

OptiMOS™-5 Power-Transistor



Features

- OptiMOS™ - power MOSFET for automotive applications
- N-channel - Enhancement mode - Normal 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

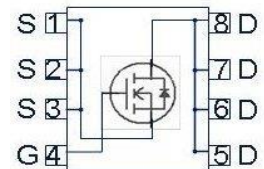
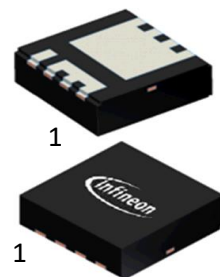


Enhanced tested

Product Summary

V_{DS}	80	V
$R_{DS(on)}$	10	mΩ
I_D	40	A

PG-TSDSON-8



Type	Package	Marking
IAUZ40N08S5N100	PG-TSDSON-8	5N08100

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ °C}, V_{GS}=10\text{ V}^{(1)}$	40	A
		$T_C=100\text{ °C}, V_{GS}=10\text{ V}^{(2)}$	40	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	$T_C=25\text{ °C}$	160	
Avalanche energy, single pulse ⁽²⁾	E_{AS}	$I_D=20\text{ A}$	75	mJ
Avalanche current, single pulse	I_{AS}	-	32	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	68	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 characteristics²⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	2.2	K/W
Thermal resistance, junction - ambient ³⁾	R_{thJA}		-	38.5	-	

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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=27\text{ }\mu\text{A}$	2.2	3	3.8	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	-	1	μA
		$V_{DS}=80\text{ V}, V_{GS}=0\text{ V}, T_j=85\text{ °C}^{2)}$	-	-	100	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=6\text{ V}, I_D=10\text{ A}$	-	11.6	14.5	m Ω
		$V_{GS}=10\text{ V}, I_D=20\text{ A}$	-	8.4	10	
Gate resistance ²⁾	R_G		-	1.2	-	Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics²⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=40\text{ V},$ $f=1\text{ MHz}$	-	1224	1591	pF
Output capacitance	C_{oss}		-	231	300	
Reverse transfer capacitance	C_{rss}		-	13.5	20	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=40\text{ V}, V_{GS}=10\text{ V},$ $I_D=40\text{ A}, R_G=3.5\ \Omega$	-	3	-	ns
Rise time	t_r		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	7	-	
Fall time	t_f		-	5	-	

Gate Charge Characteristics²⁾

Gate to source charge	Q_{gs}	$V_{DD}=40\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	5.8	7.5	nC
Gate to drain charge	Q_{gd}		-	4.5	6.8	
Gate charge total	Q_g		-	18.6	24.2	
Gate plateau voltage	$V_{plateau}$		-	4.8	-	V

Reverse Diode

Diode continuous forward current ²⁾	I_S	$T_C=25\text{ °C}$	-	-	40	A
Diode pulse current ²⁾	$I_{S,pulse}$		-	-	147	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=20\text{ A},$ $T_J=25\text{ °C}$	-	0.9	1.2	V
Reverse recovery time ²⁾	t_{rr}	$V_R=40\text{ V}, I_F=40\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	37	-	ns
Reverse recovery charge ²⁾	Q_{rr}		-	32	-	nC

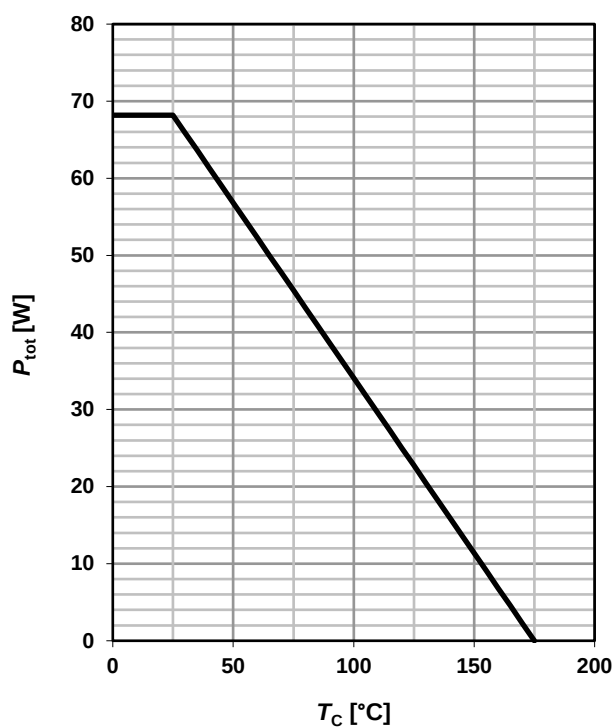
¹⁾ Current is limited by bondwire; with an $R_{thJC} = 2.2\text{ K/W}$ the chip is able to carry 58A at 25°C.

²⁾ The parameter is not subject to production test - verified by design/characterization.

³⁾ Device on four layer 2s2p PCB defined in accordance with JEDEC standards (JESD51-5-7).
PCB is vertical in still air.

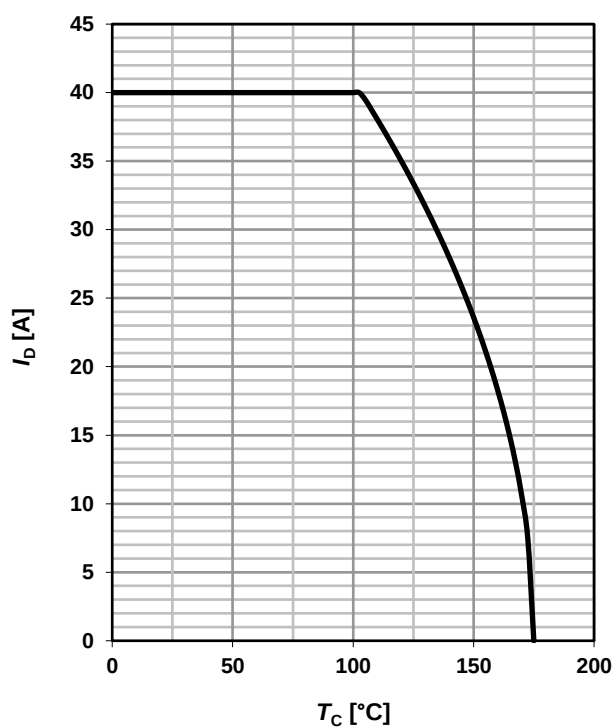
1 Power dissipation

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



2 Drain current

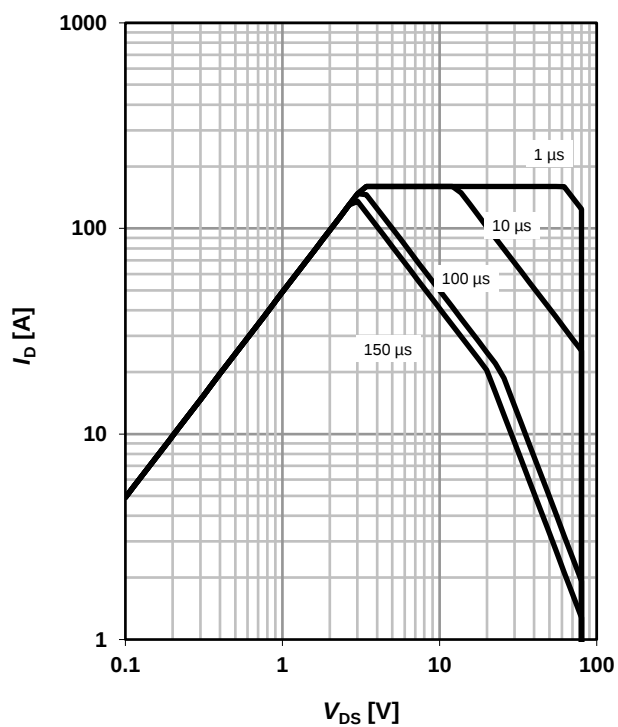
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



3 Safe operating area

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

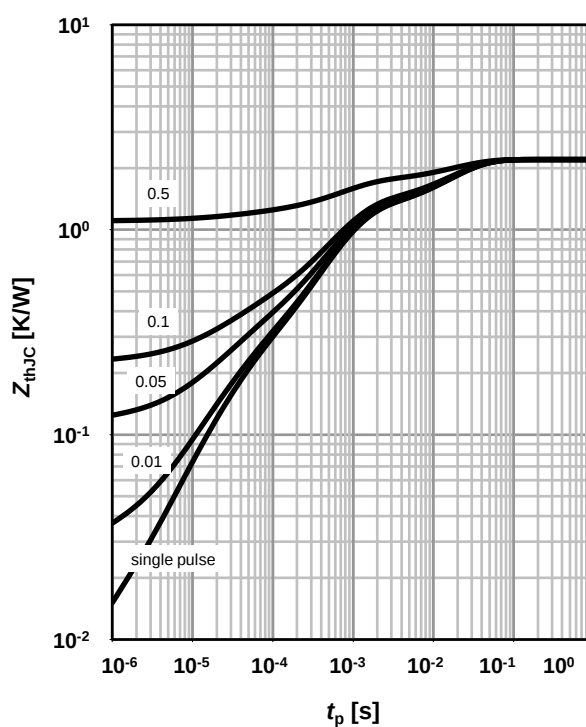
parameter: t_p



4 Max. transient thermal impedance

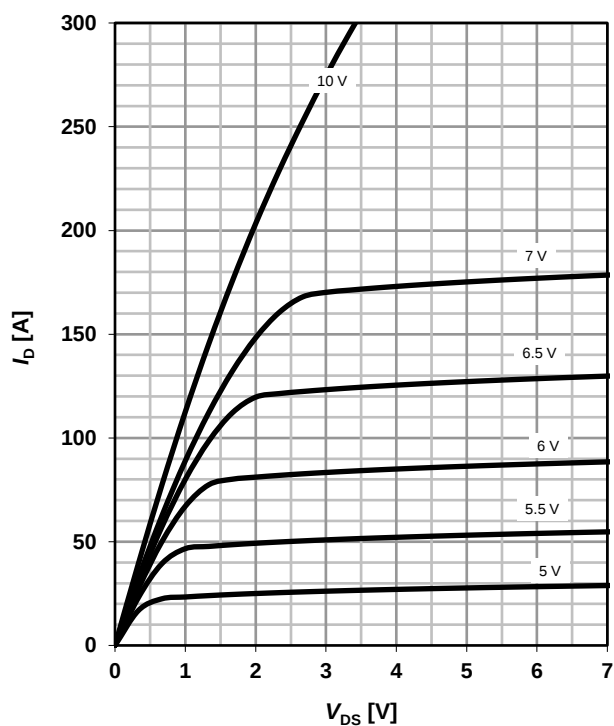
$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$



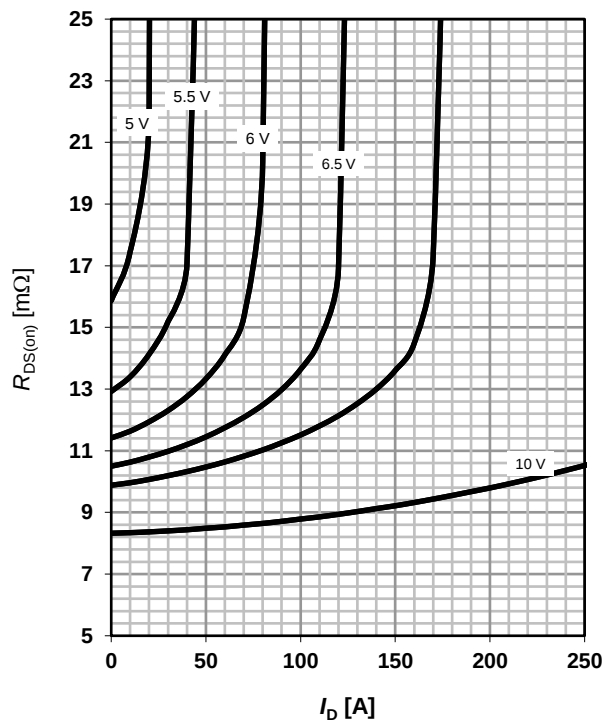
5 Typ. output characteristics

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

parameter: V_{GS}


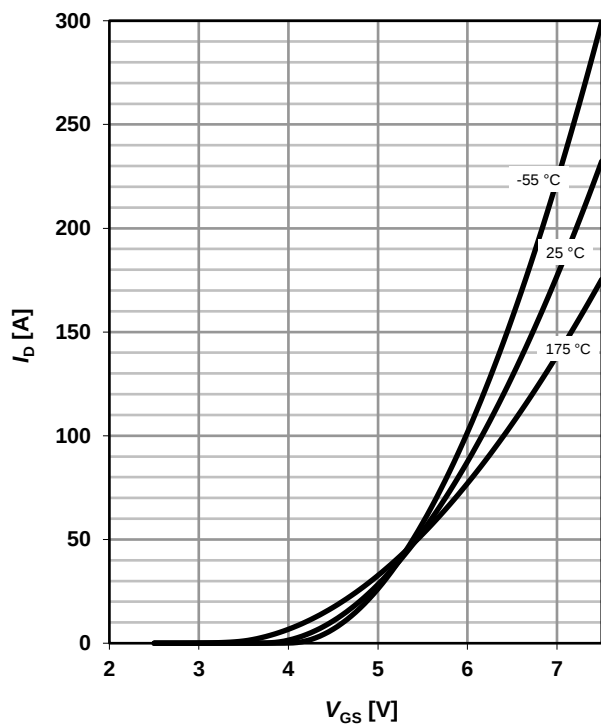
6 Typ. drain-source on-state resistance

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

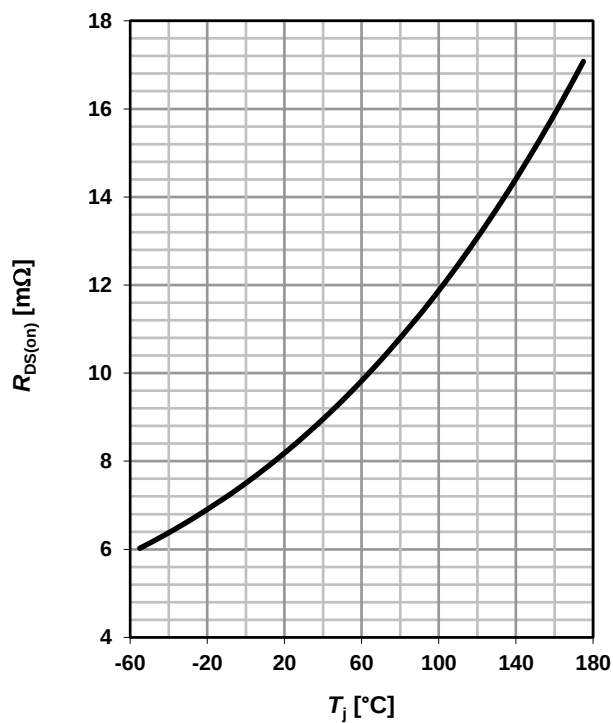
parameter: V_{GS}


7 Typ. transfer characteristics

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

parameter: T_j


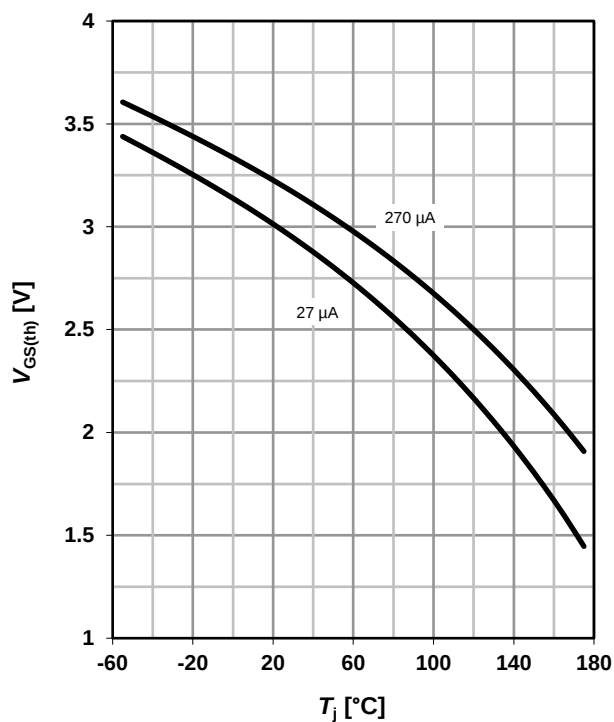
8 Typ. drain-source on-state resistance

 $R_{DS(on)} = f(T_j); I_D = 20\text{ A}; V_{GS} = 10\text{ V}$


9 Typ. gate threshold voltage

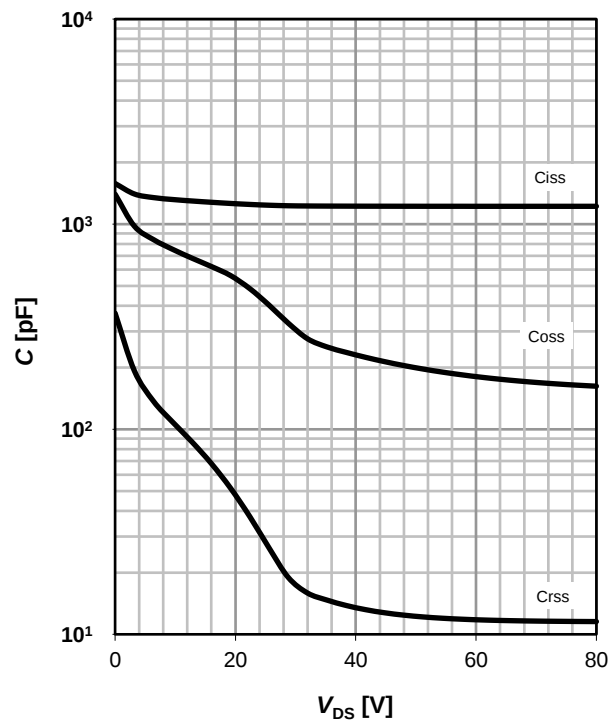
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 Typ. capacitances

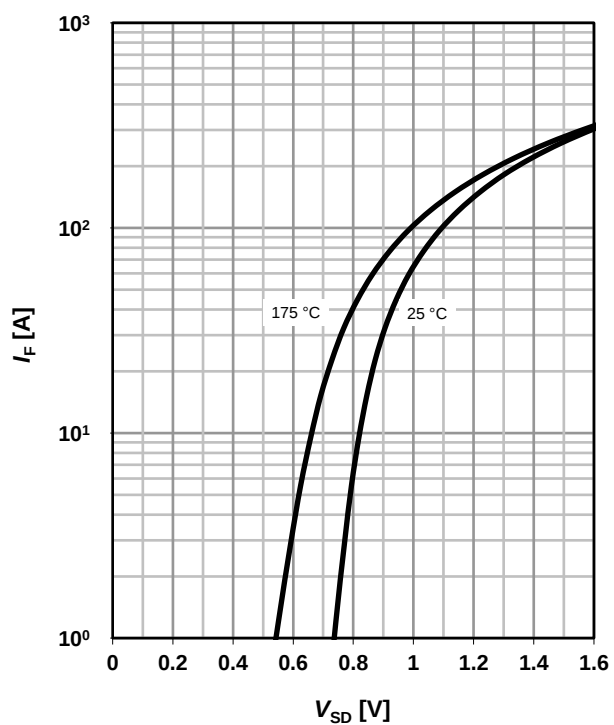
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$$



11 Typical forward diode characteristics

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

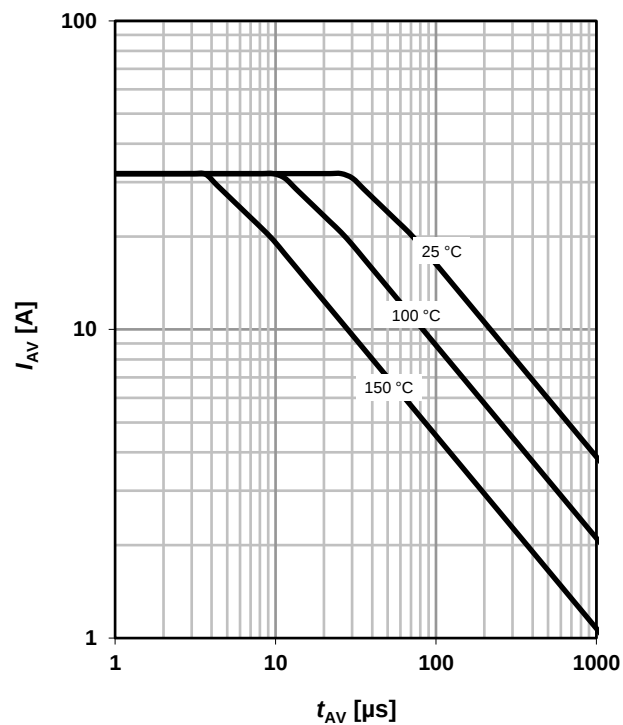
parameter: T_j



12 Typ. avalanche characteristics

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

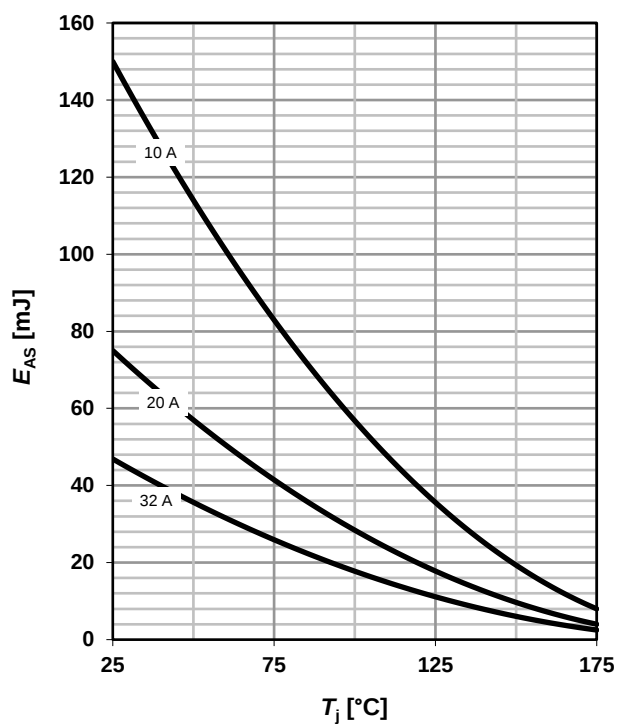
parameter: $T_{j(start)}$



13 Typical avalanche energy

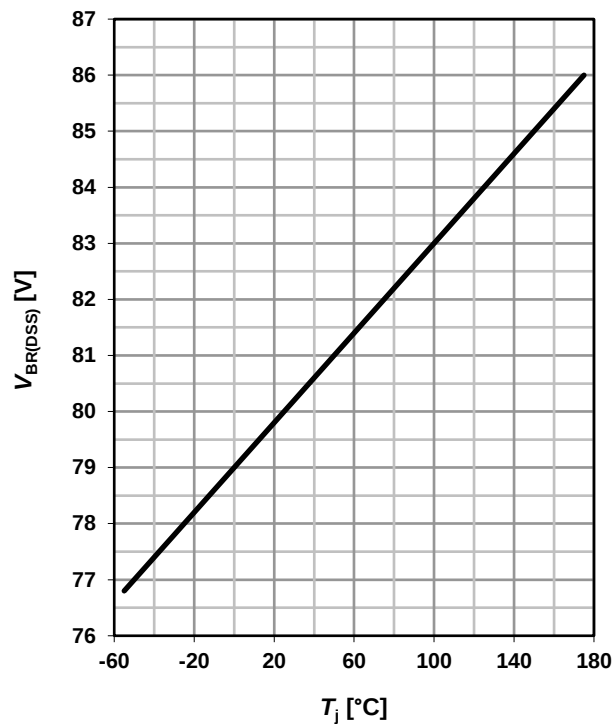
$$E_{AS} = f(T_j)$$

parameter: I_D



14 Drain-source breakdown voltage

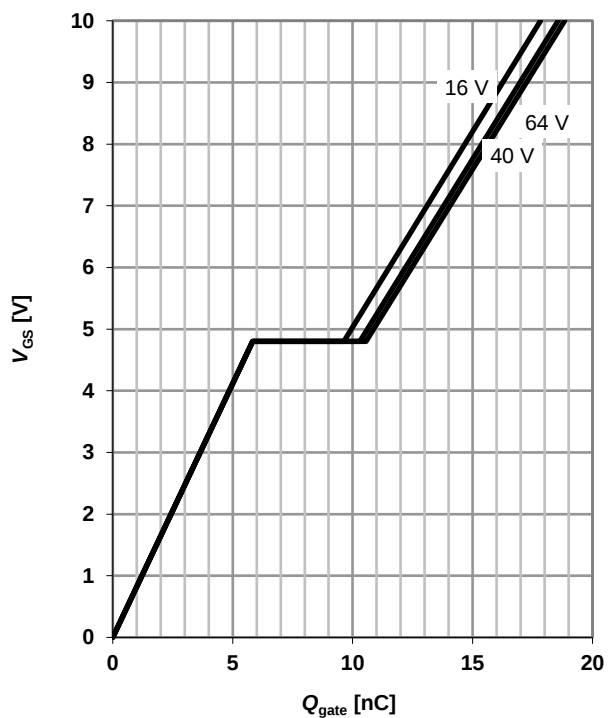
$$V_{BR(DSS)} = f(T_j); I_{D_typ} = 1 \text{ mA}$$



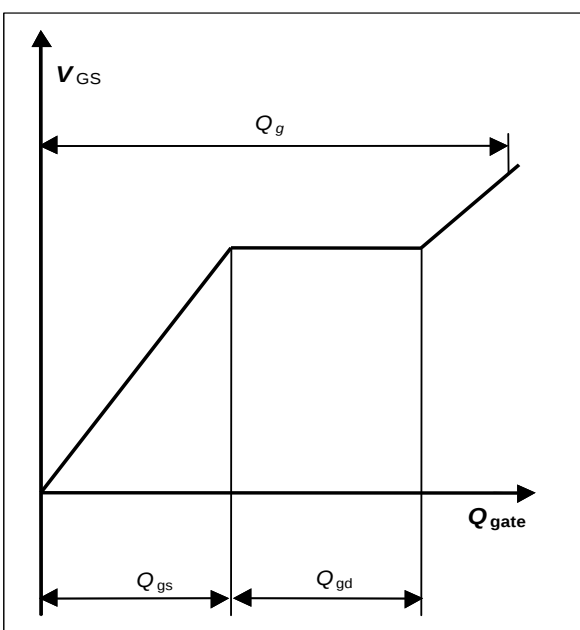
15 Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = 20 \text{ A pulsed}$$

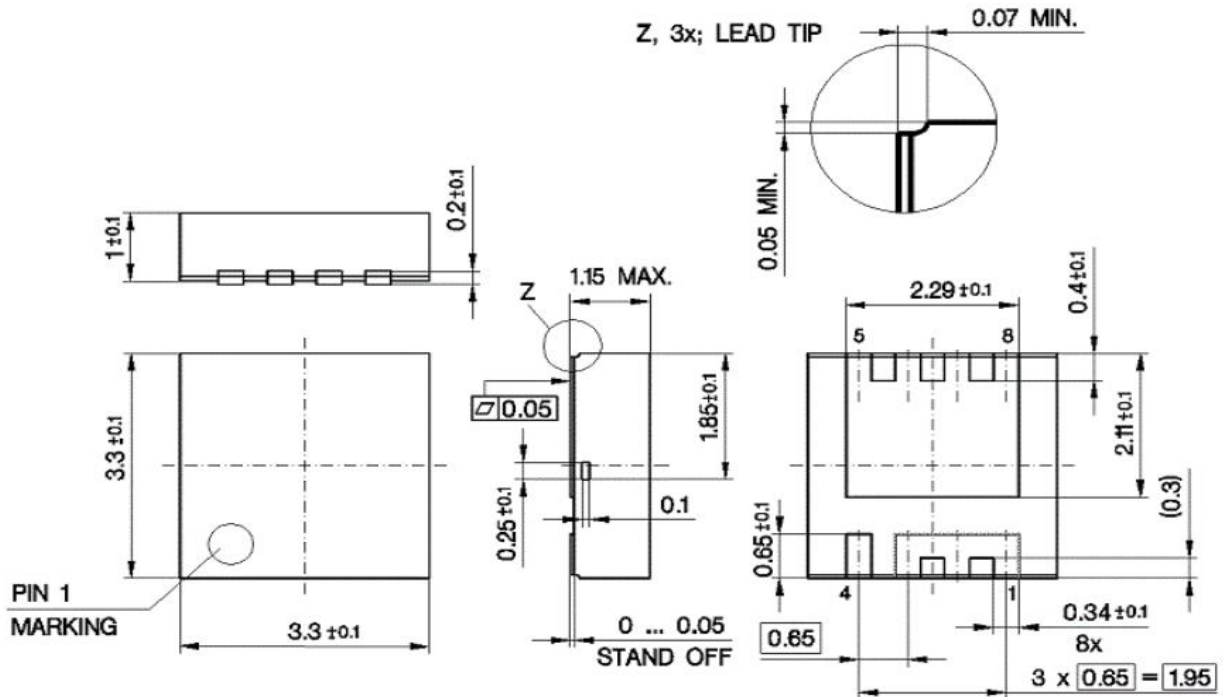
parameter: V_{DD}



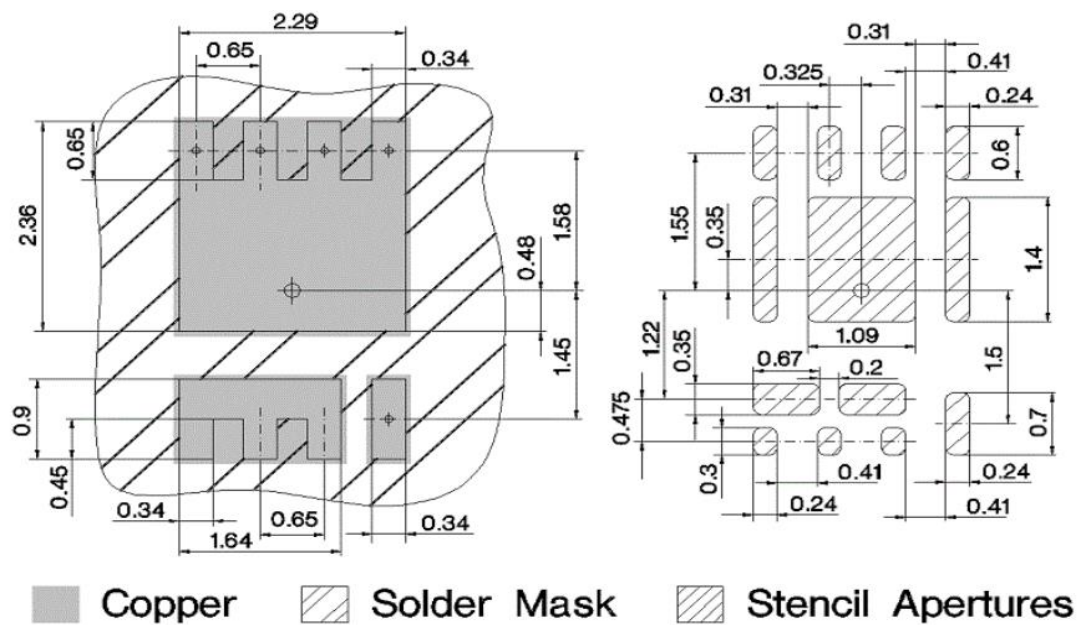
16 Gate charge waveforms



PG-TSDSON-8: Outline

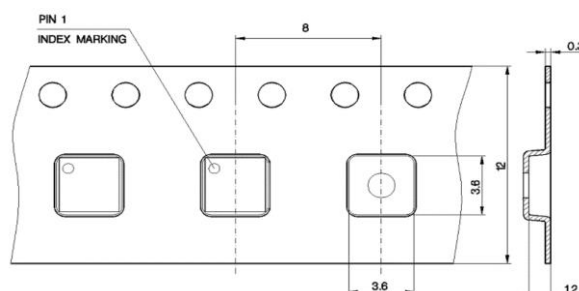


Footprint



Dimensions in mm

Packaging



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