

OptiMOS™-5 Power-Transistor



Features

- OptiMOS™ - power MOSFET for automotive applications
- N-channel - Enhancement mode - Logic Level
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green product (RoHS compliant)
- 100% Avalanche tested

Quality Features

- Infineon Automotive Quality
- Extended qualification beyond AEC Q101
- Enhanced testing
- Advanced adhesion against delamination
- Complementary testing for board level reliability



Advanced
adhesion



Robust

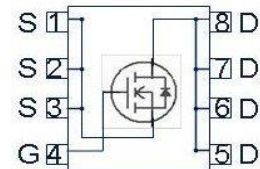
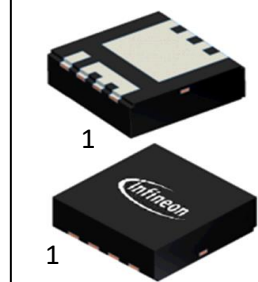


Enhanced
tested

Product Summary

V_{DS}	80	V
$R_{DS(on)}$	30	mΩ
I_D	20	A

PG-TSDSON-8



Type	Package	Marking
IAUZ20N08S5L300	PG-TSDSON-8	5N8L300

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ °C}, V_{GS}=10\text{ V}$	20	A
		$T_C=100\text{ °C}, V_{GS}=10\text{ V}^{1)}$	14	
Pulsed drain current ¹⁾	$I_{D,pulse}$	$T_C=25\text{ °C}$	80	
Avalanche energy, single pulse ¹⁾	E_{AS}	$I_D=10\text{ A}$	20	mJ
Avalanche current, single pulse	I_{AS}	-	10	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	30	W
Operating and storage temperature	T_J, T_{stg}	-	-55 ... +175	°C
IEC climatic category; DIN IEC 68-1	-	-	55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics¹⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	5	K/W
Thermal resistance, junction - ambient ²⁾	R_{thJA}	-	-	40	-	

Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	80	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=8\text{ }\mu\text{A}$	1.2	1.6	2.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	-	1	μA
		$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=85\text{ °C}^{1)}$	-	-	100	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=10\text{ A}$	-	29.8	41.0	$\text{m}\Omega$
		$V_{GS}=10\text{ V}, I_D=10\text{ A}$	-	22.4	30	
Gate resistance ¹⁾	R_G		-	0.9	-	Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics¹⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V},$ $f=1\text{ MHz}$	-	461	599	pF
Output capacitance	C_{oss}		-	83	108	
Reverse transfer capacitance	C_{rss}		-	7.7	11.6	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V},$ $I_D=20\text{ A}, R_G=3.5\text{ }\Omega$	-	2	-	ns
Rise time	t_r		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	5	-	
Fall time	t_f		-	3	-	

Gate Charge characteristics¹⁾

Gate to source charge	Q_{gs}	$V_{DD}=40\text{ V}, I_D=10\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	1.5	1.9	nC
Gate to drain charge	Q_{gd}		-	1.8	2.7	
Gate charge total	Q_g		-	8.1	10.5	
Gate plateau voltage	$V_{plateau}$		-	3.2	-	V

Reverse Diode

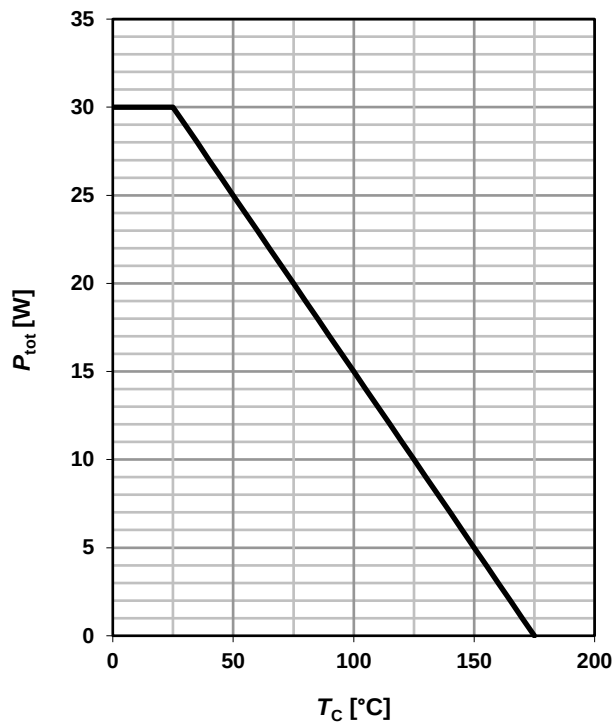
Diode continuous forward current ¹⁾	I_S	$T_C=25\text{ }^\circ\text{C}$	-	-	20	A
Diode pulse current ¹⁾	$I_{S,pulse}$		-	-	43	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=10\text{ A},$ $T_J=25\text{ }^\circ\text{C}$	-	0.9	1.2	V
Reverse recovery time ¹⁾	t_{rr}	$V_R=40\text{ V}, I_F=20\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	29	-	ns
Reverse recovery charge ¹⁾	Q_{rr}		-	20	-	nC

¹⁾ The parameter is not subject to production test - verified by design/characterization.

²⁾ Device on four layer 2s2p PCB defined in accordance with JEDEC standards (JESD51-5-7).
PCB is vertical in still air.

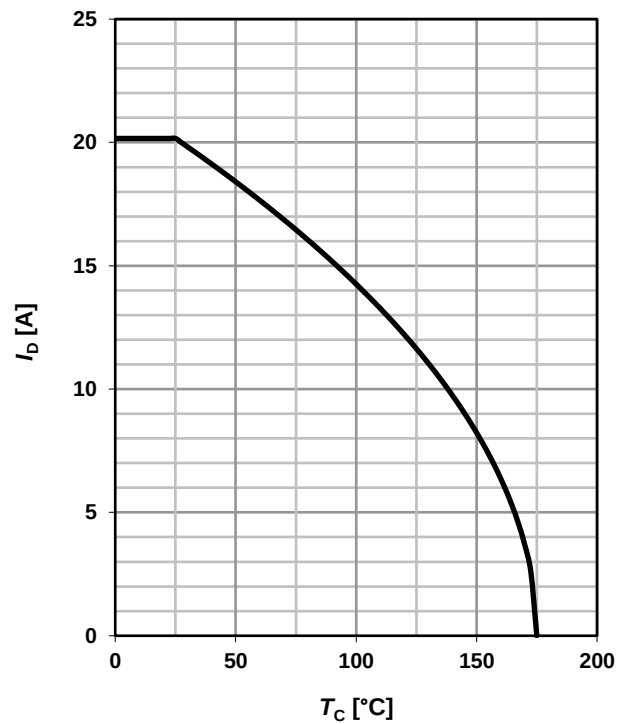
1 Power dissipation

$$P_{\text{tot}} = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



2 Drain current

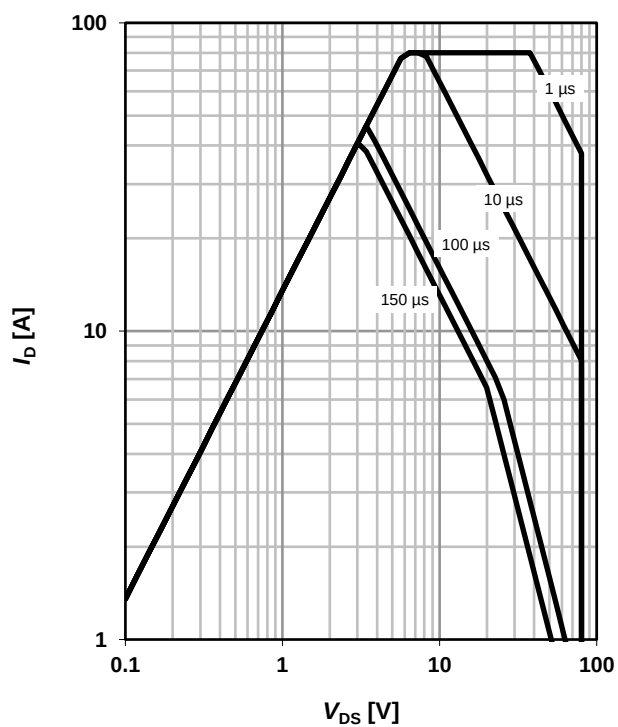
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{\text{DS}}); T_C = 25 \text{ °C}; D = 0$$

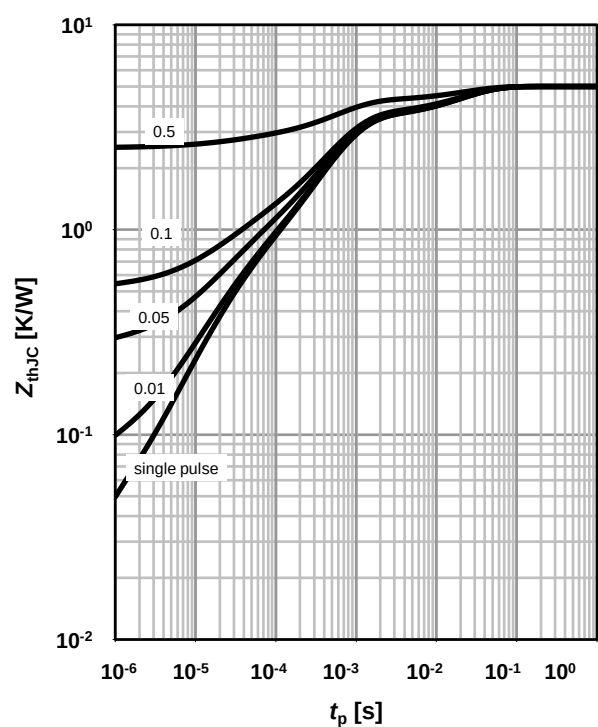
parameter: t_p



4 Max. transient thermal impedance

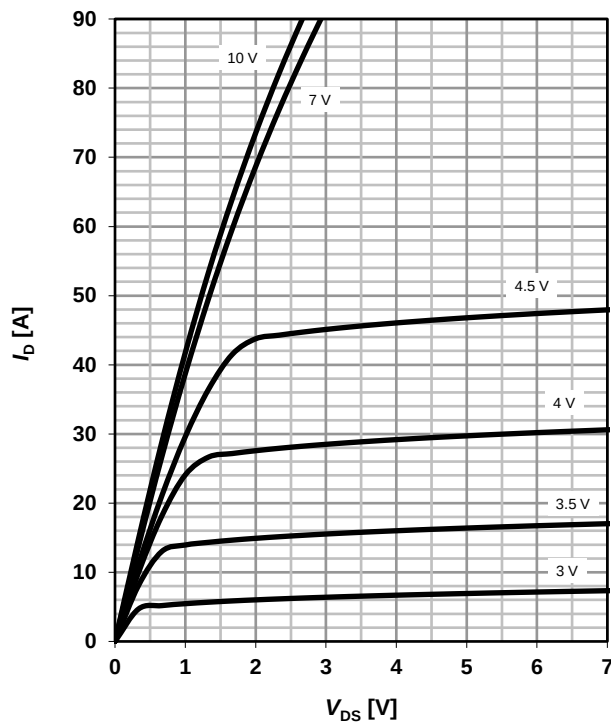
$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$



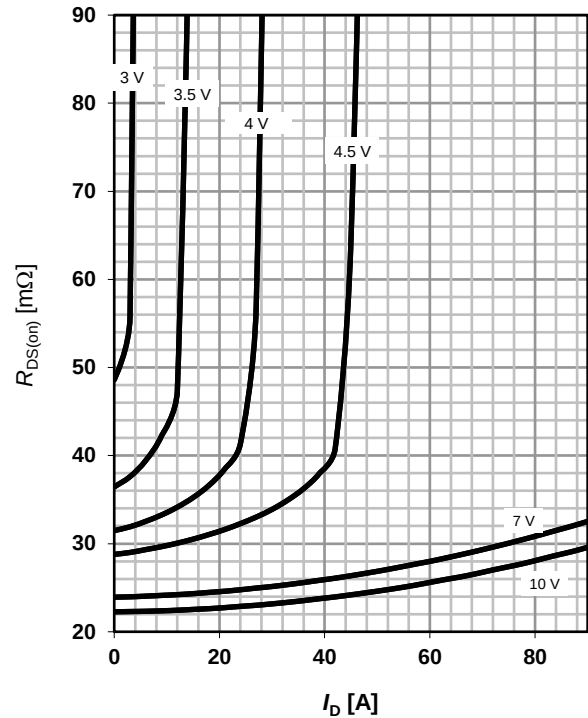
5 Typ. output characteristics

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

parameter: V_{GS}


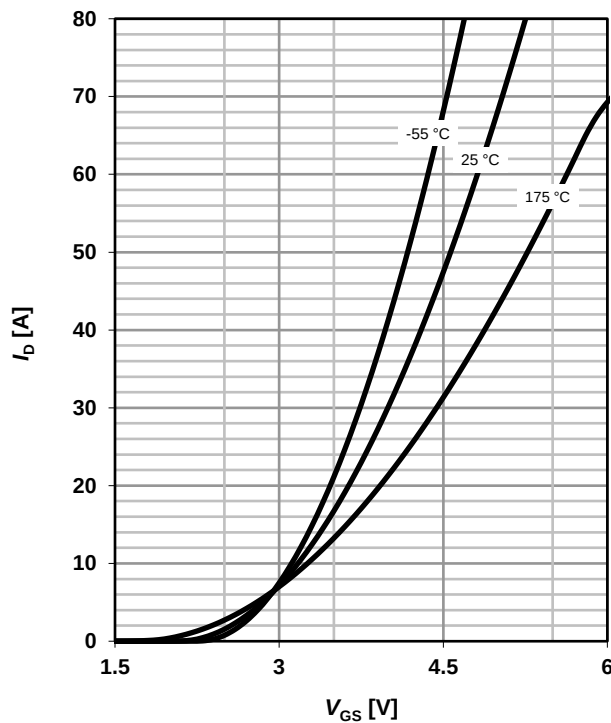
6 Typ. drain-source on-state resistance

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

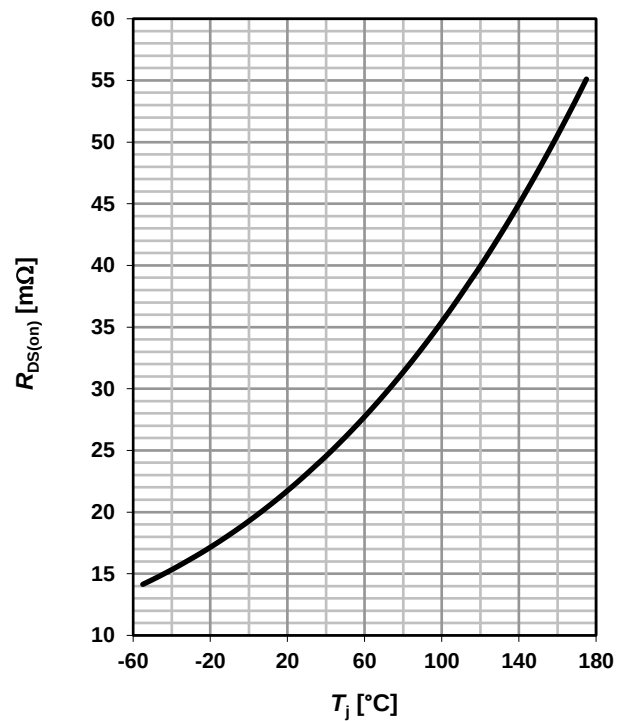
parameter: V_{GS}


7 Typ. transfer characteristics

 $I_D = f(V_{GS}); V_{DS} = 6\text{ V}$

parameter: T_j


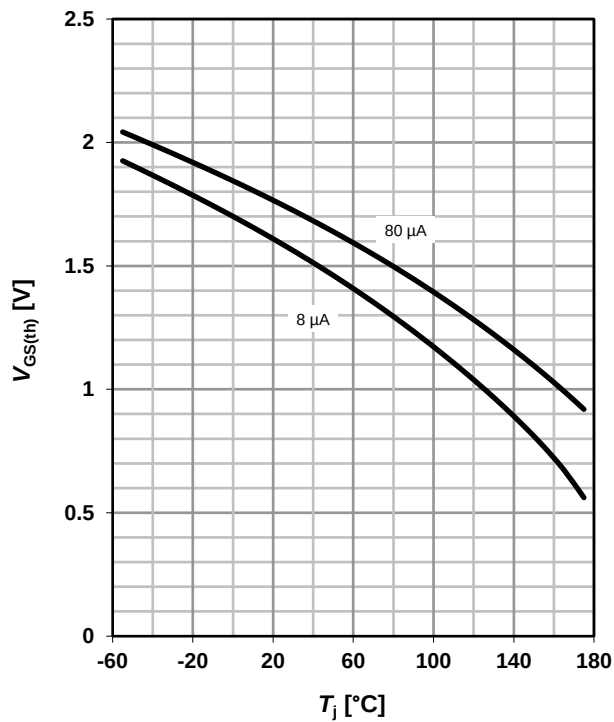
8 Typ. drain-source on-state resistance

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


9 Typ. gate threshold voltage

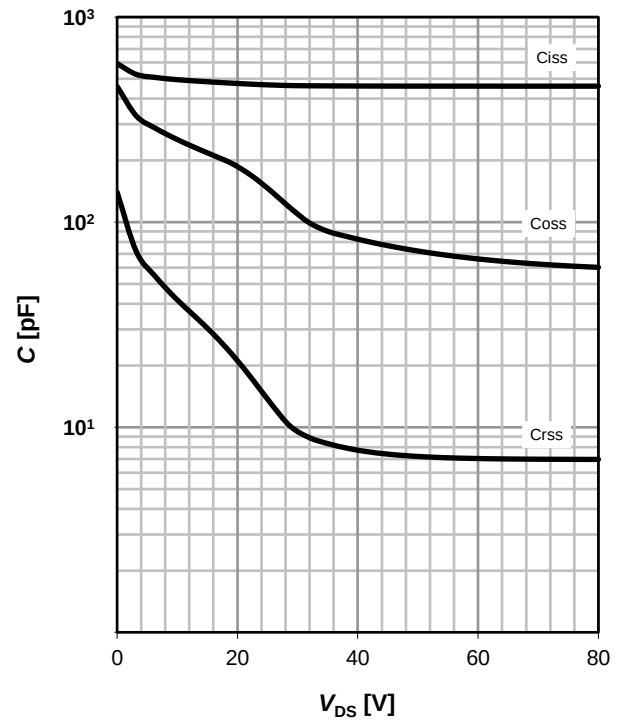
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 Typ. capacitances

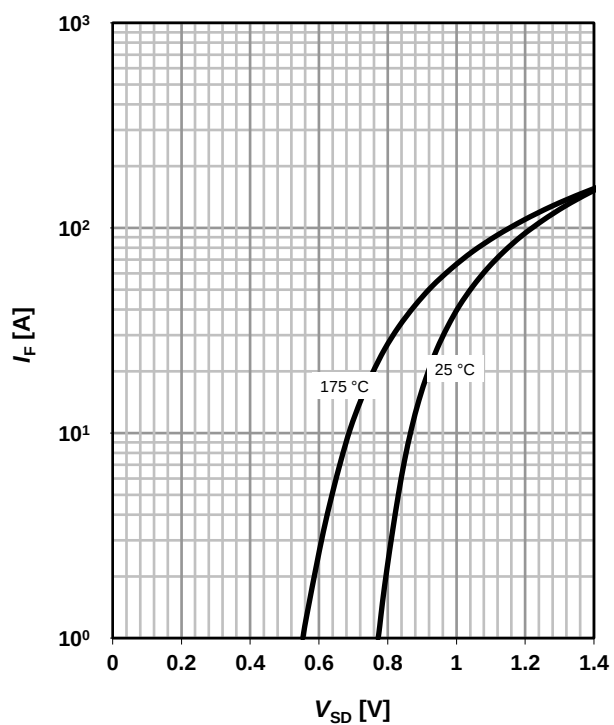
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$$



11 Typical forward diode characteristics

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

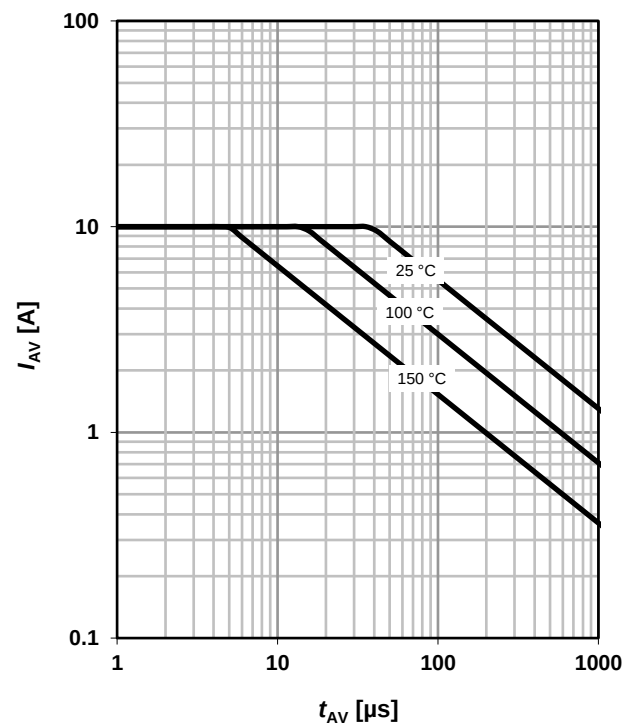
parameter: T_j



12 Typ. avalanche characteristics

$$I_{AS} = f(t_{AV})$$

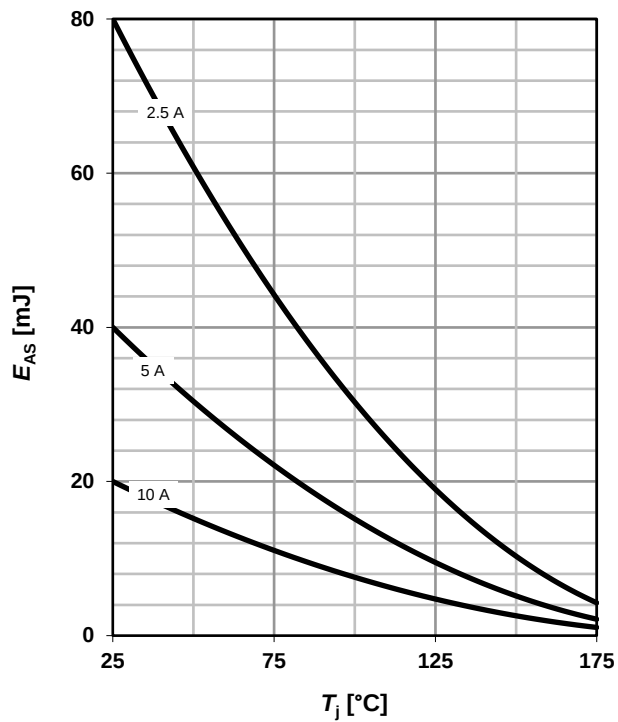
parameter: $T_{j(start)}$



13 Typical avalanche energy

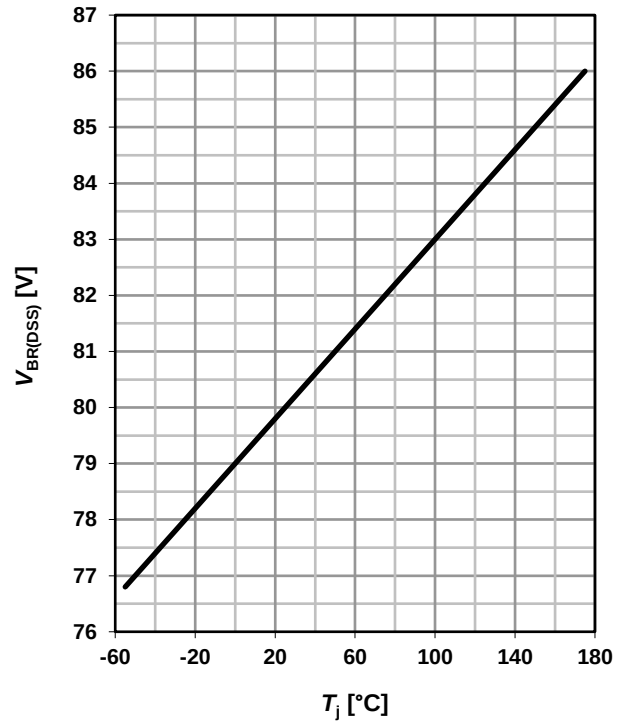
$$E_{AS} = f(T_j)$$

parameter: I_D



14 Drain-source breakdown voltage

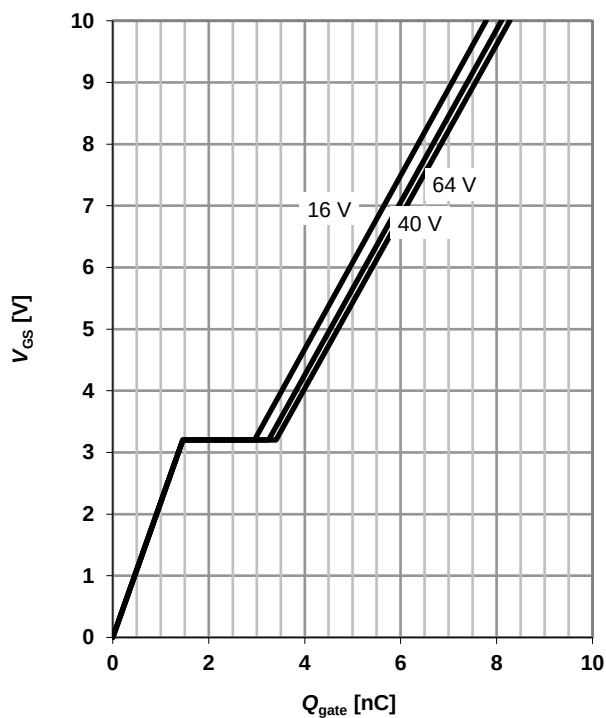
$$V_{BR(DSS)} = f(T_j); I_{D_typ} = 1 \text{ mA}$$



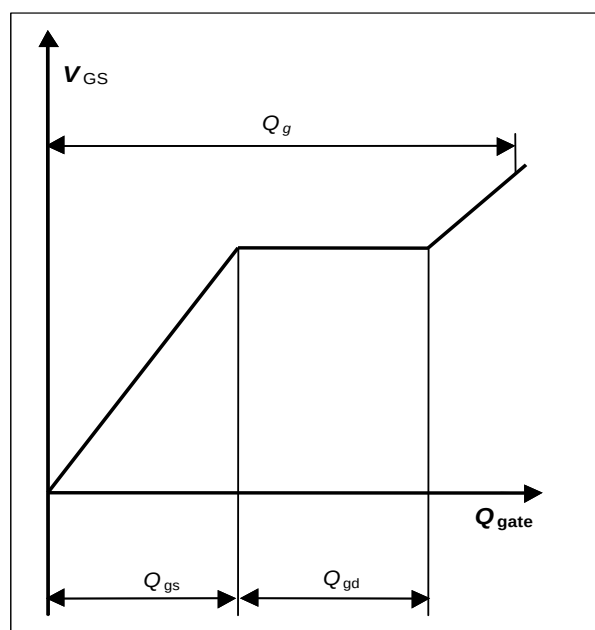
15 Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = 10 \text{ A pulsed}$$

parameter: V_{DD}



16 Gate charge waveforms



[illegible]

Technical drawings of a mechanical part, showing front, top, and side views with dimensions in millimeters.

Front View (Left):

- Overall width: 2.29
- Overall height: 2.36
- Top flange width: 0.65
- Top flange thickness: 0.34
- Bottom flange width: 0.65
- Bottom flange thickness: 0.34
- Central body width: 1.64
- Central body height: 0.9
- Central body thickness: 0.48
- Central body width (inner): 0.65
- Central body height (inner): 0.45
- Central body thickness (inner): 0.34

Top View (Right):

- Overall width: 0.31
- Overall height: 0.41
- Top flange width: 0.31
- Top flange thickness: 0.325
- Bottom flange width: 0.31
- Bottom flange thickness: 0.24
- Central body width: 1.09
- Central body height: 0.6
- Central body thickness: 0.35
- Central body width (inner): 0.67
- Central body height (inner): 0.2
- Central body thickness (inner): 0.24
- Central body width (inner): 0.41
- Central body height (inner): 0.24
- Central body thickness (inner): 0.41

Side View (Bottom):

- Overall width: 0.475
- Overall height: 1.22
- Top flange width: 0.35
- Top flange thickness: 0.35
- Bottom flange width: 0.35
- Bottom flange thickness: 0.35
- Central body width: 1.55
- Central body height: 0.6
- Central body thickness: 0.35
- Central body width (inner): 0.67
- Central body height (inner): 0.2
- Central body thickness (inner): 0.24
- Central body width (inner): 0.41
- Central body height (inner): 0.24
- Central body thickness (inner): 0.41

Technical drawing of a rectangular plate with the following dimensions and features:

- Overall width: 12
- Overall height: 12
- Distance between center lines of the three square holes: 8
- Distance from the left edge to the center line of the first square hole: 3.6
- Distance from the center line of the last square hole to the right edge: 3.6
- Height of the square holes: 3.6
- Thickness of the plate: 0.2
- Features: Three square holes with rounded corners and a small circular hole in the center of each. A label "PIN 1 INDEX MARKING" points to the top-left corner.

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