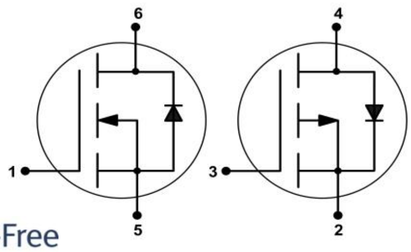
OptiMOS™ 2 + OptiMOS™-P 2 Small Signal Transistor

Product Summary

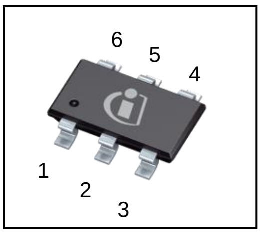
		P	N	
V_{DS}		-30	30	V
$R_{DS(on),max}$	V_{GS}=±10 V	150	160	mΩ
	V_{GS}=±4.5 V	270	280	
I_D		-1.5	1.4	A

Features

- Complementary P + N channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen free according to IEC61249-2-21



PG-TSOP6



Type	Package	Tape and Reel Information	Marking	Lead Free	Packing
BSL316C	PG-TSOP-6	H6327: 3000 pcs / reel	sPJ	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	-1.5	1.4	A
		T_A=70 °C	-1.2	1.1	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	-6.0	5.6	
Avalanche energy, single pulse	E_{AS}	P: I_D=-1.5 A, N: I_D=1.4 A, R_{GS}=25 Ω	11	3.7	mJ
Gate source voltage	V_{GS}		±20		V
Power dissipation[1)]	P_{tot}	T_A=25 °C	0.5		W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150		°C
ESD class		JESD22-A114-HBM	0 (<250V)		
Soldering temperature	T_{solder}		260		°C
IEC climatic category; DIN IEC 68-1			55/150/56		

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

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Thermal characteristics							
Thermal resistance, junction - ambient[1]	P N	R_{thJA}	minimal footprint [2]	-	-	250	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	-	-	-30	V
	N		V_{GS}=0 V, I_D=250 µA	30	-	-	
Gate threshold voltage	P	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-11 µA	-2	-1.5	-1	
	N		V_{DS}=V_{GS}, I_D=3.7 µA	1.2	1.6	2	
Zero gate voltage drain current	P	I_{DSS}	V_{DS}=-30 V, V_{GS}=0 V, T_j=25 °C	-	-	-1	µA
	N		V_{DS}=30 V, V_{GS}=0 V, T_j=25 °C	-	-	1	
	P		V_{DS}=-30 V, V_{GS}=0 V, T_j=150 °C	-	-	-100	
	N		V_{DS}=30 V, V_{GS}=0 V, T_j=150 °C	-	-	100	
Gate-source leakage current	P N	I_{GSS}	V_{GS}=±20 V, V_{DS}=0 V	-	-	±100	nA
Drain-source on-state resistance	P	$R_{DS(on)}$	V_{GS}=-4.5 V, I_D=-1.1 A	-	177	270	mΩ
	N		V_{GS}=4.5 V, I_D=-1.1 A	-	191	280	
	P		V_{GS}=-10 V, I_D=-1.5 A	-	113	150	
	N		V_{GS}=10 V, I_D=1.4 A	-	119	160	
Transconductance	P	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-1.18 A	-	2.7	-	S
	N		$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=1.1 A	-	2.3	-	

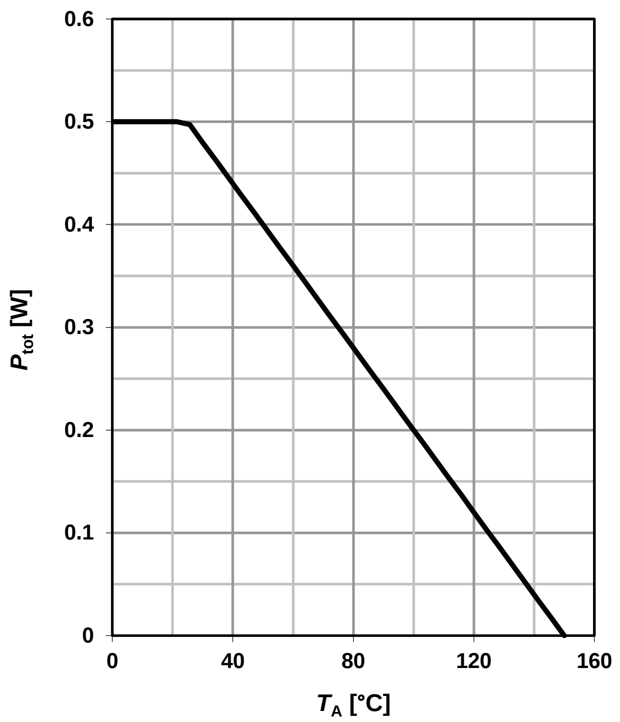
[2] Performed on 40mm^2 FR4 PCB. The traces are 1mm wide, 70µm thick and 20mm long; they are present on both sides of the PCB

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Dynamic characteristics							
Input capacitance	P	C_{iss}	V_{GS}=0 V, P: V_{DS}=-15 V, N: V_{DS}= 15 V, f=1 MHz	-	212	282	pF
	N			-	71	94	
Output capacitance	P	C_{oss}		-	69	91	
	N			-	26	35	
Reverse transfer capacitance	P	C_{rss}		-	56	84	
	N			-	5	7	
Turn-on delay time	P	$t_{d(on)}$	P: V_{DD}=-15 V, V_{GS}=-10 V, R_G=6 Ω, I_D=-1.5 A N: V_{DD}=15 V, V_{GS}=10 V, R_G=6 Ω, I_D=1.4 A	-	5.0	-	ns
	N			-	3.4	-	
Rise time	P	t_r		-	6.5	-	
	N			-	2.3	-	
Turn-off delay time	P	$t_{d(off)}$		-	14.3	-	
	N			-	5.8	-	
Fall time	P	t_f		-	7.5	-	
	N			-	1.0	-	
Gate Charge Characteristics							
Gate to source charge	P	Q_{gs}	V_{DD}=-15 V, I_D=-1.5 A, V_{GS}=0 to -5 V	-	-0.6	-	nC
Gate to drain charge		Q_{gd}		-	-1.2	-	
Switching charge		Q_g		-	-2.4	-	
Gate plateau voltage		$V_{plateau}$		-	-2.9	-	
Gate to source charge	N	Q_{gs}	V_{DD}=15 V, I_D=1.4 A, V_{GS}=0 to 5 V	-	0.3	-	
Gate to drain charge		Q_{gd}		-	0.2	-	
Switching charge		Q_g			0.6	-	
Gate plateau voltage		$V_{plateau}$		-	3.4	-	

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Reverse Diode							
Diode continuous forward current	P	I_S	T_C=25 °C	-	-	-0.5	A
	N			-	-	0.5	
Diode pulse current	P	$I_{S,pulse}$		-	-	-6.0	
	N			-	-	5.6	
Diode forward voltage	P	V_{SD}	V_{GS}=0 V, I_F=-1.5 A, T_j=25 °C	-	-0.8	-1.1	V
	N		V_{GS}=0 V, I_F=1.4 A, T_j=25 °C	-	0.86	1.1	
Reverse recovery time	P	t_{rr}	V_R=±15 V, I_F=I_S, di_F/dt=100 A/µs	-	8.2	-	ns
	N			-	9.1	-	
Reverse recovery charge	P	Q_{rr}		-	2.1	-	nC
	N			-	2.6	-	

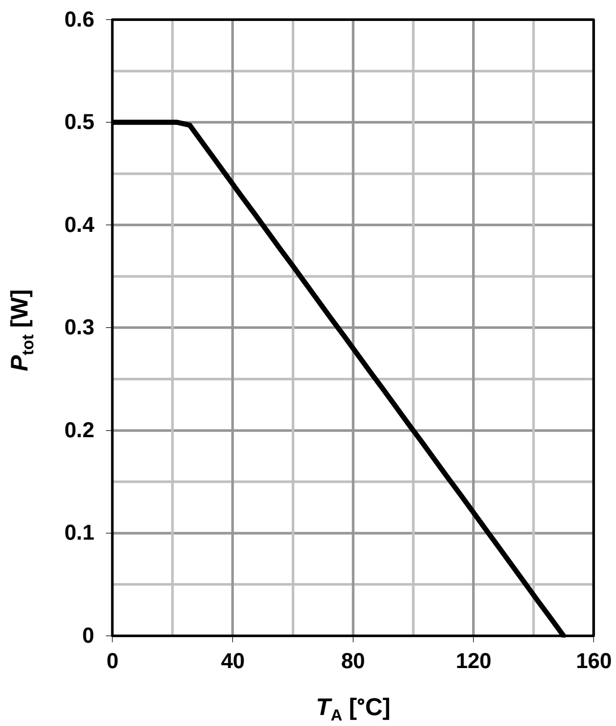
1 Power dissipation (P)

P_{tot}=f(T_A)



2 Power dissipation (N)

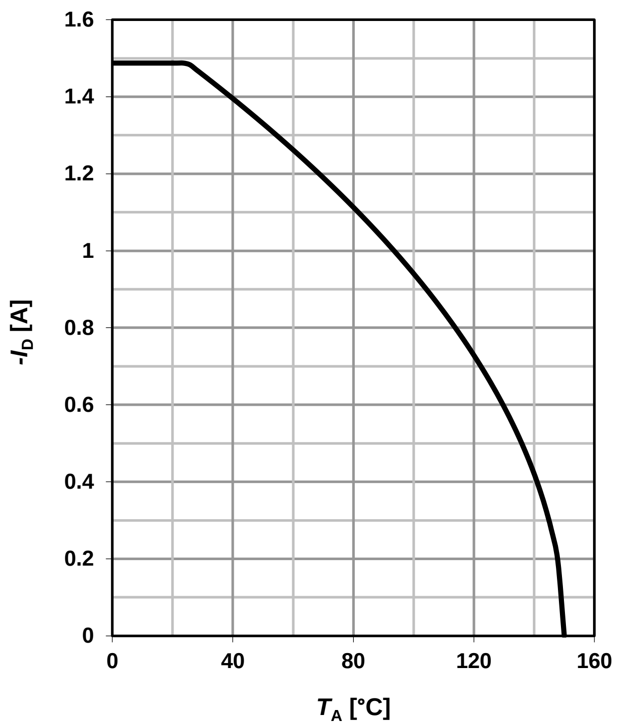
P_{tot}=f(T_A)



3 Drain current (P)

I_D=f(T_A)

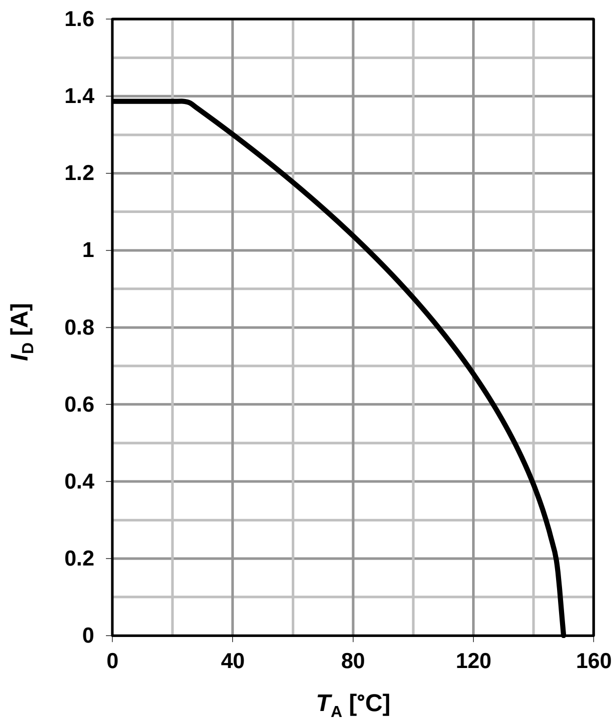
parameter: V_{GS}≤-10 V



4 Drain current (N)

I_D=f(T_A)

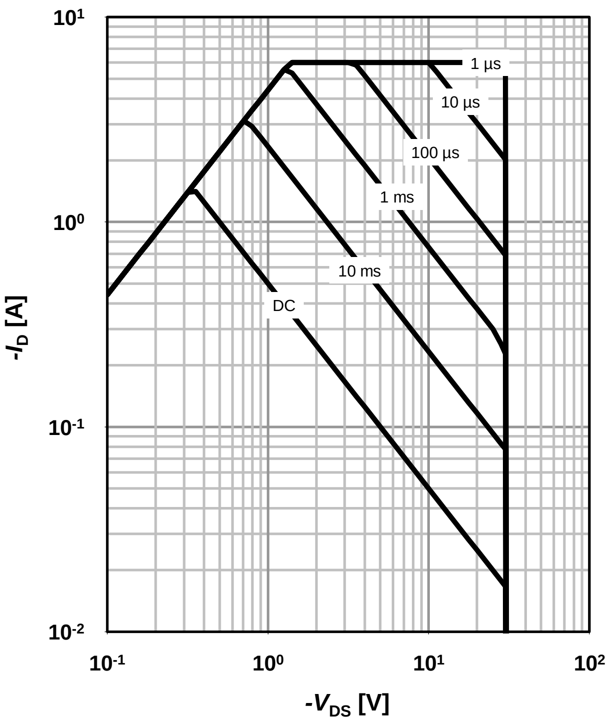
parameter: V_{GS}≥10 V



5 Safe operating area (P)

I_D=f(V_{DS}); T_A=25 °C; D=0

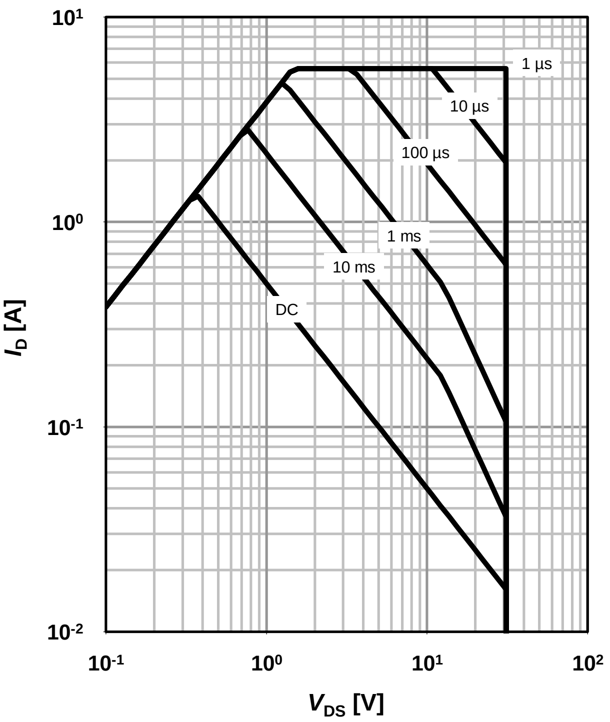
parameter: t_p



6 Safe operating area (N)

I_D=f(V_{DS}); T_A=25 °C; D=0

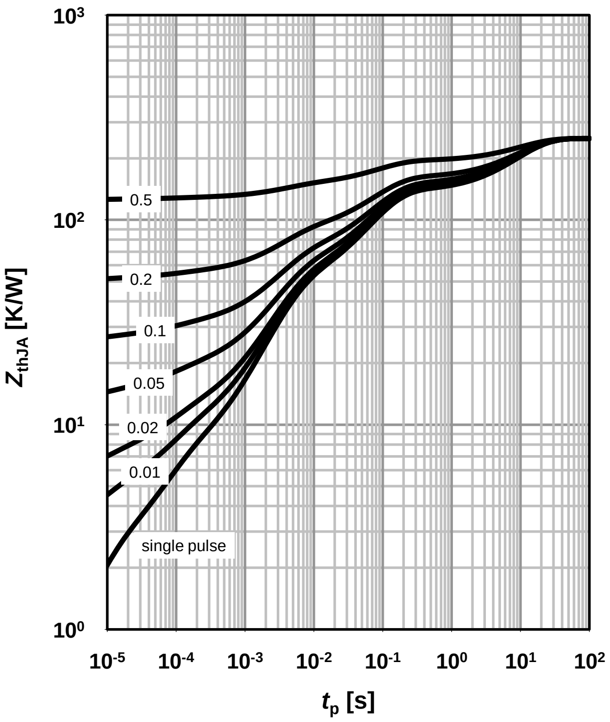
parameter: t_p



7 Max. transient thermal impedance (P)

Z_{thJA}=f(t_p)

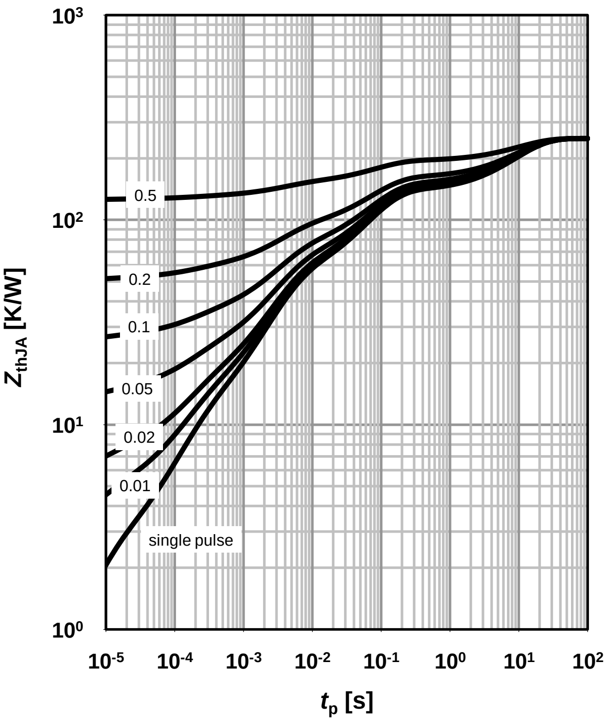
parameter: $D=t_p/T$



8 Max. transient thermal impedance (N)

Z_{thJA}=f(t_p)

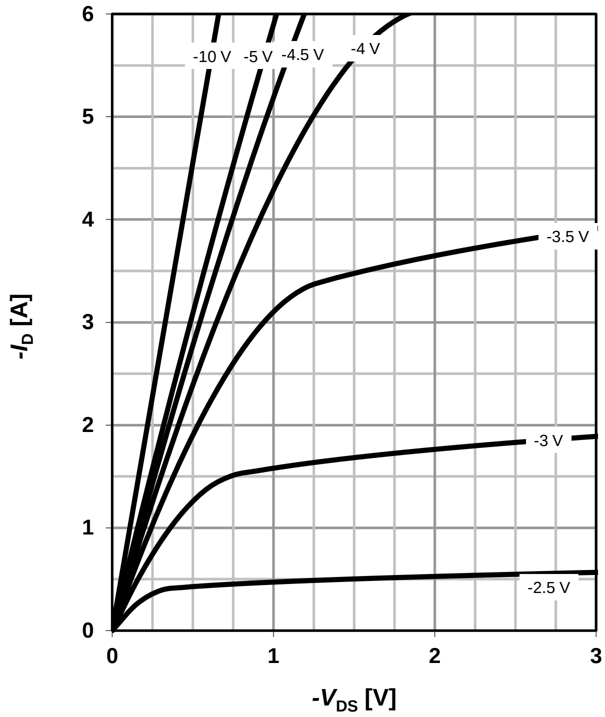
parameter: $D=t_p/T$



9 Typ. output characteristics (P)

I_D=f(V_{DS}); T_j=25 °C

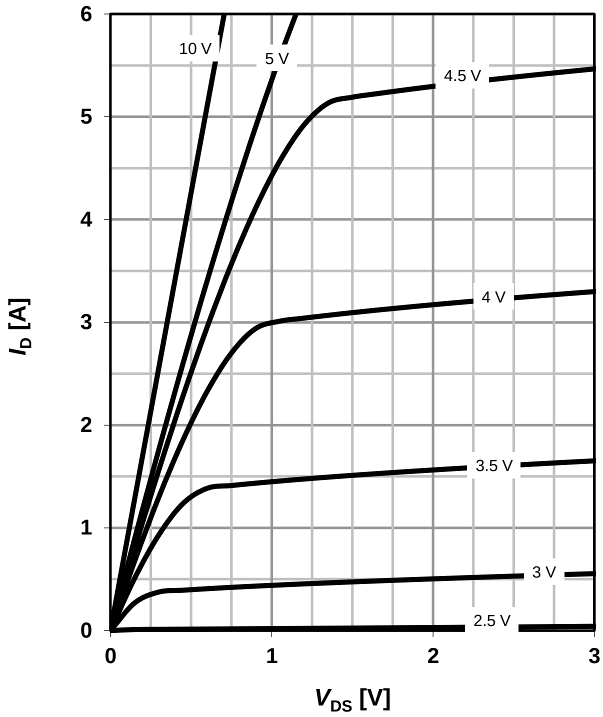
parameter: V_{GS}



10 Typ. output characteristics (N)

I_D=f(V_{DS}); T_j=25 °C

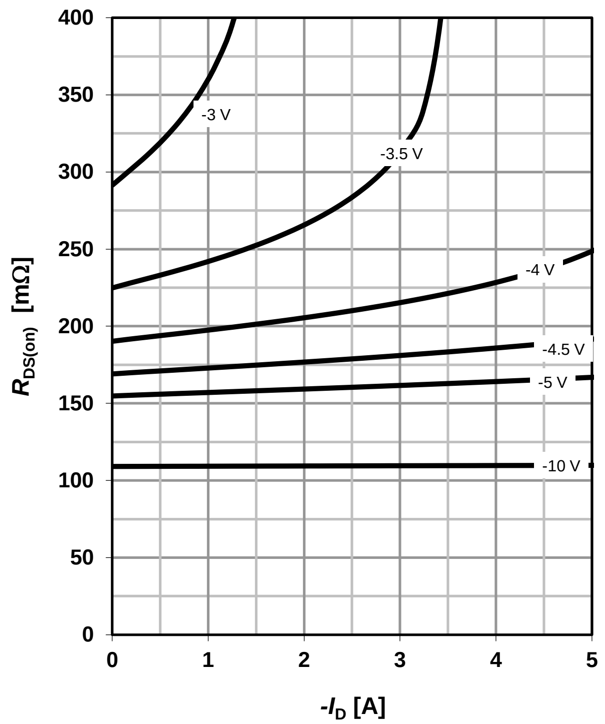
parameter: V_{GS}



11 Typ. drain-source on resistance (P)

$R_{DS(on)}$=f(I_D); T_j=25 °C

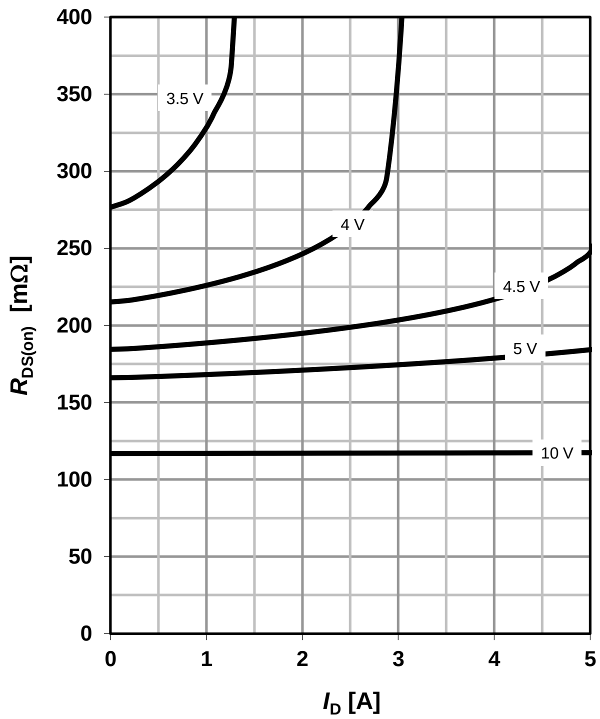
parameter: V_{GS}



12 Typ. drain-source on resistance (N)

$R_{DS(on)}$=f(I_D); T_j=25 °C

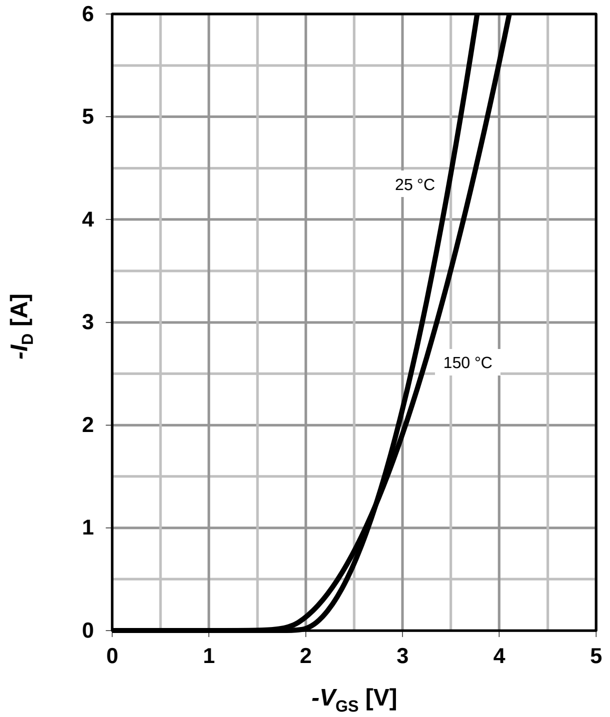
parameter: V_{GS}



13 Typ. transfer characteristics (P)

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

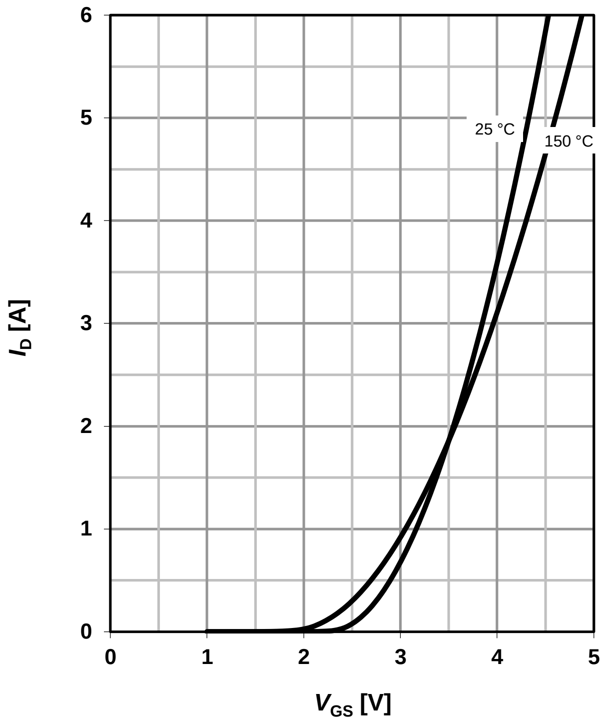
parameter: T_j



14 Typ. transfer characteristics (N)

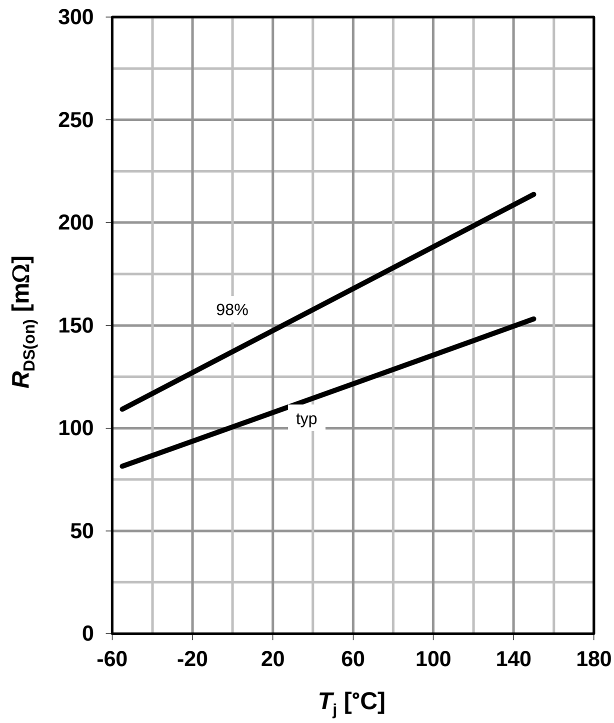
I_D=f(V_{GS}); |V_{DS} |>2 | I_D | $R_{DS(on)max}$

parameter: T_j



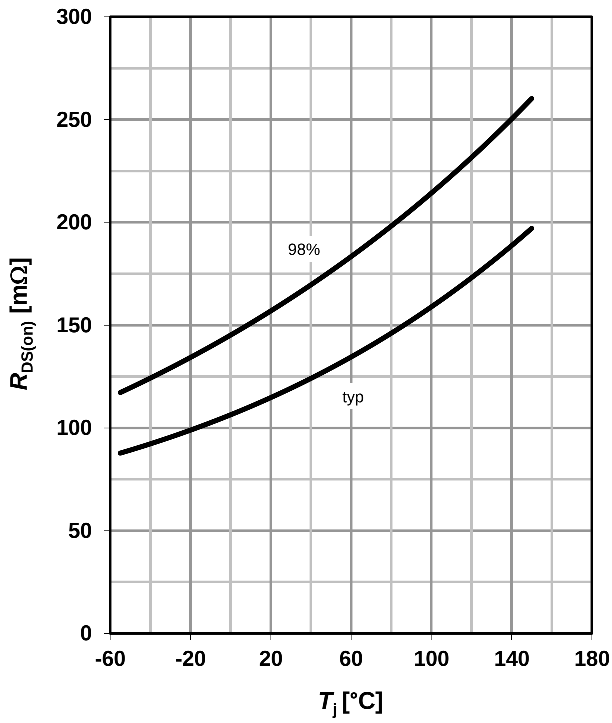
15 Drain-source on-state resistance (P)

$R_{DS(on)}$=f(T_j); I_D=-1.5 A; V_{GS}=-10 V



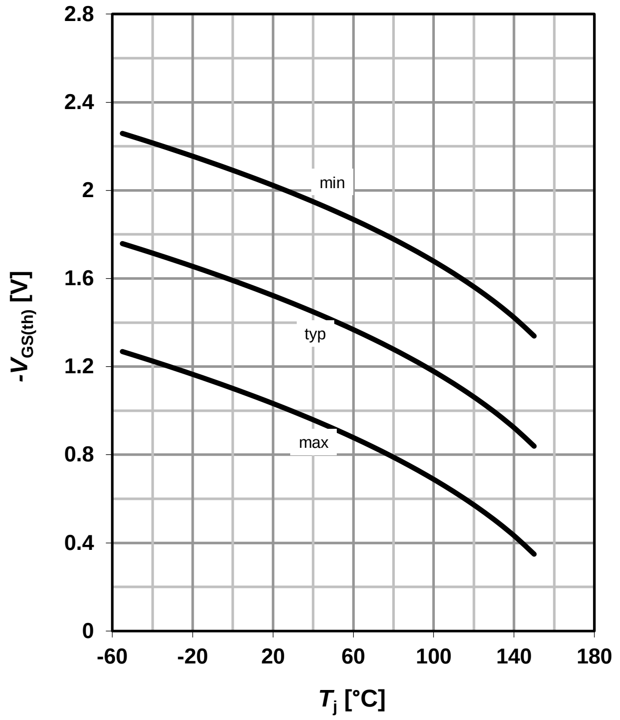
16 Drain-source on-state resistance (N)

$R_{DS(on)}$=f(T_j); I_D=1.4 A; V_{GS}=10 V



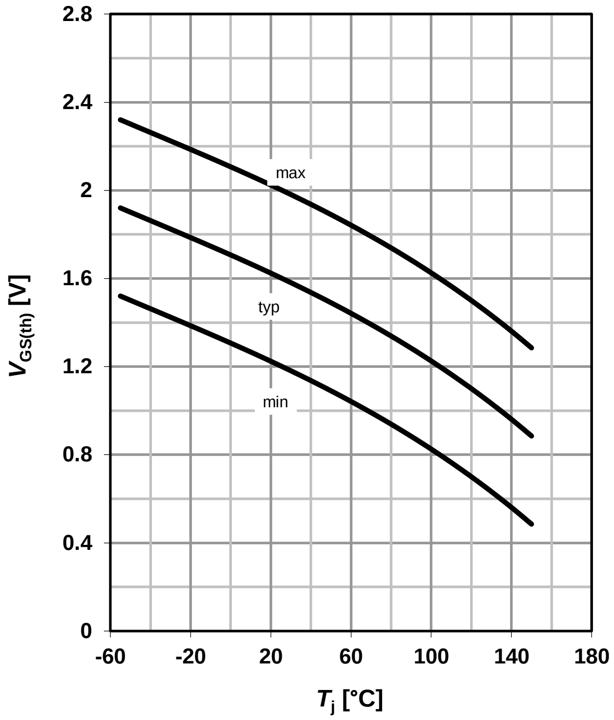
17 Typ. gate threshold voltage (P)

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=-11 µA



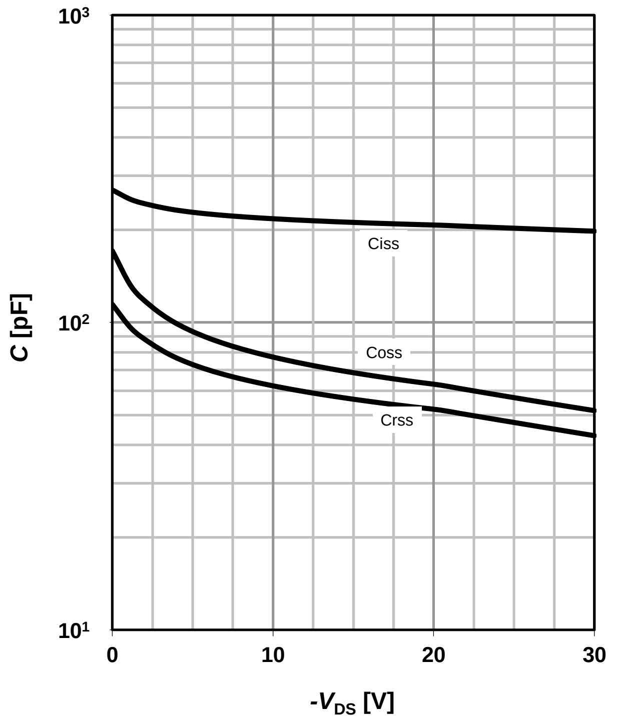
18 Typ. gate threshold voltage (N)

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=3.7 µA



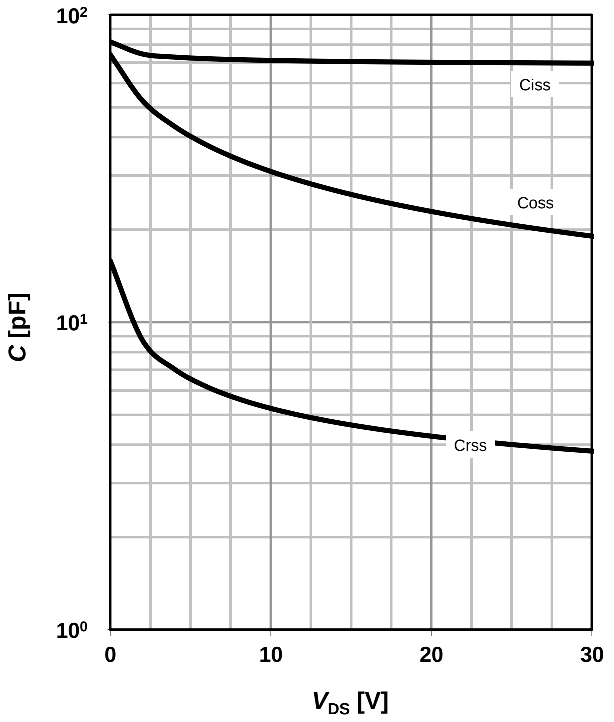
19 Typ. capacitances (P)

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



20 Typ. capacitances (N)

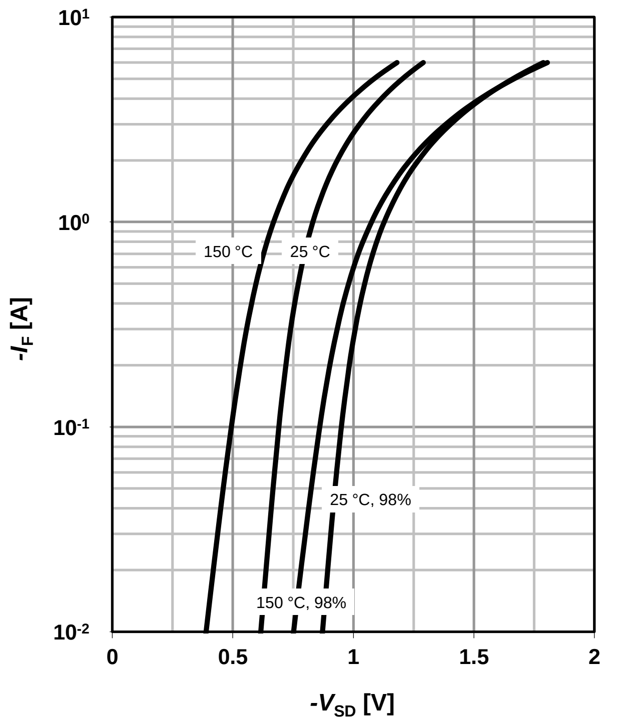
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



21 Forward characteristics of reverse diode (P)

$I_F = f(V_{SD})$

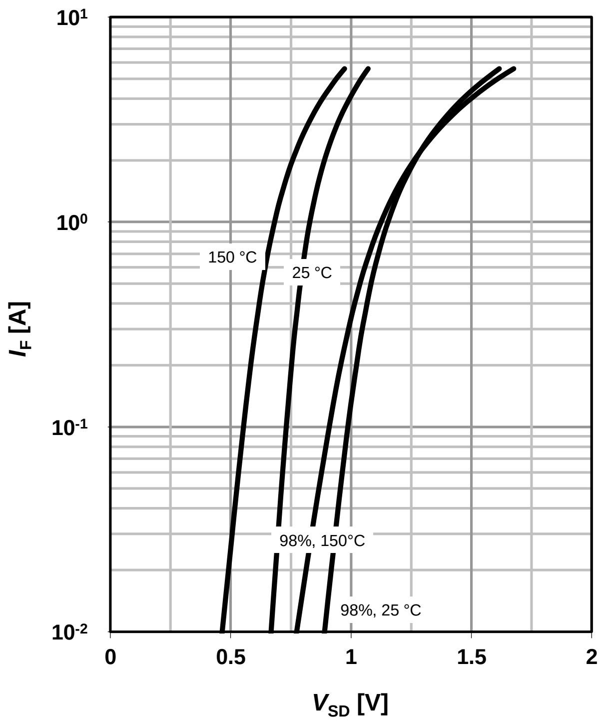
parameter: T_j



22 Forward characteristics of reverse diode (N)

$I_F = f(V_{SD})$

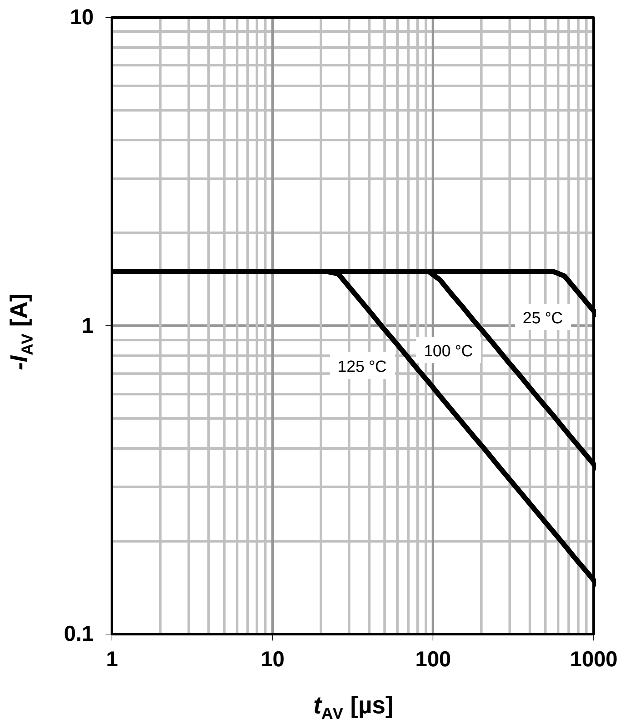
parameter: T_j



23 Avalanche characteristics (P)

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

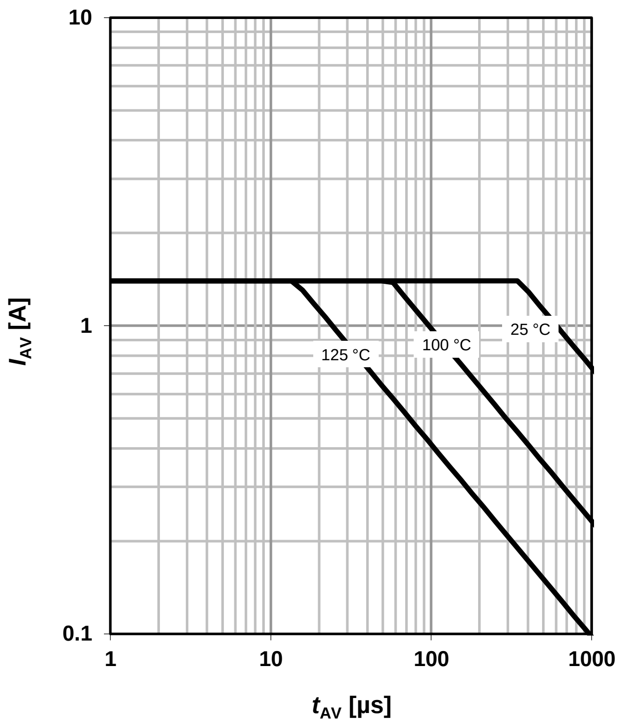
parameter: $T_{j(start)}$



24 Avalanche characteristics (N)

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

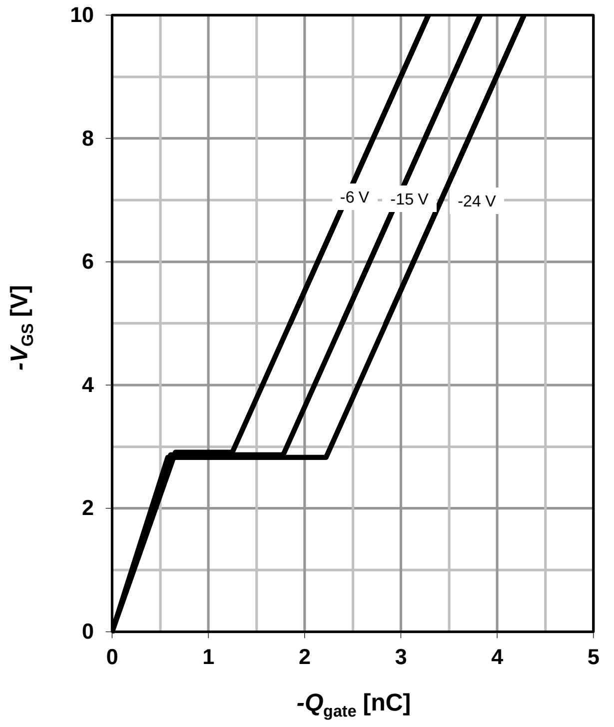
parameter: $T_{j(start)}$



25 Typ. gate charge (P)

V_{GS}=f(Q_{gate}); I_D=-1.5 A pulsed

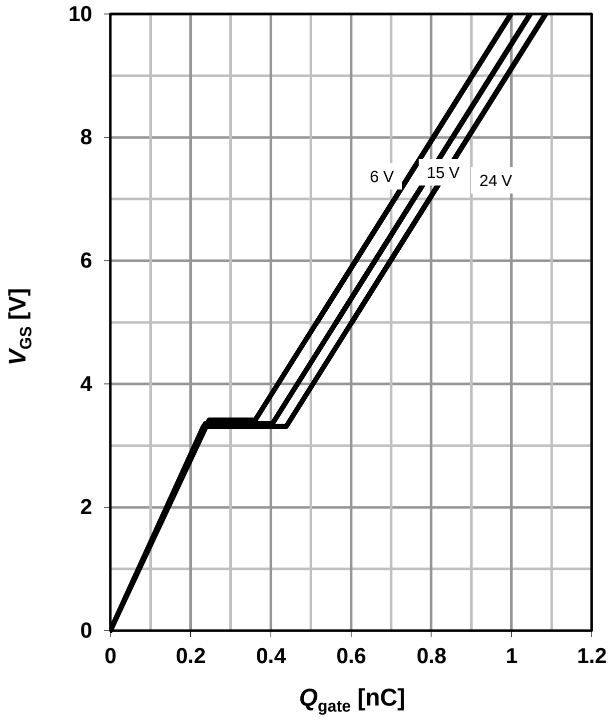
parameter: V_{DD}



26 Typ. gate charge (N)

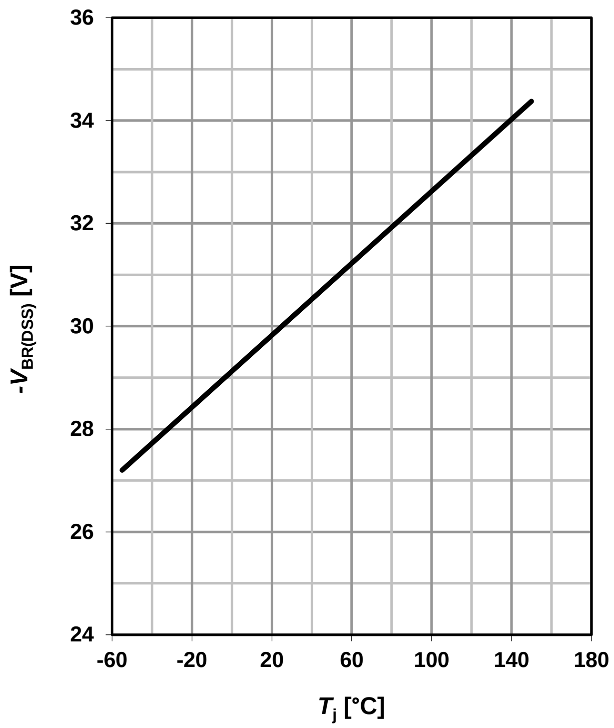
V_{GS}=f(Q_{gate}); I_D=1.4 A pulsed

parameter: V_{DD}



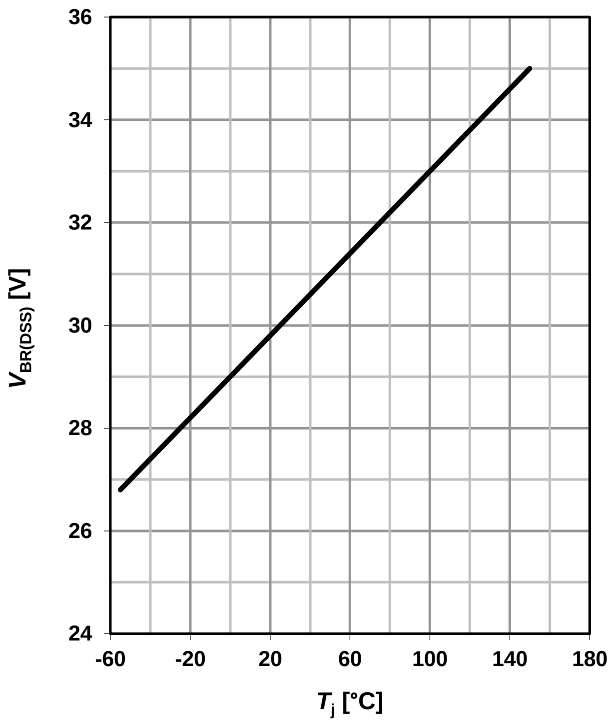
27 Drain-source breakdown voltage (P)

$V_{BR(DSS)}$=f(T_j); I_D=-250 µA

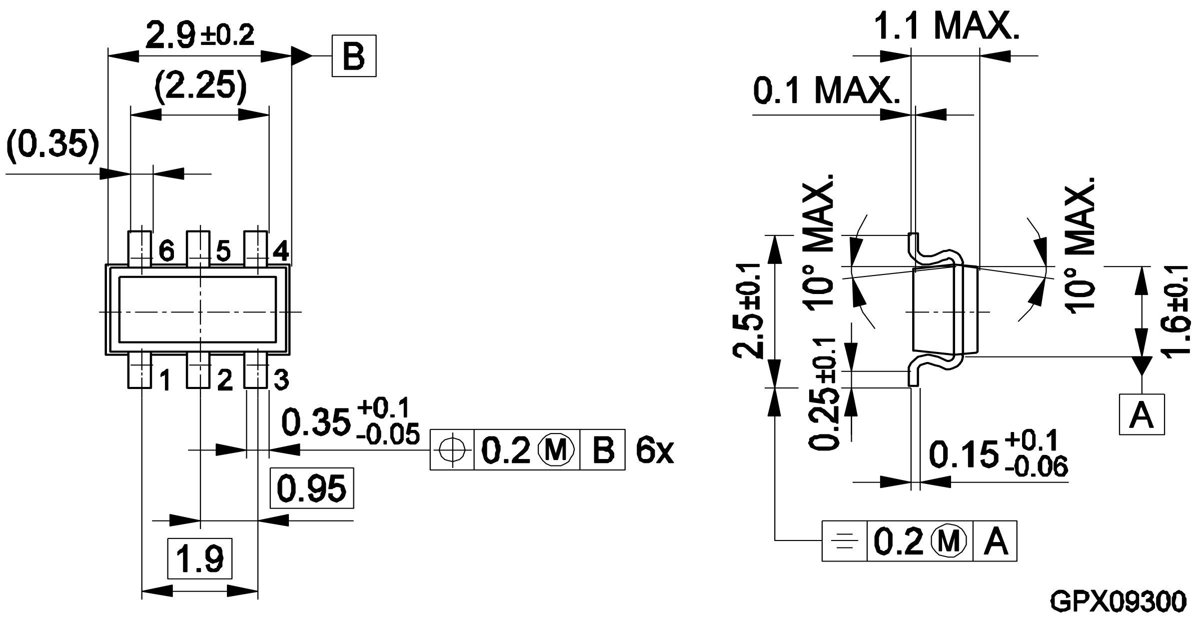


28 Drain-source breakdown voltage (N)

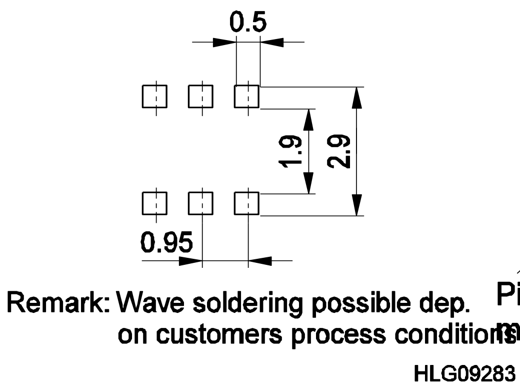
$V_{BR(DSS)}$=f(T_j); I_D=250 µA



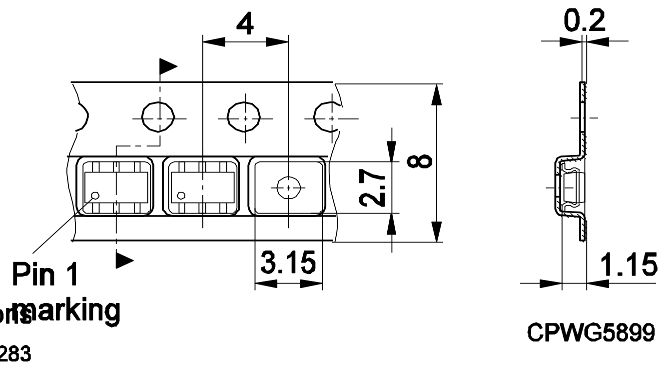
Package Outline: **TSOP6**



Footprint:



Packaging:



Dimensions in mm

Note: For symmetric types there is no defined Pin 1 orientation in the reel.

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