OptiMOS™ P3 Power-Transistor

Features

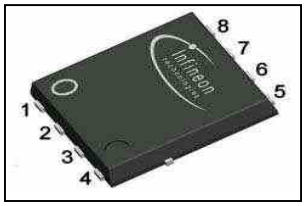
- single P-Channel in SuperSO8
- Qualified according JEDEC[1] for target applications
- V_{GS}=25 V, specially suited for notebook applications
- Pb-free; RoHS compliant
- ESD > 4 kV
- applications: battery management, load switching
- Halogen-free according to IEC61249-2-21

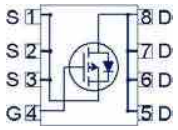
RoHS Halogen-Free

Product Summary

V_{DS}	-30	V
$R_{DS(on),max}$	3.0	mΩ
I_D	-100	A

PG-TDSON-8





Type	Package	Marking	Lead free	Halogen free	Packing
BSC030P03NS3 G	PG-TDSON-8	030P3NS	Yes	Yes	dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	-100	A
		T_C=70 °C	-100	
		T_A=25 °C	-25.4	
Pulsed drain current	$I_{D,pulse}$	T_C=25 °C[3]	-200	
Avalanche energy, single pulse	E_{AS}	I_D=-100 A, R_{GS}=25 Ω	345	mJ
Gate source voltage	V_{GS}		±25	V
Power dissipation	P_{tot}	T_C=25 °C	125	W
		T_A=25 °C[2]	2.5	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
ESD class		JESD22-A114 HBM	class 3 (> 4KV)	
Soldering temperature			260 °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}		-	-	1.0	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 cooling area[2)]	-	-	50	
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=-250µA	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-345 µA	-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	µA
		V_{DS}=-30 V, V_{GS}=0 V, T_j=125 °C	-	-	-10	
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=-50 A	-	3.0	4.6	mΩ
		V_{GS}=-10 V, I_D=-50 A	-	2.3	3.0	
Gate resistance	R_G		-	3.1	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-30 A	47	93	-	S

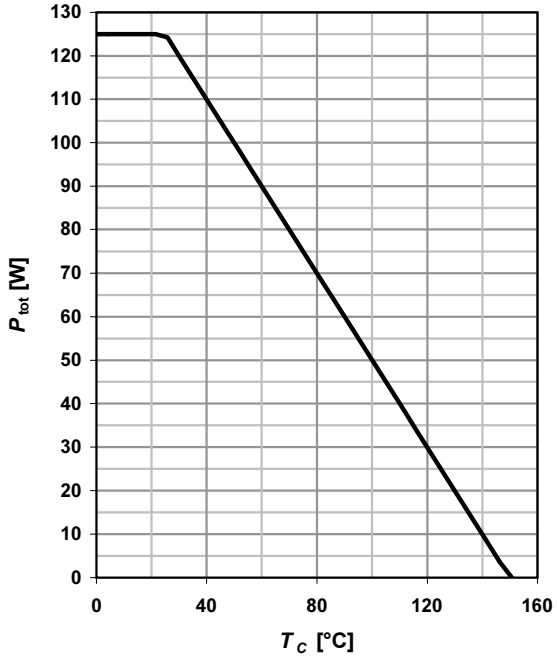
[2)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

[3)] See Fig. 3

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=-15 V, f=1 MHz	-	10500	14000	pF
Output capacitance	C_{oss}		-	4690	6240	
Reverse transfer capacitance	C_{rss}		-	350	520	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-15 V, V_{GS}=-10 V, I_D=-50 A, R_G=6 Ω	-	27	41	ns
Rise time	t_r		-	105	158	
Turn-off delay time	$t_{d(off)}$		-	98	147	
Fall time	t_f		-	33	50	
Gate Charge Characteristics[3)]						
Gate to source charge	Q_{gs}	V_{DD}=-15 V, I_D=-50 A, V_{GS}=0 to -10 V	-	42	56	nC
Gate charge at threshold	$Q_{g(th)}$		-	17	22	
Gate to drain charge	Q_{gd}		-	19	28	
Switching charge	Q_{sw}		-	44	62	
Gate charge total	Q_g		-	140	186	
Gate plateau voltage	$V_{plateau}$		-	4.1	-	V
Output charge	Q_{oss}	V_{DD}=-15 V, V_{GS}=0 V	-	108	144	
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	100	A
Diode pulse current	$I_{S,pulse}$		-	-	200	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=-50 A, T_j=25 °C	-	-	-1.1	V
Reverse recovery time	t_{rr}	V_R=15 V, I_F=$\|I_S\|$, di_F/dt=100 A/µs	-	65	90	ns
Reverse recovery charge	Q_{rr}		-	86	111	nC

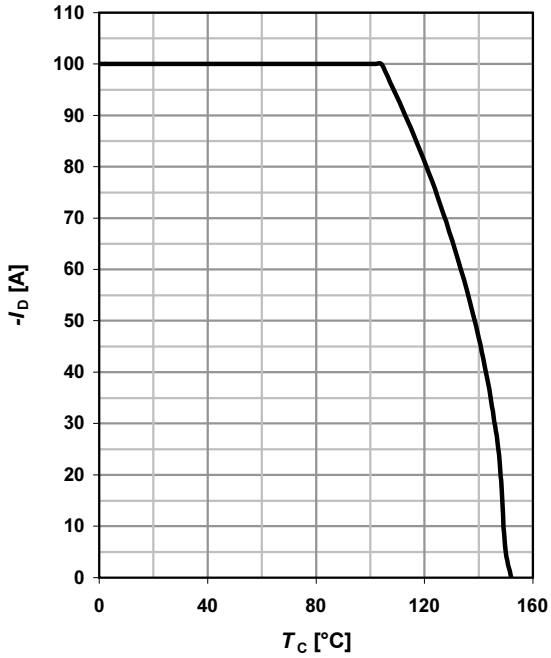
1 Power dissipation

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



2 Drain current

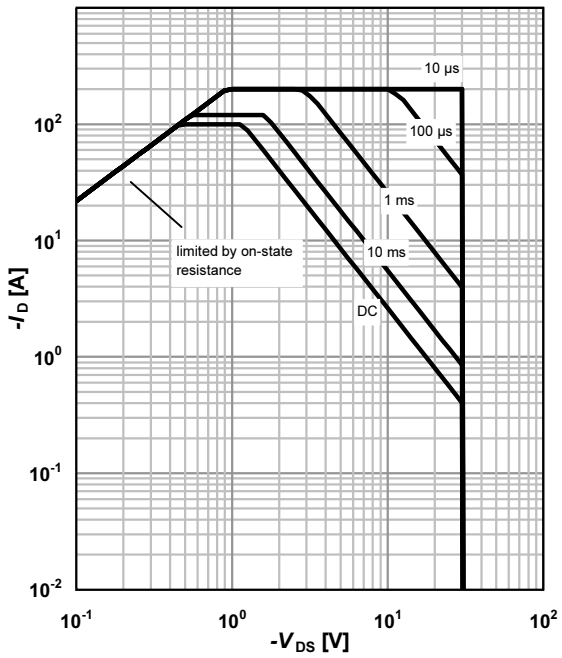
$I_D=f(T_C)$; $|V_{GS}| \geq 10$ V; $t_p \leq 10$ s



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C[1]; $D=0$

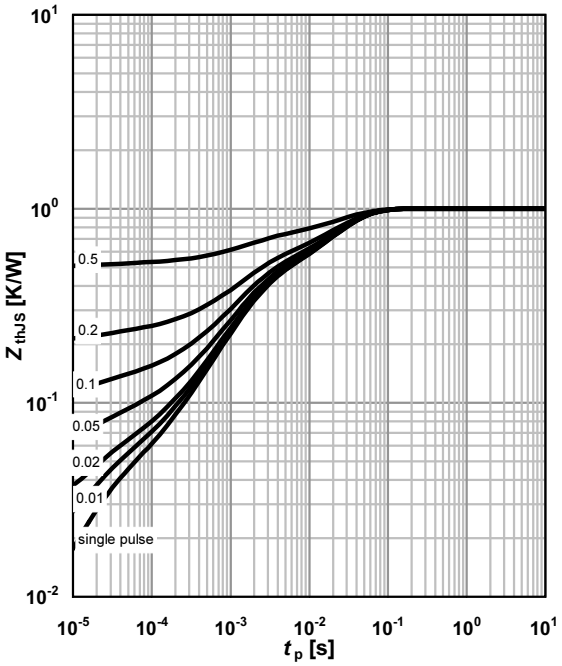
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJS}=f(t_p)$

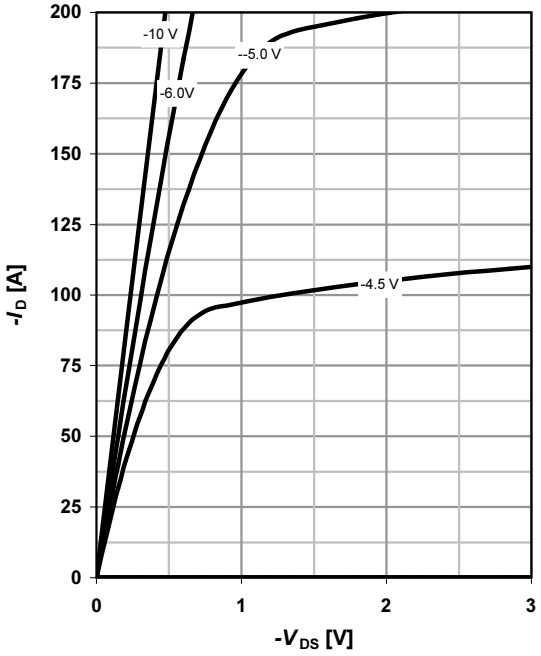
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

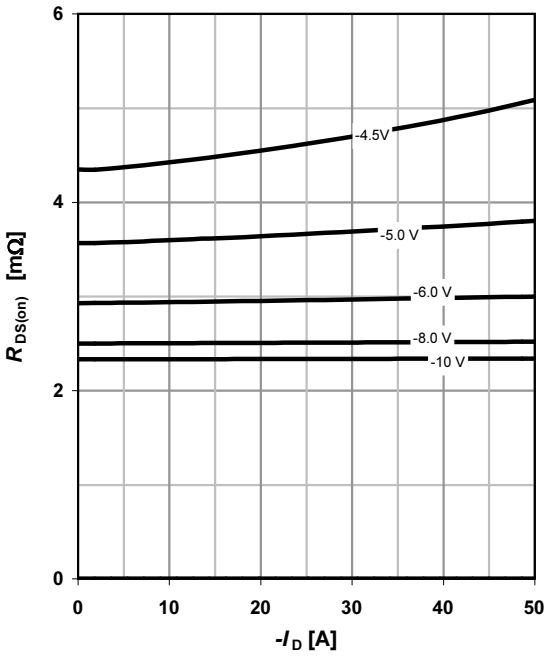
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

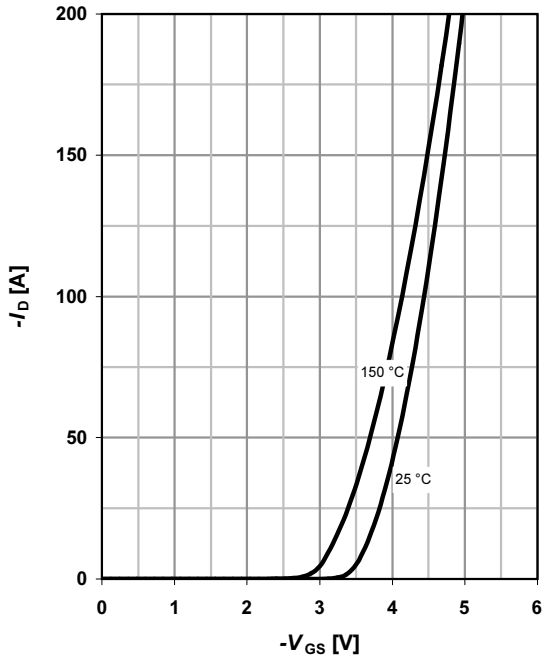
parameter: V_{GS}



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