

SIPMOS[®] Small-Signal-Transistor

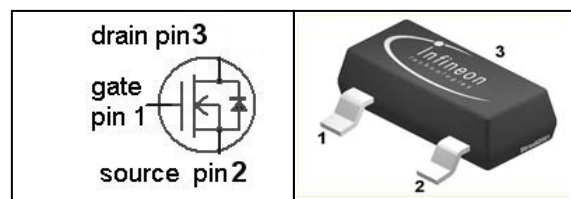
Features

- N-channel
- Depletion mode
- dv/dt rated

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	8	Ω
$I_{DSS,min}$	0.13	A

SOT-23



Type	Package	Ordering Code	Tape and Reel Information	Marking
BSS159N	SOT-23	Q67042-S1488	E6327: 3000 pcs/reel	SGs

Maximum ratings, at $T_J=25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_A=25\text{ °C}$	0.23	A
		$T_A=70\text{ °C}$	0.18	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	0.92	
Reverse diode dv/dt	dv/dt	$I_D=0.23\text{ A}$, $V_{DS}=60\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$	6	kV/ μs
Gate source voltage	V_{GS}		± 20	V
ESD sensitivity (HBM) as per MIL-STD 883			Class 1	
Power dissipation	P_{tot}	$T_A=25\text{ °C}$	0.36	W
Operating and storage temperature	T_J , T_{stg}		-55 ... 150	$^{\circ}\text{C}$
IEC climatic category; DIN IEC 68-1			55/150/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics

Thermal resistance, junction - minimal footprint	R_{thJA}		-	-	350	K/W
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Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified
Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=-10\text{ V}$, $I_D=250\text{ }\mu\text{A}$	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=3\text{ V}$, $I_D=26\text{ }\mu\text{A}$	-3.5	-2.8	-2.4	
Drain-source leakage current	$I_{D(off)}$	$V_{DS}=60\text{ V}$, $V_{GS}=-10\text{ V}$, $T_j=25\text{ °C}$	-	-	0.1	μA
		$V_{DS}=60\text{ V}$, $V_{GS}=-10\text{ V}$, $T_j=125\text{ °C}$	-	-	10	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$	-	-	10	nA
Saturated drain current	I_{DSS}	$V_{GS}=0\text{ V}$, $V_{DS}=10\text{ V}$	130	-	-	mA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=0\text{ V}$, $I_D=0.07\text{ A}$	-	3.9	8	Ω
		$V_{GS}=10\text{ V}$, $I_D=0.23\text{ A}$	-	1.8	3.5	
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}$, $I_D=0.16\text{ A}$	0.1	0.19	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS} = -10\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	33	44	pF
Output capacitance	C_{oss}		-	8.3	11	
Reverse transfer capacitance	C_{rss}		-	3.9	5.9	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 25\text{ V}, V_{GS} = -3 \dots -7\text{ V}, I_D = 0.16\text{ A}, R_G = 6\text{ }\Omega$	-	3.1	4.7	ns
Rise time	t_r		-	2.9	4.4	
Turn-off delay time	$t_{d(off)}$		-	9	13	
Fall time	t_f		-	9	13	

Gate Charge Characteristics

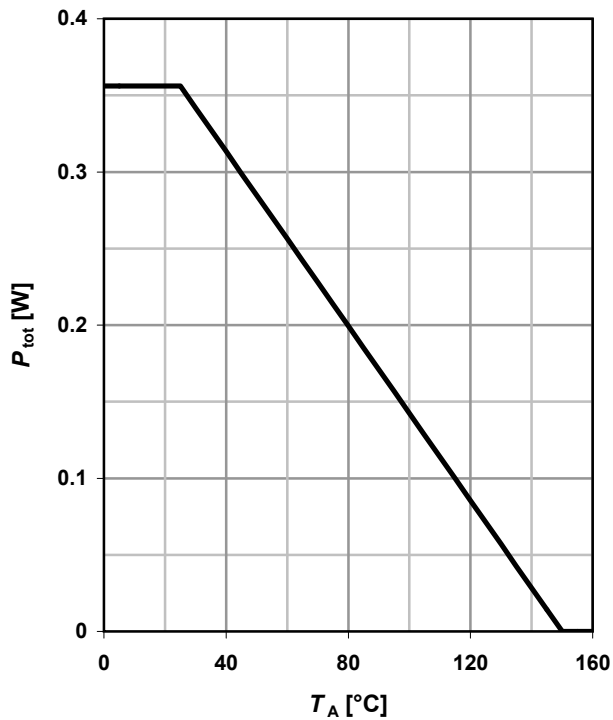
Gate to source charge	Q_{gs}	$V_{DD} = 40\text{ V}, I_D = 0.16\text{ A}, V_{GS} = -3\text{ to }5\text{ V}$	-	0.14	0.21	nC
Gate to drain charge	Q_{gd}		-	0.7	1.1	
Gate charge total	Q_g		-	2.2	2.9	
Gate plateau voltage	$V_{plateau}$		-	-0.14	-	V

Reverse Diode

Diode continuous forward current	I_S	$T_A = 25\text{ }^\circ\text{C}$	-	-	0.23	A
Diode pulse current	$I_{S,pulse}$		-	-	0.92	
Diode forward voltage	V_{SD}	$V_{GS} = -10\text{ V}, I_F = 0.23\text{ A}, T_J = 25\text{ }^\circ\text{C}$	-	0.81	1.2	V
Reverse recovery time	t_{rr}	$V_R = 30\text{ V}, I_F = 0.16\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$	-	10.4	13	ns
Reverse recovery charge	Q_{rr}		-	3.3	4.1	nC

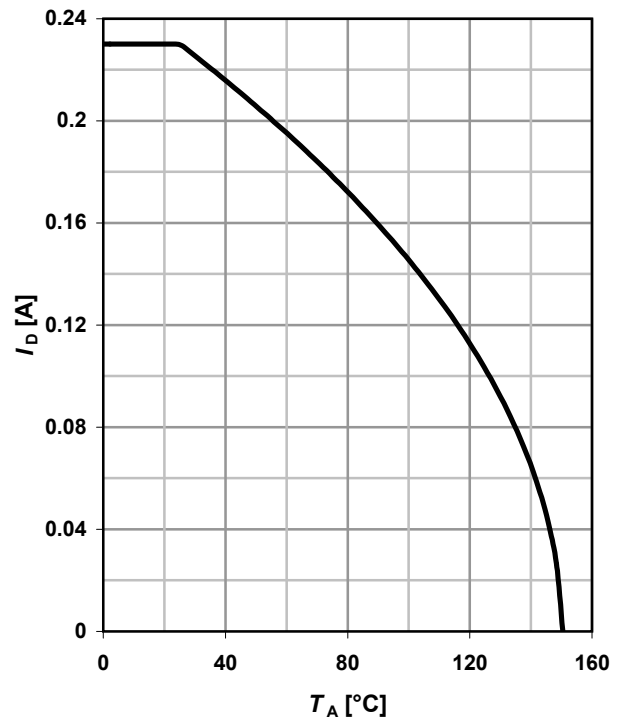
1 Power dissipation

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



2 Drain current

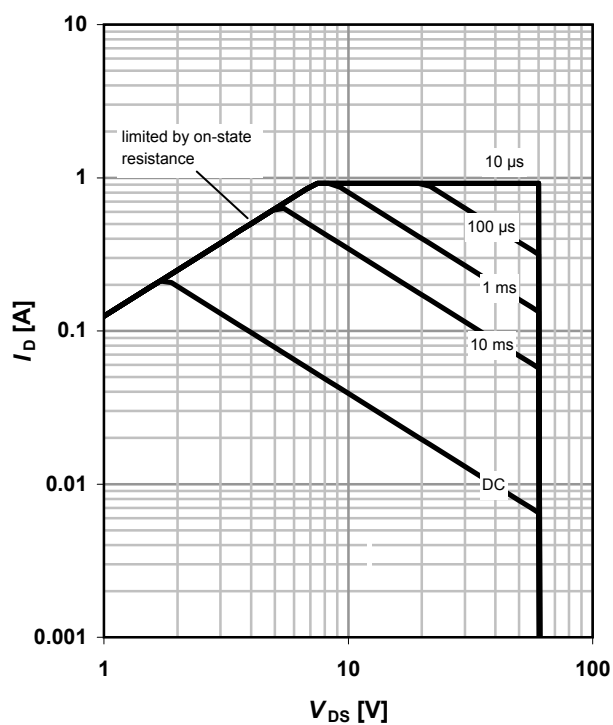
$$I_D = f(T_A); V_{\text{GS}} \geq 10 \text{ V}$$



3 Safe operation area

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

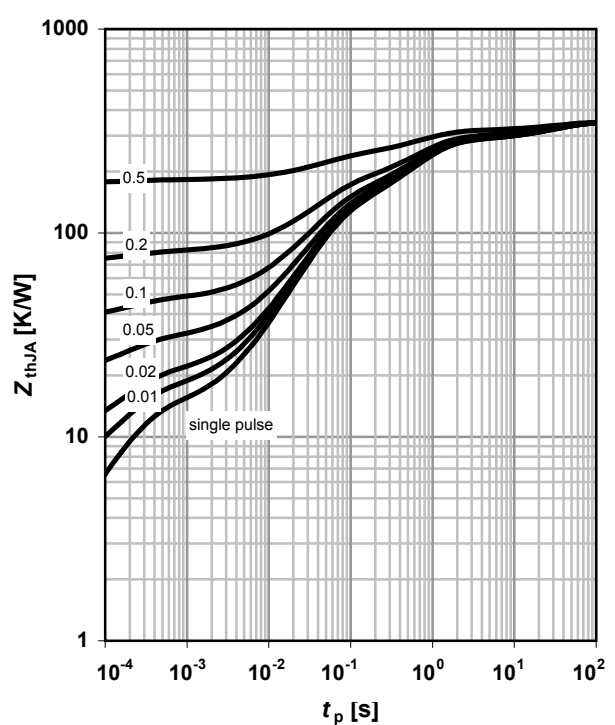
parameter: t_p



4 Max. transient thermal impedance

$$Z_{\text{thJA}} = f(t_p)$$

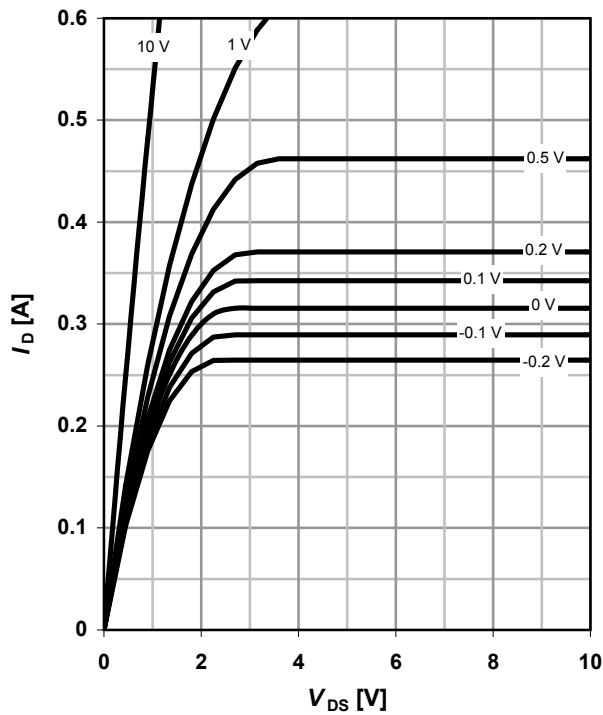
parameter: $D = t_p / T$



5 Typ. output characteristics

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

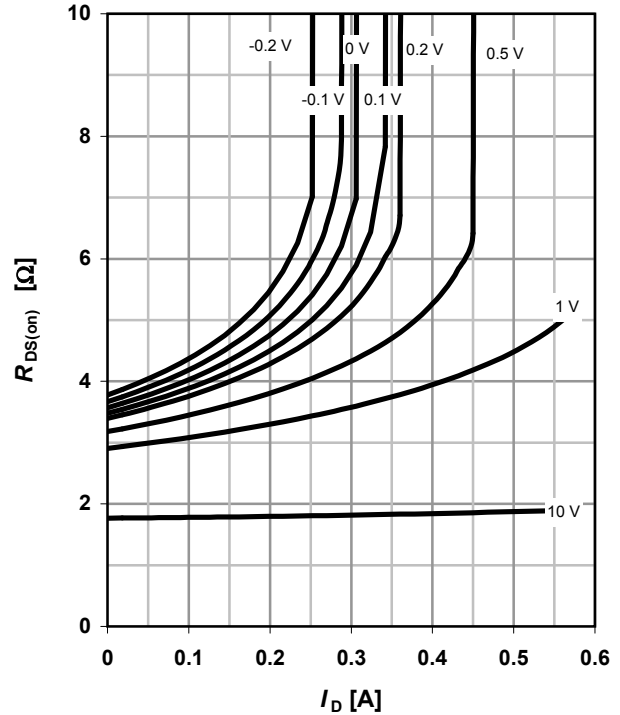
parameter: V_{GS}



6 Typ. drain-source on resistance

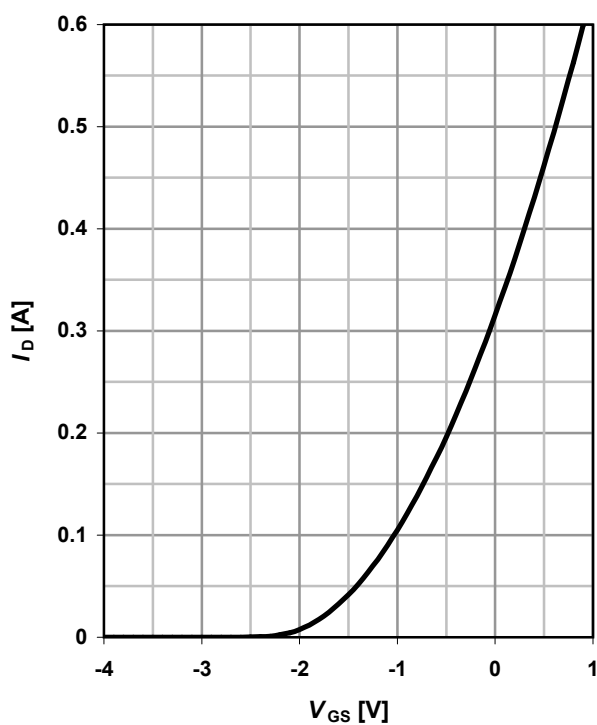
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter: V_{GS}



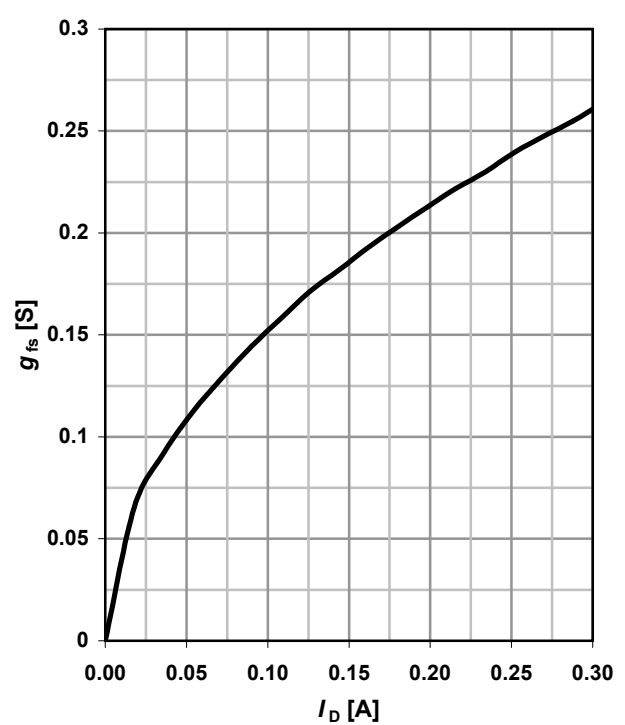
7 Typ. transfer characteristics

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



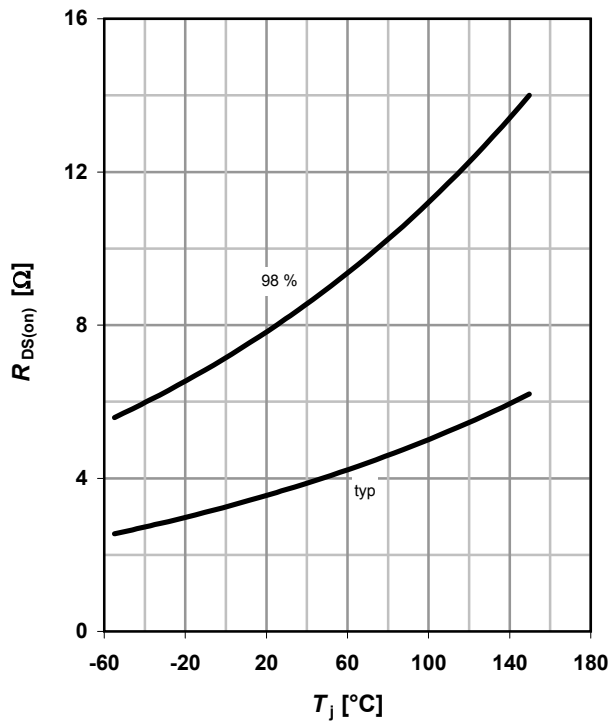
8 Typ. forward transconductance

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



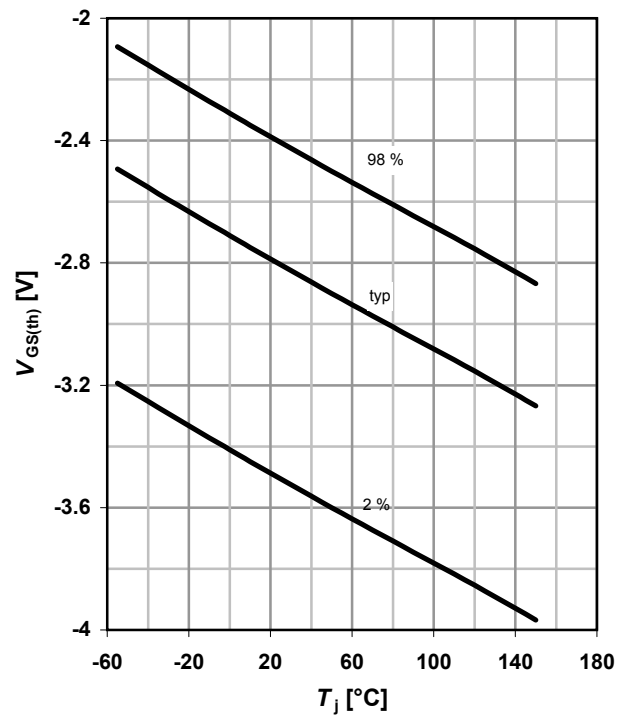
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = 0.07 \text{ A}; V_{GS} = 0 \text{ V}$$

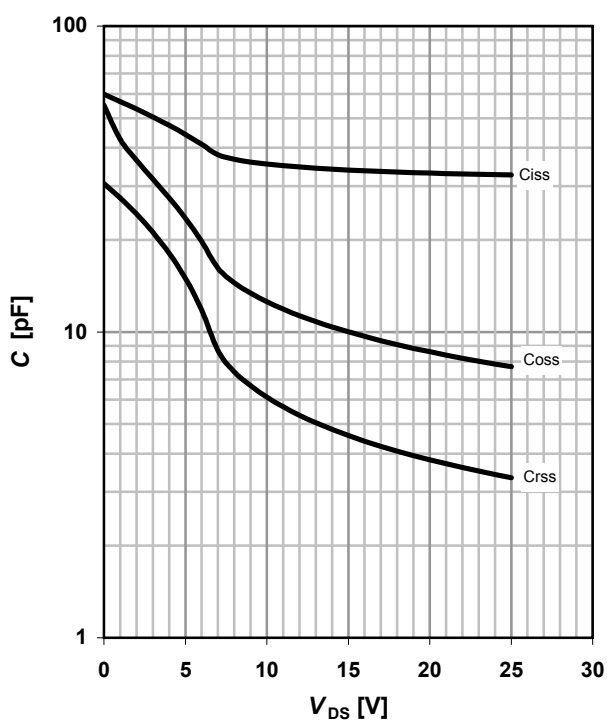

10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{DS} = 3 \text{ V}; I_D = 26 \mu\text{A}$$

parameter: I_D

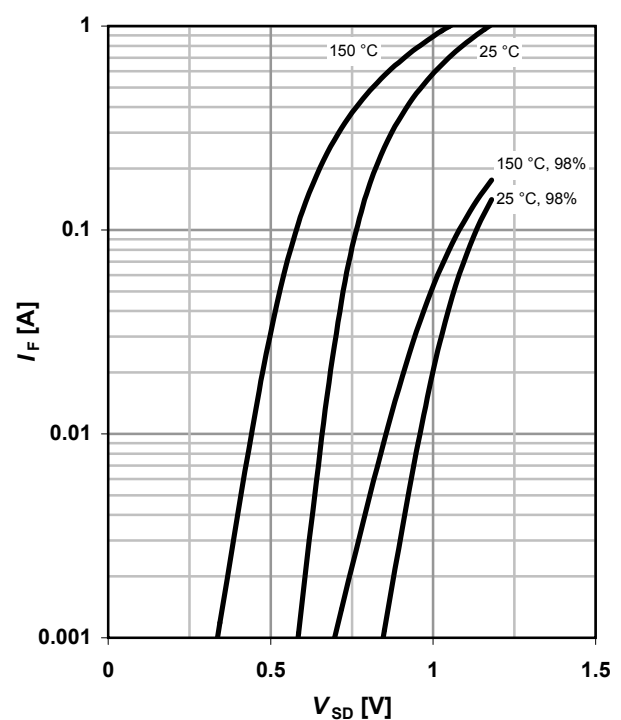

11 Typ. Capacitances

$$C = f(V_{DS}); V_{GS} = -10 \text{ V}; f = 1 \text{ MHz}$$

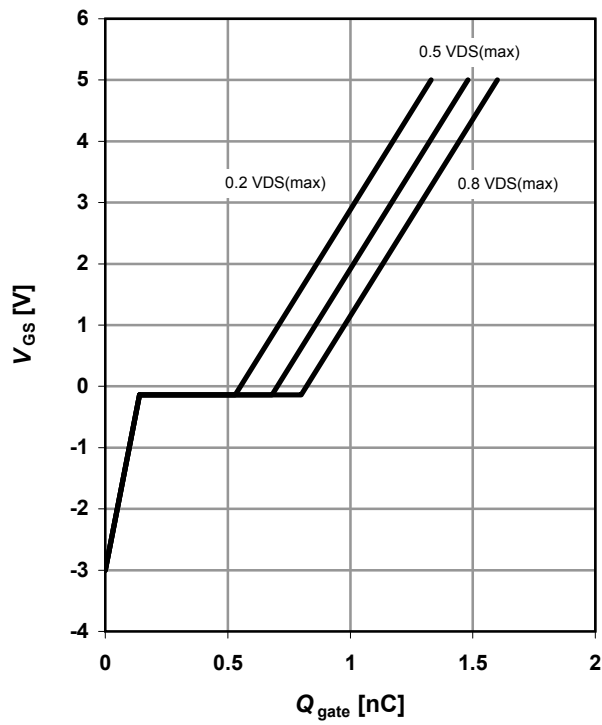
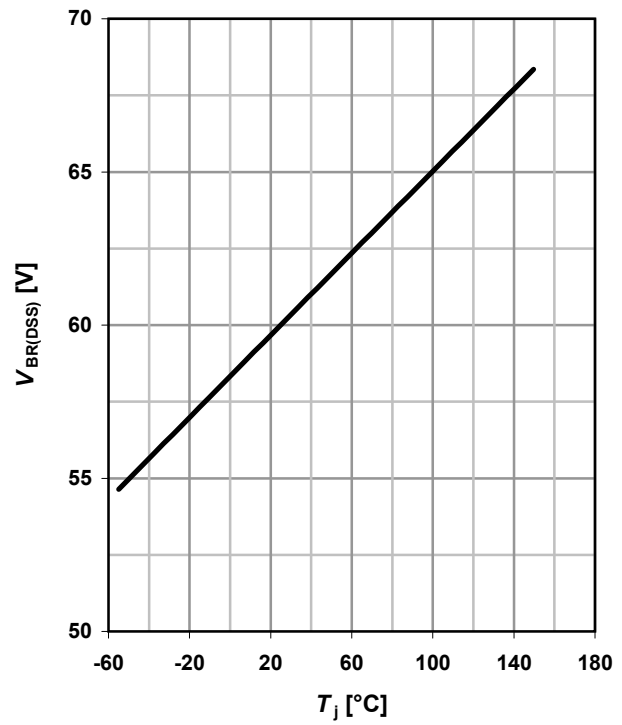

12 Forward characteristics of reverse diode

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

parameter: T_j



14 Typ. gate charge
 $V_{GS}=f(Q_{gate}); I_D=0.16\text{ A pulsed}$

parameter: V_{DD}

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


Technical drawing of a mechanical part, showing front and side views with dimensions and tolerances.

Front View (Left):

- Overall width: 2.9 ± 0.1
- Top surface feature: 3 (with tolerance ± 0.05)
- Bottom surface features: 1 (with tolerance ± 0.05) and 2 (with tolerance ± 0.05)
- Dimension 0.4 with tolerance $+0.1 / -0.05$
- Dimension 0.95
- Dimension 1.9
- Surface finish: $+0.2$ acc. to DIN 6784
- Feature A: Top surface
- Feature B: Right side surface
- Feature C: Bottom surface

Side View (Right):

- Overall height: 1.3 ± 0.1
- Top surface feature: 1.1 MAX.
- Dimension 0.1 MAX.
- Dimension 2.6 MAX.
- Angle 10° MAX.
- Angle 10° MAX.
- Dimension 0.08...0.15
- Angle $2^\circ \dots 30^\circ$
- Surface finish: ± 0.20 (M) A

Feature A: Top surface

Feature B: Right side surface

Feature C: Bottom surface

Technical drawing of a mechanical part showing three views: front, top, and side. The front view shows a rectangular part with three circular holes and a central slot. Dimensions include a width of 4, a height of 2.65, and a total height of 8. The top view shows a width of 3.15. The side view shows a thickness of 0.2 and a width of 1.15.

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