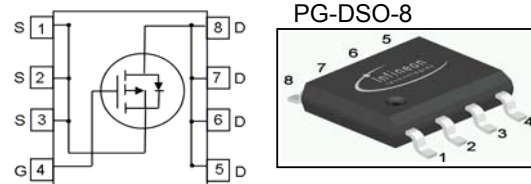


OptiMOS® P-Power-Transistor
Features

- single P-Channel in SO8
- Qualified according JEDEC¹⁾ for target applications
- 150°C operating temperature
- Super Logic Level (2.5V rated)
- Pb-free plating; RoHS compliant
- Halogen-free according to IEC61249-2-21


Product Summary

V_{DS}		-20	V
$R_{DS(on),max}$	$V_{GS}=4.5\text{ V}$	8.0	mΩ
	$V_{GS}=2.5\text{ V}$	12.9	
I_D		-14.9	A



Type	Package	Marking	Lead free	Halogen free	Packing
BSO201SP H	PG-DSO-8	201SP	Yes	Yes	dry

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

Parameter	Symbol	Conditions	Value		Unit
			10 secs	steady state	
Continuous drain current ¹⁾	I_D	$V_{GS}=4.5\text{ V}, T_A=25\text{ °C}$	14.9	12.0	A
		$V_{GS}=4.5\text{ V}, T_A=70\text{ °C}$	11.9	9.4	
		$V_{GS}=2.5\text{ V}, T_A=25\text{ °C}$	11.8	9.3	
		$V_{GS}=2.5\text{ V}, T_A=70\text{ °C}$	9.4	7.4	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_A=25\text{ °C}$	59.6		
Avalanche energy, single pulse	E_{AS}	$I_D=-14.9\text{ A}, R_{GS}=25\text{ Ω}$	248		mJ
Gate source voltage	V_{GS}		±12		V
Power dissipation ¹⁾	P_{tot}	$T_A=25\text{ °C}$	2.5	1.6	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150		°C
ESD class		JESD22-A114 HBM	1C (< 2 kV)		
Soldering temperature			260		°C
IEC climatic category; DIN IEC 68-1			55/150/56		

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - soldering point	R_{thJS}		-	-	35	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint, $t_p \leq 10$ s	-	-	110	
		minimal footprint, steady state	-	-	150	
		6 cm ² cooling area ¹⁾ , $t_p \leq 10$ s	-	-	50	
		6 cm ² cooling area ¹⁾ , steady state	-	-	80	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0$ V, $I_D=-0.25$ mA	-20	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-250$ μ A	-0.6	-0.9	-1.2	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-20$ V, $V_{GS}=0$ V, $T_j=25$ °C	-	0.1	1	μ A
		$V_{DS}=-20$ V, $V_{GS}=0$ V, $T_j=150$ °C	-	10	100	
Gate-source leakage current	I_{GSS}	$V_{GS}=-12$ V, $V_{DS}=0$ V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=2.5$ V, $I_D=-11.8$ A	-	10.3	12.9	m Ω
		$V_{GS}=4.5$ V, $I_D=-14.9$ A	-	6.7	8.0	
Gate resistance	R_G		-	3.8	-	Ω
Transconductance	g_{fs}	$ V_{DS} > 2 I_D R_{DS(on)max}$, $I_D=-11.8$ A	40	71	-	S

¹⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μ m thick) copper area for drain connection. PCB is vertical in still air.

²⁾ See figure 3 for more detailed information

³⁾ See figure 13 for more detailed information

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=15\text{ V},$ $f=1\text{ MHz}$	-	6400	9600	pF
Output capacitance	C_{oss}		-	2100	3150	
Reverse transfer capacitance	C_{rss}		-	1700	2550	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-10\text{ V},$ $V_{GS}=4.5\text{ V}, I_D=-$ $14.9\text{ A}, R_G=1.6\ \Omega$	-	21	32	ns
Rise time	t_r		-	99	149	
Turn-off delay time	$t_{d(off)}$		-	99	149	
Fall time	t_f		-	162	243	

Gate Charge Characteristics⁴⁾

Gate to source charge	Q_{gs}	$V_{DD}=-10\text{ V}, I_D=-$ $14.9\text{ A}, V_{GS}=0\text{ to }4.5\text{ V}$	-	-10	-15	nC
Gate charge at threshold	$Q_{g(th)}$		-	-6	-16	
Gate to drain charge	Q_{gd}		-	-23	-39	
Switching charge	Q_{sw}		-	-26	-38	
Gate charge total	Q_g		-	-66	-88	
Gate plateau voltage	$V_{plateau}$		-	-1.5	-	
Output charge	Q_{oss}	$V_{DD}=-10\text{ V}, V_{GS}=0\text{ V}$	-	38	51	nC

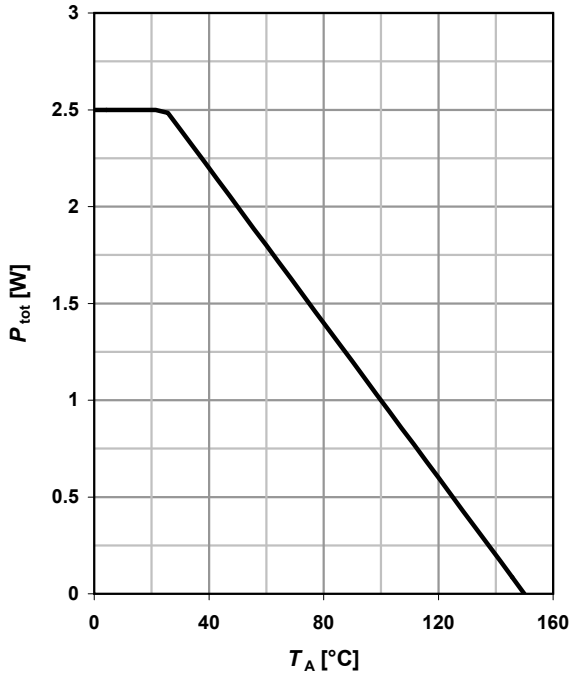
Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ }^\circ\text{C}$	-	-	-3.7	A
Diode pulse current	$I_{S,pulse}$		-	-	-59.6	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-14.9\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	-	1.2	V
Reverse recovery time	t_{rr}	$V_R=10\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	-	95	ns
Reverse recovery charge	Q_{rr}	$V_R=10\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	-	109	nC

⁴⁾ See figure 16 for gate charge parameter definition

1 Power dissipation

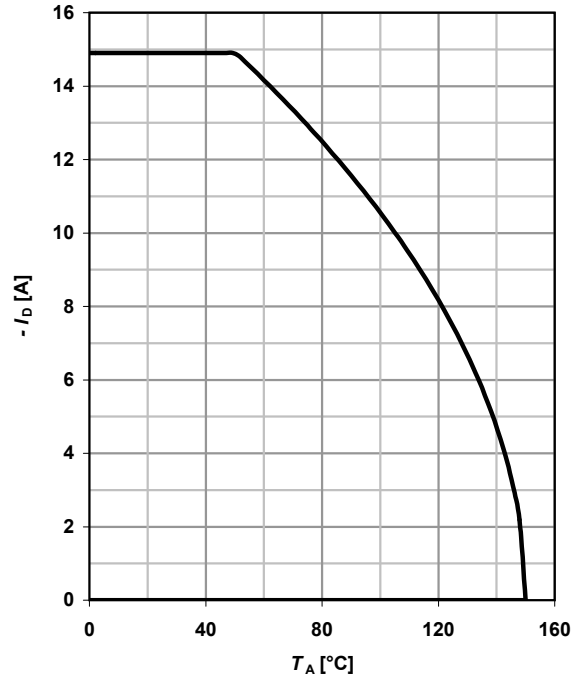
$$P_{tot} = f(T_A); t_p \leq 10 \text{ s}$$



2 Drain current

$$I_D = f(T_A); t_p \leq 10 \text{ s}$$

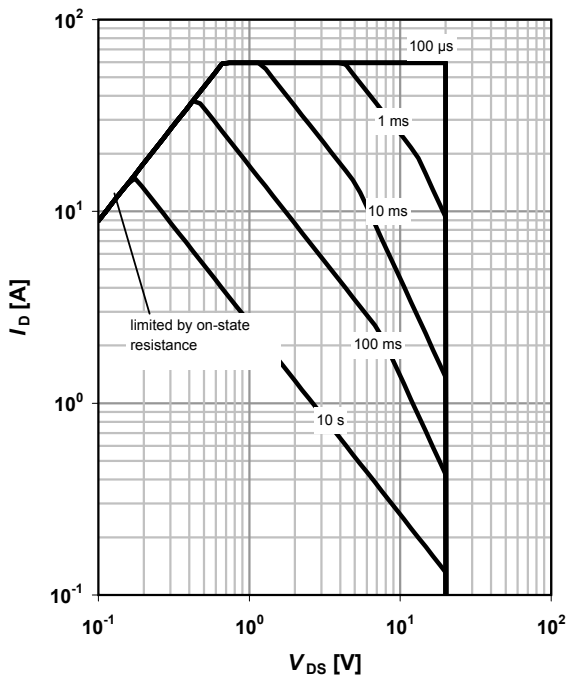
parameter: $V_{GS} = 4.5 \text{ V}$



3 Safe operating area

$$I_D = f(V_{DS}); T_A = 25 \text{ °C}^2; D = 0$$

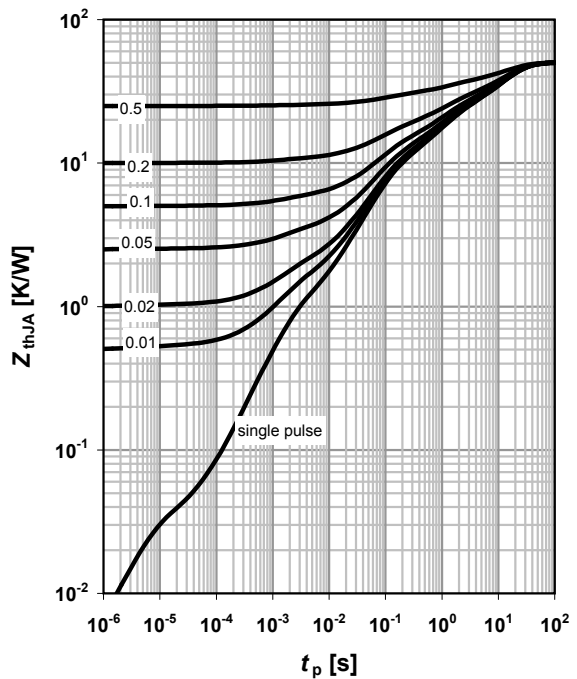
parameter: t_p



4 Max. transient thermal impedance

$$Z_{thJA} = f(t_p^2)$$

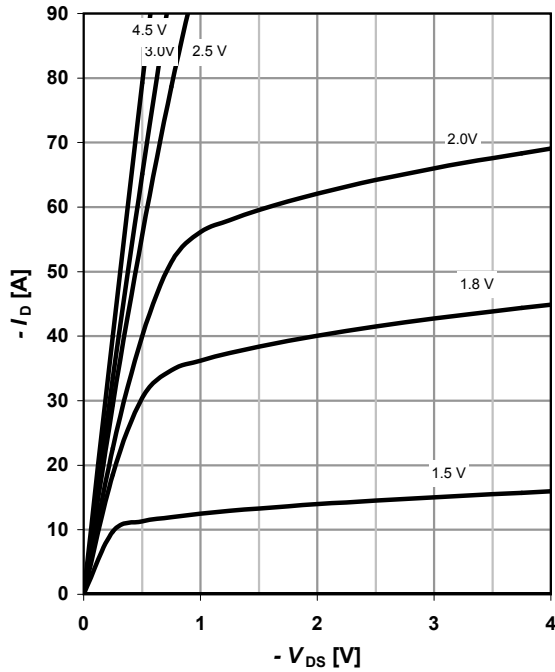
parameter: $D = t_p / T$



5 Typ. output characteristics

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

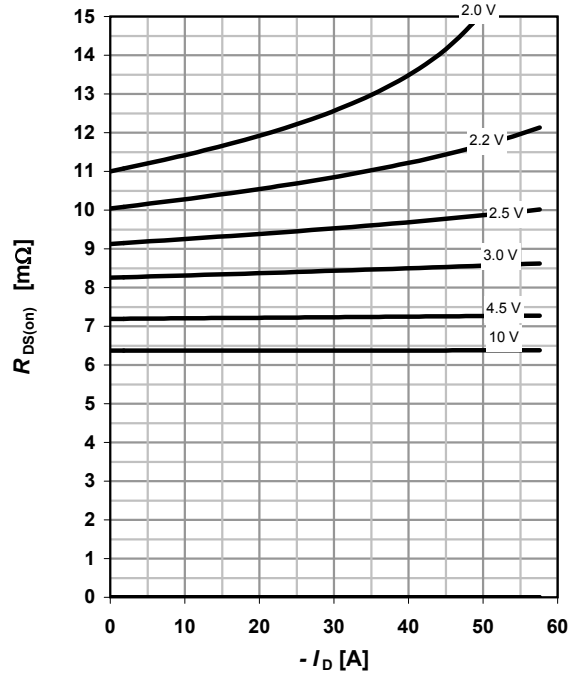
parameter: V_{GS}



6 Typ. drain-source on resistance

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

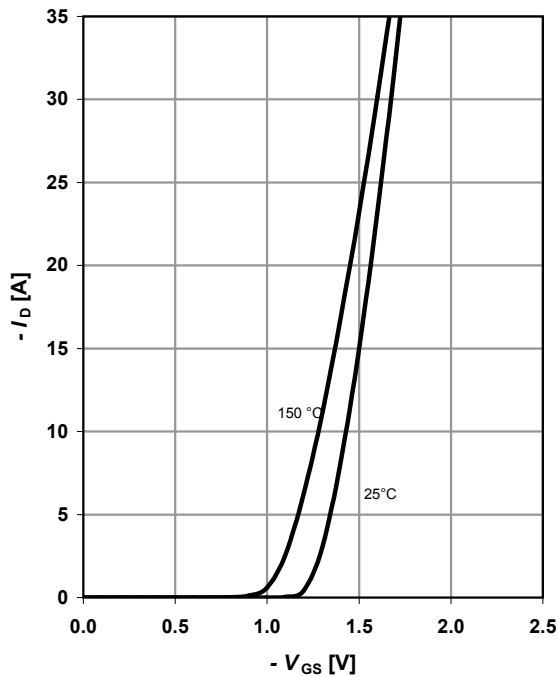
parameter: V_{GS}



7 Typ. transfer characteristics

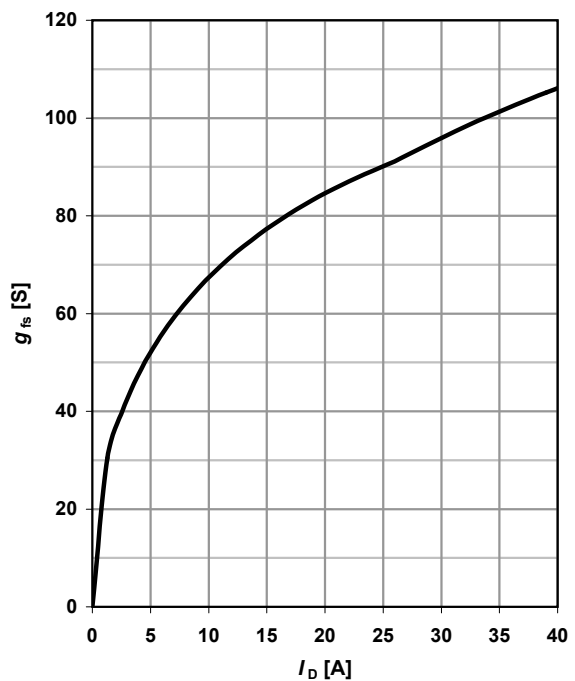
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



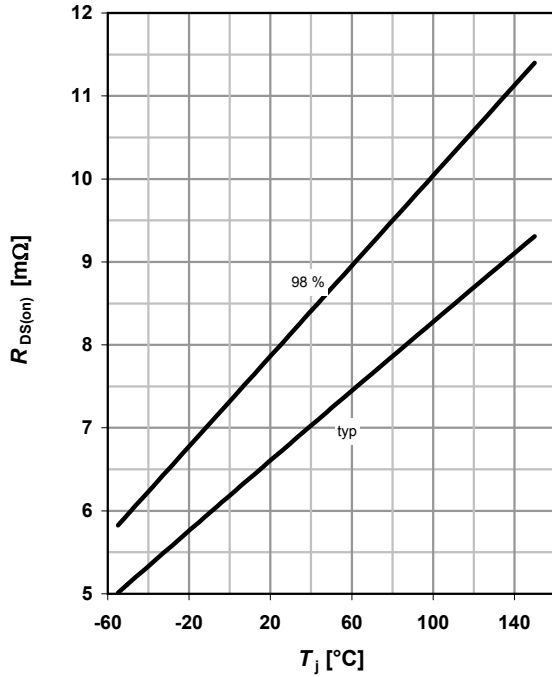
8 Typ. forward transconductance

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



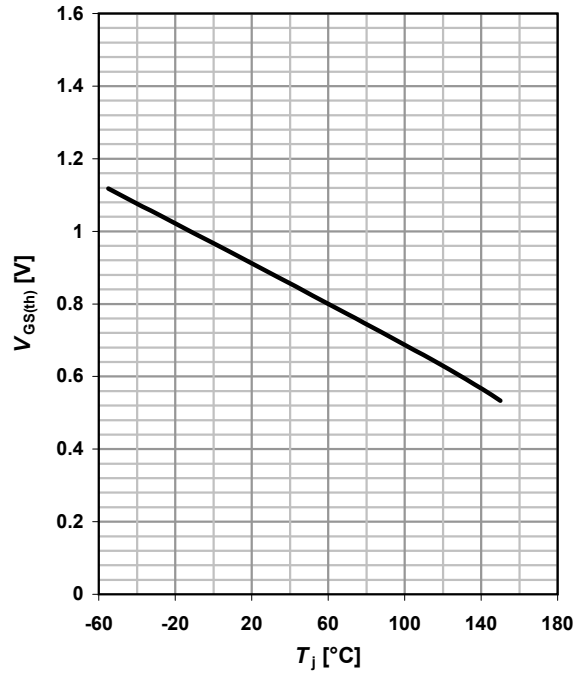
9 Drain-source on-state resistance

$R_{DS(on)} = f(T_j); I_D = -14.9 \text{ A}; V_{GS} = -4.5 \text{ V}$



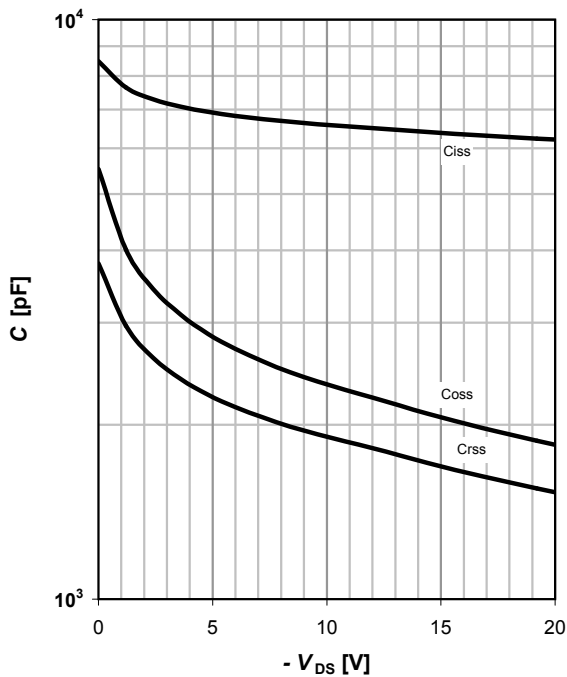
10 Typ. gate threshold voltage

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



11 Typ. capacitances

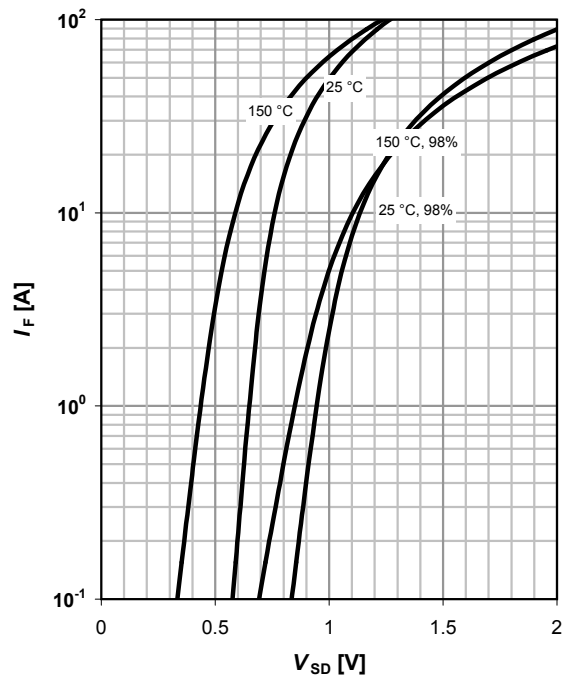
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

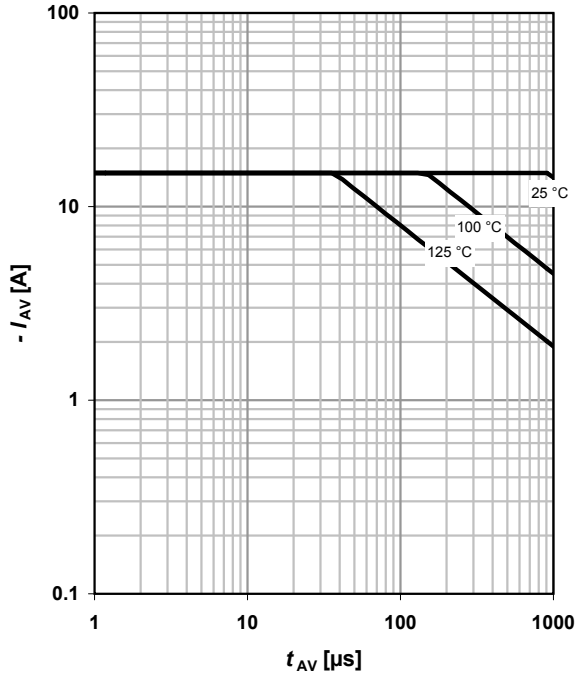
parameter: T_j



13 Avalanche characteristics

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

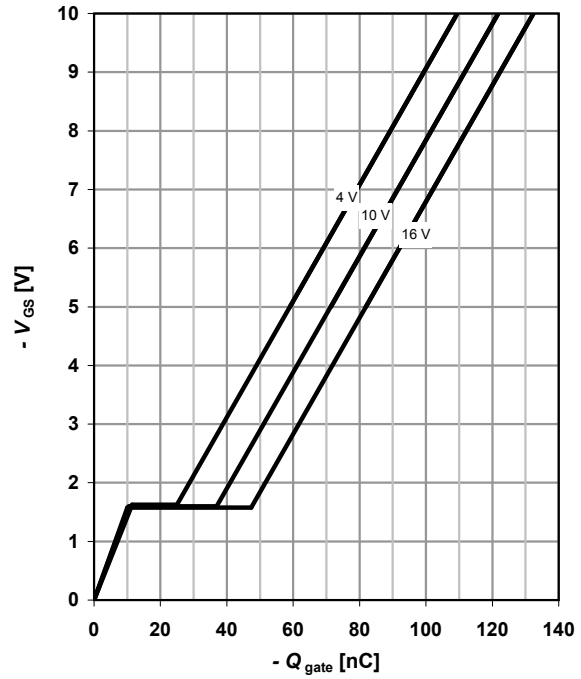
parameter: $T_{j(start)}$



14 Typ. gate charge

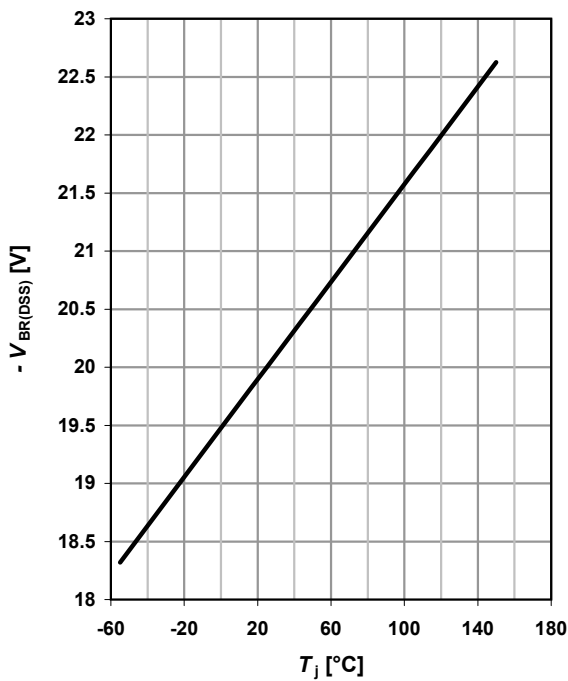
$V_{GS}=f(Q_{gate}); I_D=-14.9\ A\ pulsed$

parameter: V_{DD}



15 Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j); I_D=0.25\ mA$



16 Gate charge waveforms



Package Outline

PG-DSO-8: Outline



1) DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	-	1.75	-	0.069
A1	0.10	-	0.004	-
A2	1.25	1.65	0.049	0.065
b	0.35	0.51	0.014	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27		0.050	
N	8		8	
L	0.39	0.89	0.015	0.035
h	0.23	0.50	0.009	0.020
θ	0°	8°	0°	8°
θ_1	-	19°	-	19°
ccc	0.10		0.004	
ddd	0.25		0.010	
F1	5.59	5.79	0.220	0.228
F2	0.55	0.75	0.022	0.030
F3	1.21	1.41	0.048	0.056

DOCUMENT NO.
Z8B00003333

SCALE

EUROPEAN PROJECTION

ISSUE DATE
09.01.2008

REVISION
02

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Infineon Technologies AG
81726 Munich, Germany
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