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BSO080P03NS3E G

OptiMOS™ 3 P3-Power-Transistor

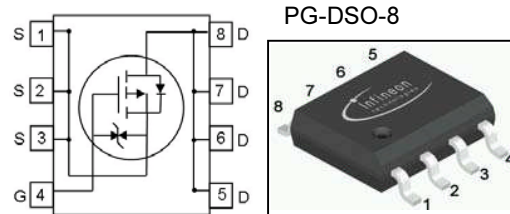
Features

- single P-Channel in SO8
- Qualified according JEDEC¹⁾ for target applications
- 150°C operating temperature
- $V_{GS}=25\text{ V}$, specially suited for notebook applications
- ESD protected
- Pb-free plating; RoHS compliant
- applications: battery management, load switching
- Halogen-free according to IEC61249-2-21



Product Summary

V_{DS}		-30	V
$R_{DS(on),max}$	$V_{GS}=10\text{ V}$	8.0	$m\Omega$
	$V_{GS}=6\text{ V}$	11.4	
I_D		14.8	A



Type	Package	Marking	Lead free	Halogen free	Packing
BSO080P03NS3E G	PG-DSO-8	080P3NSE	Yes	Yes	non 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	$V_{GS}=10\text{ V}, T_A=25\text{ °C}$	14.8	12.0	A
		$V_{GS}=10\text{ V}, T_A=70\text{ °C}$	11.8	9.4	
		$V_{GS}=6\text{ V}, T_A=25\text{ °C}$	12.4	9.8	
		$V_{GS}=6\text{ V}, T_A=70\text{ °C}$	9.9	7.8	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_A=25\text{ °C}$	48		
Avalanche energy, single pulse	E_{AS}	$I_D=14.8\text{ A}, R_{GS}=25\ \Omega$	149		mJ
Gate source voltage	V_{GS}		± 25		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	3 ($\geq 4\text{ kV}$)		
Soldering temperature			260		°C
IEC climatic category; DIN IEC 68-1			55/150/56		



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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	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-150$ μ A	-3.1	-2.5	-1.9	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-30$ V, $V_{GS}=0$ V, $T_j=25$ °C	-	-	-1	μ A
		$V_{DS}=-30$ V, $V_{GS}=0$ V, $T_j=125$ °C	-	-	-100	
Gate-source leakage current	I_{GSS}	$V_{GS}=-25$ V, $V_{DS}=0$ V	-	-	-10	μ A
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=6$ V, $I_D=-12.4$ A	-	8.1	11.0	m Ω
		$V_{GS}=10$ V, $I_D=-14.8$ A	-	6.7	8.0	
Gate resistance	R_G		-	5.9	-	Ω
Transconductance	g_{fs}	$ V_{DS} > 2 I_D R_{DS(on)max}$, $I_D=-14.8$ A	22	44	-	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



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Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=-15\text{ V},$ $f=1\text{ MHz}$	-	4500	6750	pF
Output capacitance	C_{oss}		-	2100	3150	
Reverse transfer capacitance	C_{rss}		-	150	225	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=15\text{ V}, V_{GS}=-10\text{ V},$ $I_D=-14.8\text{ A}, R_G=1.6\ \Omega$	-	16	24	ns
Rise time	t_r		-	47	70	
Turn-off delay time	$t_{d(off)}$		-	64	96	
Fall time	t_f		-	19	28.5	

Gate Charge Characteristics⁴⁾

Gate to source charge	Q_{gs}	$V_{DD}=-15\text{ V}, I_D=-$ $14.8\text{ A}, V_{GS}=0\text{ to }10\text{ V}$	-	18	23	nC
Gate charge at threshold	$Q_{g(th)}$		-	7	10	
Gate to drain charge	Q_{gd}		-	8	11	
Switching charge	Q_{sw}		-	18	25	
Gate charge total	Q_g		-	61	81	
Gate plateau voltage	$V_{plateau}$		-	3.9	-	
Output charge	Q_{oss}	$V_{DD}=15\text{ V}, V_{GS}=0\text{ V}$	-	49	65	nC

Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ }^\circ\text{C}$	-	-	3.4	A
Diode pulse current	$I_{S,pulse}$		-	-	48	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-14.8\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	-	-1.1	V
Reverse recovery charge	Q_{rr}	$V_R=-15\text{ V}, I_F=I_S,$ $di_F/dt=400\text{ A}/\mu\text{s}$	-	48	-	nC
Reverse recovery time	t_{rr}		-	49	-	ns

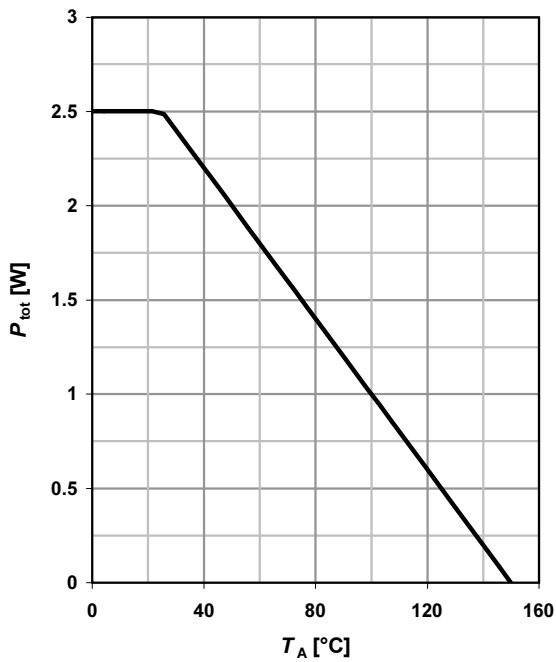
⁴⁾ See figure 16 for gate charge parameter definition



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1 Power dissipation

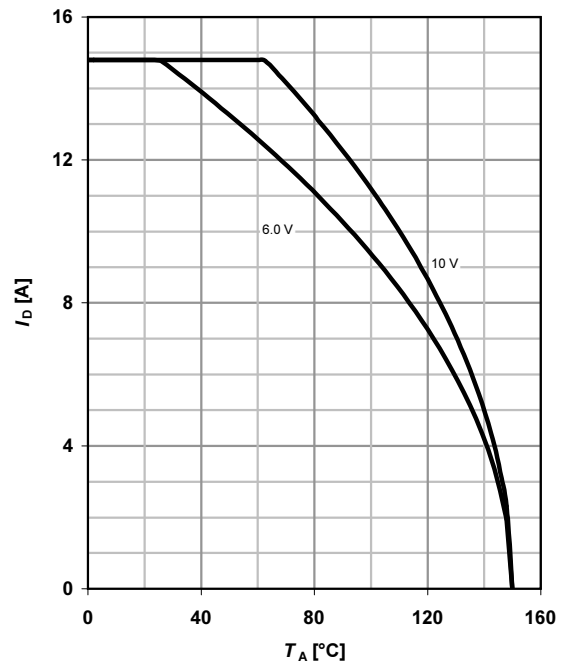
$P_{tot}=f(T_A); t_p \leq 10 \text{ s}$



2 Drain current

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

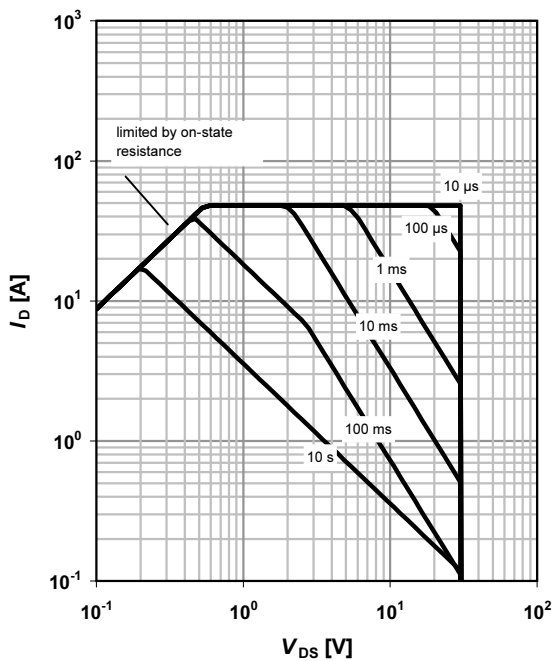
parameter: V_{GS}



3 Safe operating area

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

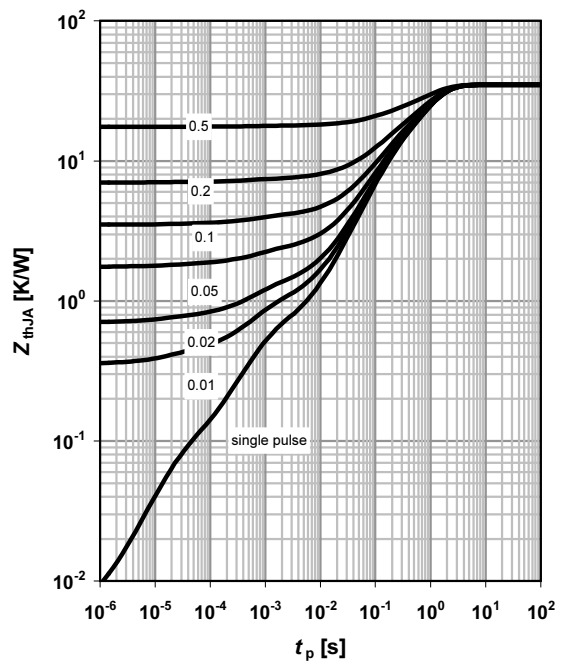
parameter: t_p



4 Max. transient thermal impedance

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

parameter: $D=t_p/T$



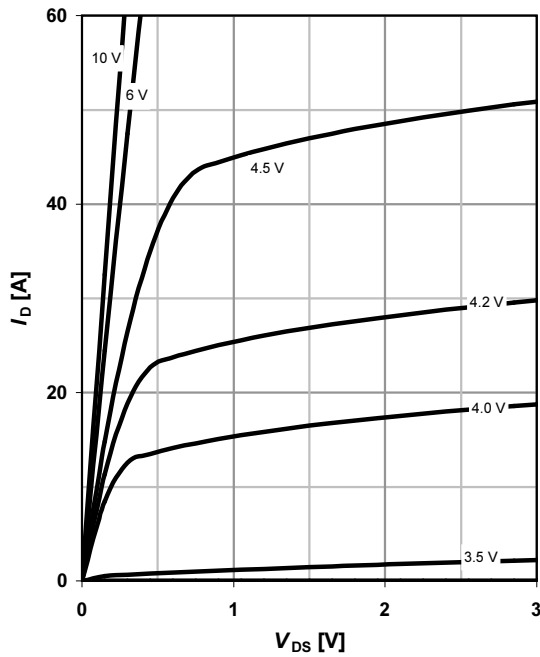


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5 Typ. output characteristics

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

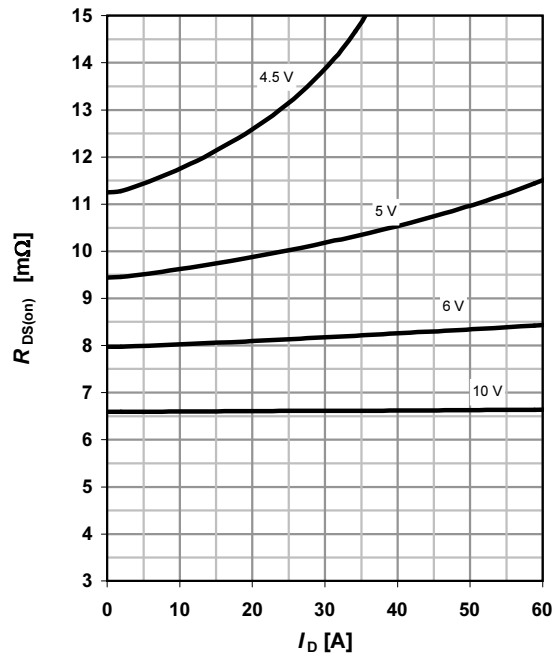
parameter: V_{GS}



6 Typ. drain-source on resistance

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

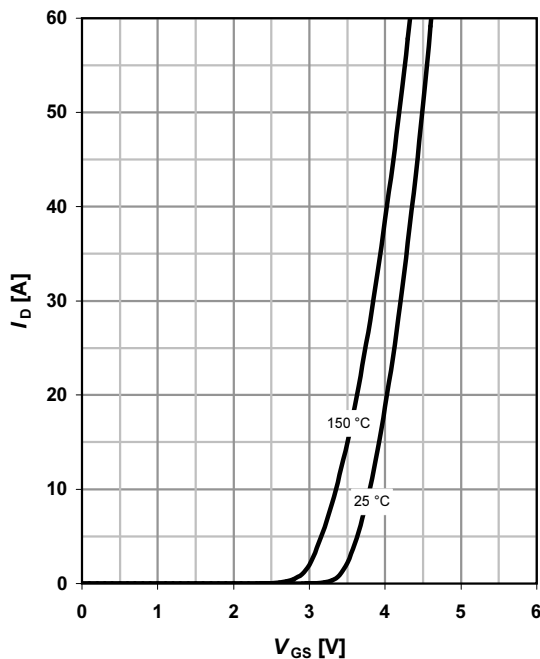
parameter: V_{GS}



7 Typ. transfer characteristics

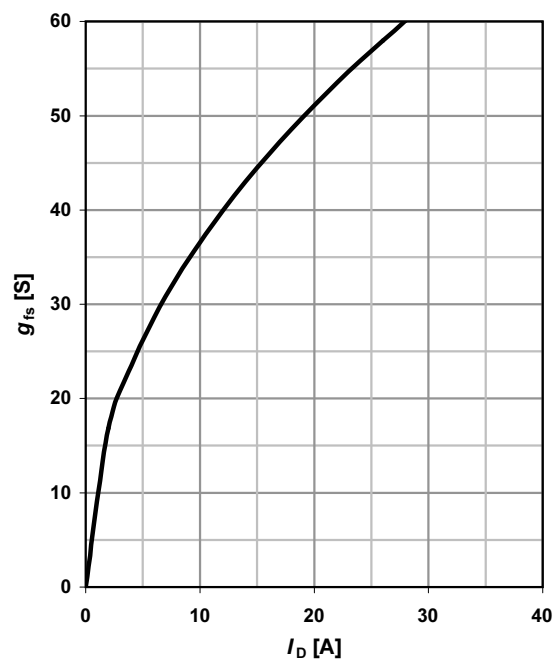
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter: T_j



8 Typ. forward transconductance

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

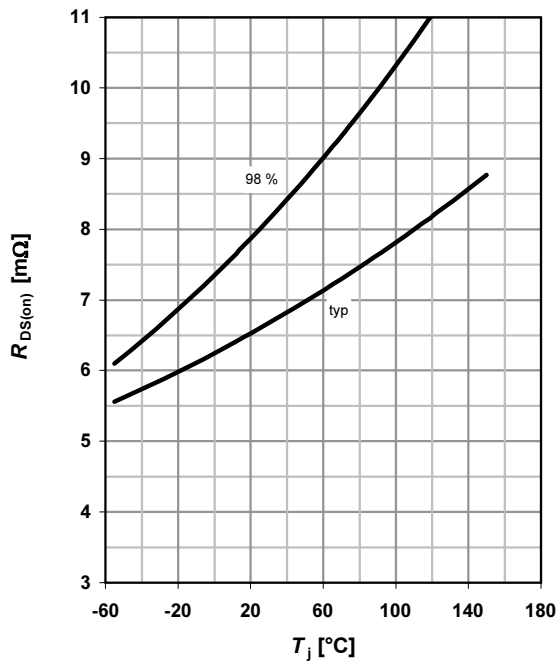




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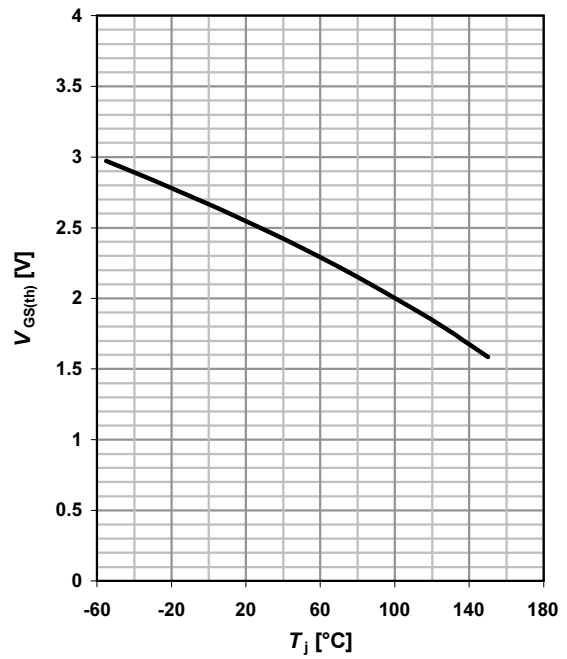
9 Drain-source on-state resistance

$R_{DS(on)}=f(T_j); I_D=14.8\text{ A}; V_{GS}=10\text{ V}$



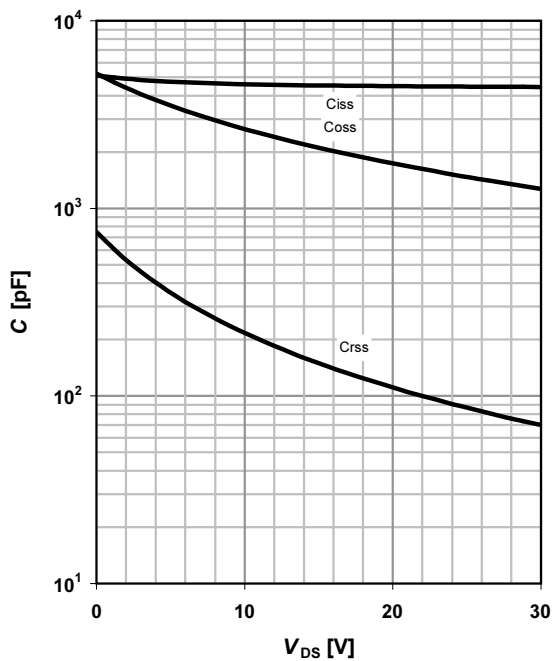
10 Typ. gate threshold voltage

$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}; I_D=-150\mu\text{A}$



11 Typ. capacitances

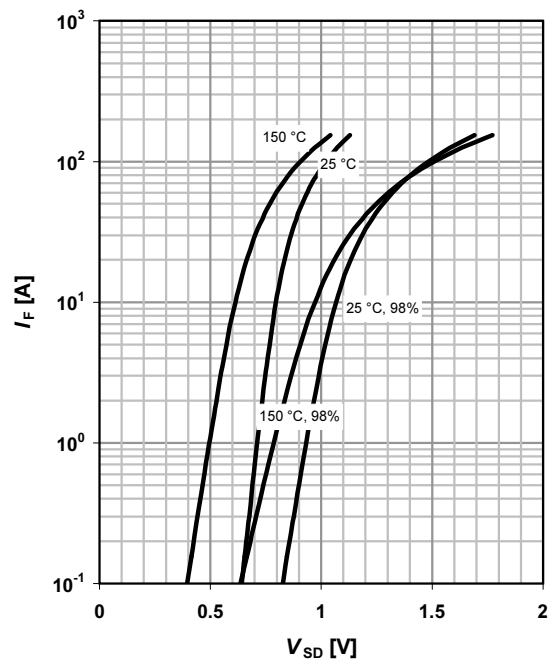
$C=f(V_{DS}); V_{GS}=0\text{ V}; f=1\text{ MHz}$



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

parameter: T_j



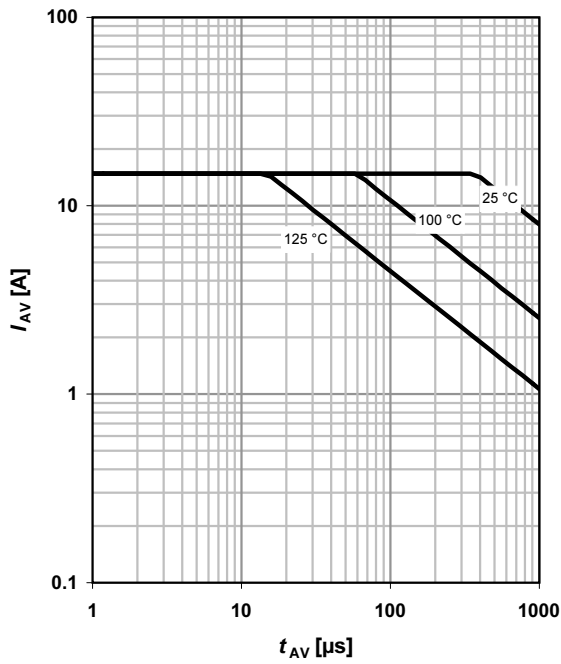


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13 Avalanche characteristics

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

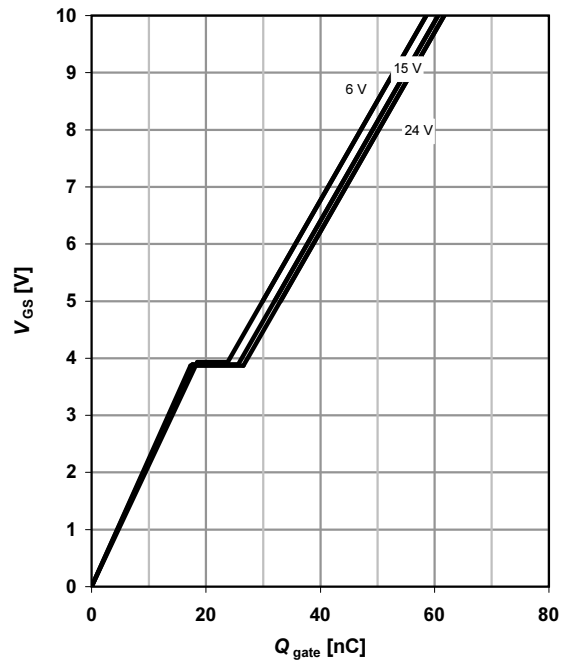
parameter: $T_{j(start)}$



14 Typ. gate charge

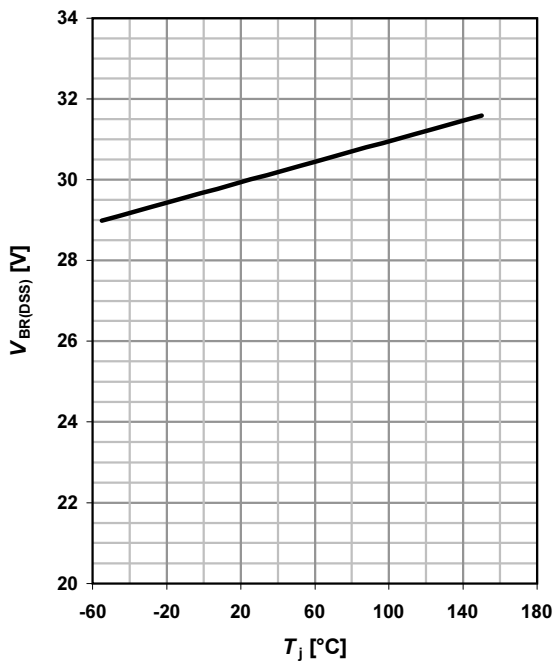
$V_{GS}=f(Q_{gate}); I_D=14.8 \text{ A pulsed}$

parameter: V_{DD}

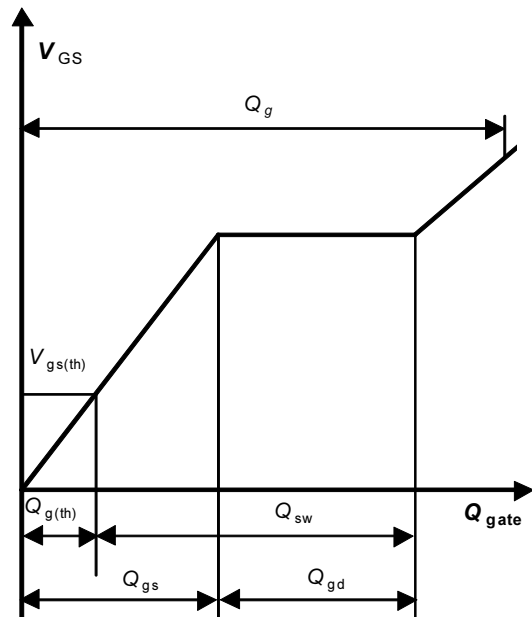


15 Drain-source breakdown voltage

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



16 Gate charge waveforms

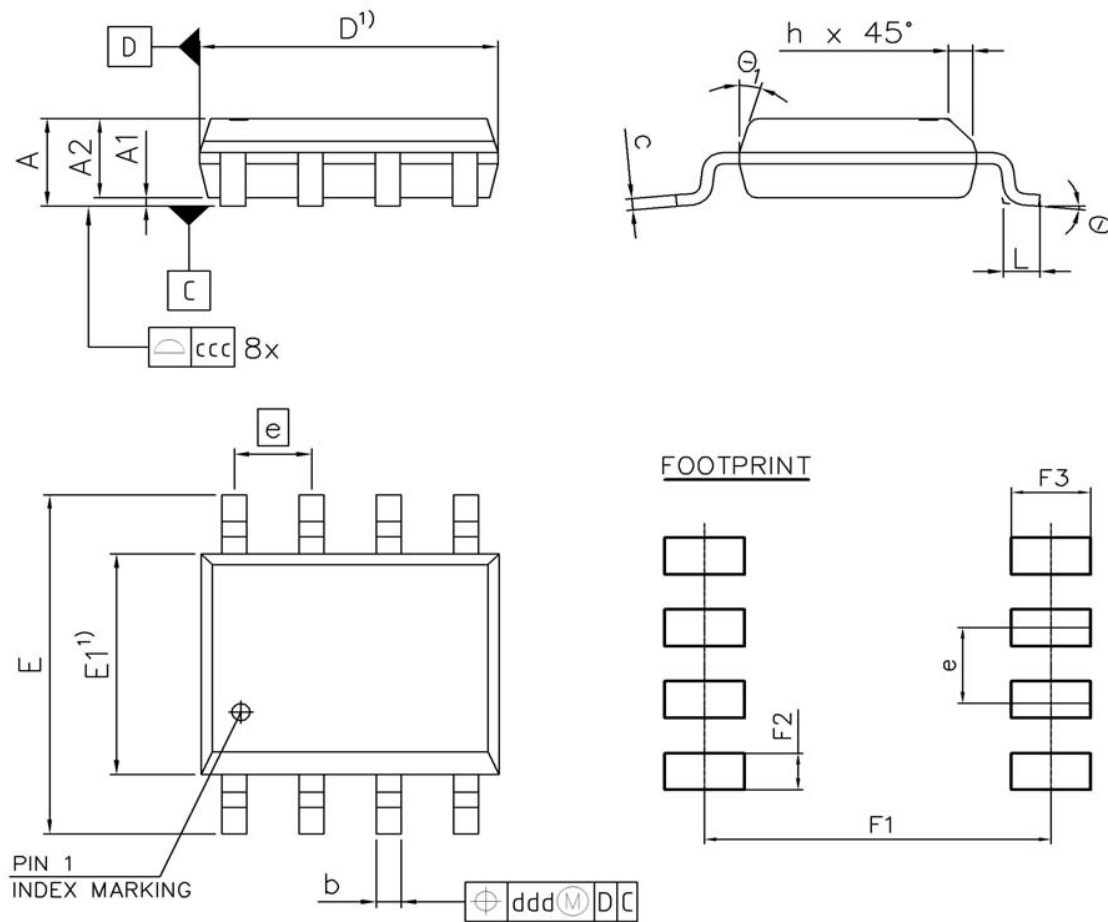




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Package Outline

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 0 1.0 2mm

EUROPEAN PROJECTION

ISSUE DATE
09.01.2008

REVISION
02



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Published by

Infineon Technologies AG

81726 Munich, Germany

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