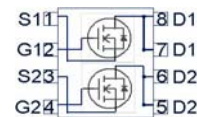
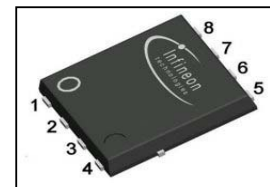


**OptiMOS<sup>®</sup>3 Power-Transistors**
**Features**

- Dual N-channel, logic level
- Fast switching MOSFETs for SMPS
- Optimized technology for DC/DC converters
- Qualified according to JEDEC<sup>1)</sup> for target applications
- Excellent gate charge x  $R_{DS(on)}$  product (FOM)
- Very low on-resistance  $R_{DS(on)}$
- Superior thermal resistance
- 100% Avalanche tested
- Pb-free plating; RoHS compliant

**Product Summary**

|                  |    |            |
|------------------|----|------------|
| $V_{DS}$         | 30 | V          |
| $R_{DS(on),max}$ | 15 | m $\Omega$ |
| $I_D$            | 20 | A          |

**PG-TDSON-8**


| Type          | Package    | Marking  |
|---------------|------------|----------|
| BSC150N03LD G | PG-TDSON-8 | 150N03LD |

**Maximum ratings, at  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified**

| Parameter                           | Symbol         | Conditions  | Value          |              | Unit             |
|-------------------------------------|----------------|---|----------------|--------------|------------------|
|                                     |                |   | $\leq 10$ secs | steady state |                  |
| Continuous drain current            | $I_D$          | $V_{GS}=10\text{ V}, T_C=25\text{ }^\circ\text{C}$      | 20             |              | A                |
|                                     |                | $V_{GS}=10\text{ V}, T_C=100\text{ }^\circ\text{C}$     | 20             |              |                  |
|                                     |                | $V_{GS}=4.5\text{ V}, T_C=25\text{ }^\circ\text{C}$     | 20             |              |                  |
|                                     |                | $V_{GS}=4.5\text{ V}, T_C=100\text{ }^\circ\text{C}$    | 17             |              |                  |
|                                     |                | $V_{GS}=10\text{ V}, T_A=25\text{ }^\circ\text{C}^{3)}$ | 12.4           | 8            |                  |
| Pulsed drain current <sup>2)</sup>  | $I_{D,pulse}$  | $T_C=25\text{ }^\circ\text{C}$                          | 80             |              |                  |
| Avalanche energy, single pulse      | $E_{AS}$       | $I_D=20\text{ A}, R_{GS}=25\text{ }\Omega$              | 10             |              | mJ               |
| Gate source voltage                 | $V_{GS}$       |   | $\pm 20$       |              | V                |
| Power dissipation                   | $P_{tot}$      | $T_C=25\text{ }^\circ\text{C}$                          | 26             |              | W                |
|                                     |                | $T_A=25\text{ }^\circ\text{C}^{3)}$                     | 3.6            | 1.5          |                  |
| Operating and storage temperature   | $T_j, T_{stg}$ |   | -55 ... 150    |              | $^\circ\text{C}$ |
| IEC climatic category; DIN IEC 68-1 |                |   | 55/150/56      |              |                  |

<sup>1)</sup> J-STD20 and JESD22

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

**Thermal characteristics**

|  |            |               |   |   |     |     |
|--|------------|---------------|---|---|-----|-----|
| Thermal resistance, junction - case  | $R_{thJC}$ |               | - | - | 4.9 | K/W |
| Thermal resistance, junction - ambient, 6 cm <sup>2</sup> cooling area <sup>3)</sup> | $R_{thJA}$ | $t \leq 10$ s | - | - | 35  |     |
|  |            | steady state  | - | - | 85  |     |

**Electrical characteristics, at  $T_j=25$  °C, unless otherwise specified**
**Static characteristics**

|                                  |               |   |    |      |     |            |
|----------------------------------|---------------|---|----|------|-----|------------|
| Drain-source breakdown voltage   | $V_{(BR)DSS}$ | $V_{GS}=0$ V, $I_D=1$ mA                      | 30 | -    | -   | V          |
| Gate threshold voltage           | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ , $I_D=250$ $\mu$ A           | 1  | -    | 2.2 |            |
| Zero gate voltage drain current  | $I_{DSS}$     | $V_{DS}=30$ V, $V_{GS}=0$ V, $T_j=25$ °C      | -  | 0.1  | 1   | $\mu$ A    |
|                                  |               | $V_{DS}=30$ V, $V_{GS}=0$ V, $T_j=125$ °C     | -  | 10   | 100 |            |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=20$ V, $V_{DS}=0$ V                   | -  | 10   | 100 | nA         |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=4.5$ V, $I_D=20$ A                    | -  | 17.6 | 22  | m $\Omega$ |
|                                  |               | $V_{GS}=10$ V, $I_D=20$ A                     | -  | 12.5 | 15  |            |
| Gate resistance                  | $R_G$         |   | -  | 1.2  | 1.8 | $\Omega$   |
| Transconductance                 | $g_{fs}$      | $ V_{DS}  > 2 I_D R_{DS(on)max}$ , $I_D=20$ A | 18 | 35   | -   | S          |

<sup>2)</sup> See figure 3

<sup>3)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu$ m thick) copper area for drain connection. PCB is vertical in still air. One transistor active.

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

**Dynamic characteristics**

|                              |              |   |   |     |      |    |
|------------------------------|--------------|---|---|-----|------|----|
| Input capacitance            | $C_{iss}$    | $V_{GS}=0\text{ V}, V_{DS}=15\text{ V},$<br>$f=1\text{ MHz}$                    | - | 850 | 1100 | pF |
| Output capacitance           | $C_{oss}$    |   | - | 350 | 470  |    |
| Reverse transfer capacitance | $C_{rss}$    |   | - | 16  | -    |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD}=15\text{ V}, V_{GS}=10\text{ V},$<br>$I_D=20\text{ A}, R_G=1.6\ \Omega$ | - | 2.7 | -    | ns |
| Rise time                    | $t_r$        |   | - | 2.2 | -    |    |
| Turn-off delay time          | $t_{d(off)}$ |   | - | 12  | -    |    |
| Fall time                    | $t_f$        |   | - | 2.0 | -    |    |

**Gate Charge Characteristics<sup>4)</sup>**

|                              |               |   |   |     |      |    |
|------------------------------|---------------|---|---|-----|------|----|
| Gate to source charge        | $Q_{gs}$      | $V_{DD}=15\text{ V}, I_D=20\text{ A},$<br>$V_{GS}=0\text{ to }4.5\text{ V}$ | - | 2.6 | -    | nC |
| Gate charge at threshold     | $Q_{g(th)}$   |   | - | 1.2 | -    |    |
| Gate to drain charge         | $Q_{gd}$      |   | - | 1.2 | -    |    |
| Switching charge             | $Q_{sw}$      |   | - | 2.6 | -    |    |
| Gate charge total            | $Q_g$         |   | - | 4.8 | 6.4  |    |
| Gate plateau voltage         | $V_{plateau}$ |   | - | 3.4 | -    |    |
| Gate charge total            | $Q_g$         | $V_{DD}=15\text{ V}, I_D=20\text{ A},$<br>$V_{GS}=0\text{ to }10\text{ V}$  | - | 10  | 13.2 | nC |
| Gate charge total, sync. FET | $Q_{g(sync)}$ | $V_{DS}=0.1\text{ V},$<br>$V_{GS}=0\text{ to }4.5\text{ V}$                 | - | 4.2 | -    |    |
| Output charge                | $Q_{oss}$     | $V_{DD}=15\text{ V}, V_{GS}=0\text{ V}$                                     | - | 9   | -    |    |

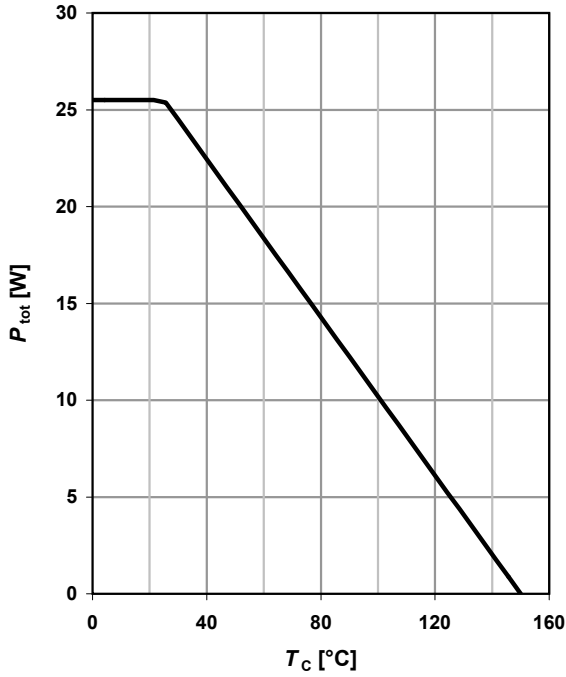
**Reverse Diode**

|                                  |               |   |   |      |     |    |
|----------------------------------|---------------|---|---|------|-----|----|
| Diode continuous forward current | $I_S$         | $T_C=25\text{ }^\circ\text{C}$  | - | -    | 20  | A  |
| Diode pulse current              | $I_{S,pulse}$ |   | - | -    | 80  |    |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0\text{ V}, I_F=20\text{ A},$<br>$T_j=25\text{ }^\circ\text{C}$ | - | 0.93 | 1.1 | V  |
| Reverse recovery charge          | $Q_{rr}$      | $V_R=15\text{ V}, I_F=I_S,$<br>$di_F/dt=400\text{ A}/\mu\text{s}$       | - | -    | 10  | nC |

<sup>4)</sup> See figure 16 for gate charge parameter definition

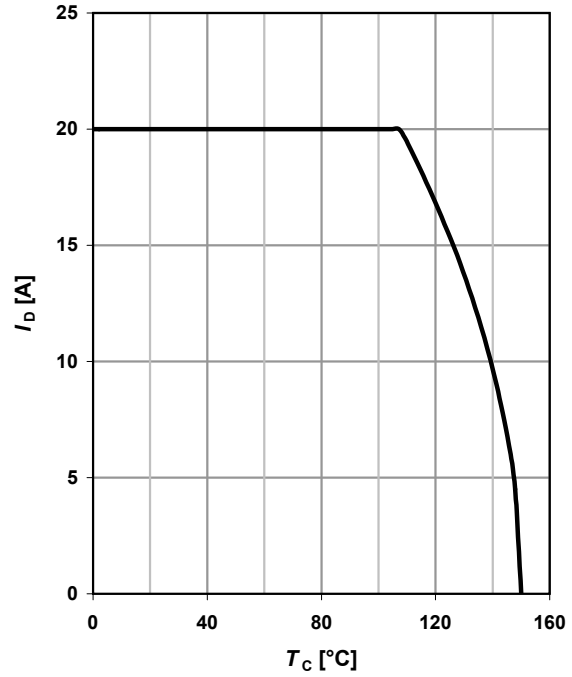
**1 Power dissipation**

$$P_{\text{tot}} = f(T_C)$$



**2 Drain current**

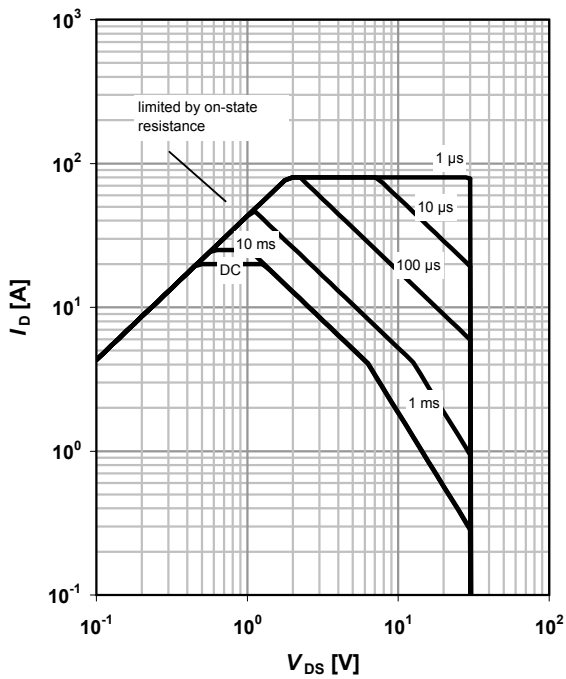
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$



**3 Safe operating area**

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

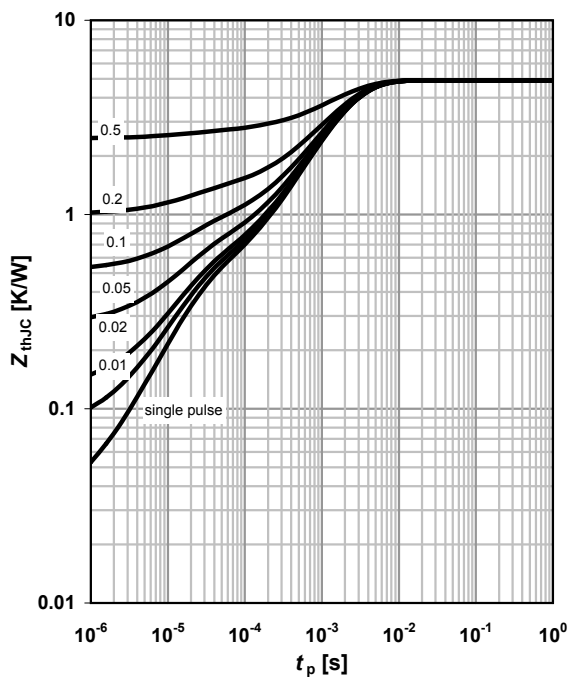
parameter:  $t_p$



**4 Max. transient thermal impedance**

$$Z_{\text{thJC}} = f(t_p)$$

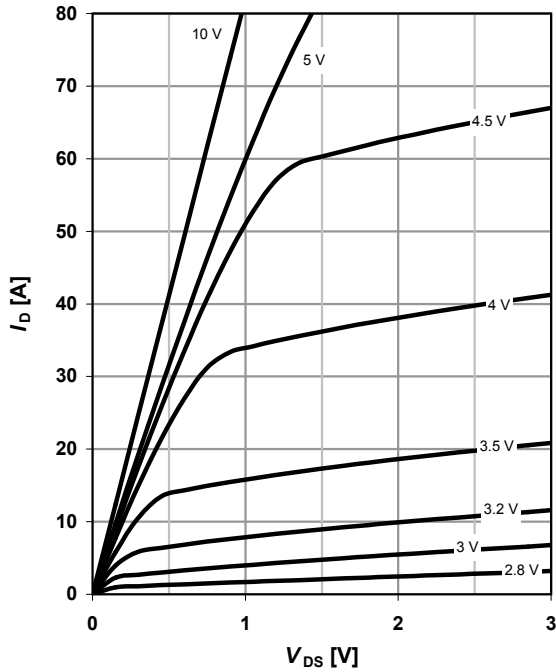
parameter:  $D = t_p / T$



**5 Typ. output characteristics**

$I_D = f(V_{DS}); T_j = 25\text{ °C}$

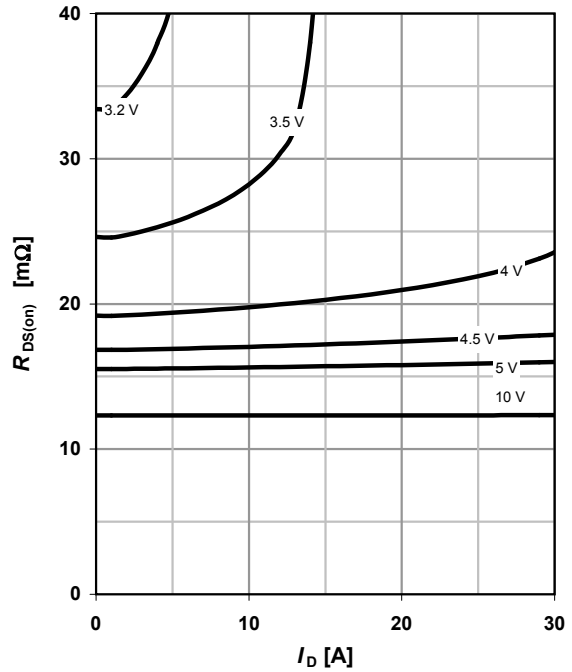
parameter:  $V_{GS}$



**6 Typ. drain-source on resistance**

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

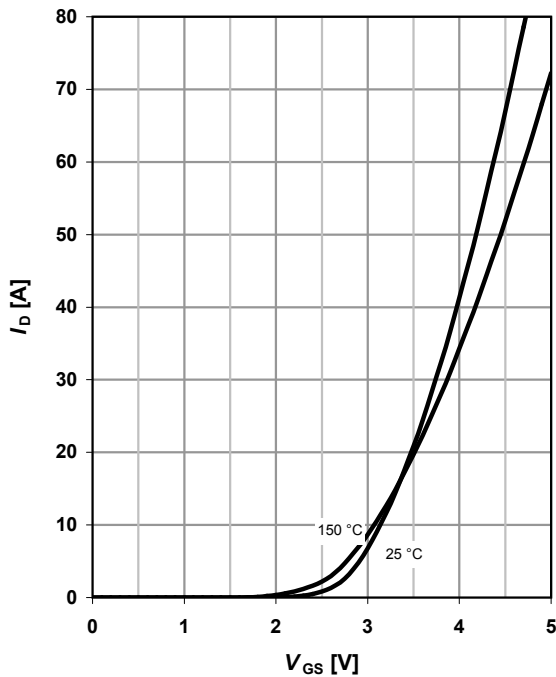
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

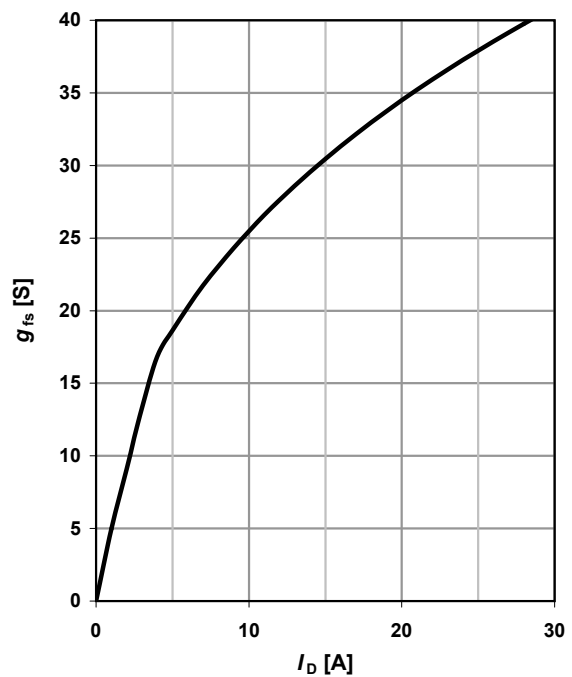
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



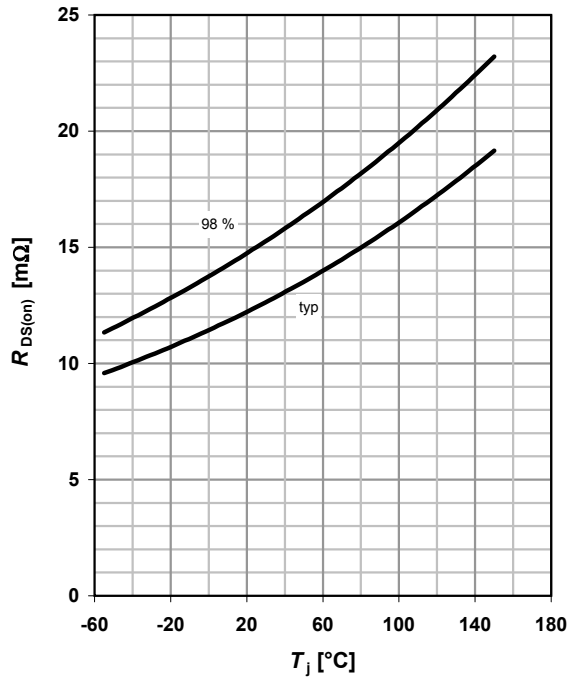
**8 Typ. forward transconductance**

$g_{fs} = f(I_D); T_j = 25\text{ °C}$



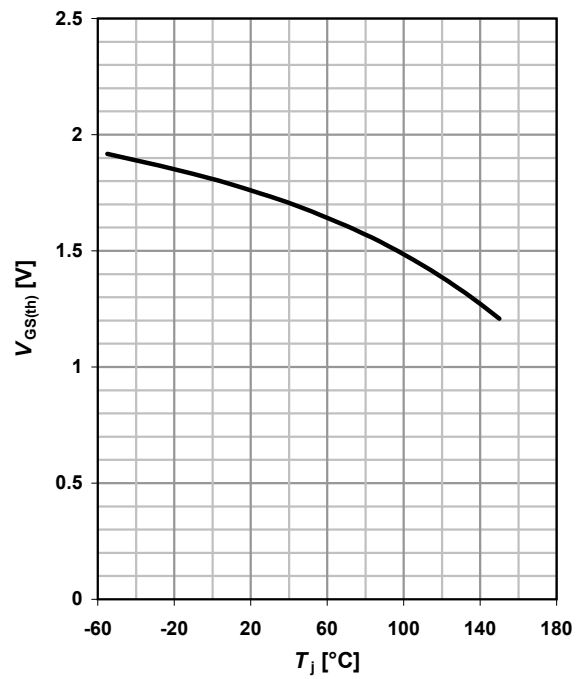
**9 Drain-source on-state resistance**

$R_{DS(on)} = f(T_j); I_D = 20 \text{ A}; V_{GS} = 10 \text{ V}$



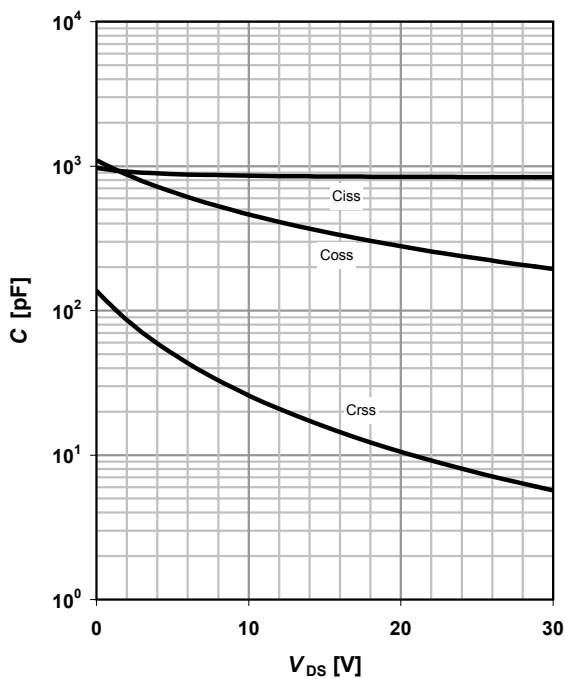
**10 Typ. gate threshold voltage**

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



**11 Typ. capacitances**

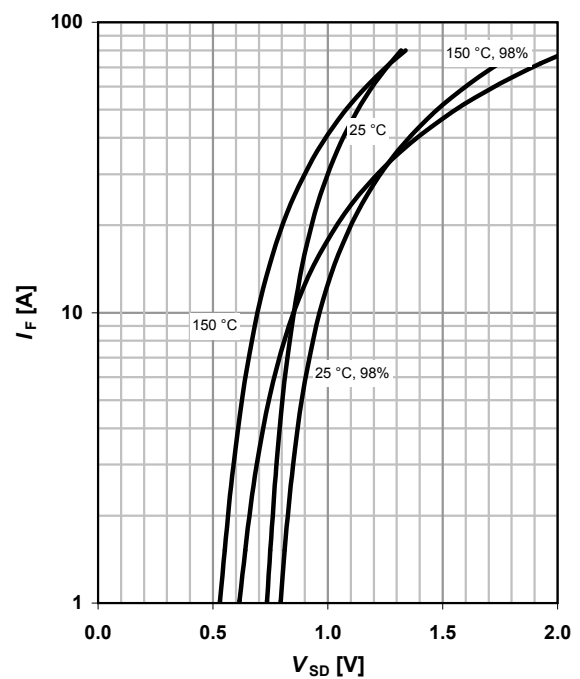
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

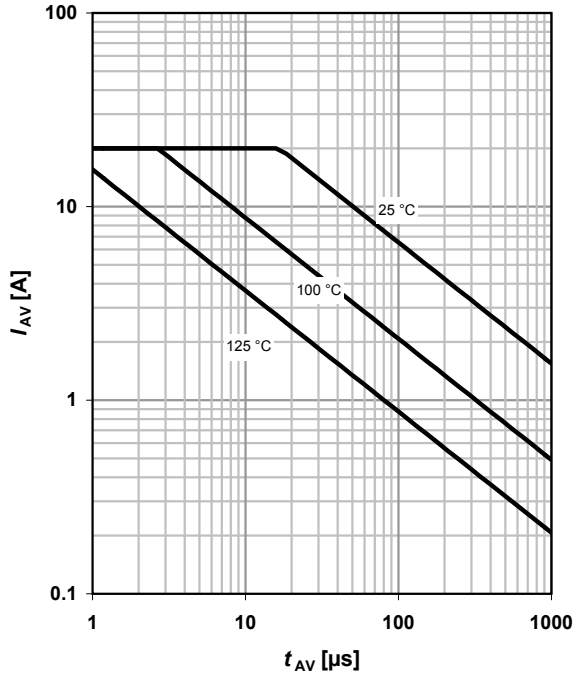
parameter:  $T_j$



**13 Avalanche characteristics**

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

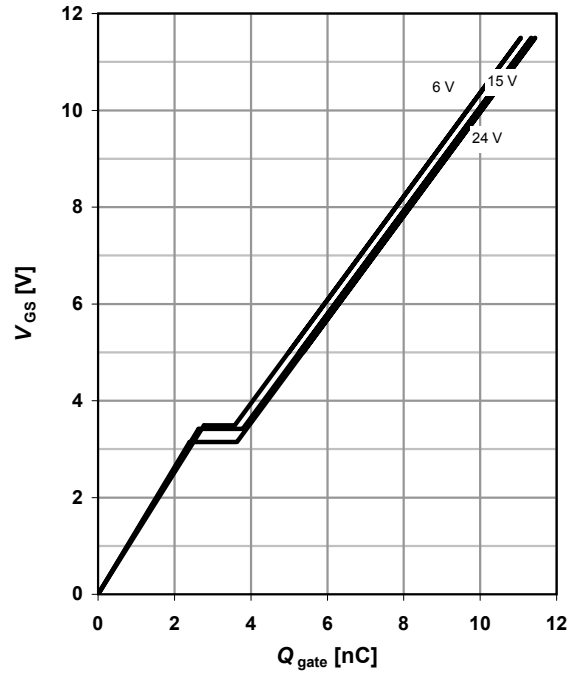
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

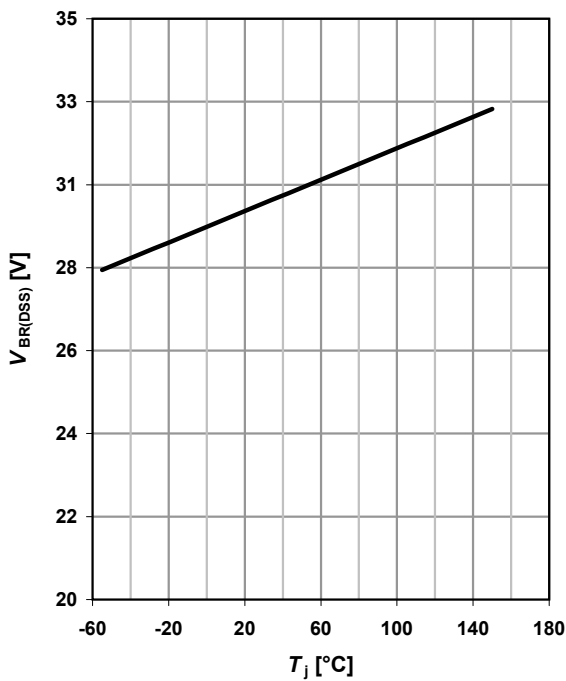
$V_{GS}=f(Q_{gate}); I_D=20 \text{ A pulsed}$

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

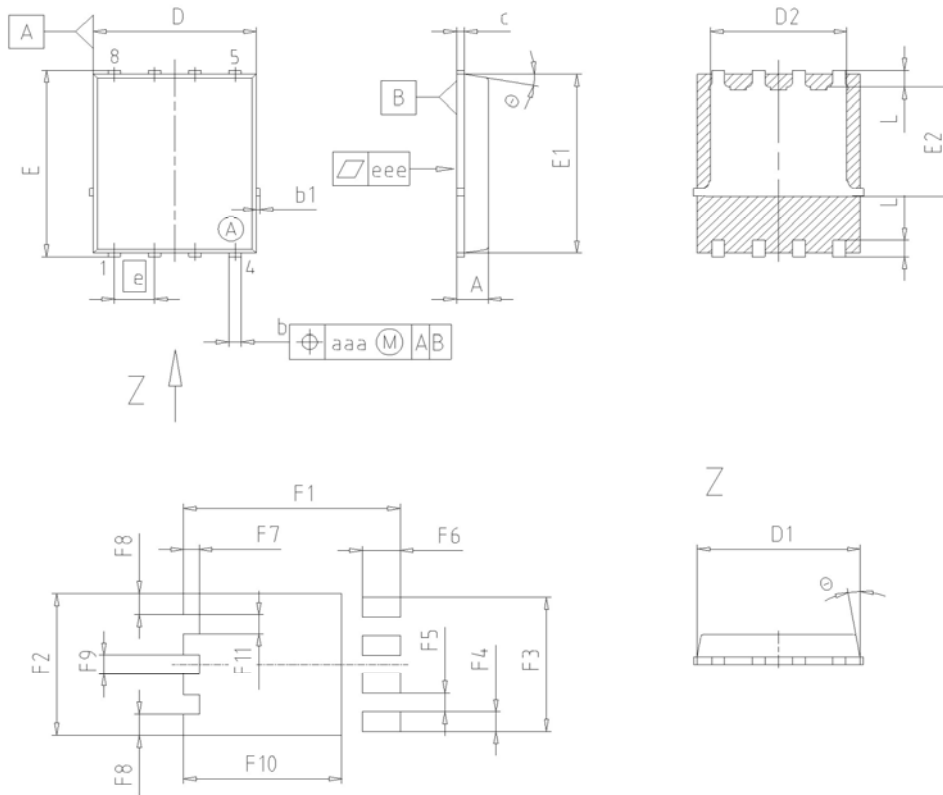
$V_{BR(DSS)}=f(T_j); I_D=1 \text{ mA}$



**16 Gate charge waveforms**



Package Outline and Footprint PG-TDSON-8 dual



| DIM  | MILLIMETERS |      | INCHES |       |
|------|-------------|------|--------|-------|
|      | MIN         | MAX  | MIN    | MAX   |
| A    | 0.90        | 1.10 | 0.035  | 0.043 |
| b    | 0.34        | 0.54 | 0.013  | 0.021 |
| b1   | 0.02        | 0.22 | 0.001  | 0.008 |
| c    | 0.15        | 0.35 | 0.006  | 0.014 |
| D=D1 | 4.95        | 5.35 | 0.195  | 0.211 |
| D2   | 4.20        | 4.40 | 0.165  | 0.173 |
| E    | 5.95        | 6.35 | 0.234  | 0.250 |
| E1   | 5.70        | 6.10 | 0.224  | 0.240 |
| E2   | 3.40        | 3.80 | 0.134  | 0.150 |
| e    | 1.27        |      | 0.050  |       |
| N    | 8           |      | 8      |       |
| L    | 0.45        | 0.65 | 0.018  | 0.026 |
| □    | 8.5°        |      | 8.5°   |       |
| aaa  | 0.25        |      | 0.010  |       |
| eee  | 0.05        |      | 0.002  |       |
| F1   | 6.75        | 6.95 | 0.266  | 0.274 |
| F2   | 4.60        | 4.80 | 0.181  | 0.189 |
| F3   | 4.36        | 4.56 | 0.172  | 0.180 |
| F4   | 0.55        | 0.75 | 0.022  | 0.030 |
| F5   | 0.52        | 0.72 | 0.020  | 0.028 |
| F6   | 1.10        | 1.30 | 0.043  | 0.051 |
| F7   | 0.40        | 0.60 | 0.016  | 0.024 |
| F8   | 0.60        | 0.80 | 0.024  | 0.031 |
| F9   | 0.53        | 0.73 | 0.021  | 0.029 |
| F10  | 4.90        | 5.10 | 0.193  | 0.201 |
| F11  | 0.53        | 0.73 | 0.021  | 0.029 |

**DOCUMENT NO.**  
Z8B00003332

**SCALE** 0 2.5 5mm

**EUROPEAN PROJECTION**

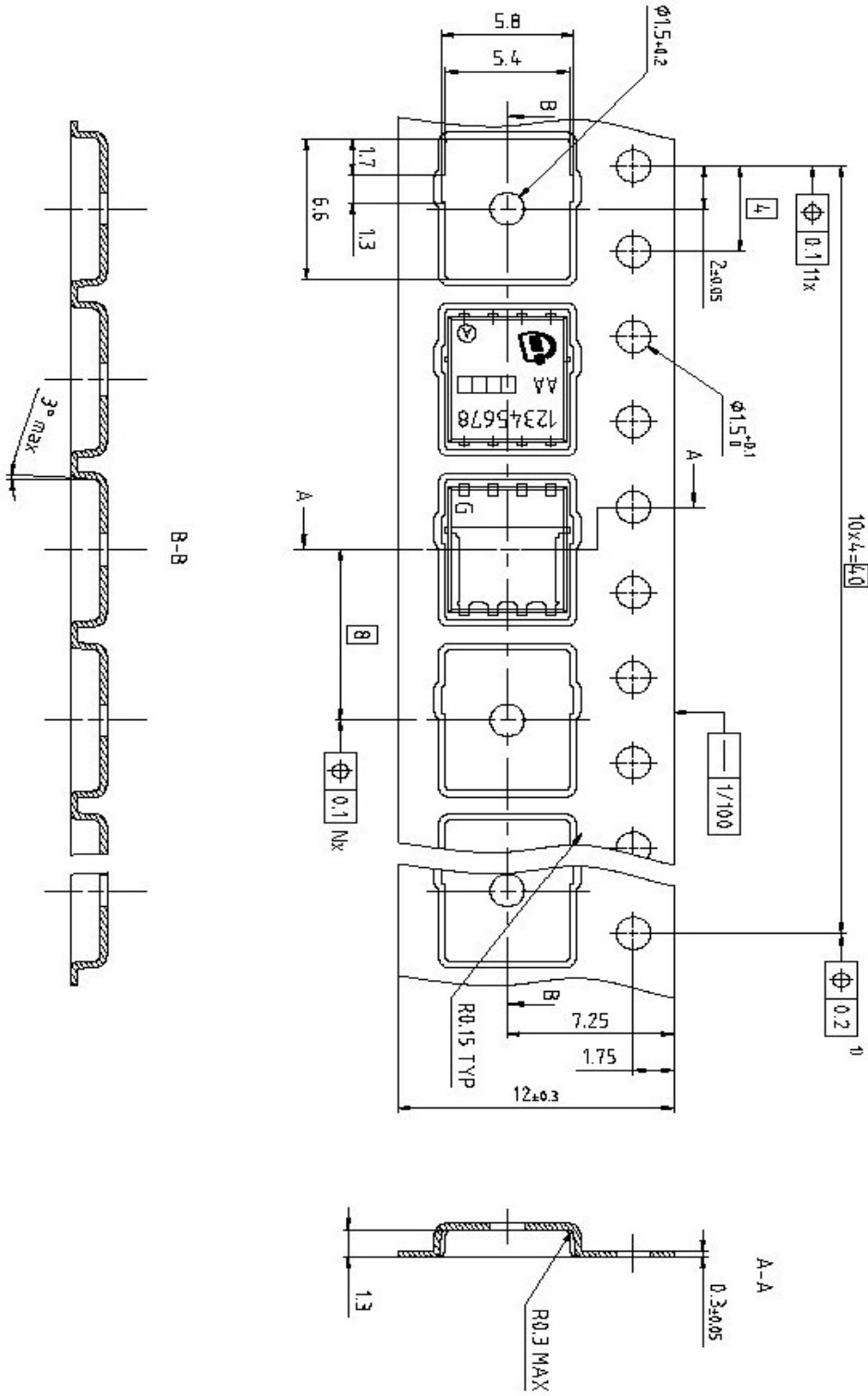
**ISSUE DATE**  
08-03-2007

**REVISION**  
03



Tape

PG-TDSON-8



Dimensions in mm

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