## OptiMOS™2 Power-Transistor

### Features

- Dual N-channel, normal level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Low on-resistance $R_{DS(on)}$
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[1] for target application
- Ideal for high-frequency switching and synchronous rectification
- 100% avalanche tested
- Halogen-free according to IE61249-2-21

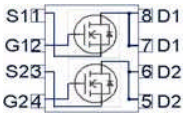
RoHS Halogen-Free

### Product Summary

| | | |
|---|---|---|
| $V_{DS}$ | 100 | V |
| $R_{DS(on),max}$ | 75 | mΩ |
| $I_D$ | 13 | A |

PG-TDSON-8


| Type | Package | Marking |
|---|---|---|
| BSC750N10ND G | PG-TDSON-8 | 750N10ND |




**Maximum ratings,** at $T_j$=25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | | Unit |
|---|---|---|---|---|---|
| | | | ≤10 secs | steady state | |
| Continuous drain current | $I_D$ | $V_{GS}$=10 V, $T_C$=25 °C | 13 | | A |
| | | $V_{GS}$=10 V, $T_C$=100 °C | 8.5 | | |
| | | $V_{GS}$=10 V, $T_A$=25 °C[3] | 5.0 | 3.2 | |
| Pulsed drain current[2] | $I_{D,pulse}$ | $T_C$=25 °C | 52 | | |
| Avalanche energy, single pulse | $E_{AS}$ | $I_D$=13 A, $R_{GS}$=25 Ω | 17 | | mJ |
| Reverse diode d$v$/d$t$ | d$v$/d$t$ | $I_D$=13 A, $V_{DS}$=80 V, d$i$/d$t$=100 A/µs, $T_{j,max}$=150 °C | 6 | | kV/µs |
| Gate source voltage | $V_{GS}$ | | ±20 | | V |
| Power dissipation | $P_{tot}$ | $T_C$=25 °C | 26 | | W |
| | | $T_A$=25 °C[3] | 3.6 | 1.5 | |
| Operating and storage temperature | $T_j$, $T_{stg}$ | | -55 ... 150 | | °C |
| IEC climatic category; DIN IEC 68-1 | | | 55/150/56 | | |

[1] J-STD20 and JESD22

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Thermal characteristics** | | | | | | |
| Thermal resistance, junction - case | $R_{thJC}$ | bottom | - | - | 4.9 | K/W |
| | | top | | | 20 | |
| Thermal resistance, junction - ambient, 6 cm² cooling area[3)] | $R_{thJA}$ | t≤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 | 100 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=12 µA | 2 | 3 | 4 | |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=100 V, $V_{GS}$=0 V, $T_j$=25 °C | - | 0.1 | 1 | µA |
| | | $V_{DS}$=100 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 | - | 1 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=10 V, $I_D$=13 A | - | 62 | 75 | mΩ |
| Gate resistance | $R_G$ | | - | 0.8 | - | Ω |
| Transconductance | $g_{fs}$ | $\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, $I_D$=13 A | 6.5 | 13 | - | S |

[2)] See figure 3

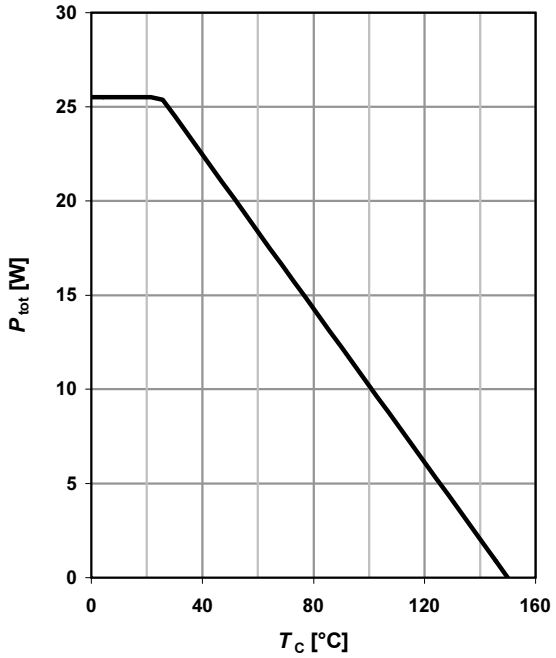
[3)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air. One transistor active.

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0 V, $V_{DS}$=50 V, $f$=1 MHz | - | 540 | 720 | pF |
| Output capacitance | $C_{oss}$ | | - | 76 | 100 | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 8 | 12 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=50 V, $V_{GS}$=10 V, $I_D$=13 A, $R_G$=2.4 Ω | - | 9 | 13 | ns |
| Rise time | $t_r$ | | - | 4 | 6 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 13 | 18 | |
| Fall time | $t_f$ | | - | 3 | 4 | |
| Gate Charge Characteristics[4)] | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DD}$=50 V, $I_D$=13 A, $V_{GS}$=0 to 10 V | - | 3 | 4 | nC |
| Gate to drain charge | $Q_{gd}$ | | - | 2 | 3 | |
| Switching charge | $Q_{sw}$ | | - | 4 | 6 | |
| Gate charge total | $Q_g$ | | - | 8 | 11 | |
| Gate plateau voltage | $V_{plateau}$ | | - | 6 | - | V |
| Output charge | $Q_{oss}$ | $V_{DD}$=50 V, $V_{GS}$=0 V | - | 8 | 10 | |
| **Reverse Diode** | | | | | | |
| Diode continuous forward current | $I_S$ | $T_C$=25 °C | - | - | 13 | A |
| Diode pulse current | $I_{S,pulse}$ | | - | - | 52 | |
| Diode forward voltage | $V_{SD}$ | $V_{GS}$=0 V, $I_F$=13 A, $T_j$=25 °C | - | 1 | 1.2 | V |
| Reverse recovery time | $t_{rr}$ | $V_R$=50 V, $I_F$=$I_S$, $di_F/dt$=100 A/µs | - | 67 | | ns |
| Reverse recovery charge | $Q_{rr}$ | | - | 114 | - | nC |

[4)] See figure 16 for gate charge parameter definition

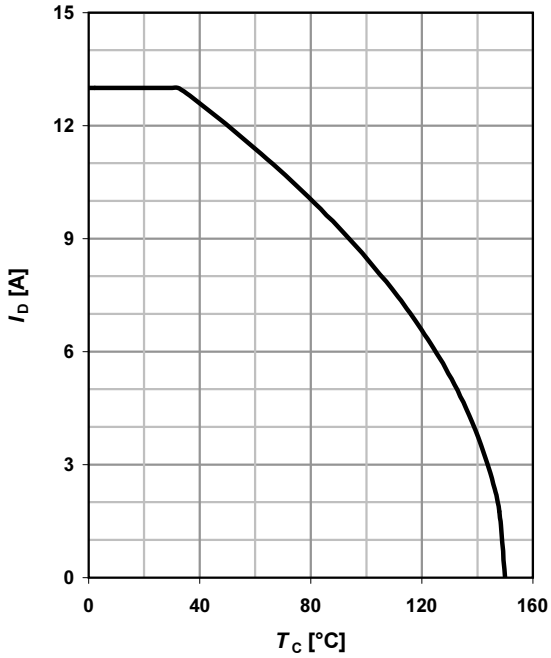
### 1 Power dissipation

$P_{tot}=f(T_C)$




### 2 Drain current

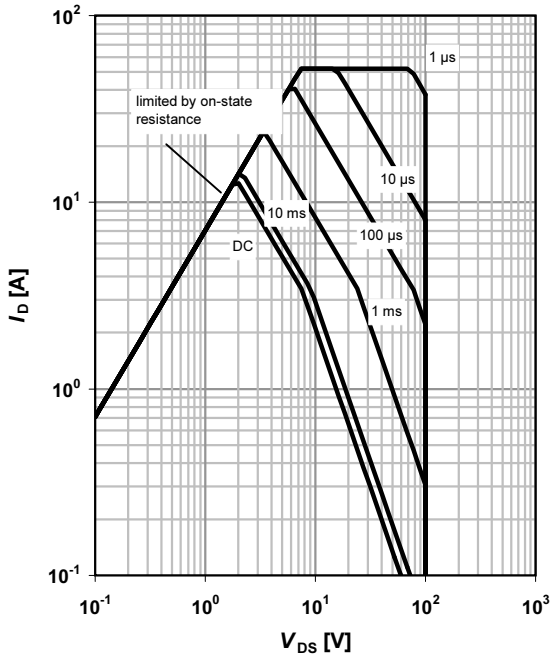
$I_D=f(T_C)$; $V_{GS}\geq 10$ V




### 3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

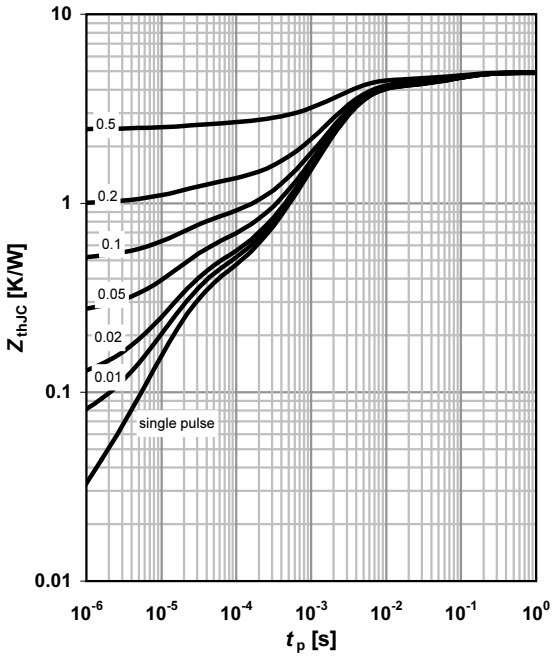
parameter: $t_p$




### 4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

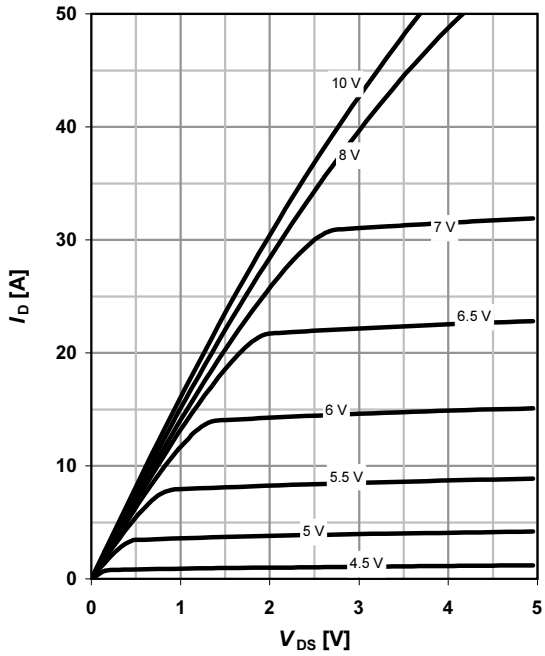
parameter: $D=t_p/T$



### 5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

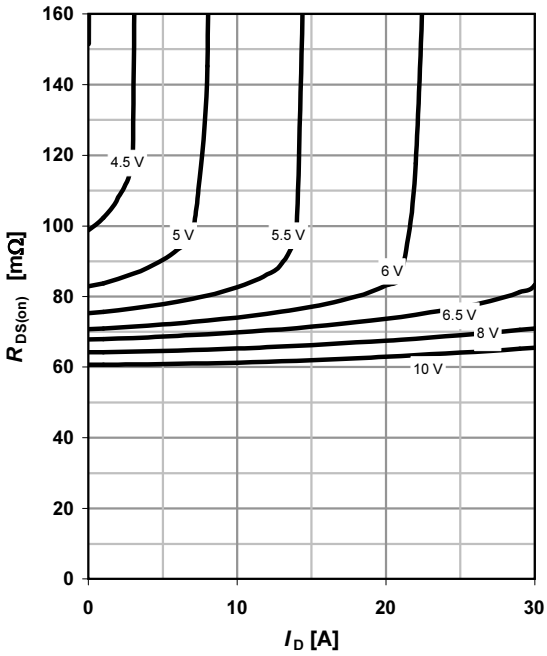
parameter: $V_{GS}$




### 6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

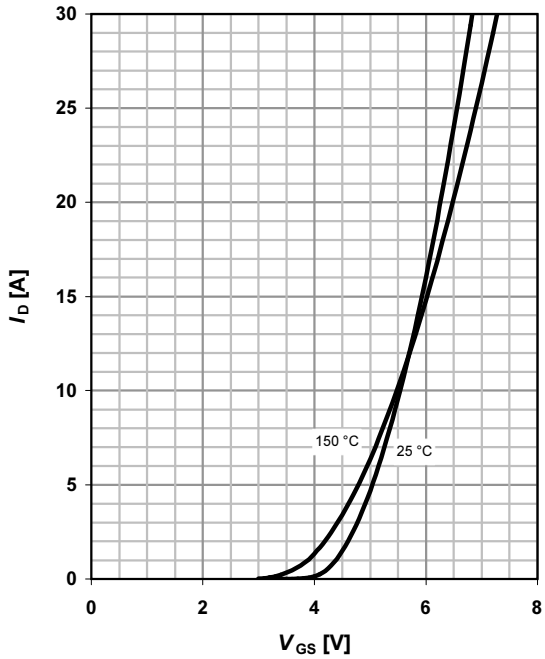
parameter: $V_{GS}$




### 7 Typ. transfer characteristics

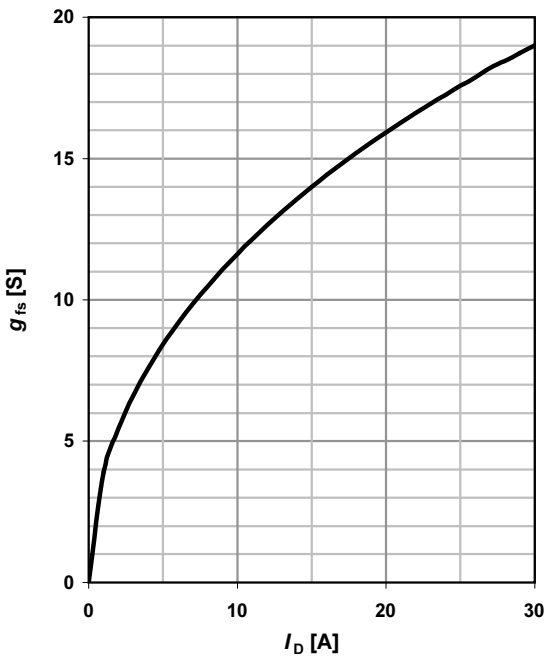
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: $T_j$



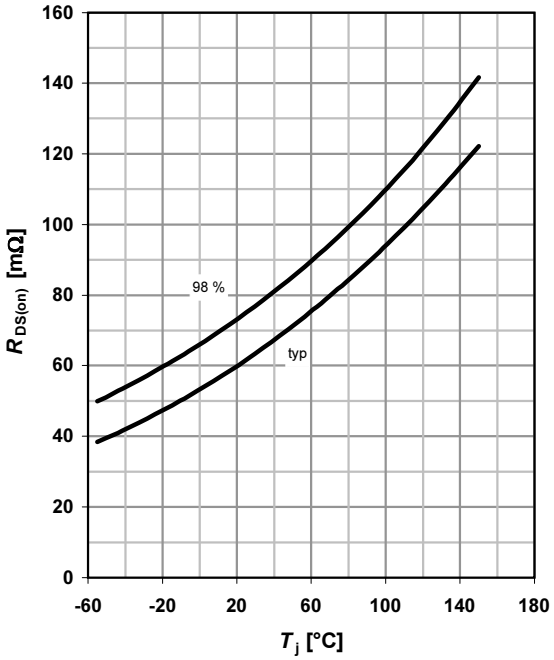

### 8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



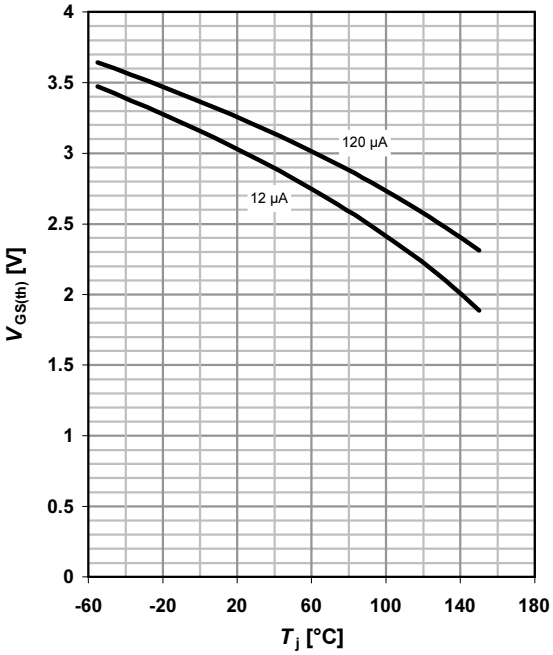
### 9 Drain-source on-state resistance

$R_{DS(on)}=f(T_j)$; $I_D=13$ A; $V_{GS}=10$ V



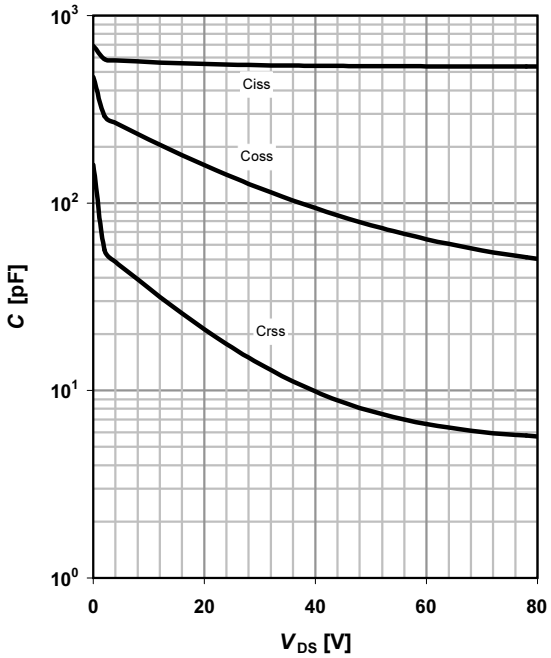

### 10 Typ. gate threshold voltage

$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$




### 11 Typ. capacitances

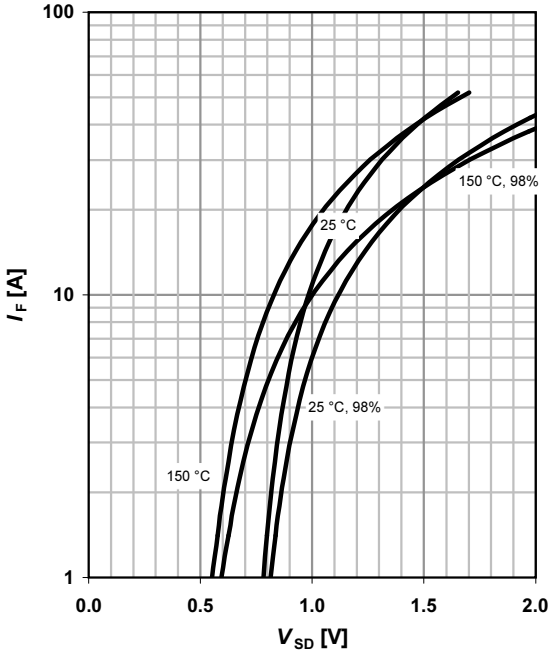
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz




### 12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

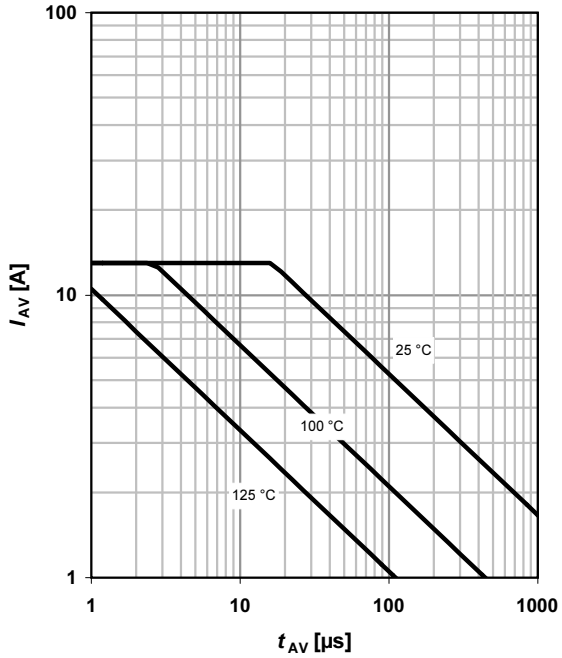
parameter: $T_j$



### 13 Avalanche characteristics

$I_{AS}$=f($t_{AV}$); $R_{GS}$=25 Ω

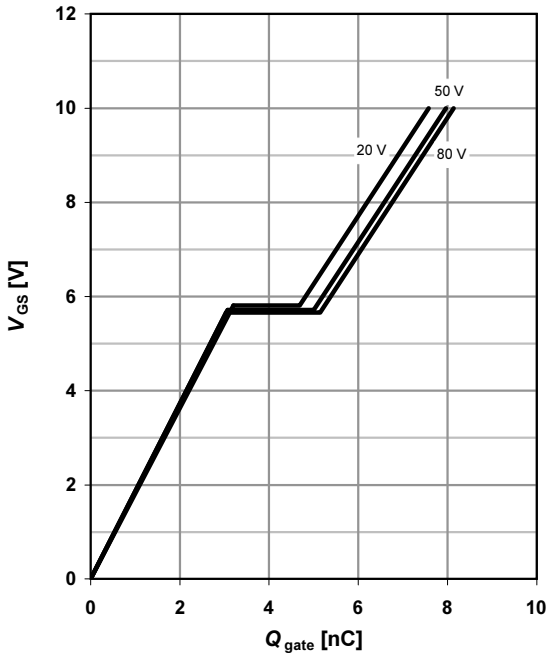
parameter: $T_{j(start)}$




### 14 Typ. gate charge

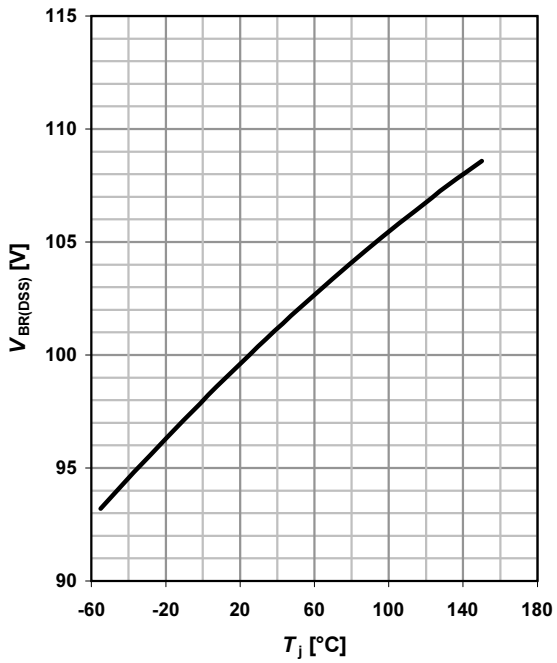
$V_{GS}$=f($Q_{gate}$); $I_D$=13 A pulsed

parameter: $V_{DD}$

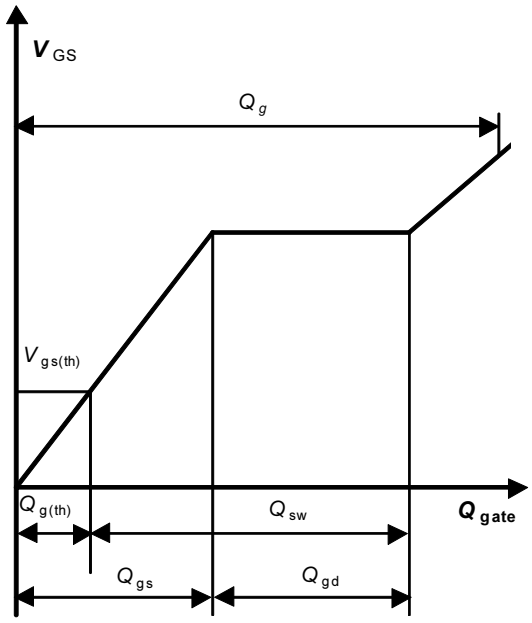



### 15 Drain-source breakdown voltage

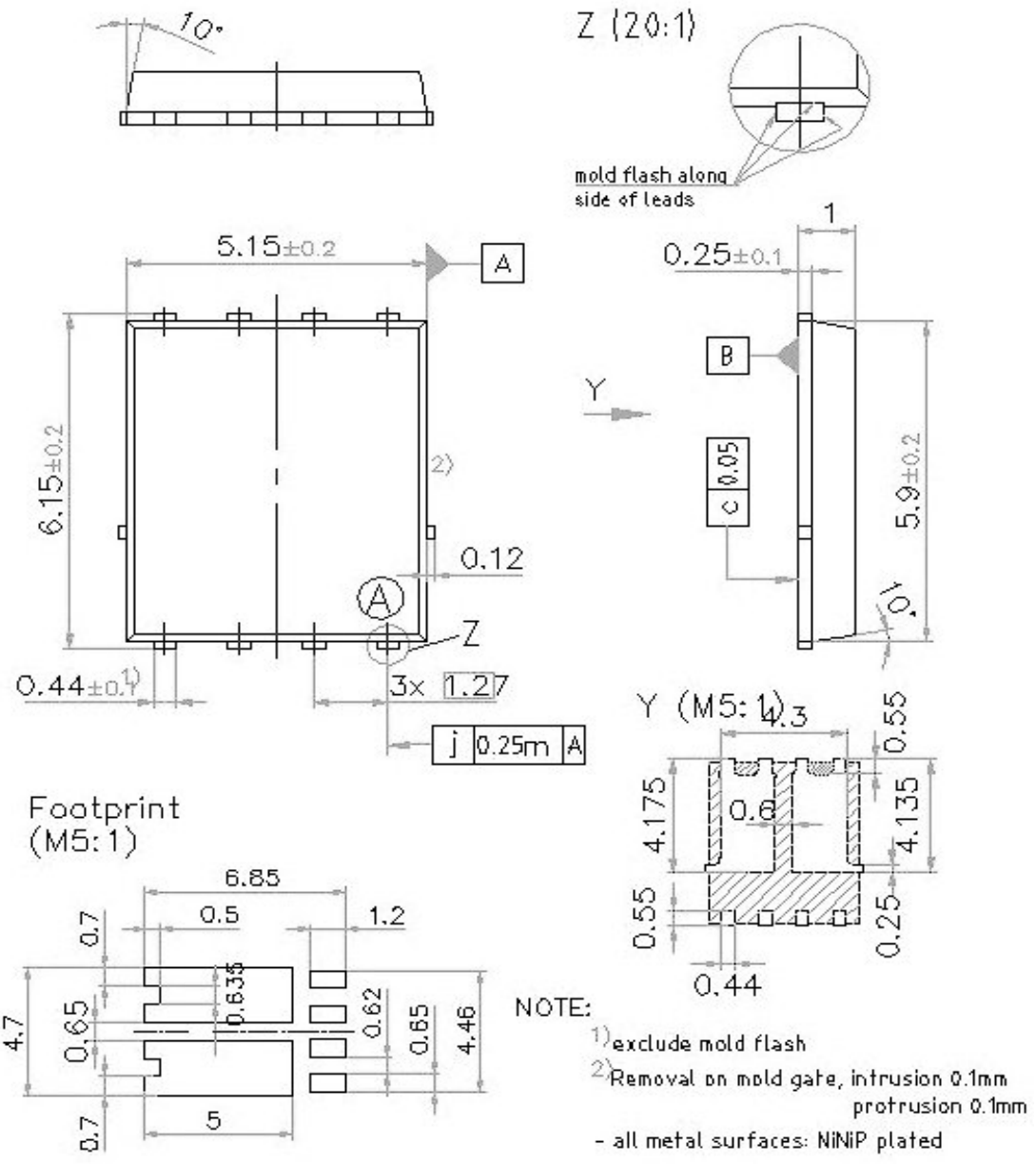
$V_{BR(DSS)}$=f($T_j$); $I_D$=1 mA




### 16 Gate charge waveforms



**Package Outline and Footprint** **PG-TDSON-8 dual**



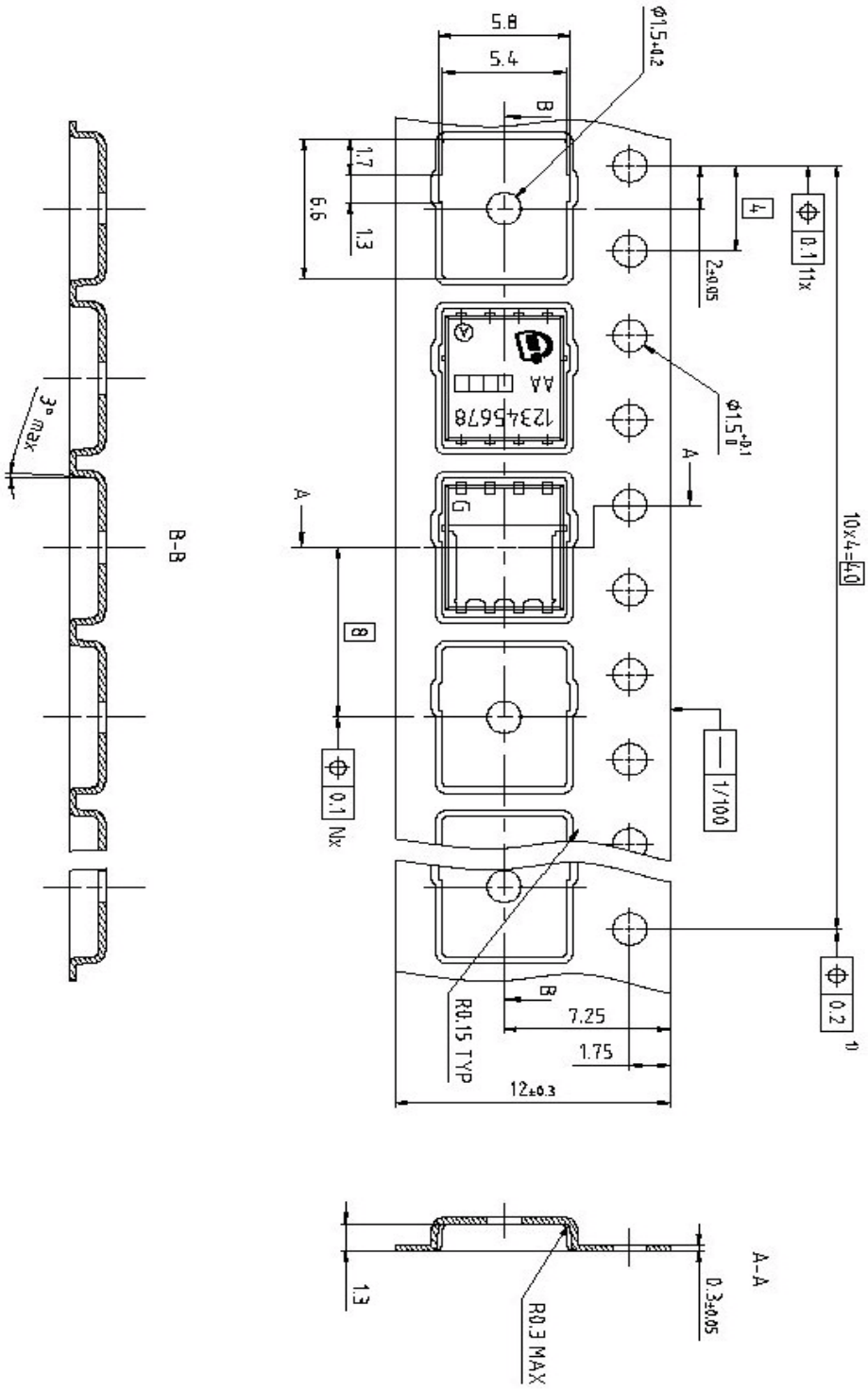

NOTE:

1) exclude mold flash

2) Removal on mold gate, intrusion 0.1mm
protrusion 0.1mm

- all metal surfaces: NiNiP plated

**Tape** **PG-TDSON-8**




Dimensions in mm

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