



**THE DATASHEET OF  
BSD235C L6327**

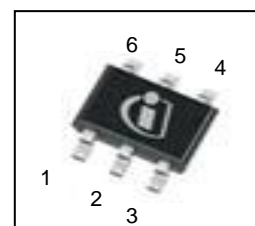
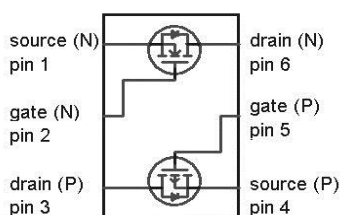


**OptiMOS™ 2 + OptiMOS™-P 2 Small Signal Transistor**
**Features**

- Complementary P + N channel
- Enhancement mode
- Super Logic level (2.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21


**Product Summary**

		P	N	
$V_{DS}$		-20	20	V
$R_{DS(on),max}$	$V_{GS}=\pm 4.5\text{ V}$	1200	350	mΩ
	$V_{GS}=\pm 2.5\text{ V}$	2100	600	
$I_D$		-0.53	0.95	A

**PG-SOT-363**


Type	Package	Tape and Reel Information	Marking	Lead Free	Packing
BSD235C	PG-SOT-363	H6327: 3000 pcs / reel	X9s	Yes	Non dry

**Maximum ratings, at  $T_j=25\text{ °C}$ , unless otherwise specified <sup>1)</sup>**

Parameter	Symbol	Conditions	Value		Unit
			P	N	
Continuous drain current	$I_D$	$T_A=25\text{ °C}$	-0.53	0.95	A
		$T_A=70\text{ °C}$	-0.46	0.76	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-2.1	3.8	
Avalanche energy, single pulse	$E_{AS}$	P: $I_D=-0.53\text{ A}$ , N: $I_D=0.95\text{ A}$ , $R_{GS}=25\text{ Ω}$	1.4	1.6	mJ
Gate source voltage	$V_{GS}$		±12		V
Power dissipation	$P_{tot}$	$T_A=25\text{ °C}$	0.5		W
Operating and storage temperature	$T_j, T_{stg}$		-55 ... 150		°C
ESD class		JESD22-A114-HBM	0 (<250V)		°C
Soldering temperature	$T_{solder}$		260		°C
IEC climatic category; DIN IEC 68-1			55/150/56		

<sup>1)</sup> Remark: only one of both transistors active

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Thermal characteristics**

Thermal resistance, junction - ambient	P	$R_{thJA}$	minimal footprint <sup>2)</sup>	-	-	250	K/W
	N						

**Electrical characteristics, at  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified**
**Static characteristics**

Drain-source breakdown voltage	P	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-	-	-20	V
	N		$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	20	-	-	
Gate threshold voltage	P	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-1.5\text{ }\mu\text{A}$	-1.2	-0.9	-0.6	
	N		$V_{DS}=V_{GS}, I_D=1.6\text{ }\mu\text{A}$	0.7	0.95	1.2	
Zero gate voltage drain current	P	$I_{DSS}$	$V_{DS}=-20\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-	-1	$\mu\text{A}$
	N		$V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-	1	
	P		$V_{DS}=-20\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-	-100	
	N		$V_{DS}=20\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-	100	
Gate-source leakage current	P	$I_{GSS}$	$V_{GS}=\pm 12\text{ V}, V_{DS}=0\text{ V}$	-	-	$\pm 100$	nA
	N						
Drain-source on-state resistance	P	$R_{DS(on)}$	$V_{GS}=-2.5\text{ V}, I_D=-0.17\text{ A}$	-	1221	2100	m $\Omega$
	N		$V_{GS}=2.5\text{ V}, I_D=0.29\text{ A}$	-	415	600	
	P		$V_{GS}=-4.5\text{ V}, I_D=-0.53\text{ A}$	-	745	1200	
	N		$V_{GS}=4.5\text{ V}, I_D=0.95\text{ A}$	-	266	350	
Transconductance	P	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=-0.46\text{ A}$	-	0.7	-	S
	N		$ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.76\text{ A}$	-	2	-	

<sup>2)</sup> Performed on 40mm<sup>2</sup> FR4 PCB. The traces are 1mm wide, 70 $\mu\text{m}$  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	$C_{iss}$	$V_{GS}=0\text{ V}$ , P: $V_{DS}=-10\text{ V}$ , N: $V_{DS}=10\text{ V}$ , $f=1\text{ MHz}$	-	37	-	pF			
	N			-	47	-				
Output capacitance	P	$C_{oss}$		$V_{GS}=0\text{ V}$ , P: $V_{DS}=-10\text{ V}$ , N: $V_{DS}=10\text{ V}$ , $f=1\text{ MHz}$	-	17	-			
	N				-	24	-			
Reverse transfer capacitance	P	$C_{rss}$			$V_{GS}=0\text{ V}$ , P: $V_{DS}=-10\text{ V}$ , N: $V_{DS}=10\text{ V}$ , $f=1\text{ MHz}$	-	14	-		
	N					-	3	-		
Turn-on delay time	P	$t_{d(on)}$				P: $V_{DD}=-10\text{ V}$ , $V_{GS}=-4.5\text{ V}$ , $R_G=6\ \Omega$ , $I_D=-0.53\text{ A}$	-	3.8	-	ns
	N						-	3.8	-	
Rise time	P	$t_r$					P: $V_{DD}=-10\text{ V}$ , $V_{GS}=-4.5\text{ V}$ , $R_G=6\ \Omega$ , $I_D=-0.53\text{ A}$	-	5.0	-
	N							-	3.6	-
Turn-off delay time	P	$t_{d(off)}$	N: $V_{DD}=10\text{ V}$ , $V_{GS}=4.5\text{ V}$ , $R_G=6\ \Omega$ , $I_D=0.95\text{ A}$					-	5.1	-
	N							-	4.5	-
Fall time	P	$t_f$		N: $V_{DD}=10\text{ V}$ , $V_{GS}=4.5\text{ V}$ , $R_G=6\ \Omega$ , $I_D=0.95\text{ A}$				-	3.2	-
	N							-	1.2	-

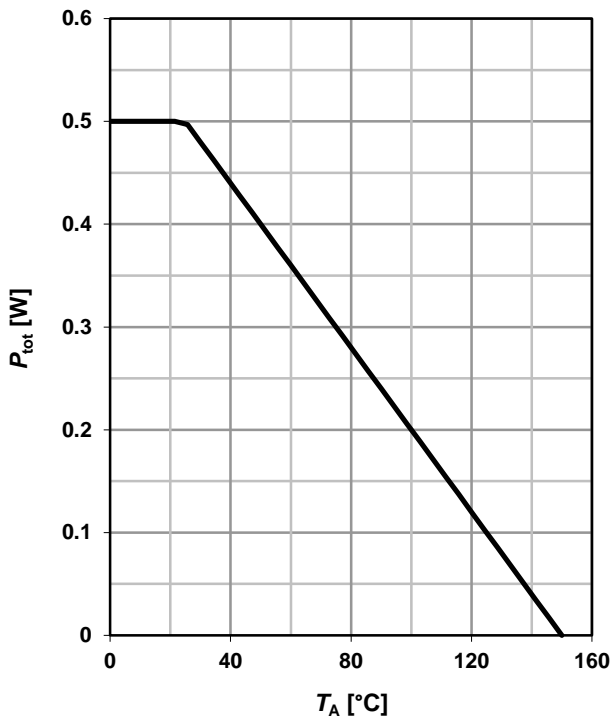
**Gate Charge Characteristics**

Gate to source charge	P	$Q_{gs}$	$V_{DD}=-10\text{ V}$ , $I_D=-0.53\text{ A}$ , $V_{GS}=0\text{ to }-4.5\text{ V}$	-	-0.09	-	nC
Gate to drain charge		$Q_{gd}$		-	-0.2	-	
Switching charge		$Q_g$		-	-0.4	-	
Gate plateau voltage		$V_{plateau}$		-	-2.4	-	
Gate to source charge	N	$Q_{gs}$	$V_{DD}=16\text{ V}$ , $I_D=0.95\text{ A}$ , $V_{GS}=0\text{ to }4.5\text{ V}$	-	0.11	-	
Gate to drain charge		$Q_{gd}$		-	0.09	-	
Switching charge		$Q_g$		-	0.34	-	
Gate plateau voltage		$V_{plateau}$		-	2.4	-	

Parameter	Symbol	Conditions	Values			Unit	
			min.	typ.	max.		
<b>Reverse Diode</b>							
Diode continuous forward current	P	$I_S$	$T_C=25\text{ °C}$	-	-	-0.42	A
	N					0.5	
Diode pulse current	P	$I_{S,pulse}$		-	-	-2.1	
	N			-	-	3.8	
Diode forward voltage	P	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=-0.53\text{ A},$ $T_j=25\text{ °C}$	-	-1	-1.2	V
	N		$V_{GS}=0\text{ V}, I_F=0.95\text{ A},$ $T_j=25\text{ °C}$	-	0.9	1.1	
Reverse recovery time	P	$t_{rr}$	$V_R=\pm 10\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	7.6	-	ns
	N			-	5.2	-	
Reverse recovery charge	P	$Q_{rr}$		-	1.1	-	nC
	N			-	0.97	-	

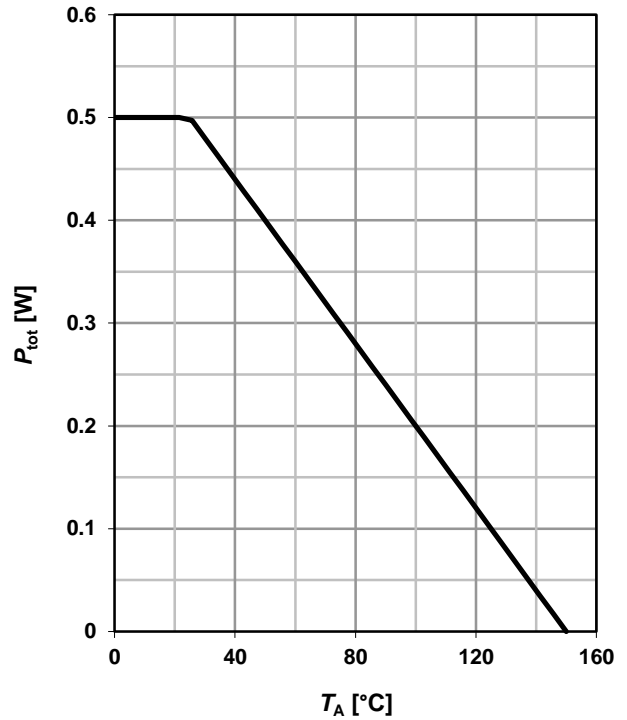
**1 Power dissipation (P)**

$$P_{\text{tot}}=f(T_A)$$



**2 Power dissipation (N)**

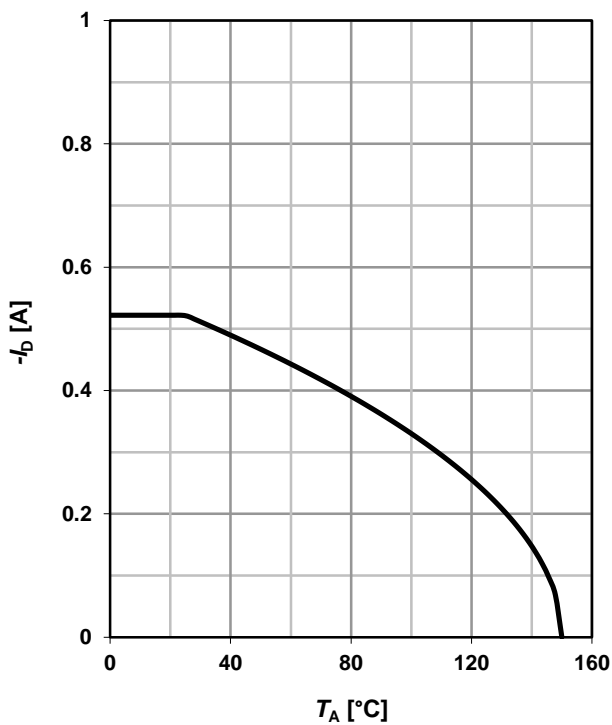
$$P_{\text{tot}}=f(T_A)$$



**3 Drain current (P)**

$$I_D=f(T_A)$$

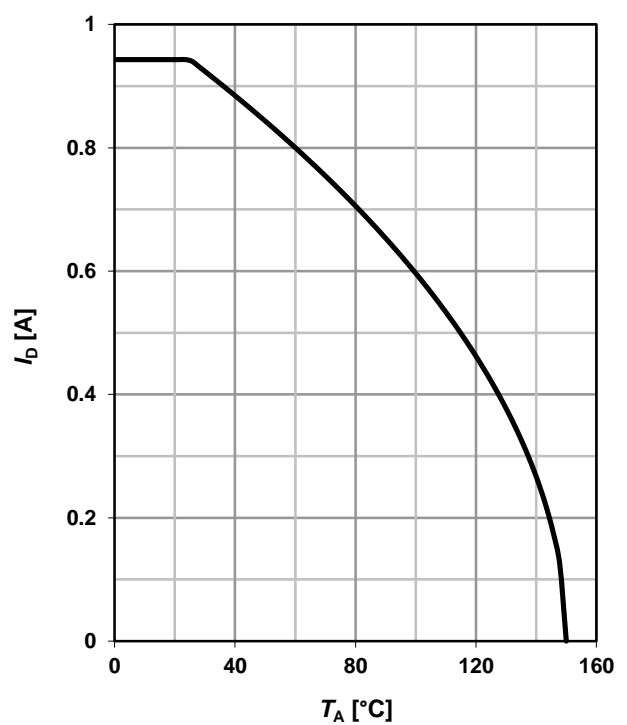
parameter:  $V_{GS} \leq 4.5 \text{ V}$



**4 Drain current (N)**

$$I_D=f(T_A)$$

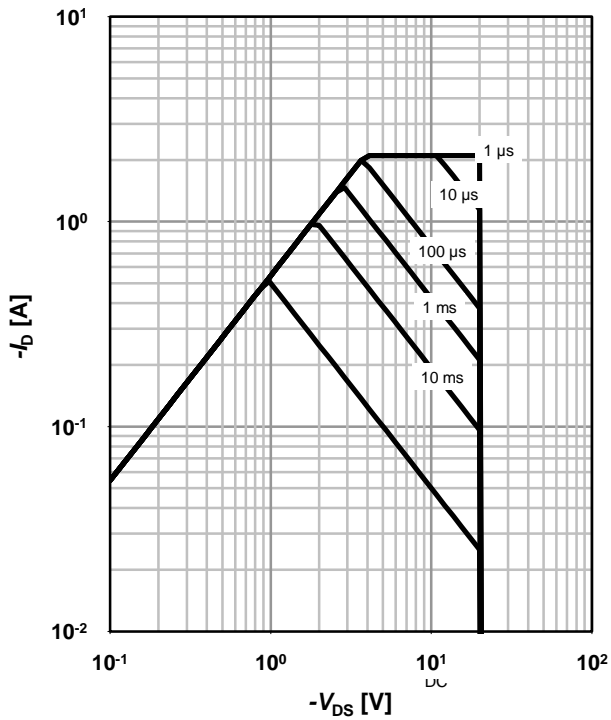
parameter:  $V_{GS} \geq 4.5 \text{ V}$



**5 Safe operating area (P)**

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

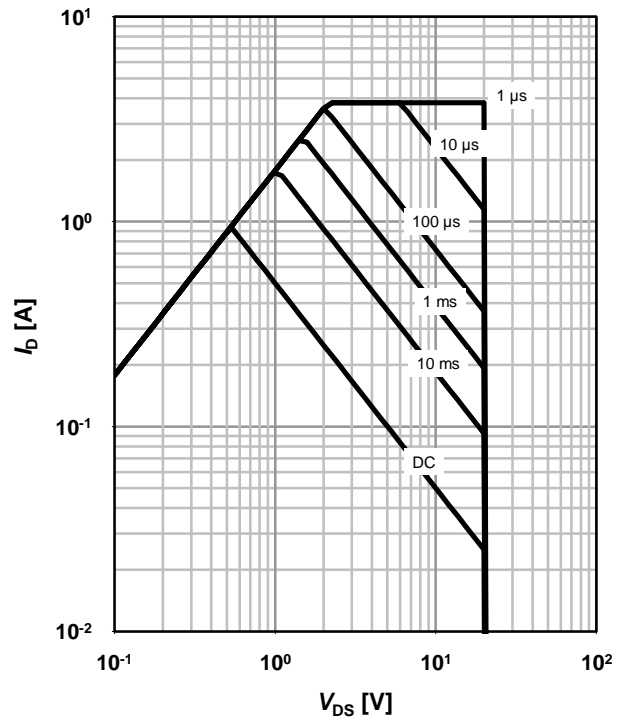
parameter:  $t_p$



**6 Safe operating area (N)**

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

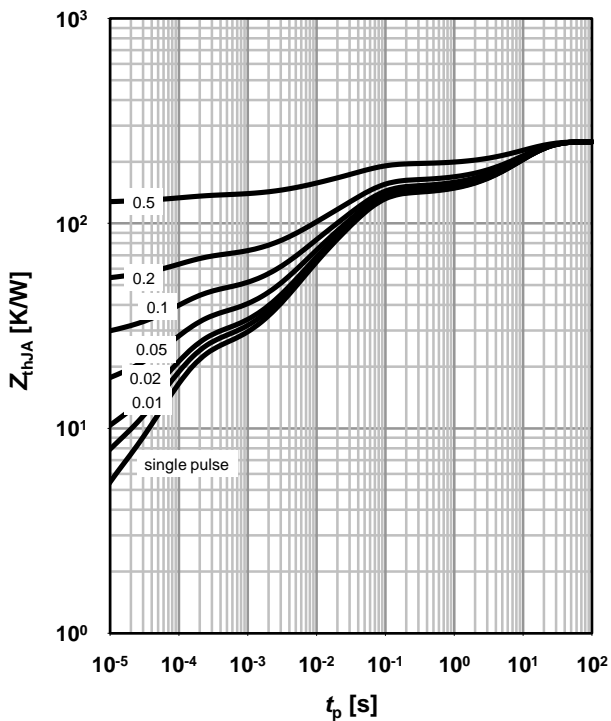
parameter:  $t_p$



**7 Max. transient thermal impedance (P)**

$Z_{thJA}=f(t_p)$

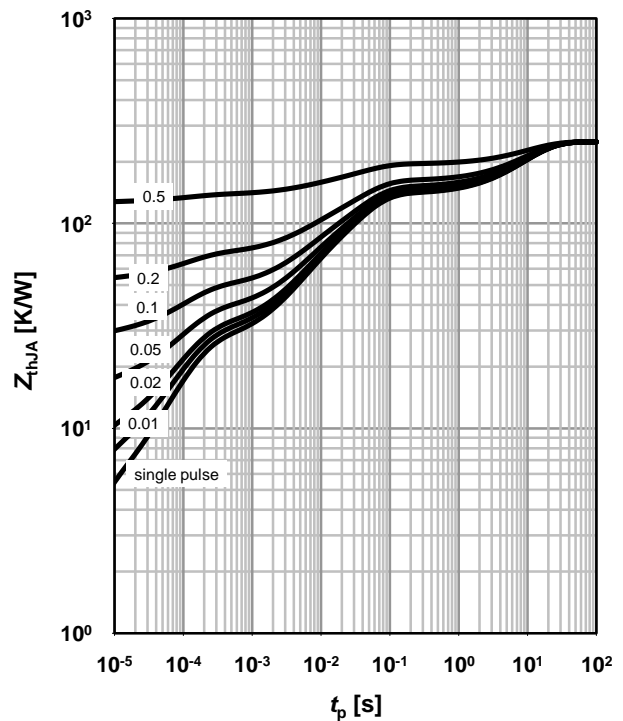
parameter:  $D=t_p/T$



**8 Max. transient thermal impedance (N)**

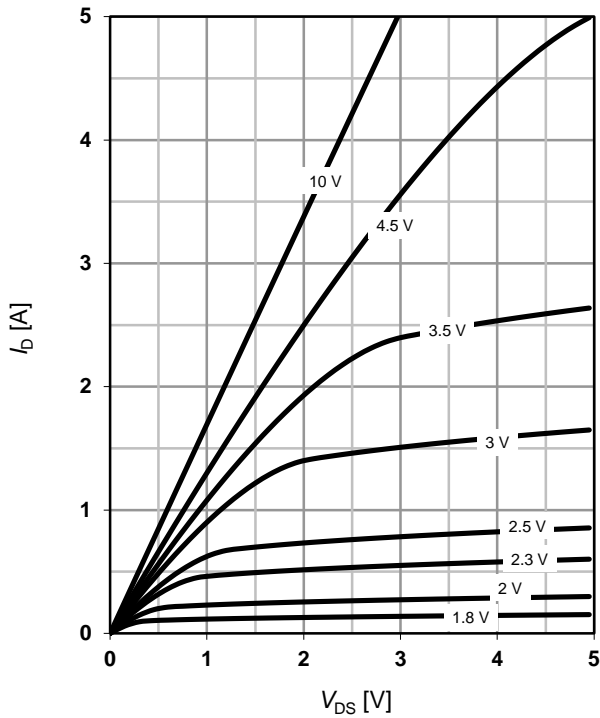
$Z_{thJA}=f(t_p)$

parameter:  $D=t_p/T$

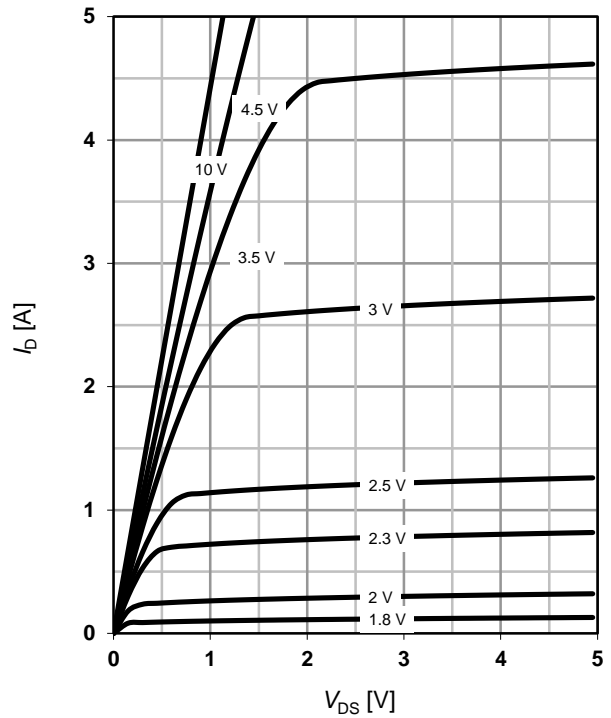


**9 Typ. output characteristics (P)**

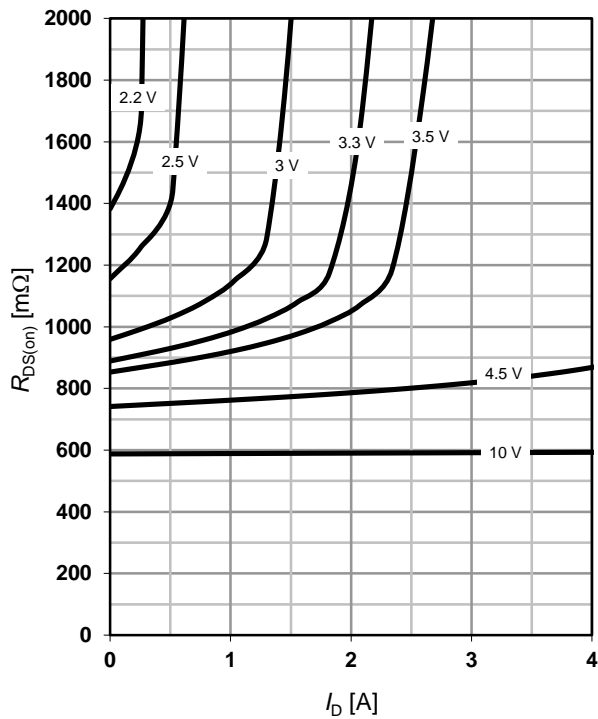
$$I_D = f(V_{DS}); T_j = 25\text{ °C}$$

 parameter:  $V_{GS}$ 

**10 Typ. output characteristics (N)**

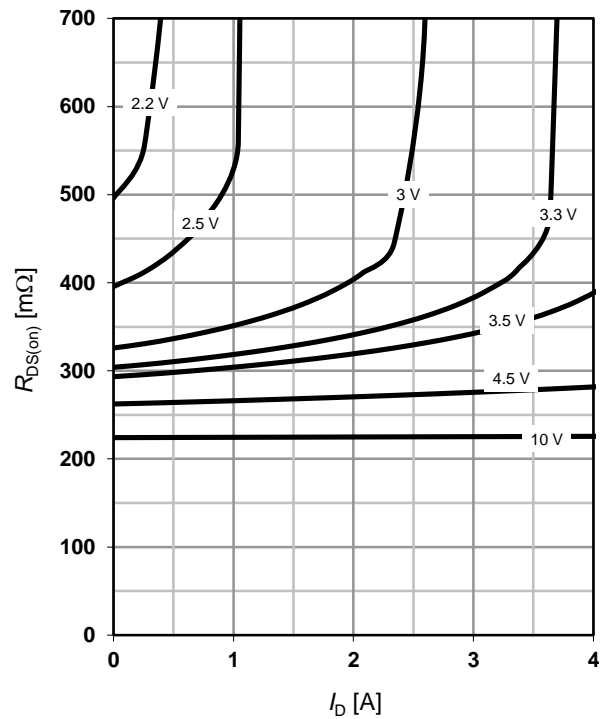
$$I_D = f(V_{DS}); T_j = 25\text{ °C}$$

 parameter:  $V_{GS}$ 

**11 Typ. drain-source on resistance (P)**

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

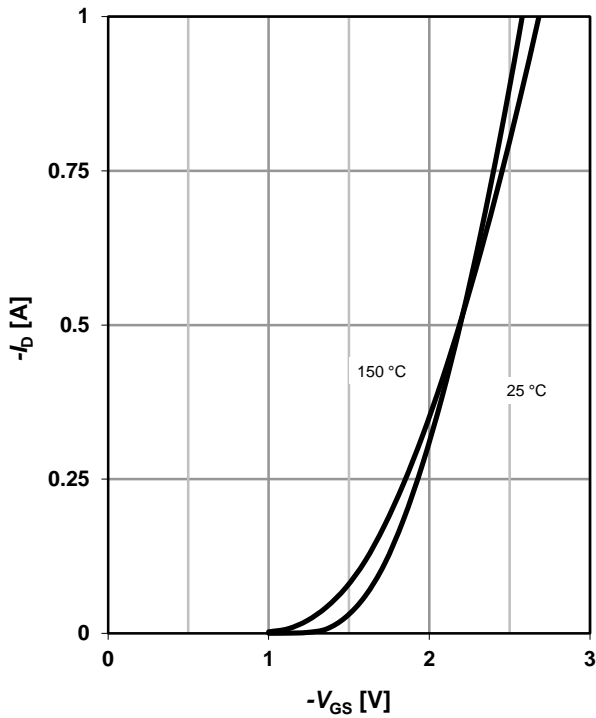
 parameter:  $V_{GS}$ 

**12 Typ. drain-source on resistance (N)**

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

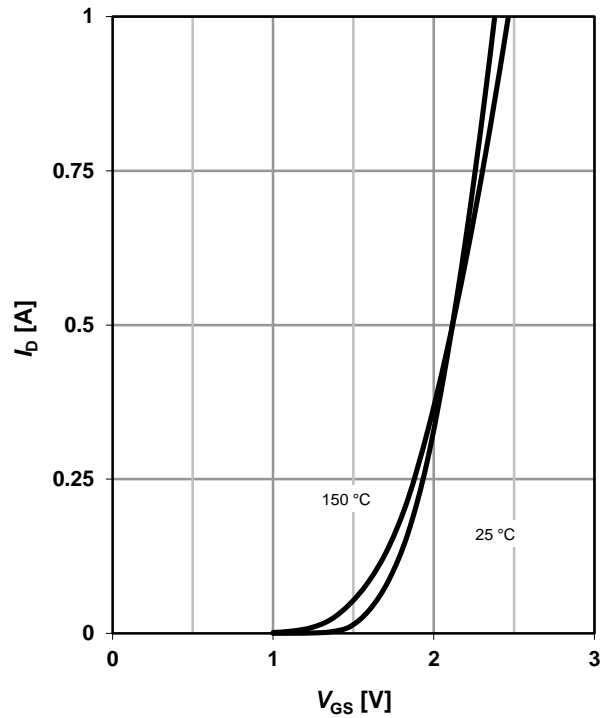
 parameter:  $V_{GS}$ 


**13 Typ. transfer characteristics (P)**

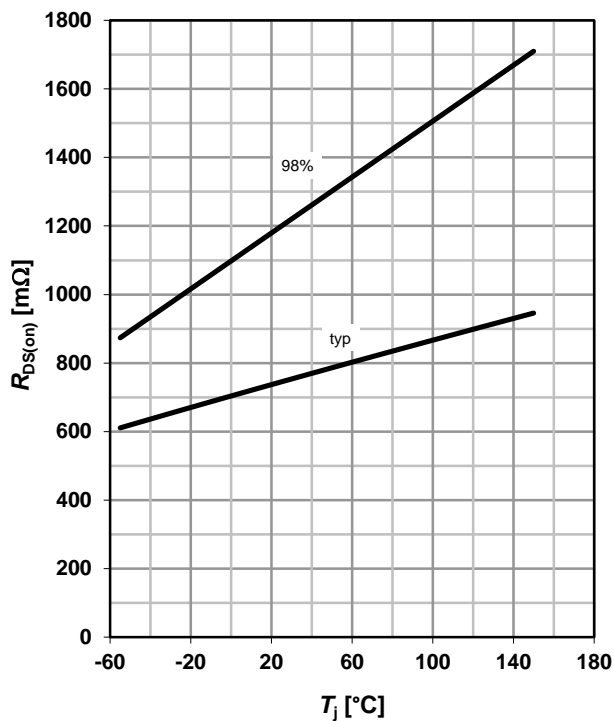
$$I_D = f(V_{GS}); |V_{DS}| > 2 |I_D| R_{DS(on)max}$$

 parameter:  $T_j$ 

**14 Typ. transfer characteristics (N)**

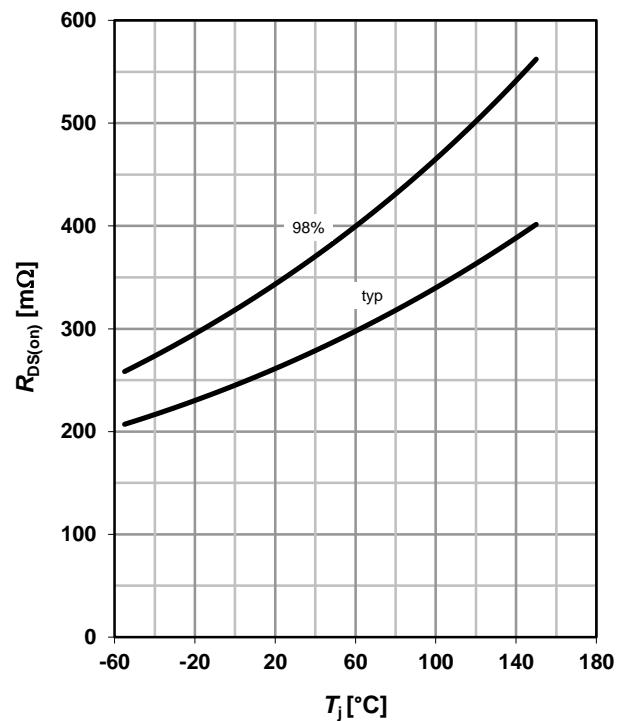
$$I_D = f(V_{GS}); |V_{DS}| > 2 |I_D| R_{DS(on)max}$$

 parameter:  $T_j$ 

**15 Drain-source on-state resistance (P)**

$$R_{DS(on)} = f(T_j); I_D = -0.53 \text{ A}; V_{GS} = -4.5 \text{ V}$$

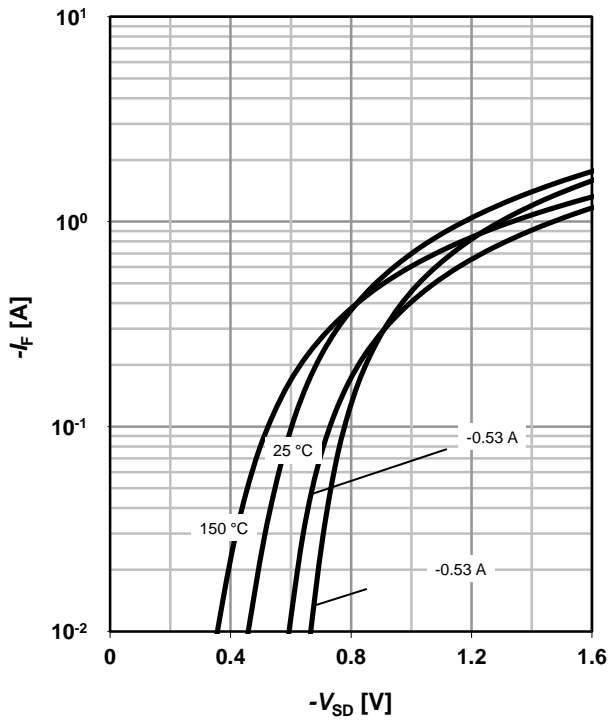

**16 Drain-source on-state resistance (N)**

$$R_{DS(on)} = f(T_j); I_D = 0.95 \text{ A}; V_{GS} = 4.5 \text{ V}$$

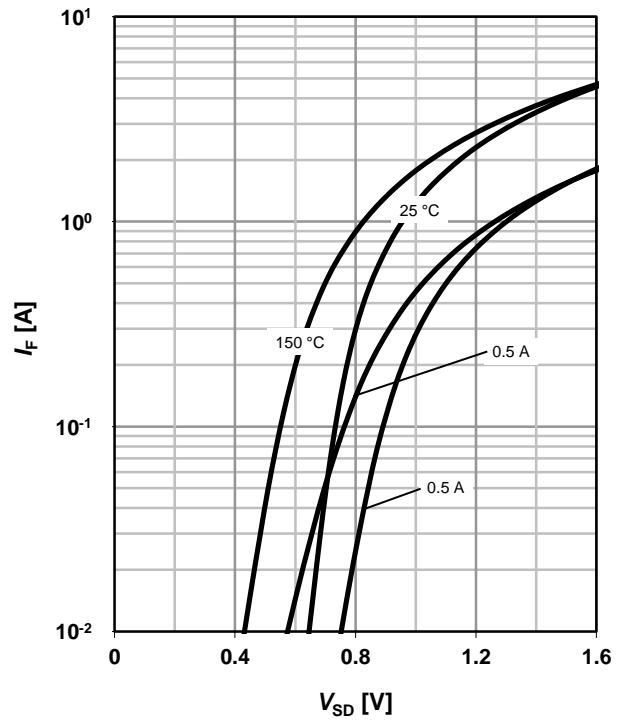


**21 Forward characteristics of reverse diode (P)**

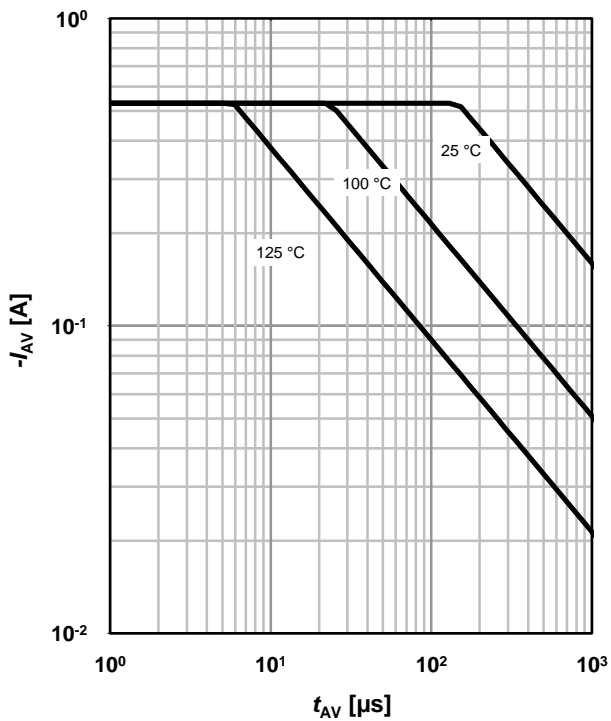
$$I_F = f(V_{SD})$$

 parameter:  $T_j$ 

**22 Forward characteristics of reverse diode (N)**

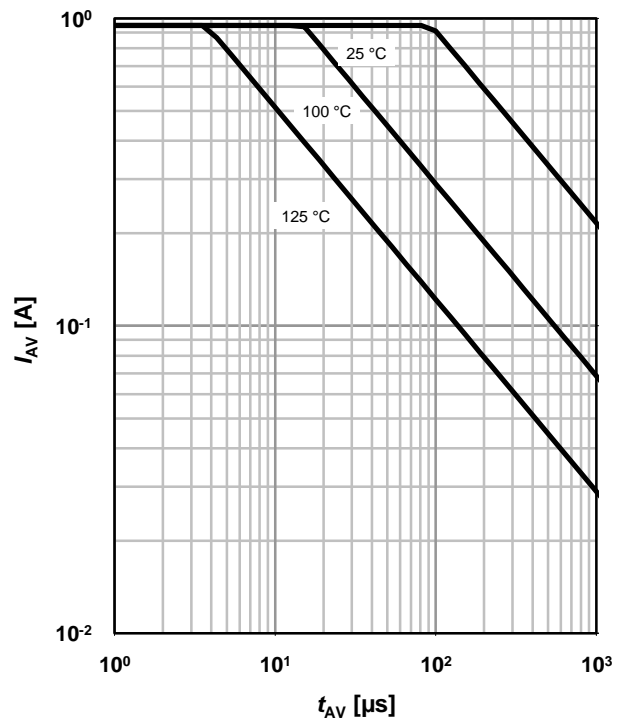
$$I_F = f(V_{SD})$$

 parameter:  $T_j$ 

**23 Avalanche characteristics (P)**

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

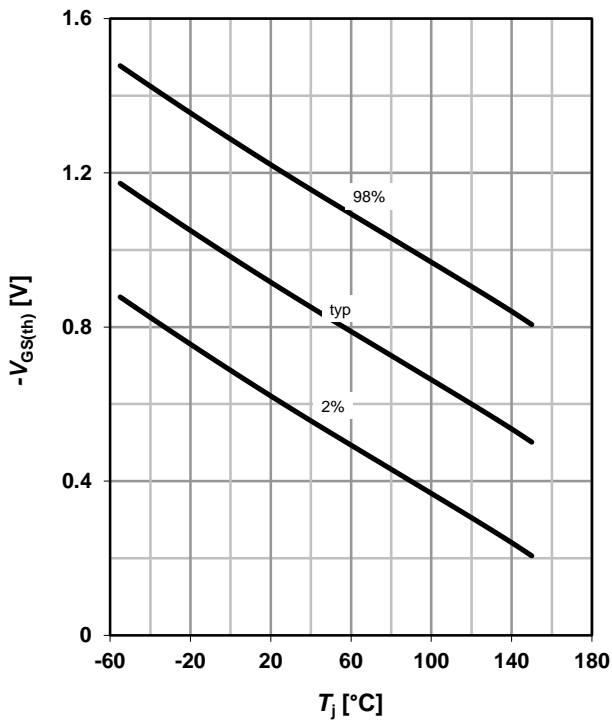
 parameter:  $T_{j(\text{start})}$ 

**24 Avalanche characteristics (N)**

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

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


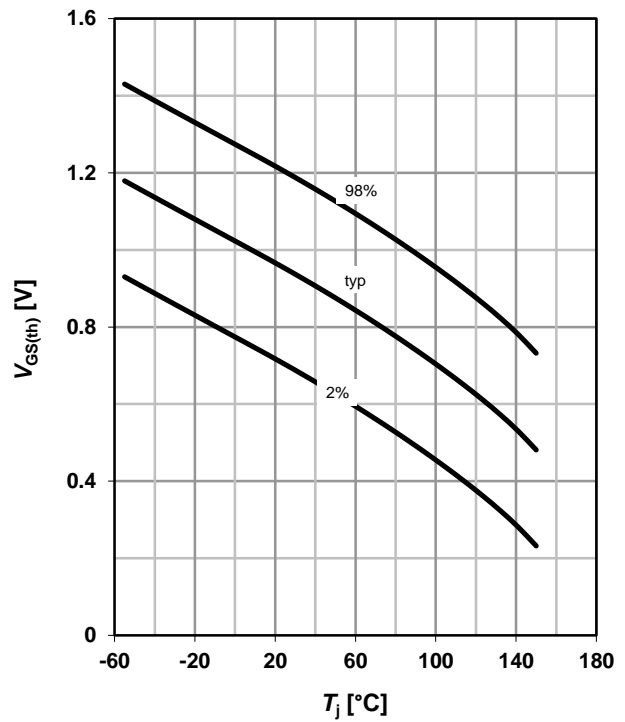
**17 Typ. gate threshold voltage (P)**

$V_{GS(th)}=f(T_j)$ ;  $V_{GS}=V_{DS}$ ;  $I_D=-1.5 \mu A$



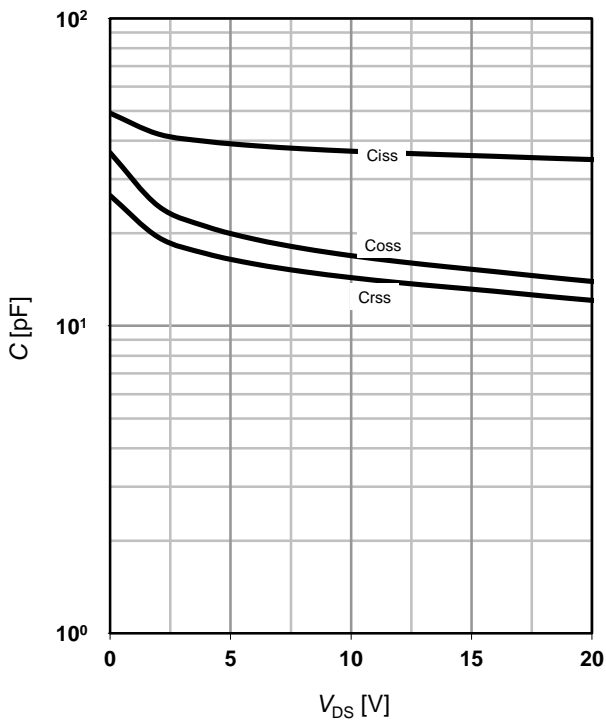
**18 Typ. gate threshold voltage (N)**

$V_{GS(th)}=f(T_j)$ ;  $V_{GS}=V_{DS}$ ;  $I_D=1.6 \mu A$



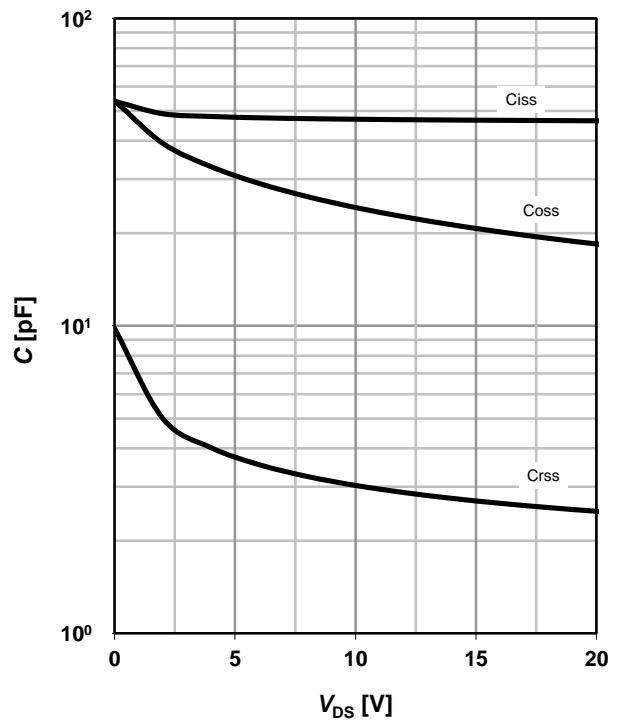
**19 Typ. capacitances (P)**

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

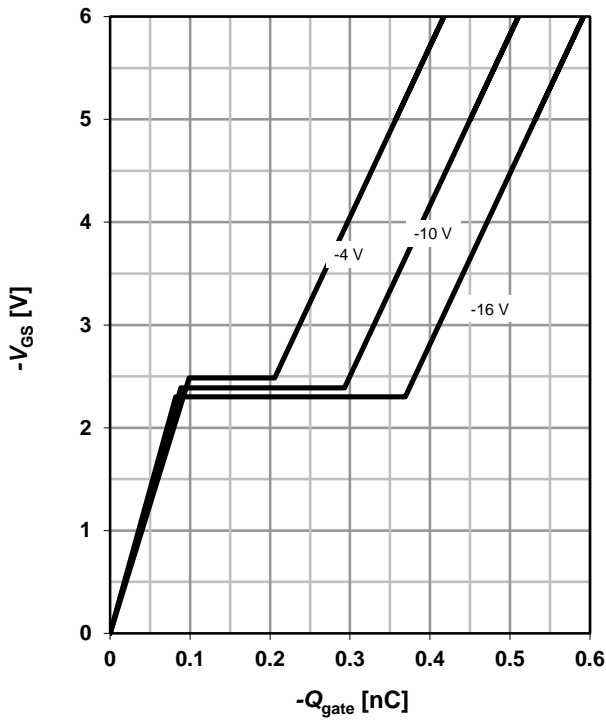


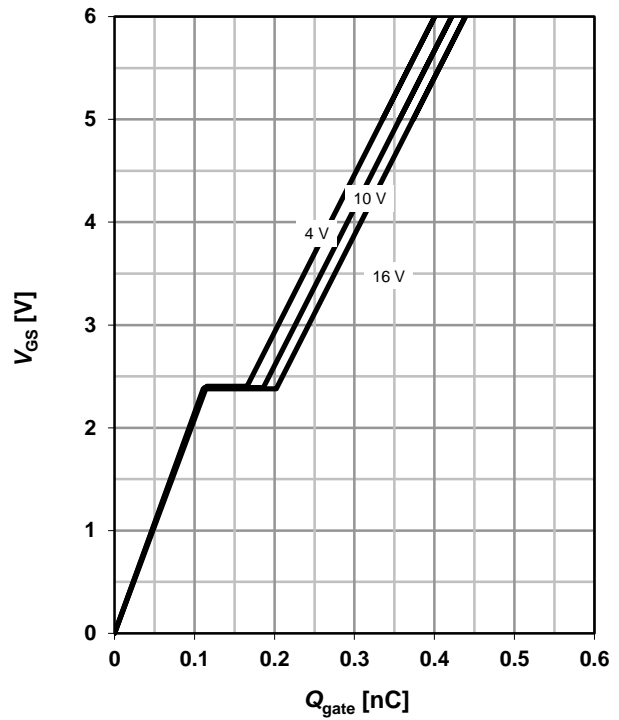
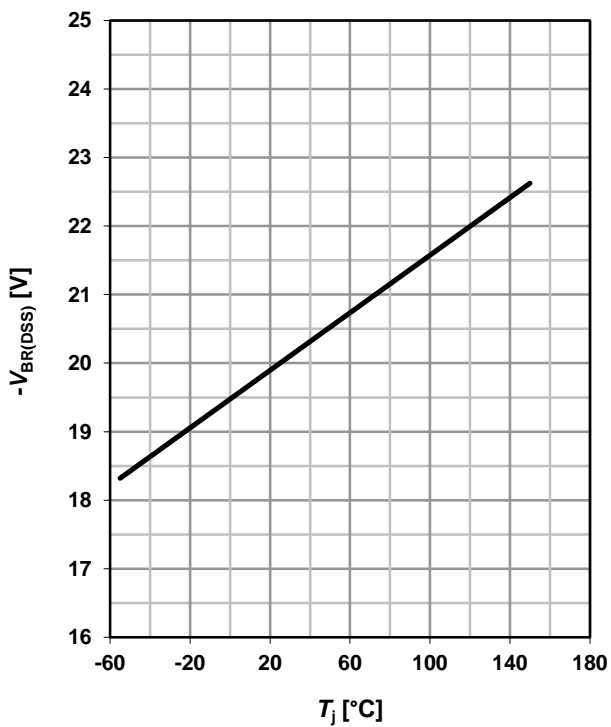
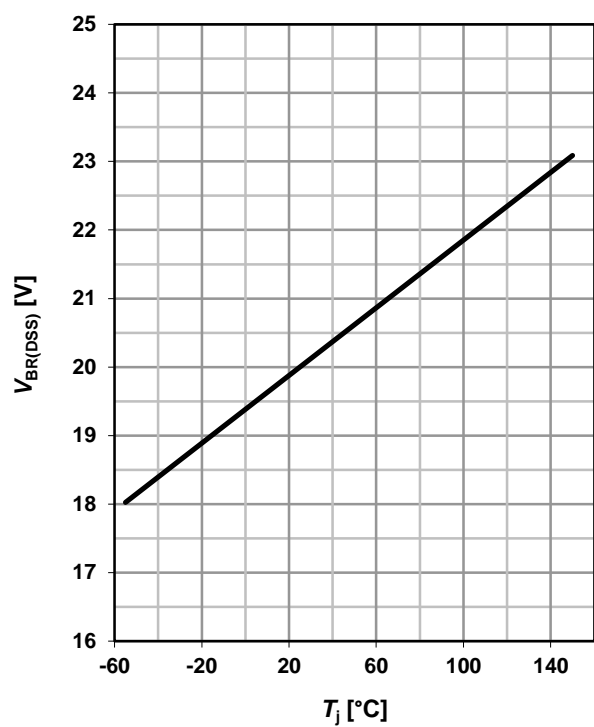
**20 Typ. capacitances (N)**

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



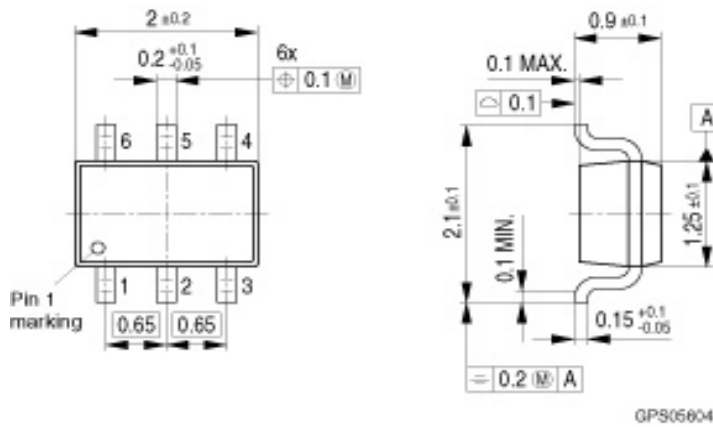
**25 Typ. gate charge (P)**
 $V_{GS}=f(Q_{gate}); I_D=-0.53 \text{ A pulsed}$ 

 parameter:  $V_{DD}$ 

**26 Typ. gate charge (N)**
 $V_{GS}=f(Q_{gate}); I_D=0.95 \text{ A pulsed}$ 

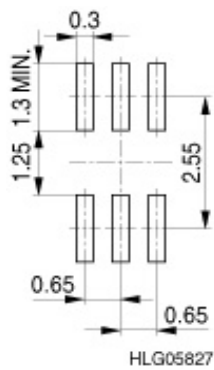
 parameter:  $V_{DD}$ 

**27 Drain-source breakdown voltage (P)**
 $V_{BR(DSS)}=f(T_j); I_D=-250 \mu\text{A}$ 

**28 Drain-source breakdown voltage (N)**
 $V_{BR(DSS)}=f(T_j); I_D=250 \mu\text{A}$ 


SOT-363

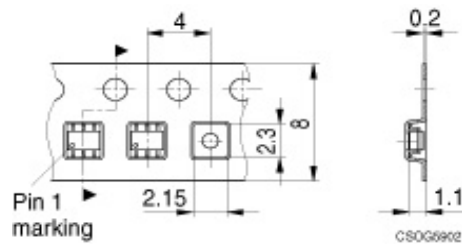
Package Outline:



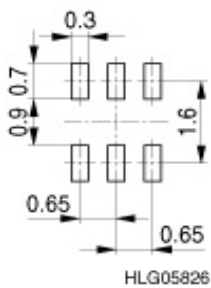
Footprint:



Packing:



Reflow soldering:



Dimensions in mm

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