OptiMOS™2 + OptiMOS™-P 2 Small Signal Transistor

Features

· Complementary P + N channel

· Enhancement mode

· Super Logic level (2.5V rated)

· Common drain

· Avalanche rated

· 175 °C operating temperature

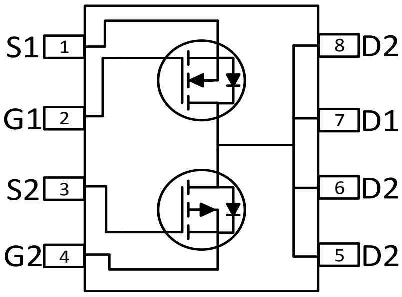
· Qualified according to AEC Q101

· 100% lead-free; RoHS compliant

· Halogen-free according to IEC61246-21

Product Summary

		P	N	
V_{DS}		-20	20	V
$R_{DS(on),max}$	V_{GS}=±4.5 V	150	55	mΩ
	V_{GS}=±2.5 V	310	95	
I_D		-3.2	5.1	A



Type	Package	Marking	Lead Free	Halogen Free	Packing
BSZ215C H	PG-TSDSON-8 LTI	215C	Yes	Yes	Non dry

Maximum ratings, at T_j=25 °C, unless otherwise specified [1)]

Parameter	**Symbol**	**Conditions**	**Value**		**Unit**
			P	**N**	
Continuous drain current	I_D	T_A=25 °C	-3.2	5.1	A
		T_A=100 °C	-2.2	3.6	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	-13	20	
Avalanche energy, single pulse	E_{AS}	P: I_D=-3.2 A, N: I_D=5.1 A, R_{GS}=25 Ω	11	11	mJ
Gate source voltage	V_{GS}		±12		V
Power dissipation	P_{tot} [2)]	T_A=25 °C	2.5		W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175		°C
ESD class		JESD22-A114-HBM	0 (<250V)		
Soldering temperature	T_{solder}		260		°C
IEC climatic category; DIN IEC 68-1			55/175/56		

[1)] Remark: only one of both transistors active

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Thermal characteristics							
Thermal resistance, junction - case	P N	R_{thJC}		-	-	8	K/W
Device on PCB		R_{thJA}	6 cm^2 cooling area[2)]	-	-	60	K/W
Electrical characteristics, at T_j=25 °C, unless otherwise specified							
Static characteristics							
Drain-source breakdown voltage	P	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=-250 µA	-	-	-20	V
	N		V_{GS}=0 V, I_D=250 µA	20	-	-	
Gate threshold voltage	P	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-110 µA	-1.4	-1.0	-0.7	
	N		V_{DS}=V_{GS}, I_D=110 µA	0.8	1.1	1.4	
Zero gate voltage drain current	P	I_{DSS}	V_{DS}=-20 V, V_{GS}=0 V, T_j=25 °C	-	-	-0.1	µA
	N		V_{DS}=20 V, V_{GS}=0 V, T_j=25 °C	-	-	0.1	
	P		V_{DS}=-20 V, V_{GS}=0 V, T_j=175 °C	-	-	-50	
	N		V_{DS}=20 V, V_{GS}=0 V, T_j=175 °C	-	-	50	
Gate-source leakage current	P N	I_{GSS}	V_{GS}=±12 V, V_{DS}=0 V	-	-	±100	nA
Drain-source on-state resistance	P	$R_{DS(on)}$	V_{GS}=-2.5 V, I_D=2.1 A	-	144	310	mΩ
	N		V_{GS}=2.5 V, I_D=1.9 A	-	63	95	
	P		V_{GS}=-4.5 V, I_D=-3.2 A	-	95	150	
	N		V_{GS}=4.5 V, I_D=5.1 A	-	41	55	
Transconductance	P	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-2.2 A	4	7.9	-	S
	N		$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=3.6 A	5.5	11	-	

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

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Dynamic characteristics							
Input capacitance	P	C_{iss}	V_{GS}=0 V, P: V_{DS}=-10 V, N: V_{DS}= 10 V, f=1 MHz	-	300	400	pF
	N			-	315	419	
Output capacitance	P	C_{oss}		-	92	120	
	N			-	114	152	
Reverse transfer capacitance	P	C_{rss}		-	92	140	
	N			-	16	24	
Turn-on delay time	P	$t_{d(on)}$	P: V_{DD}=-10 V, V_{GS}=-4.5 V, R_G=6 Ω, I_D=-3.2 A N: V_{DD}=10 V, V_{GS}=4.5 V, R_G=6 Ω, I_D=5.1 A	-	7.4	-	ns
	N			-	4.9	-	
Rise time	P	t_r		-	3.7	-	
	N			-	2.0	-	
Turn-off delay time	P	$t_{d(off)}$		-	11.3	-	
	N			-	12.2	-	
Fall time	P	t_f		-	4.7	-	
	N			-	1.4	-	
Gate Charge Characteristics							
Gate to source charge	P	Q_{gs}	V_{DD}=-10 V, I_D=-3.2 A, V_{GS}=0 to -4.5 V	-	-0.58	-0.8	nC
Gate to drain charge		Q_{gd}		-	-1.3	-1.7	
Switching charge		Q_g		-	-3.0	-4.6	
Gate plateau voltage		$V_{plateau}$		-	-1.9	-	
Gate to source charge	N	Q_{gs}	V_{DD}=10 V, I_D=5.1 A, V_{GS}=0 to 4.5 V	-	0.7	1.0	
Gate to drain charge		Q_{gd}		-	0.4	-	
Switching charge		Q_g			2.1	2.8	
Gate plateau voltage		$V_{plateau}$			2.3		

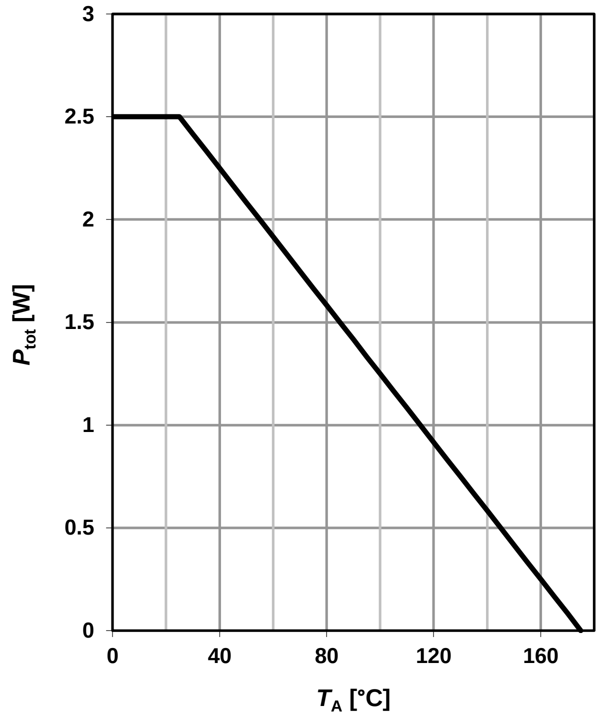
Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	

Reverse Diode

Parameter		Symbol	Conditions	min.	typ.	max.	Unit
Diode continuous forward current	P	I_S	T_C=25 °C	-	-	-2.1	A
	N					2.3	
Diode pulse current	P	$I_{S,pulse}$		-	-	-13	
	N					20	
Diode forward voltage	P	V_{SD}	V_{GS}=0 V, I_F=3.2 A, T_j=25 °C	-	-0.98	-1.2	V
	N		V_{GS}=0 V, I_F=5.1 A, T_j=25 °C	-	0.9	1.2	
Reverse recovery time	P	t_{rr}	V_R=±10 V, I_F=I_S, di_F/dt=100 A/µs		12.2		ns
	N			-	10.9	-	
Reverse recovery charge	P	Q_{rr}			4.6		nC
	N			-	3.4	-	

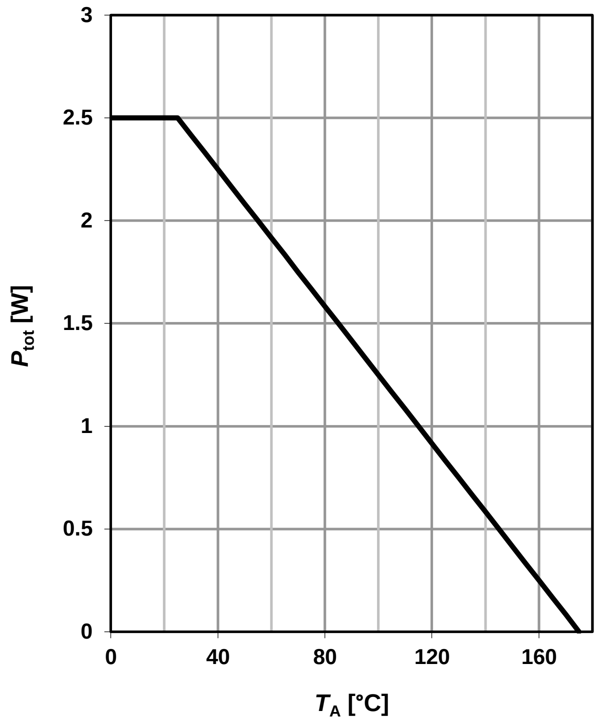
1 Power dissipation (P)

P_{tot}=f(T_A)



2 Power dissipation (N)

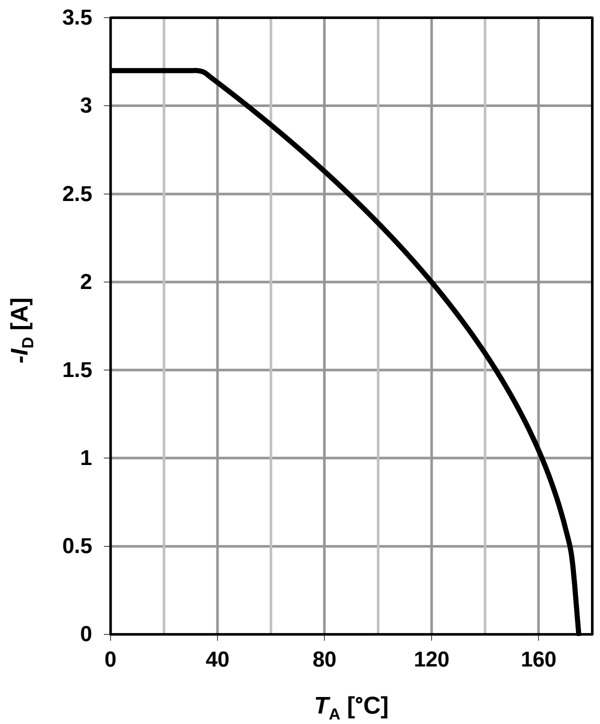
P_{tot}=f(T_A)



3 Drain current (P)

I_D=f(T_A)

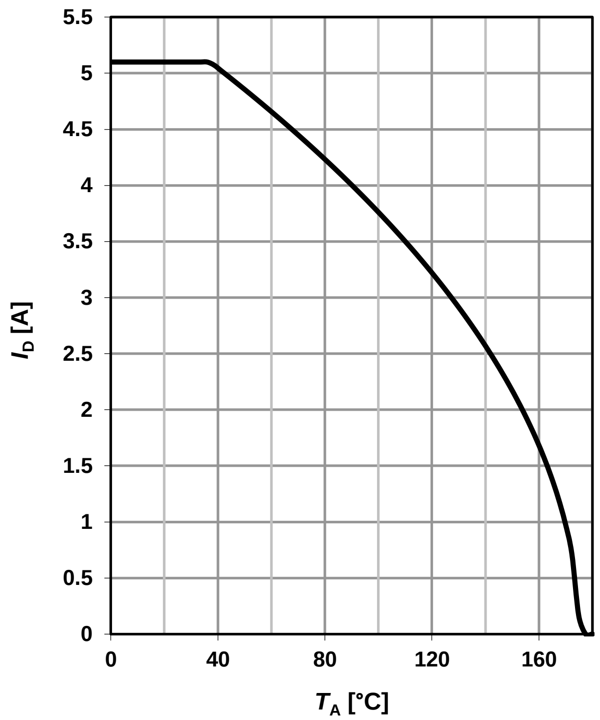
parameter: V_{GS}≤-4.5 V



4 Drain current (N)

I_D=f(T_A)

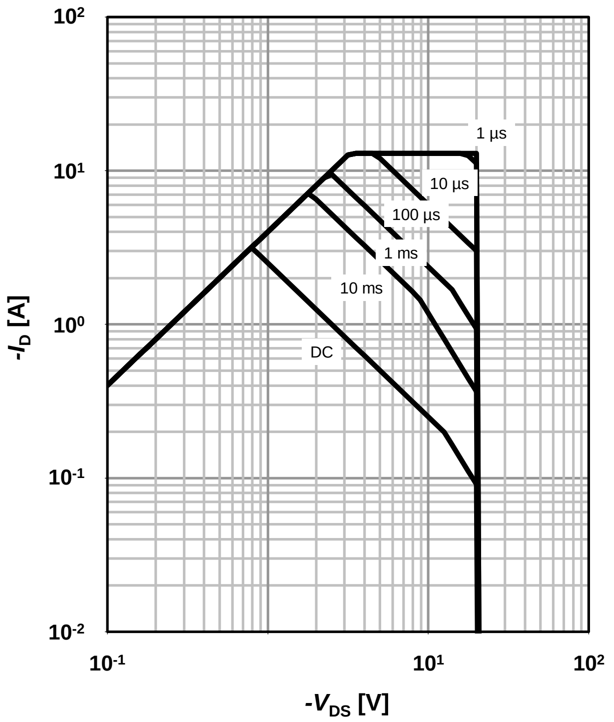
parameter: V_{GS}≥4.5 V



5 Safe operating area (P)

I_D=f(V_{DS}); T_A=25 °C; D=0

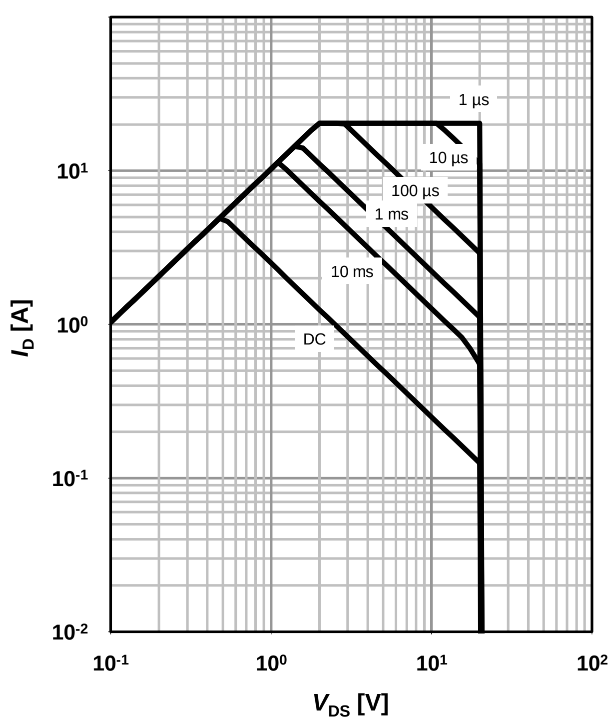
parameter: t_p



6 Safe operating area (N)

I_D=f(V_{DS}); T_A=25 °C; D=0

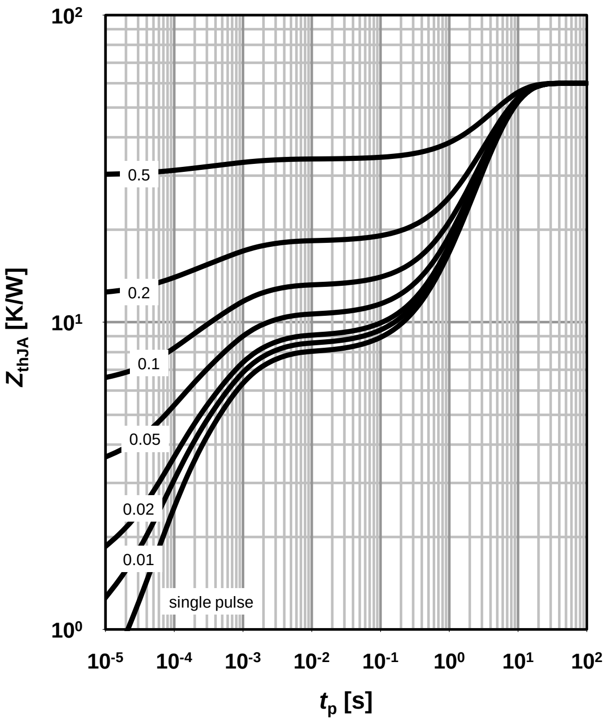
parameter: t_p



7 Max. transient thermal impedance (P)

Z_{thJA}=f(t_p)

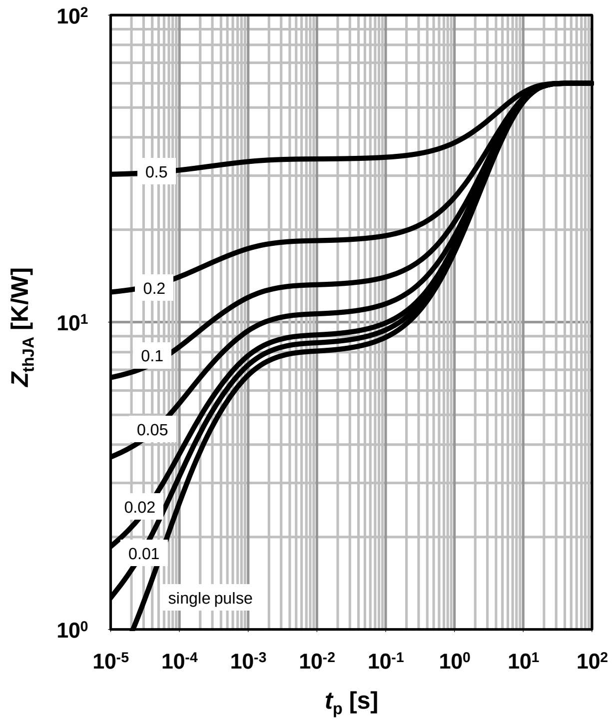
parameter: D=t_p/T



8 Max. transient thermal impedance (N)

Z_{thJA}=f(t_p)

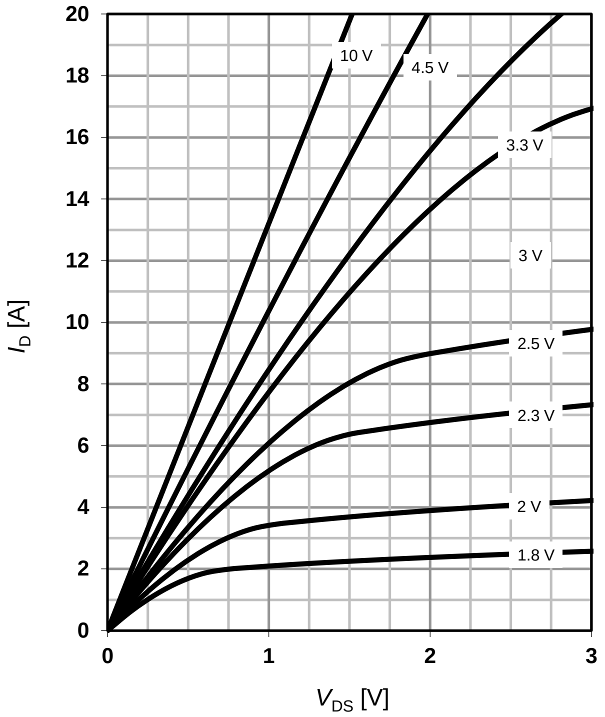
parameter: D=t_p/T



9 Typ. output characteristics (P)

I_D=f(V_{DS}); T_j=25 °C

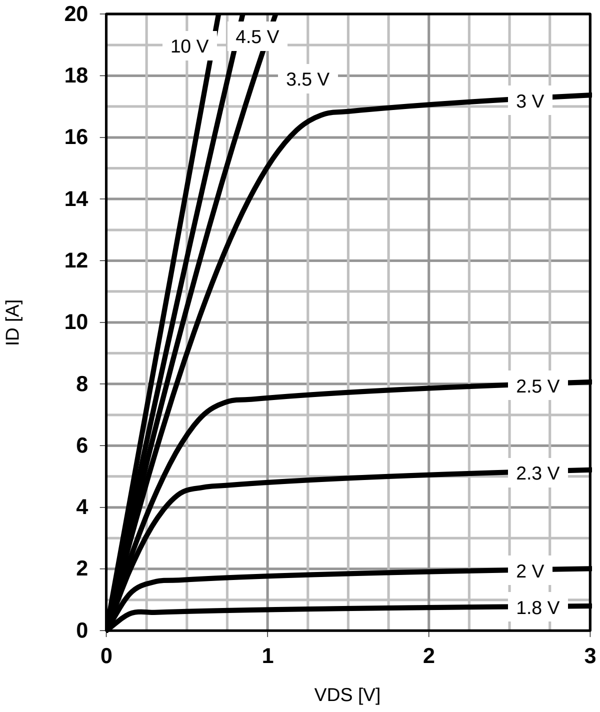
parameter: V_{GS}



10 Typ. output characteristics (N)

I_D=f(V_{DS}); T_j=25 °C

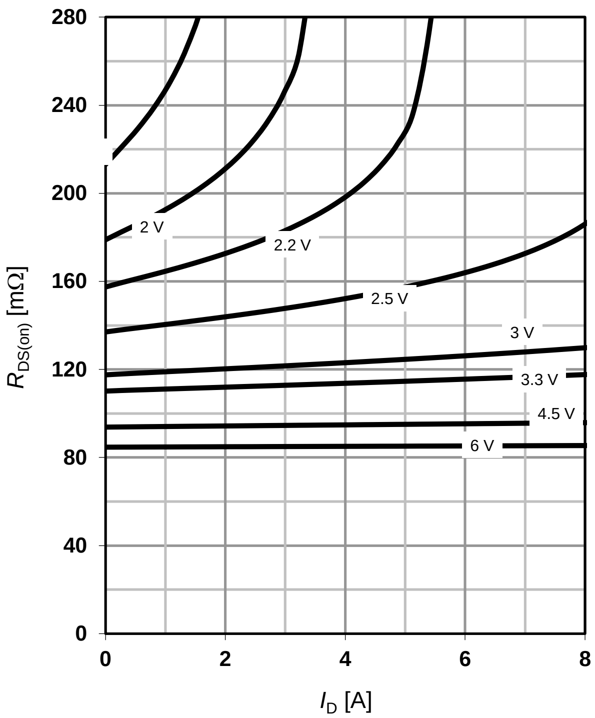
parameter: V_{GS}



11 Typ. drain-source on resistance (P)

$R_{DS(on)}$=f(I_D); T_j=25 °C

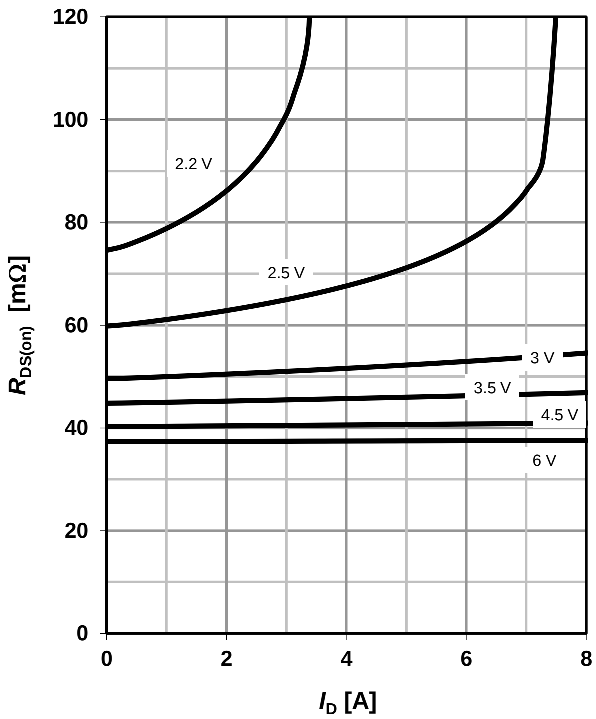
parameter: V_{GS}



12 Typ. drain-source on resistance (N)

$R_{DS(on)}$=f(I_D); T_j=25 °C

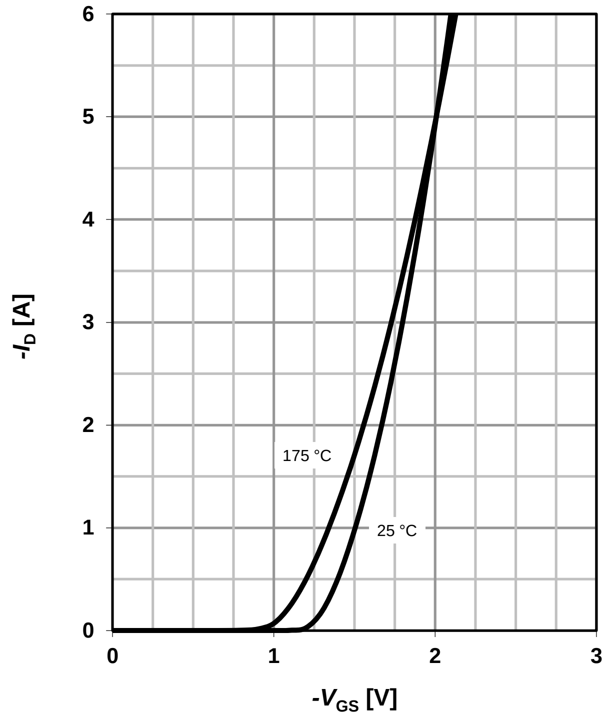
parameter: V_{GS}



13 Typ. transfer characteristics (P)

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

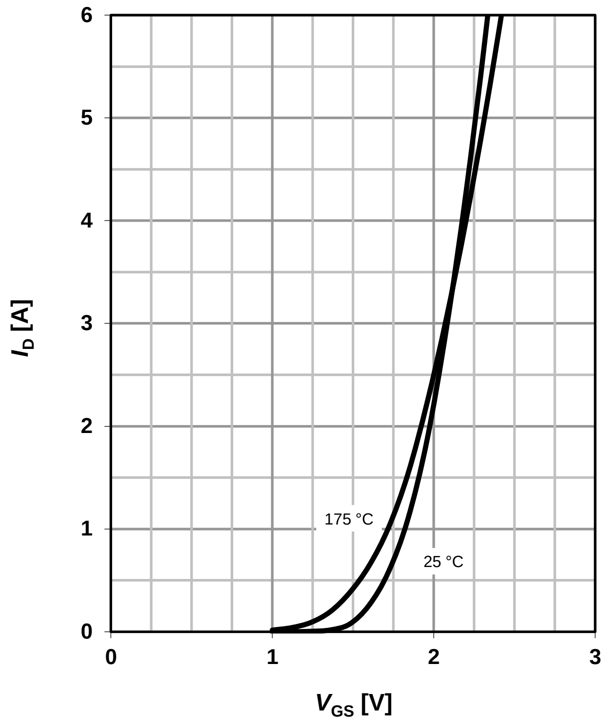
parameter: T_j



14 Typ. transfer characteristics (N)

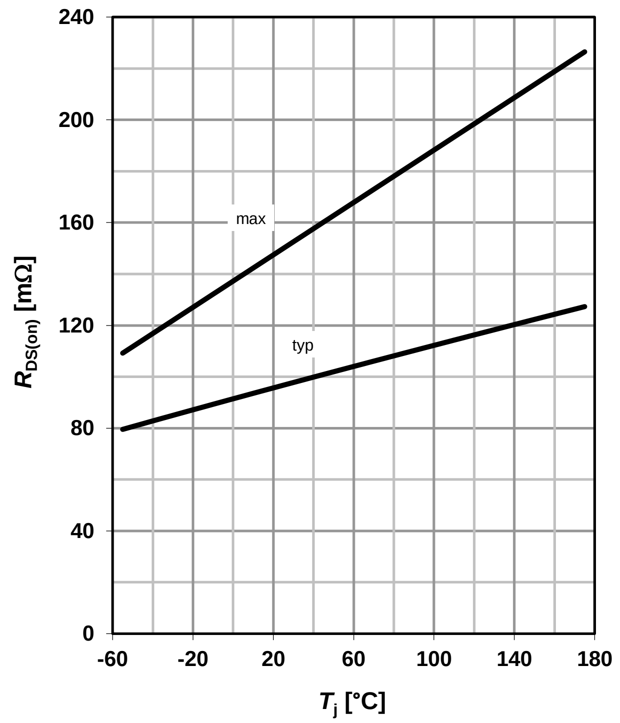
I_D=f(V_{GS}); $|V_{DS}|$>2 | I_D | $R_{DS(on)max}$

parameter: T_j



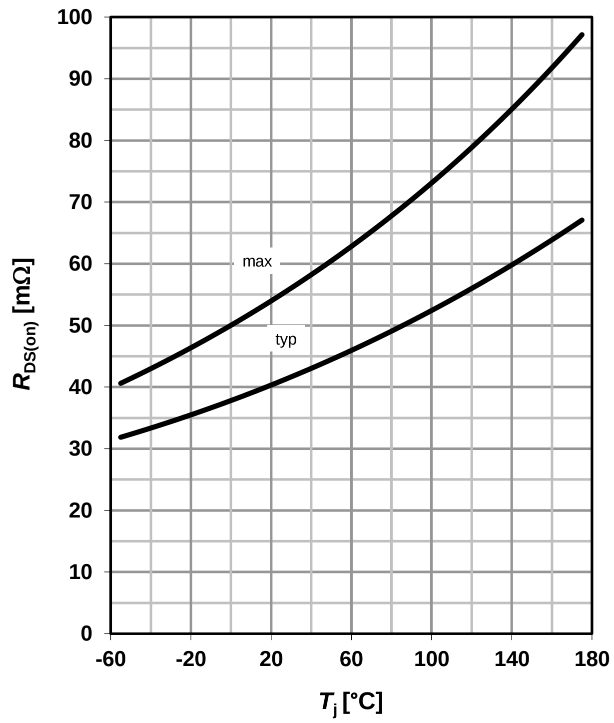
15 Drain-source on-state resistance (P)

$R_{DS(on)}$=f(T_j); I_D=-3.2 A; V_{GS}=-4.5 V



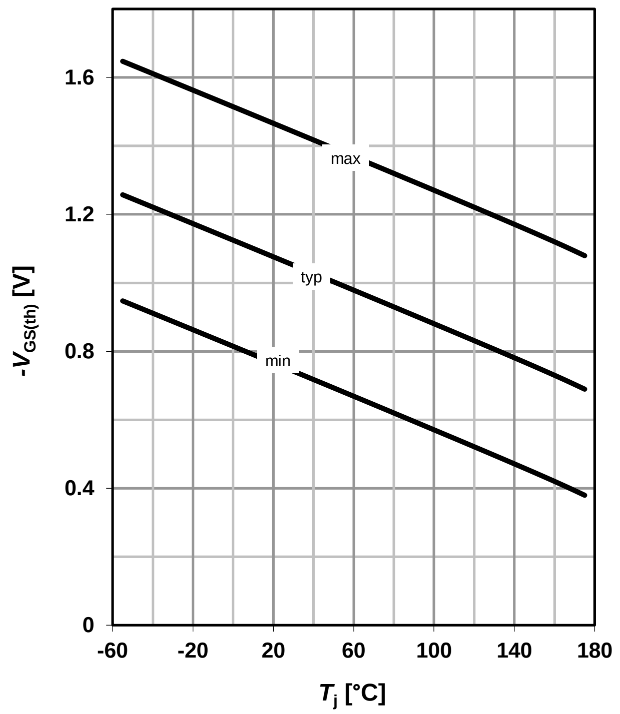
16 Drain-source on-state resistance (N)

$R_{DS(on)}$=f(T_j); I_D=5.1A; V_{GS}=4.5 V



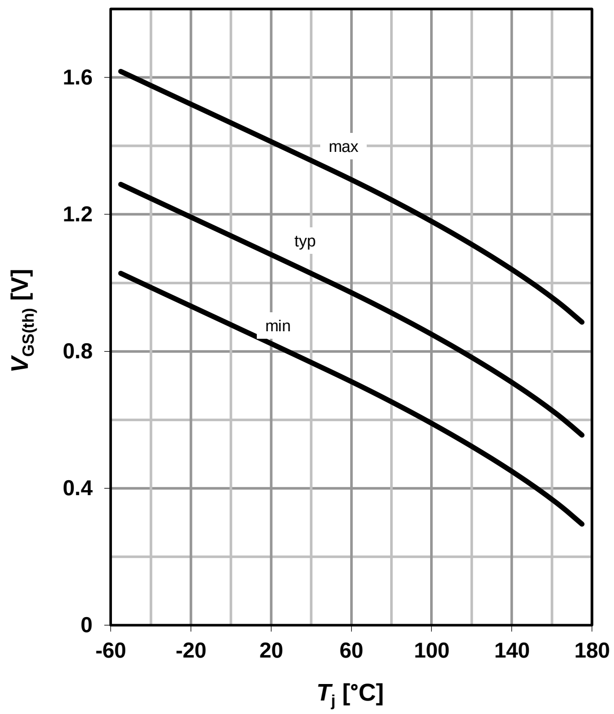
17 Typ. gate threshold voltage (P)

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=-110 µA



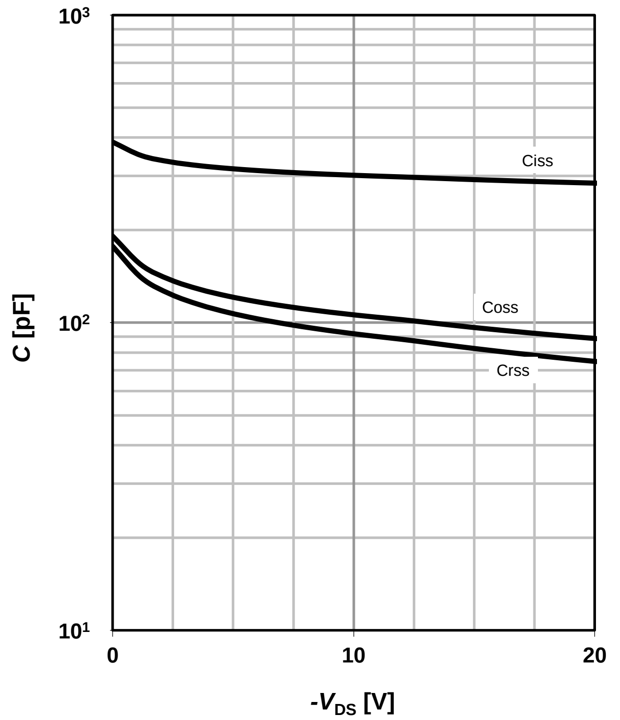
18 Typ. gate threshold voltage (N)

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=110 µA



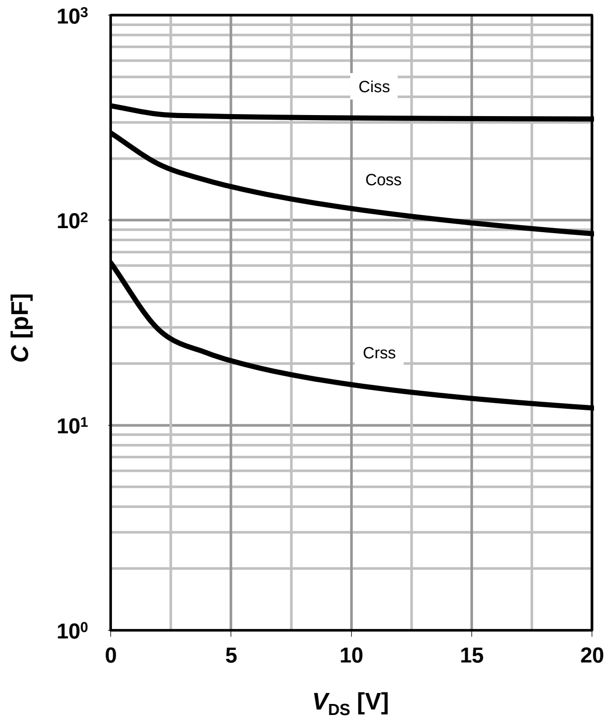
19 Typ. capacitances (P)

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



20 Typ. capacitances (N)

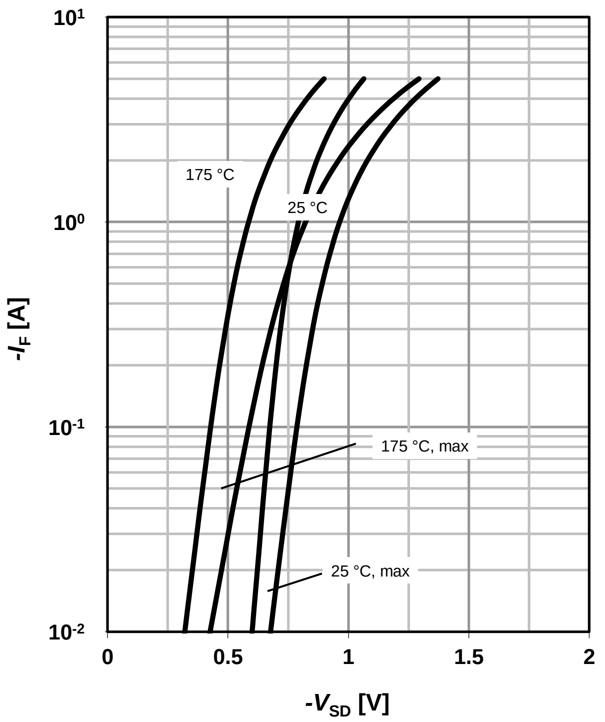
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



21 Forward characteristics of reverse diode (P)

$I_F = f(V_{SD})$

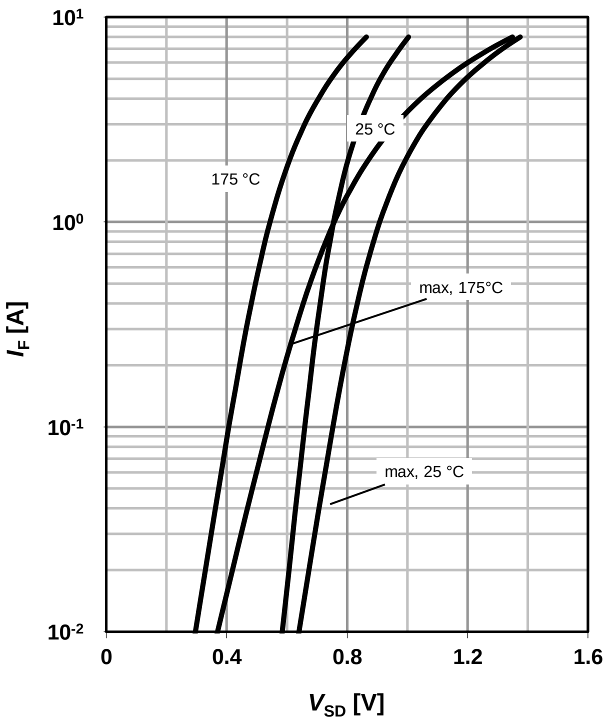
parameter: T_j



22 Forward characteristics of reverse diode (N)

$I_F = f(V_{SD})$

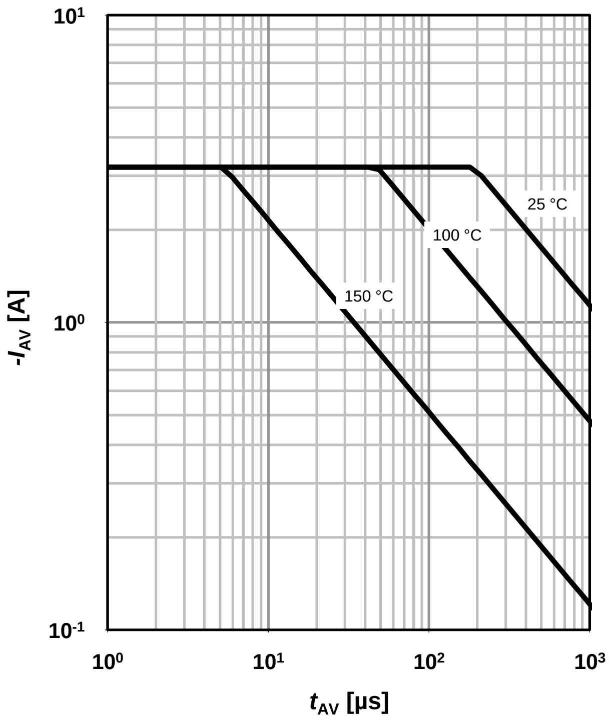
parameter: T_j



23 Avalanche characteristics (P)

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

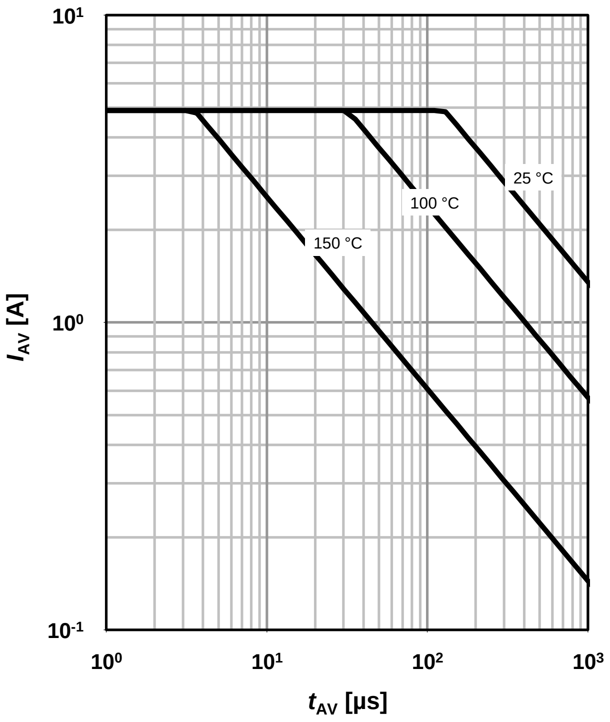
parameter: $T_{j(start)}$



24 Avalanche characteristics (N)

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

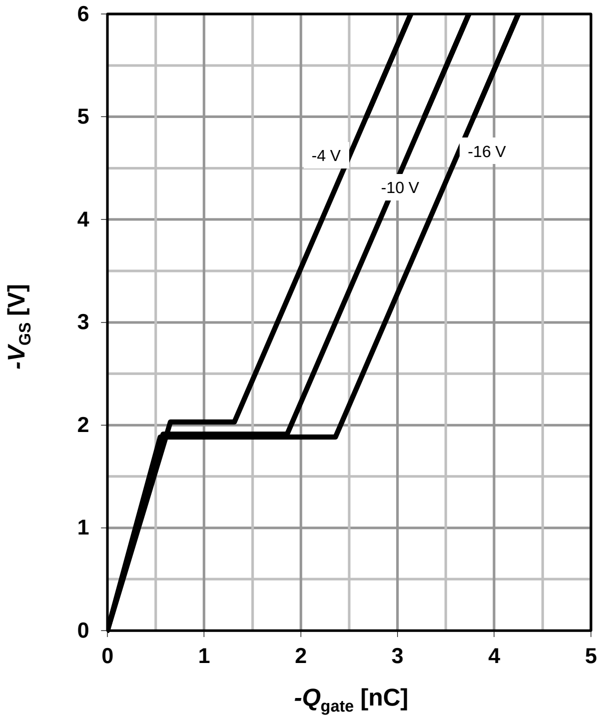
parameter: $T_{j(start)}$



25 Typ. gate charge (P)

V_{GS}=f(Q_{gate}); I_D=-3.2A pulsed

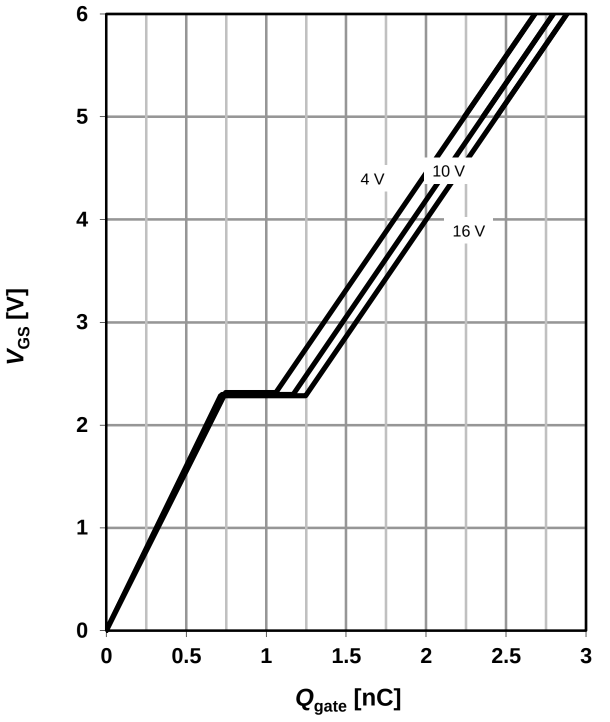
parameter: V_{DD}



26 Typ. gate charge (N)

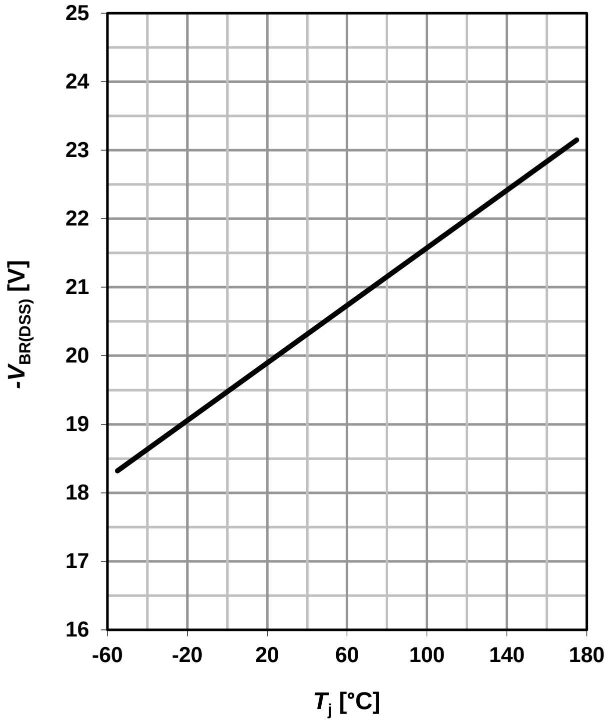
V_{GS}=f(Q_{gate}); I_D=5.1A pulsed

parameter: V_{DD}



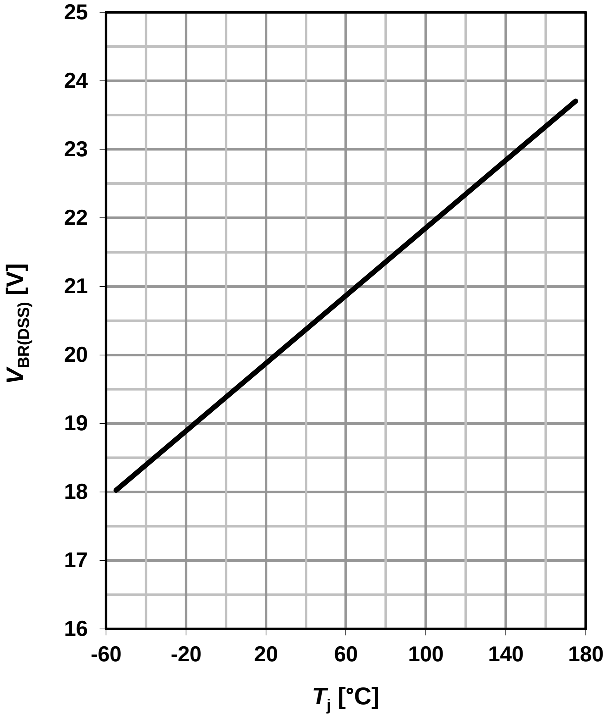
27 Drain-source breakdown voltage (P)

$V_{BR(DSS)}$=f(T_j); I_D=-250 µA



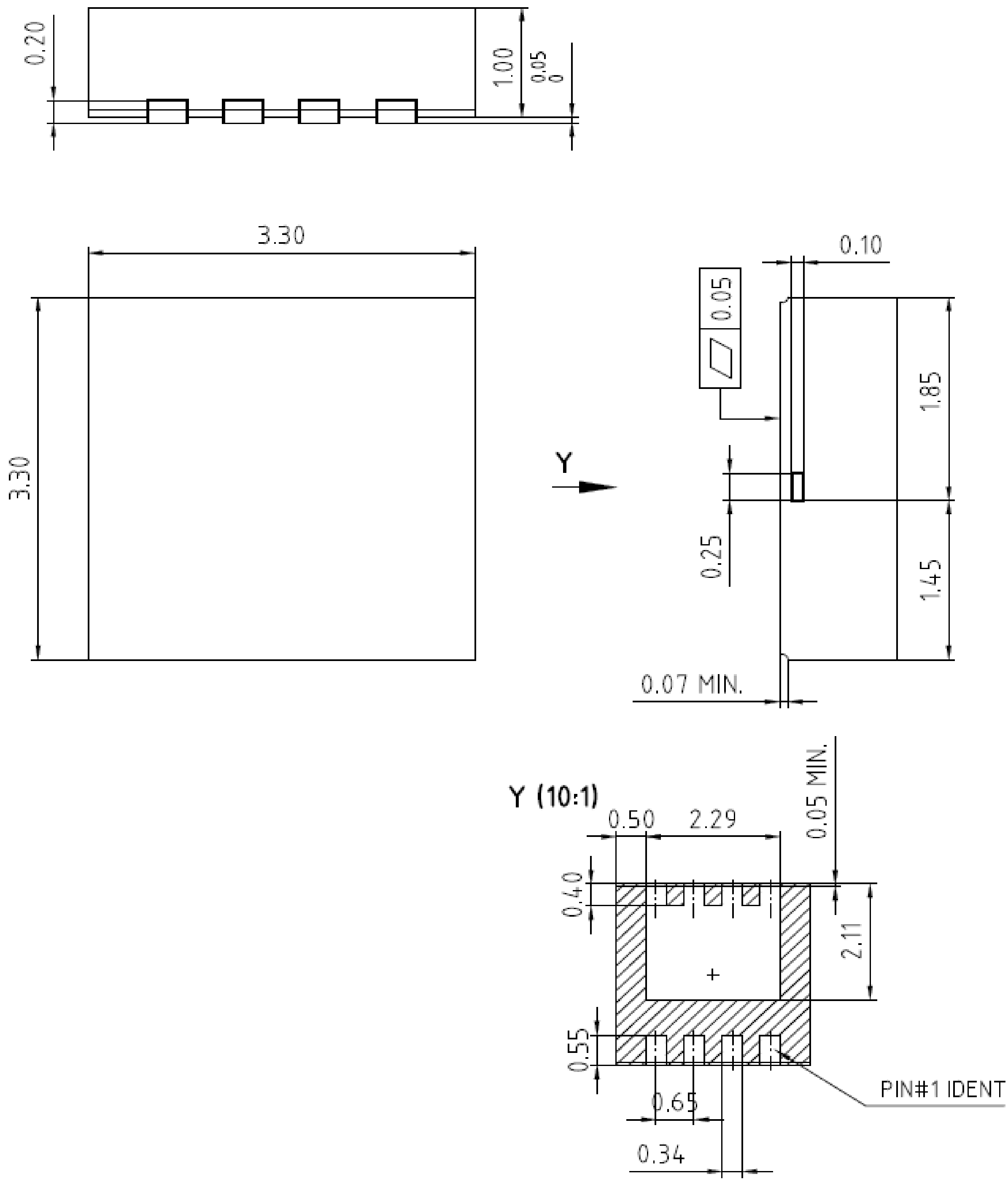
28 Drain-source breakdown voltage (N)

$V_{BR(DSS)}$=f(T_j); I_D=250 µA



Package Outline **PG-TSDSON-8LTI**

PG-TSDSON-8LTI : Outline



Dimensions in mm

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