Typ. transfer characteristics

$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$

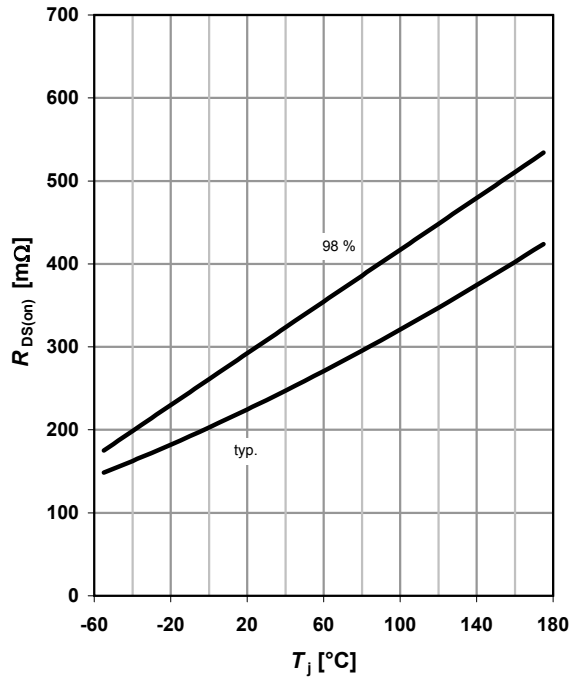
 parameter: T_j

8 Typ. forward transconductance

$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$

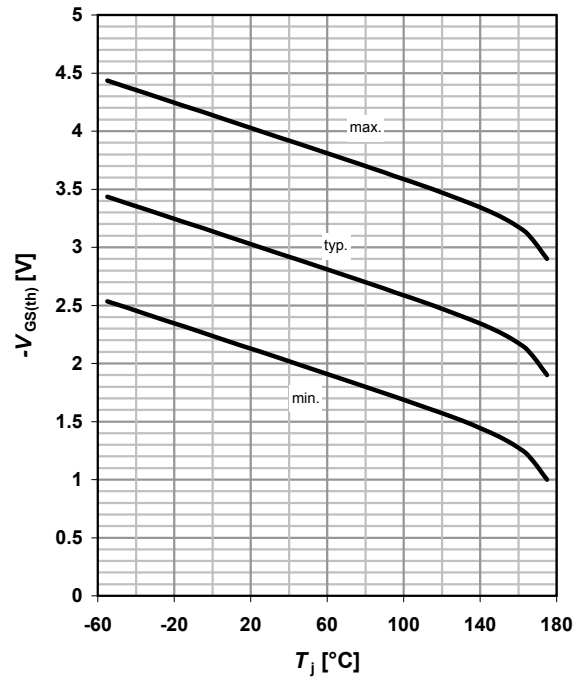


9 Drain-source on-state resistance

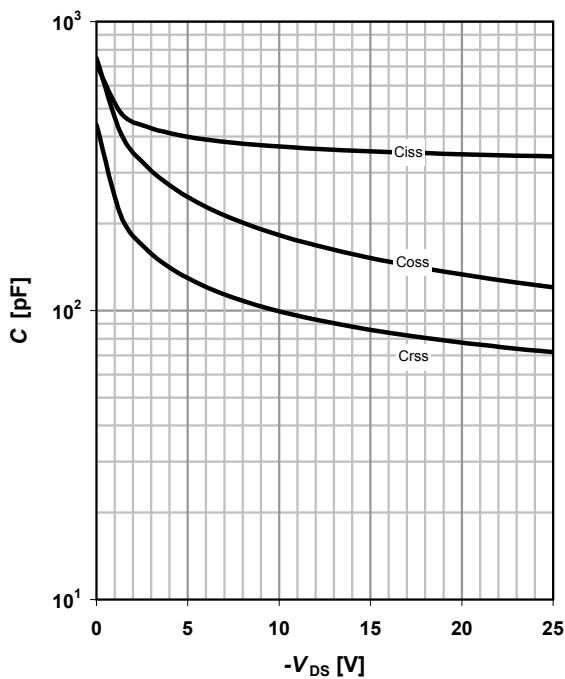
$$R_{DS(on)} = f(T_j); I_D = -6.2 \text{ A}; V_{GS} = -10 \text{ V}$$


10 Typ. gate threshold voltage

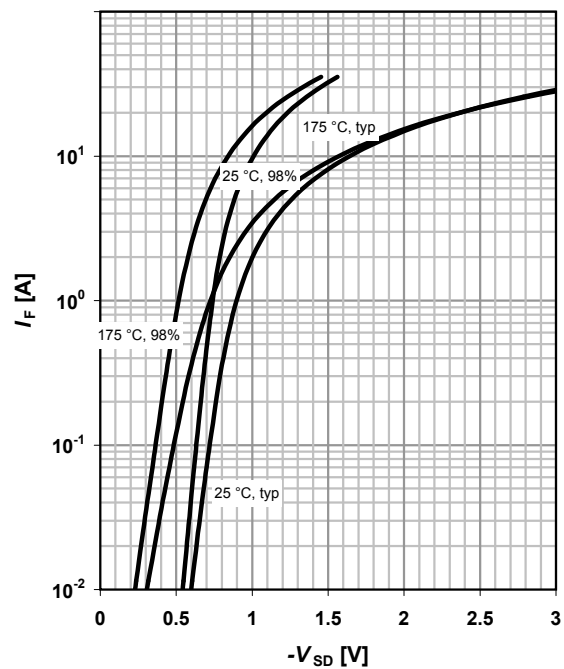
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -250 \mu\text{A}$$


11 Typ. capacitances

$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

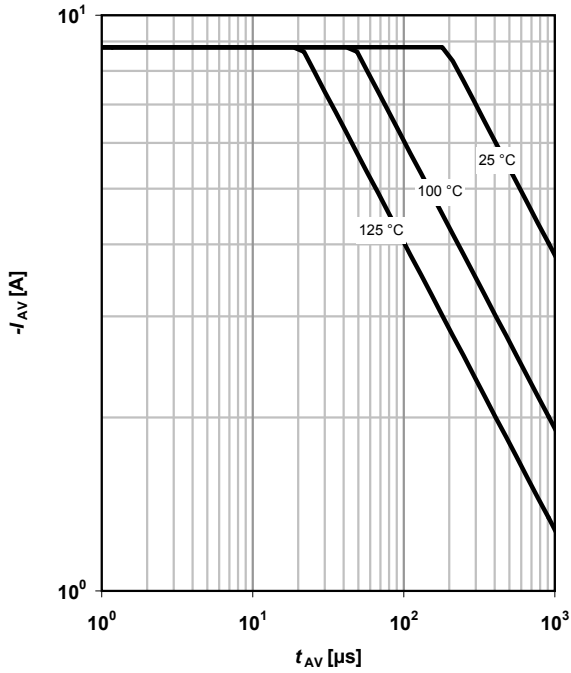

12 Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

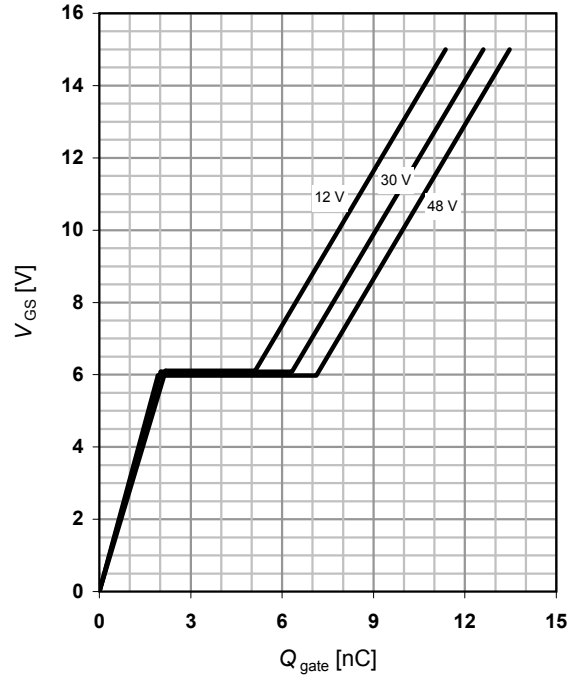
 parameter: T_j


13 Avalanche characteristics

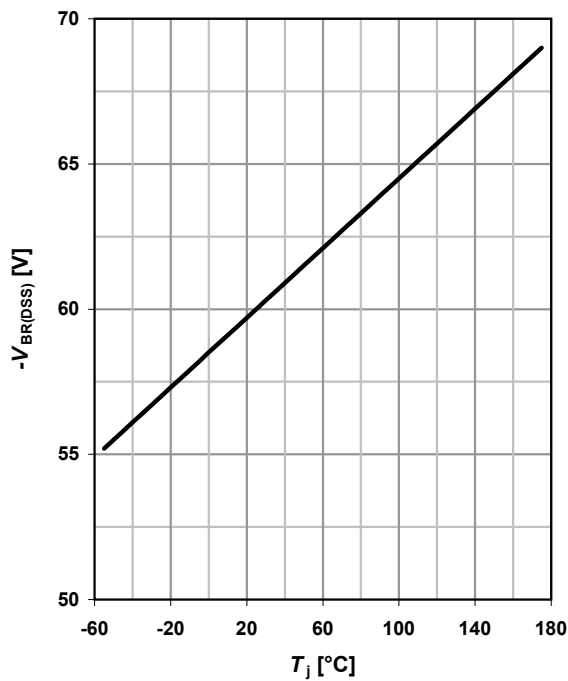
$$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$$

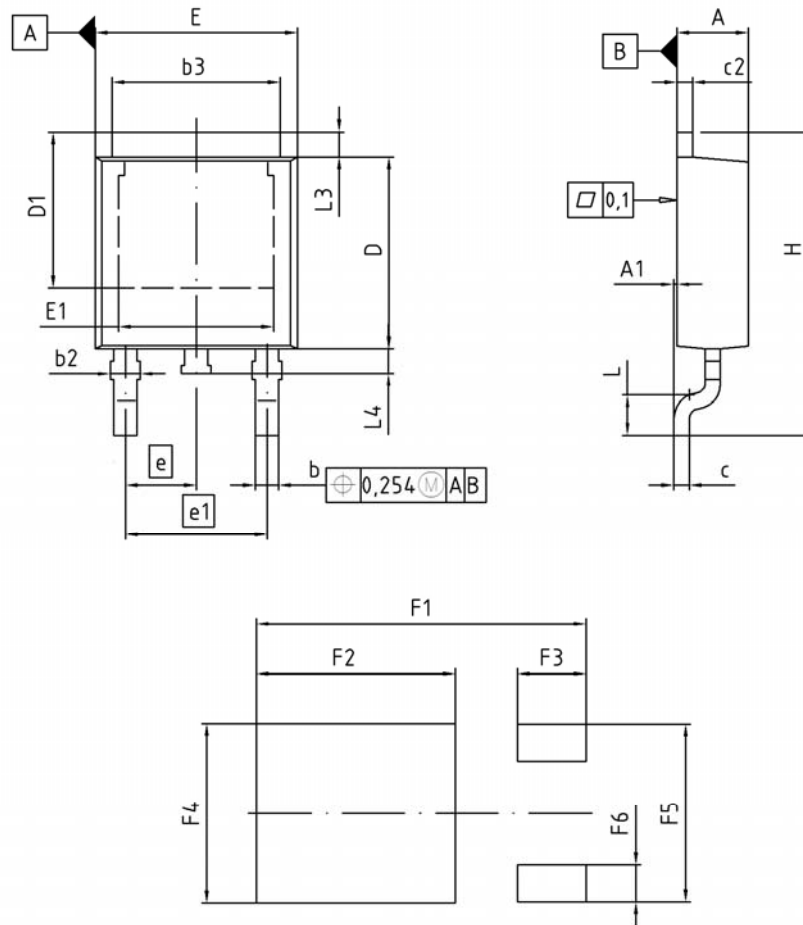
 parameter: $T_{j(\text{start})}$

14 Typ. gate charge

$$V_{GS}=f(Q_{\text{gate}}); I_D=-8.8\ \text{A pulsed}$$

 parameter: V_{DD}

15 Drain-source breakdown voltage

$$V_{BR(DSS)}=f(T_j); I_D=-250\ \mu\text{A}$$



Package outline: PG-TO252-3


| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 2.16 | 2.41 | 0.085 | 0.095 |
| A1 | 0.00 | 0.15 | 0.000 | 0.006 |
| b | 0.64 | 0.89 | 0.025 | 0.035 |
| b2 | 0.65 | 1.15 | 0.026 | 0.045 |
| b3 | 5.00 | 5.50 | 0.197 | 0.217 |
| c | 0.46 | 0.60 | 0.018 | 0.024 |
| c2 | 0.46 | 0.98 | 0.018 | 0.039 |
| D | 5.97 | 6.22 | 0.235 | 0.245 |
| D1 | 5.02 | 5.84 | 0.198 | 0.230 |
| E | 6.40 | 6.73 | 0.252 | 0.265 |
| E1 | 4.70 | 5.21 | 0.185 | 0.205 |
| e | 2.29 | | 0.090 | |
| e1 | 4.57 | | 0.180 | |
| N | 3 | | 3 | |
| H | 9.40 | 10.48 | 0.370 | 0.413 |
| L | 1.18 | 1.70 | 0.046 | 0.067 |
| L3 | 0.90 | 1.25 | 0.035 | 0.049 |
| L4 | 0.51 | 1.00 | 0.020 | 0.039 |
| F1 | 10.50 | 10.70 | 0.413 | 0.421 |
| F2 | 6.30 | 6.50 | 0.248 | 0.256 |
| F3 | 2.10 | 2.30 | 0.083 | 0.091 |
| F4 | 5.70 | 5.90 | 0.224 | 0.232 |
| F5 | 5.66 | 5.86 | 0.223 | 0.231 |
| F6 | 1.10 | 1.30 | 0.043 | 0.051 |

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