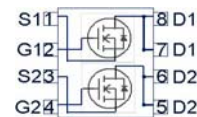
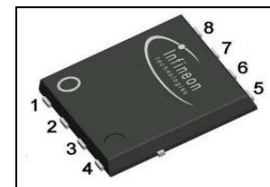


**OptiMOS<sup>®</sup>3 Power-Transistors**
**Features**

- 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
$R_{DS(on),max}$	7.2	m $\Omega$
$I_D$	20	A

**PG-TDSON-8**


Type	Package	Marking
BSC072N03LD G	PG-TDSON-8	072N03LD

**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		
		$V_{GS}=4.5\text{ V}, T_C=100\text{ }^\circ\text{C}$	20		
		$V_{GS}=10\text{ V}, T_A=25\text{ }^\circ\text{C}^{3)}$	17.9	11.5	
Pulsed drain current <sup>2)</sup>	$I_{D,pulse}$	$T_C=25\text{ }^\circ\text{C}$	80		
Avalanche energy, single pulse	$E_{AS}$	$I_D=20\text{ A}, R_{GS}=25\text{ }\Omega$	90		mJ
Gate source voltage	$V_{GS}$		$\pm 20$		V
Power dissipation	$P_{tot}$	$T_C=25\text{ }^\circ\text{C}$	57		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	$R_{thJC}$		-	-	2.2	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	-	7.5	9.4	m $\Omega$
		$V_{GS}=10$ V, $I_D=20$ A	-	6.0	7.2	
Gate resistance	$R_G$		-	1.5	2.3	$\Omega$
Transconductance	$g_{fs}$	$ V_{DS}  > 2 I_D R_{DS(on)max}$ , $I_D=20$ A	28	57	-	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	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=15\text{ V},$ $f=1\text{ MHz}$	-	2600	3500	pF
Output capacitance	$C_{oss}$		-	920	1200	
Reverse transfer capacitance	$C_{rss}$		-	49	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=15\text{ V}, V_{GS}=10\text{ V},$ $I_D=20\text{ A}, R_G=1.6\ \Omega$	-	6.0	-	ns
Rise time	$t_r$		-	4.0	-	
Turn-off delay time	$t_{d(off)}$		-	25	-	
Fall time	$t_f$		-	4.0	-	

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

Gate to source charge	$Q_{gs}$	$V_{DD}=15\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }4.5\text{ V}$	-	7.2	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	3.8	-	
Gate to drain charge	$Q_{gd}$		-	3.4	-	
Switching charge	$Q_{sw}$		-	6.8	-	
Gate charge total	$Q_g$		-	15	20	
Gate plateau voltage	$V_{plateau}$		-	3.0	-	
Gate charge total	$Q_g$	$V_{DD}=15\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	31	41	nC
Gate charge total, sync. FET	$Q_{g(sync)}$	$V_{DS}=0.1\text{ V},$ $V_{GS}=0\text{ to }4.5\text{ V}$	-	13	-	
Output charge	$Q_{oss}$	$V_{DD}=15\text{ V}, V_{GS}=0\text{ V}$	-	24	-	

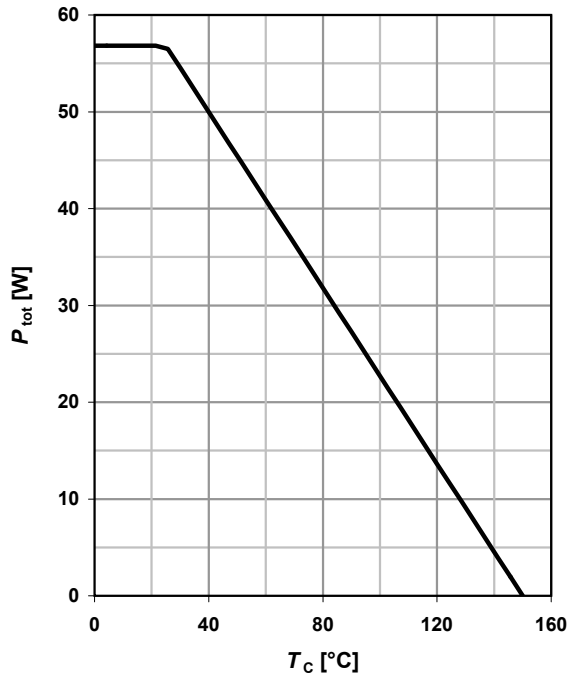
**Reverse Diode**

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	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=20\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	0.87	1.1	V
Reverse recovery charge	$Q_{rr}$	$V_R=15\text{ V}, I_F=I_S,$ $di_F/dt=400\text{ A}/\mu\text{s}$	-	-	10	nC

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

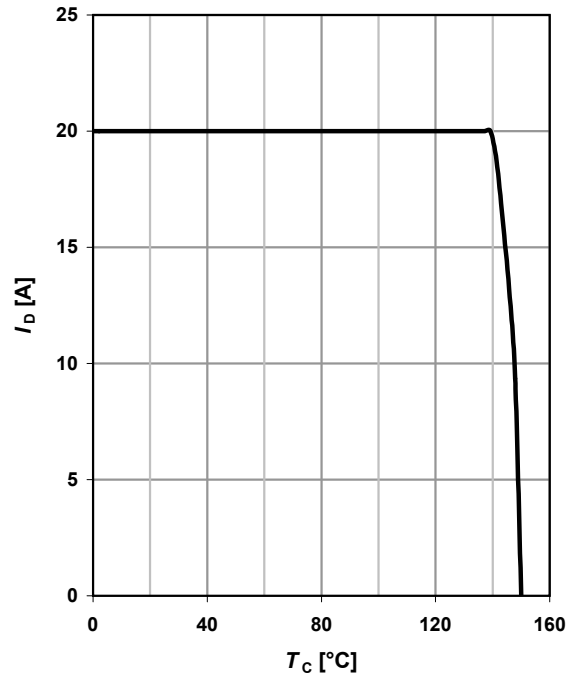
**1 Power dissipation**

$P_{tot}=f(T_C)$



**2 Drain current**

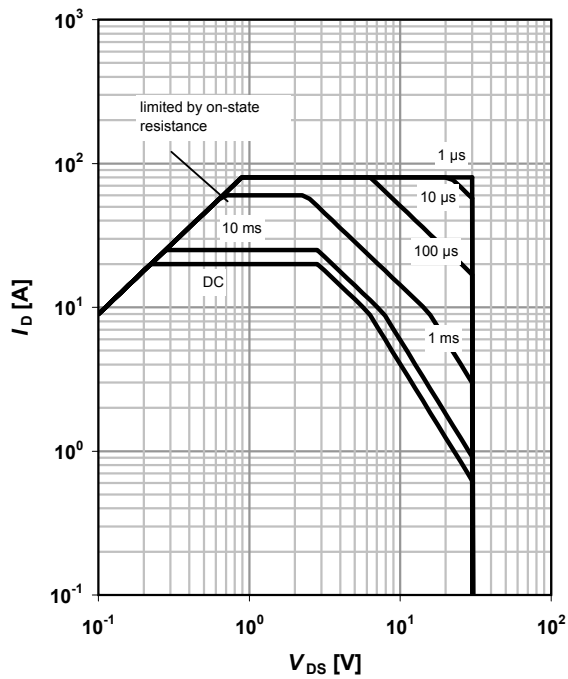
$I_D=f(T_C); V_{GS} \geq 10\text{ V}$



**3 Safe operating area**

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

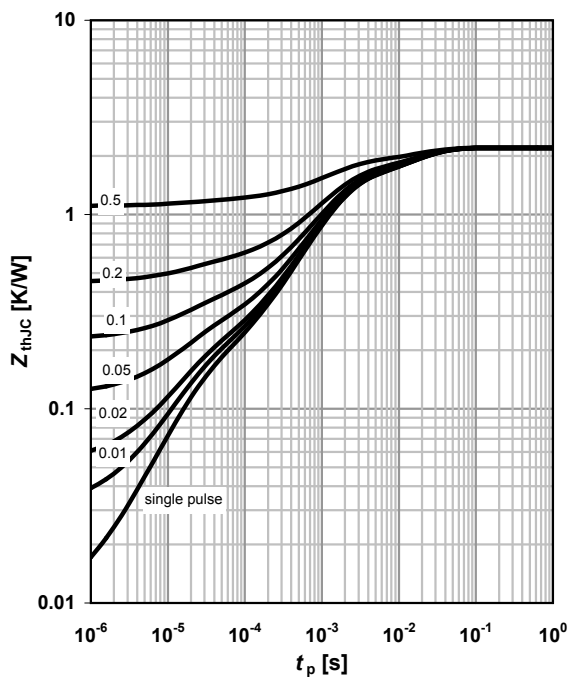
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJC}=f(t_p)$

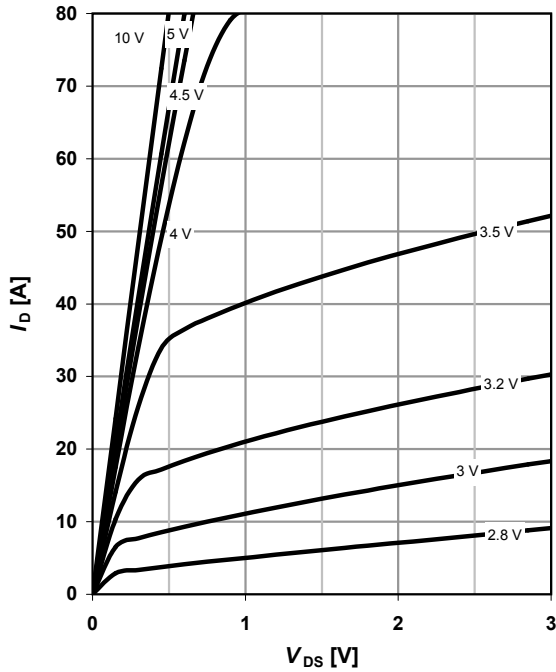
parameter:  $D=t_p/T$



**5 Typ. output characteristics**

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

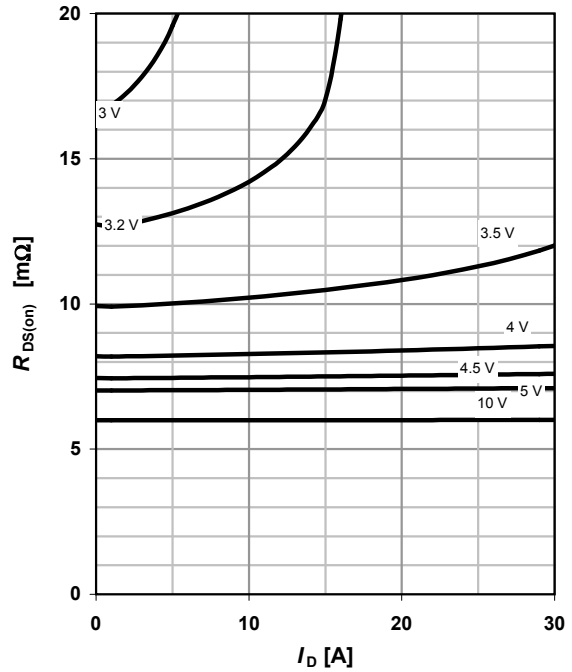
parameter:  $V_{GS}$



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

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

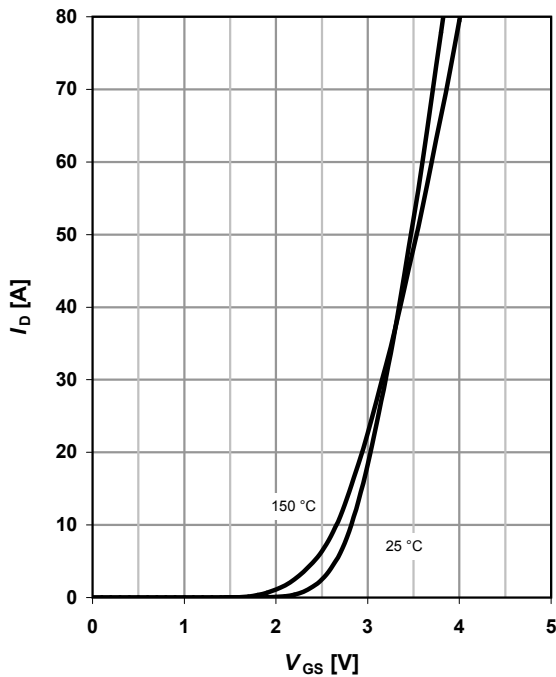
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

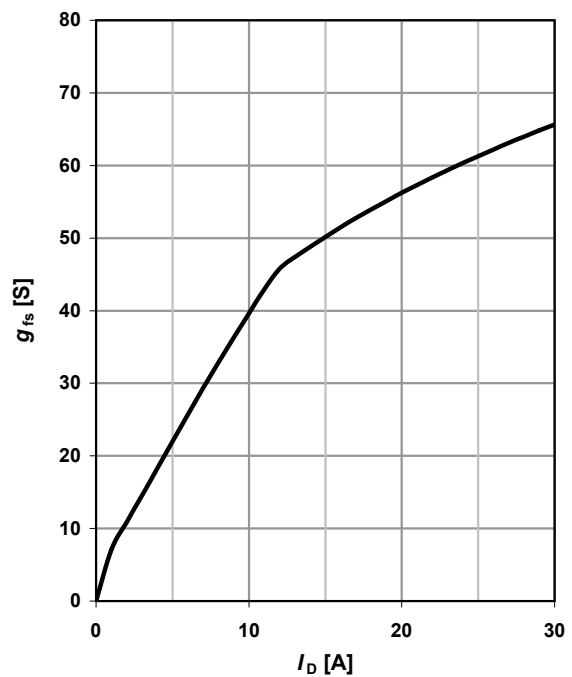
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



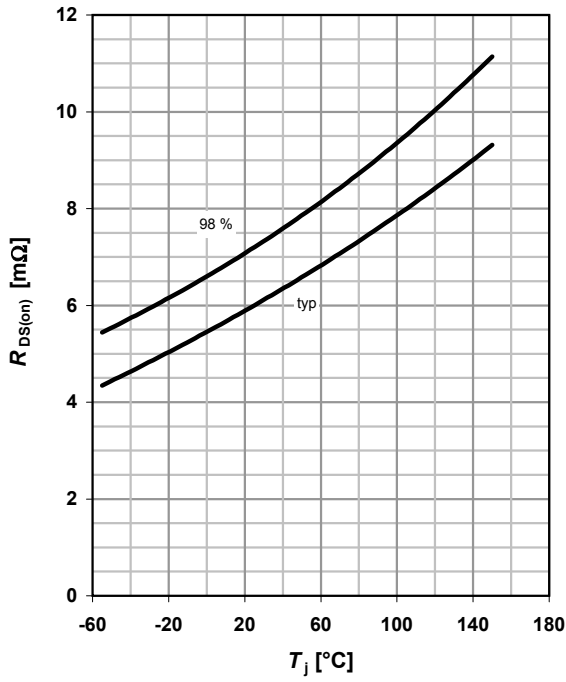
**8 Typ. forward transconductance**

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



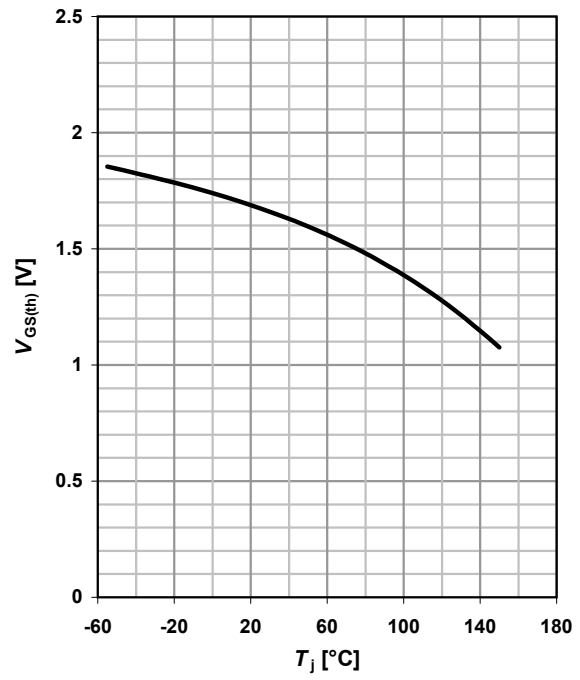
**9 Drain-source on-state resistance**

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



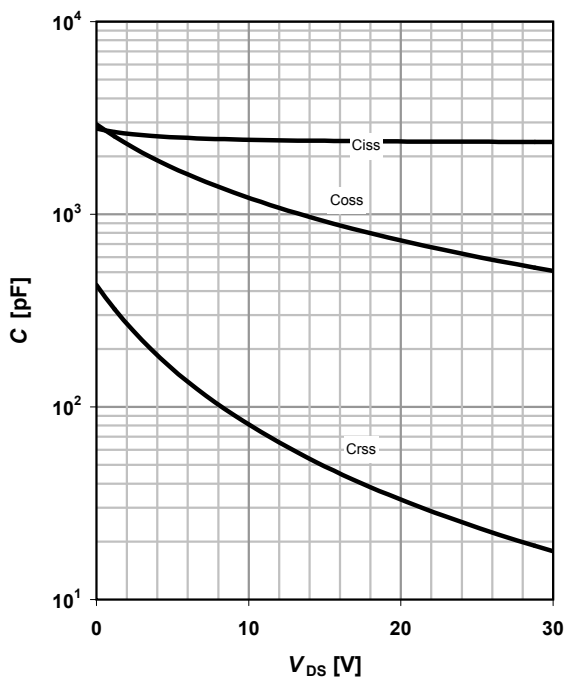
**10 Typ. gate threshold voltage**

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



**11 Typ. capacitances**

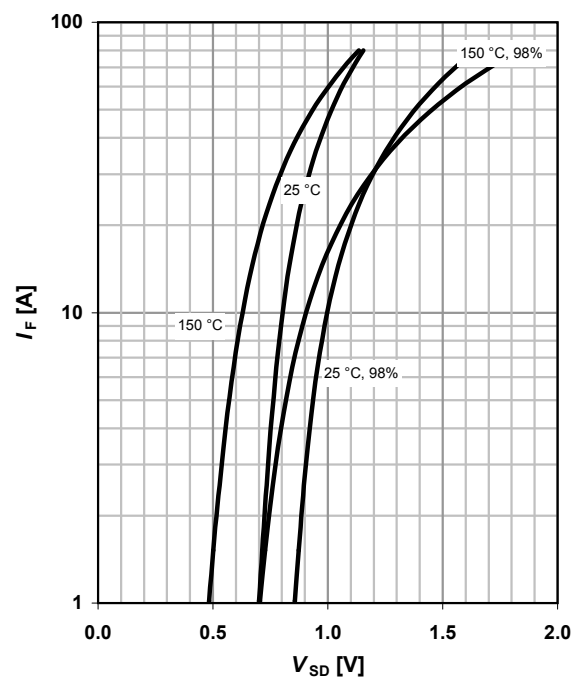
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

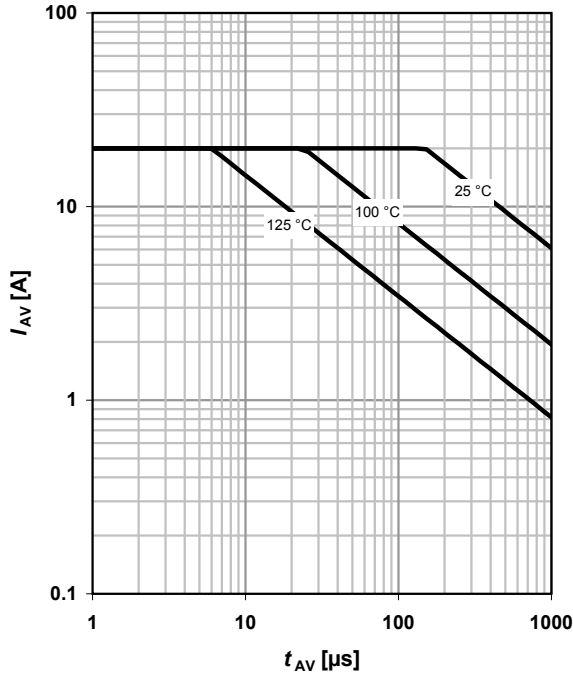
parameter:  $T_j$



**13 Avalanche characteristics**

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

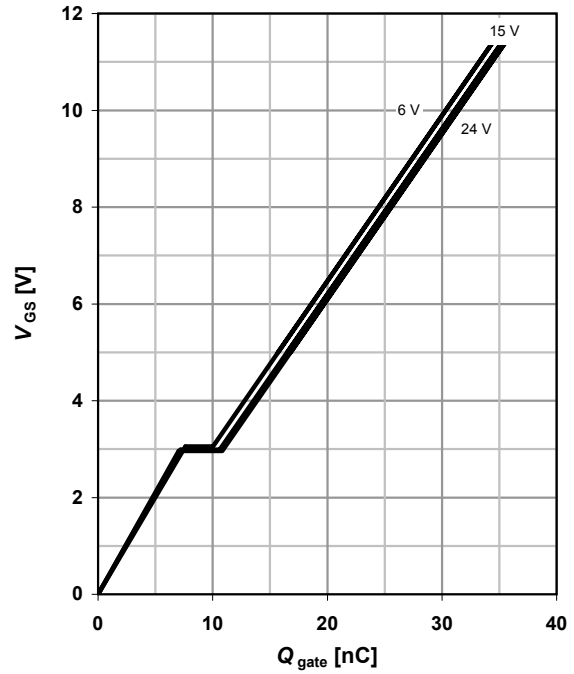
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

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

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

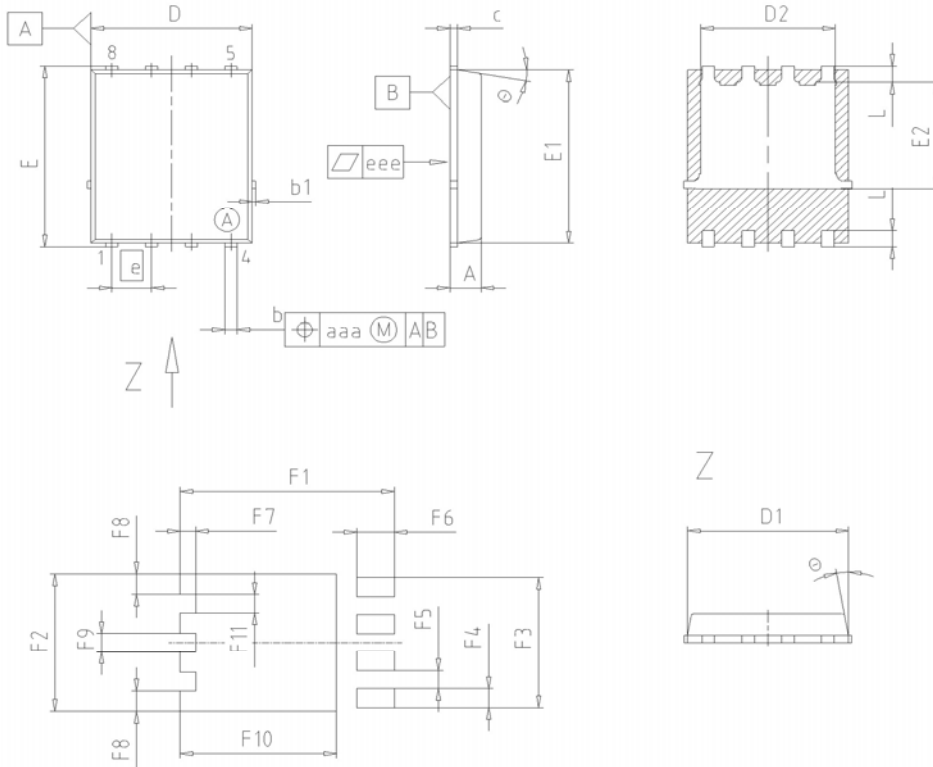
$V_{BR(DSS)}=f(T_j); I_D=1 \text{ mA}$



**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°	11.5°	8.5°	11.5°
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.**  
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**SCALE**

**EUROPEAN PROJECTION**

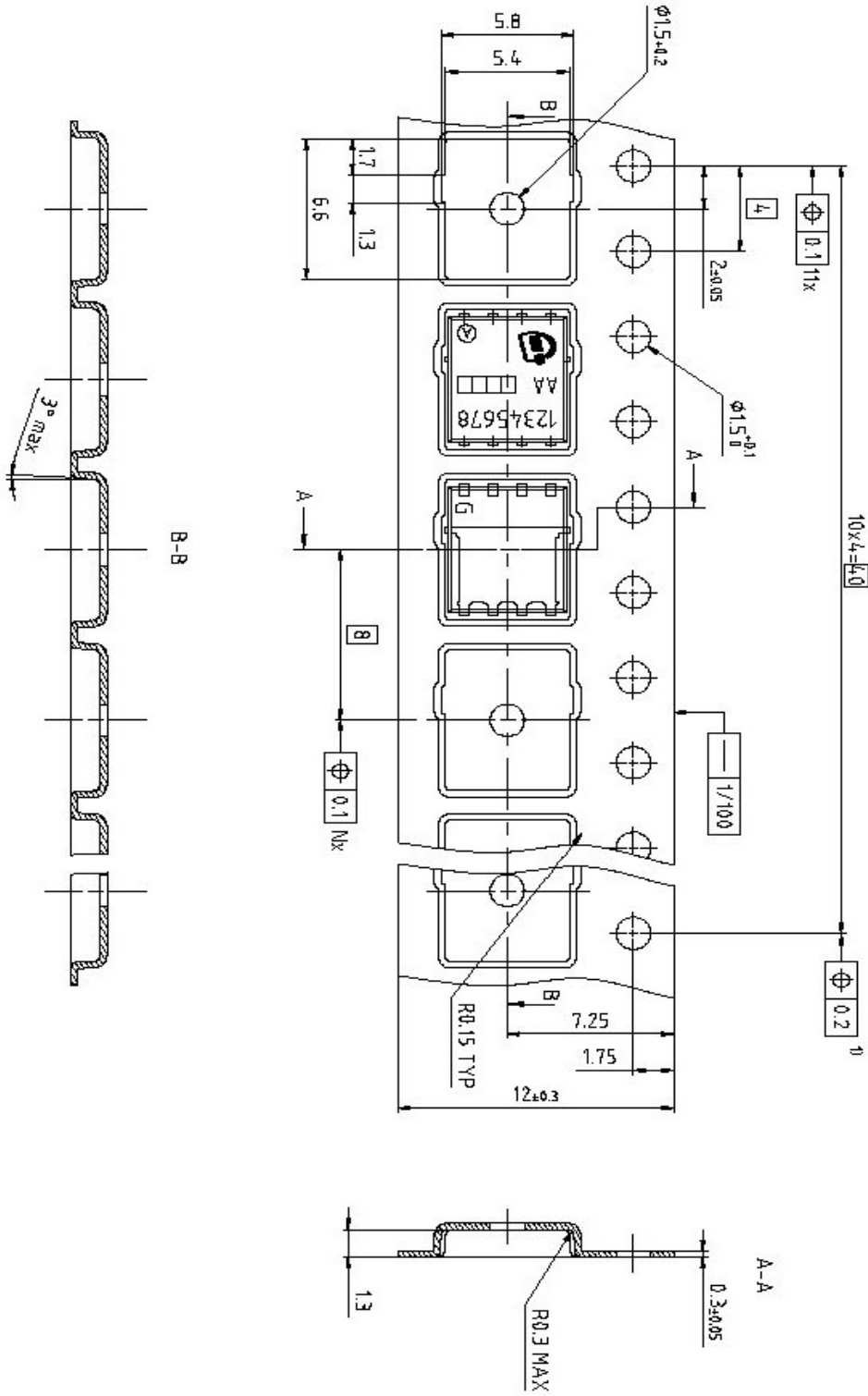
**ISSUE DATE**  
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03



Tape

PG-TDSON-8



Dimensions in mm

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