

OptiMOS™ 3 P3-Power-Transistor

Features

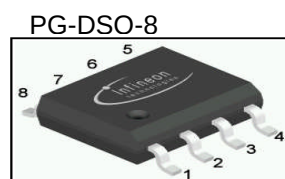
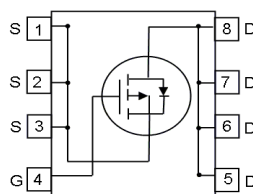
- single P-Channel in SO8
- Qualified according JEDEC¹⁾ for target applications
- 150°C operating temperature
- $V_{GS}=25\text{ V}$, specially suited for notebook applications
- Pb-free plating; RoHS compliant
- applications: battery management, load switching
- Halogen-free according to IEC61249-2-21



Halogen-Free

Product Summary

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



Type	Package	Marking	Lead free	Halogen free	Packing
BSO080P03NS3 G	PG-DSO-8	080P3NS	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	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}	$I_D=-14.8\text{ A}, R_{GS}=25\text{ Ω}$	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	1C (1 kV - 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	-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	-	-	-100	nA
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

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	-	V
Output charge	Q_{oss}	$V_{DD}=-15\text{ V}, V_{GS}=0\text{ V}$	-	49	65	nC

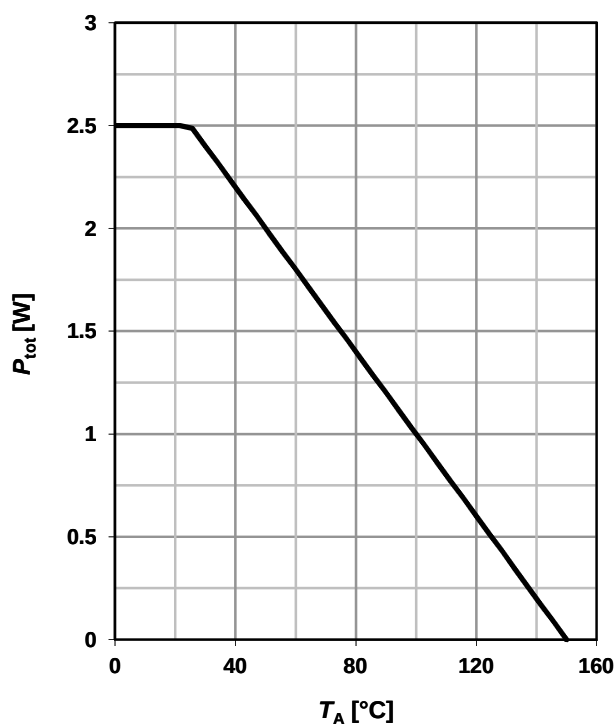
Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ °C}$	-	-	3.4	A
Diode pulse current	$I_{S,pulse}$		-	-	48	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-14.8\text{ A},$ $T_J=25\text{ °C}$	-	-	-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

1 Power dissipation

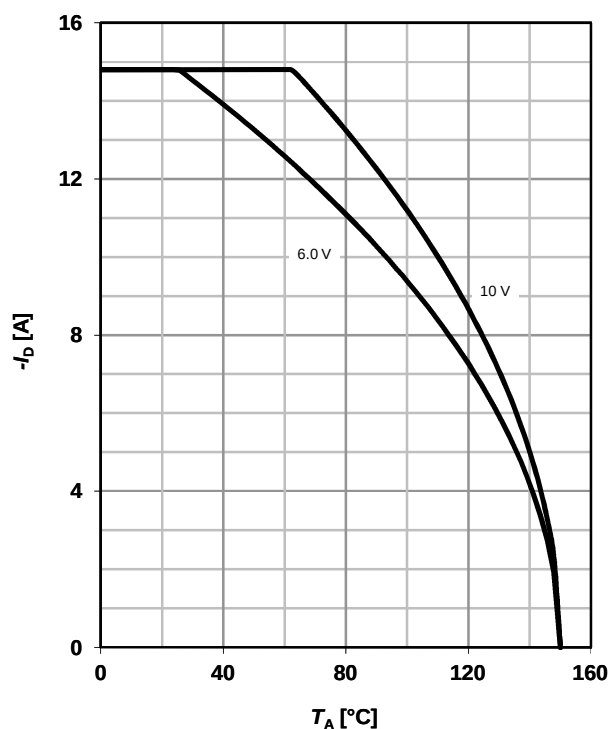
$$P_{\text{tot}} = f(T_A); t_p \leq 10 \text{ s}$$



2 Drain current

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

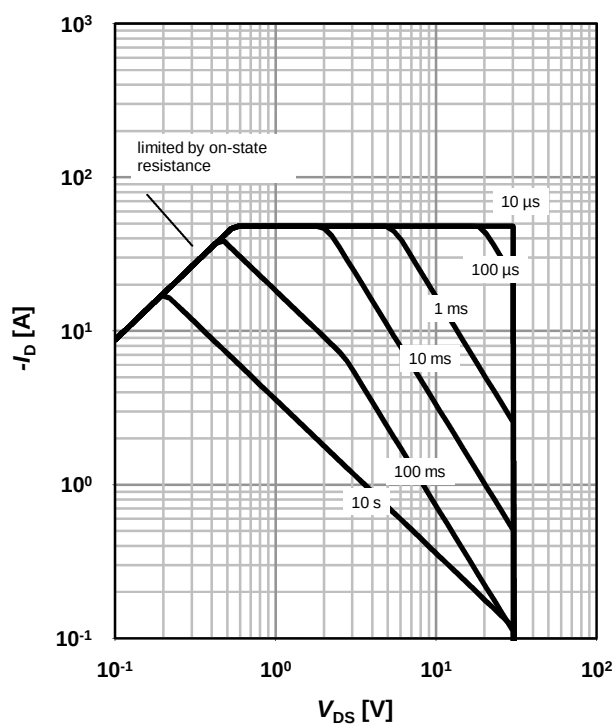
parameter: V_{GS}



3 Safe operating area

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

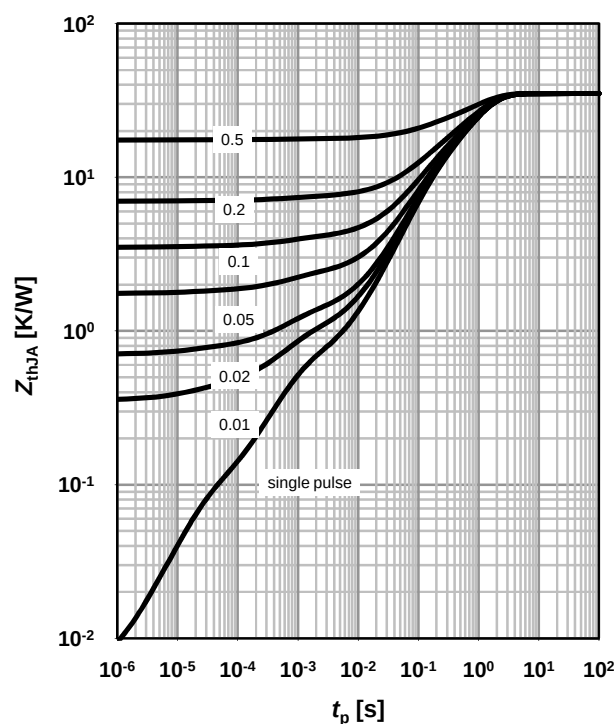
parameter: t_p



4 Max. transient thermal impedance

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

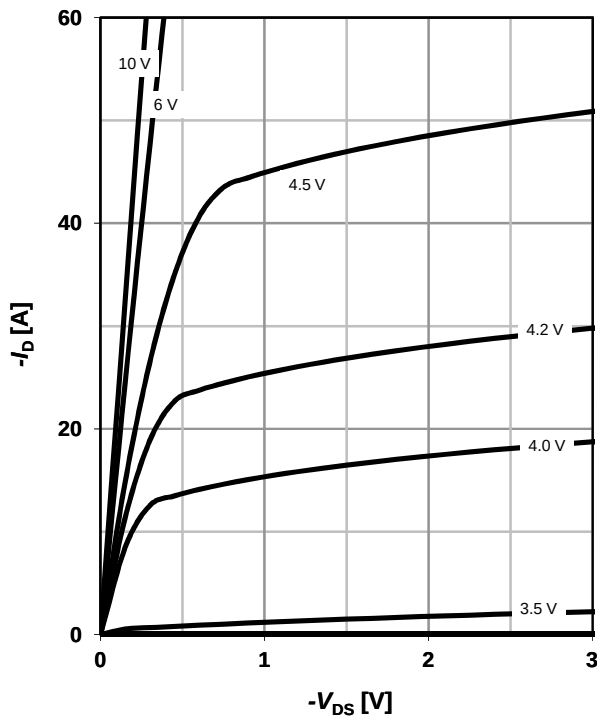
parameter: $D = t_p/T$



5 Typ. output characteristics

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

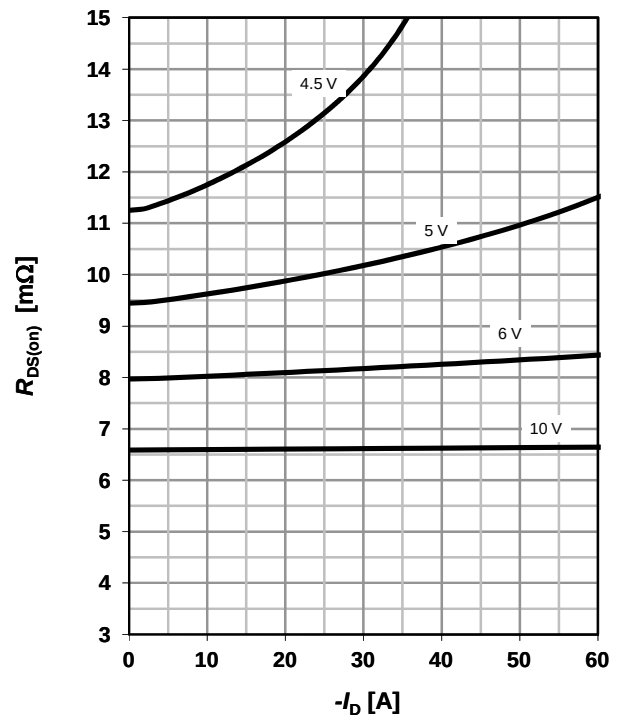
parameter: V_{GS}



6 Typ. drain-source on resistance

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

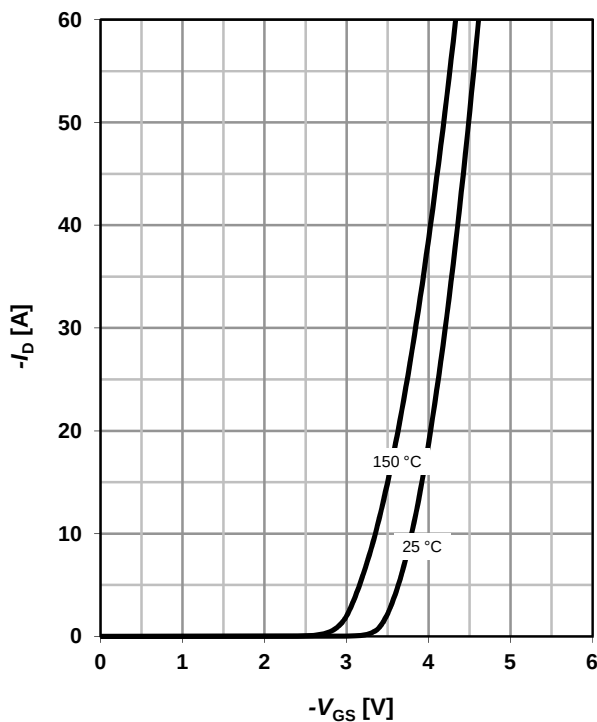
parameter: V_{GS}



7 Typ. transfer characteristics

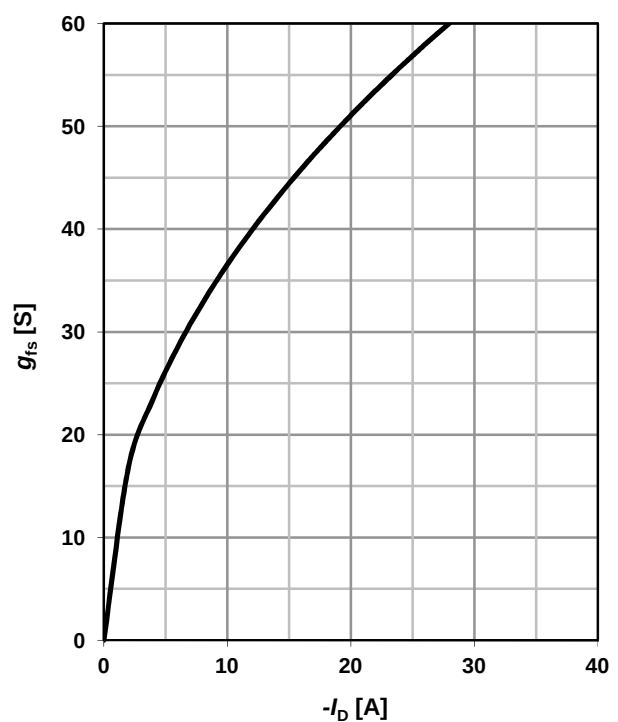
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)\max}$$

parameter: T_j

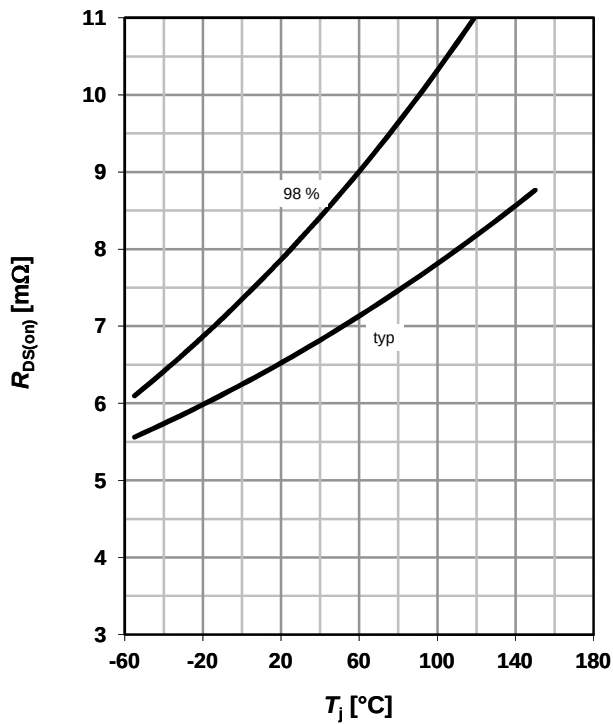


8 Typ. forward transconductance

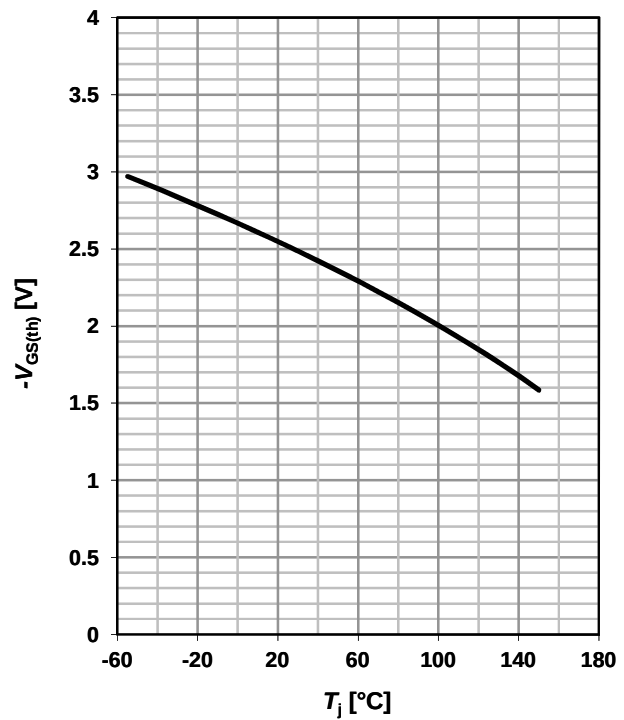
$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$



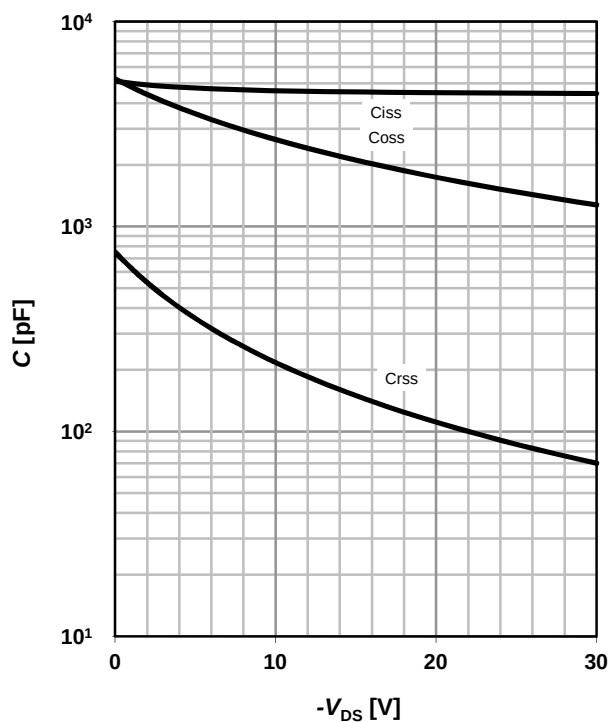
9 Drain-source on-state resistance

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


10 Typ. gate threshold voltage

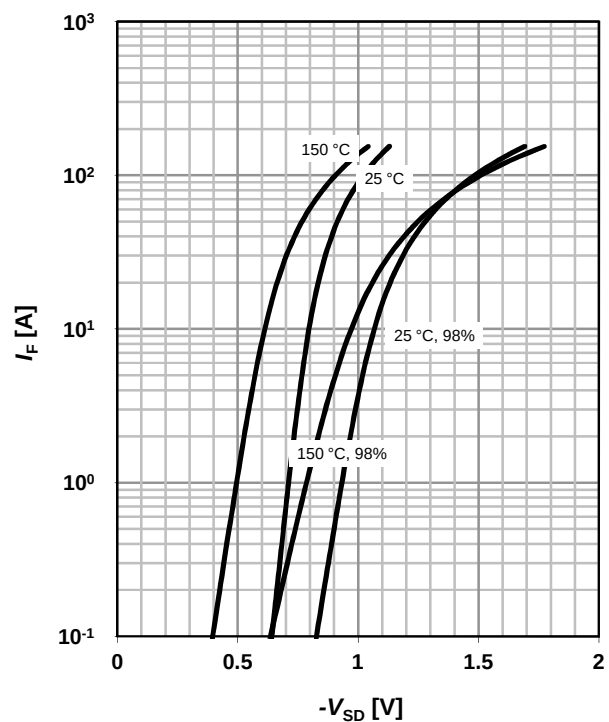
 $V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -150 \mu\text{A}$


11 Typ. capacitances

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


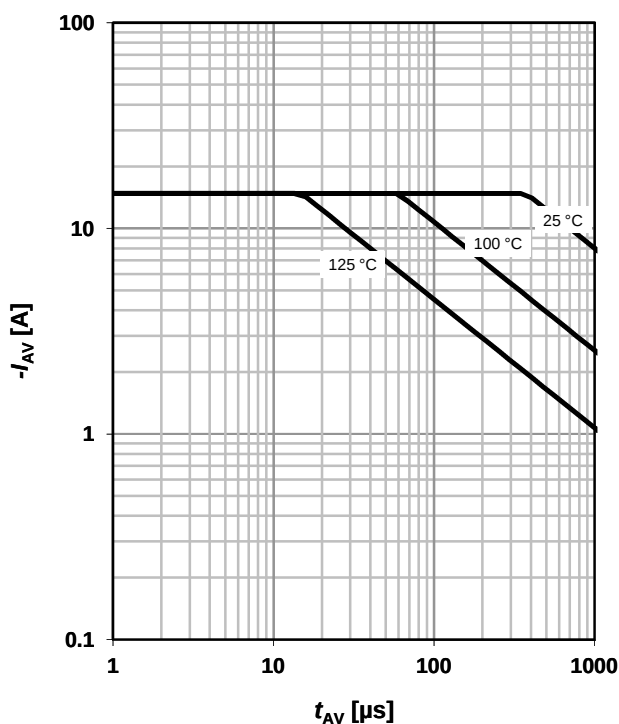
12 Forward characteristics of reverse diode

 $I_F = f(V_{SD})$

parameter: T_j


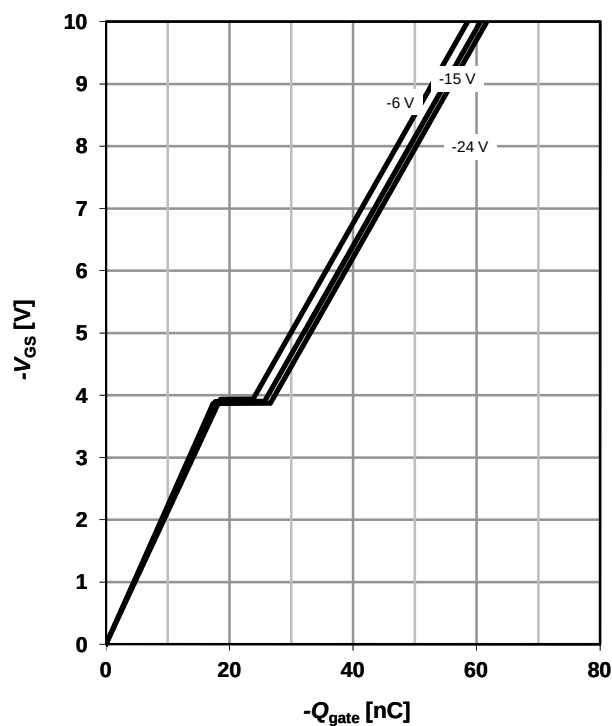
13 Avalanche characteristics

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

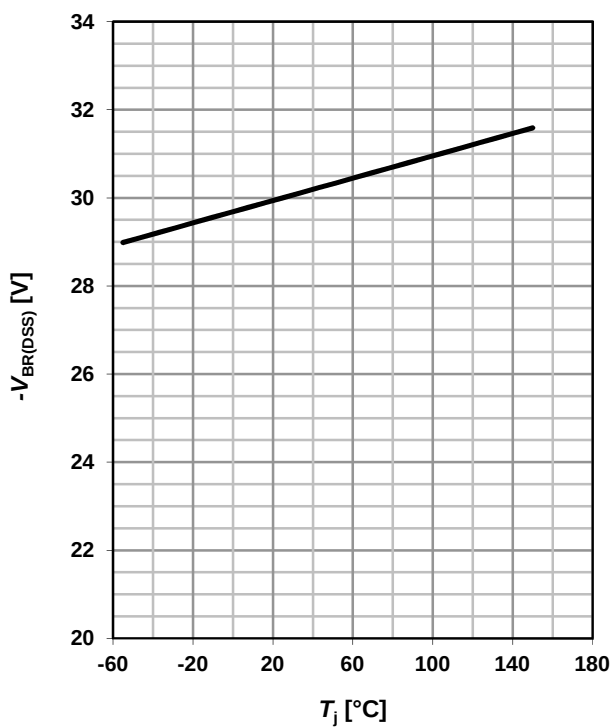
parameter: $T_{j(\text{start})}$


14 Typ. gate charge

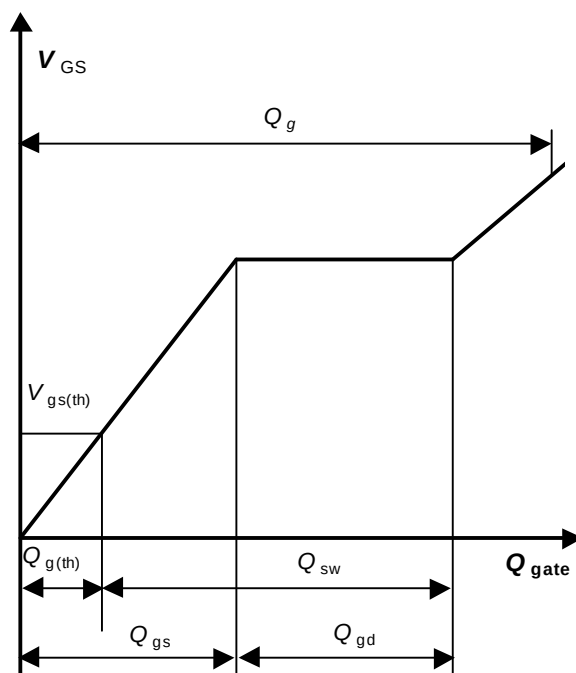
 $V_{GS}=f(Q_{gate}); I_D=-14.8\ \text{A pulsed}$

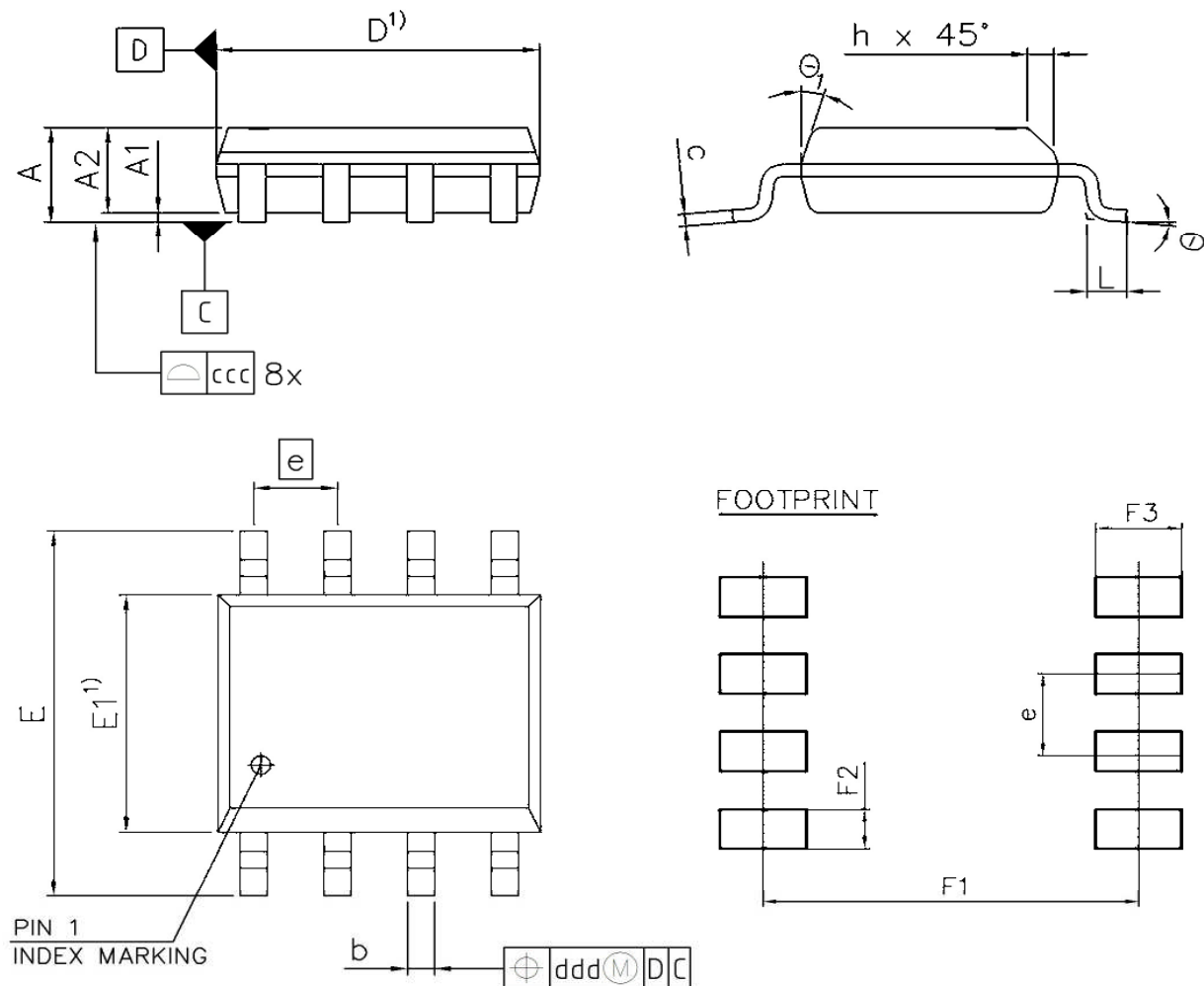
parameter: V_{DD}


15 Drain-source breakdown voltage

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


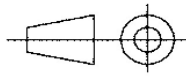
16 Gate charge waveforms



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

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