

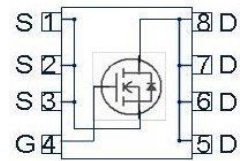
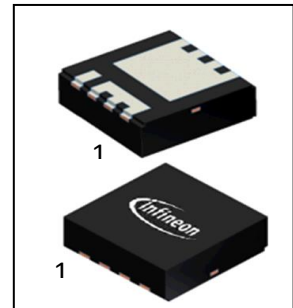
**OptiMOS™ -5 Power-Transistor**

**Product Summary**

$V_{DS}$	100	V
$R_{DS(on),max}$	42	mΩ
$I_D$	18	A

**Features**

- OptiMOS™ - power MOSFET for automotive applications
- N-channel - Enhancement mode - Logic Level
- AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green Product (RoHS compliant)
- 100% Avalanche tested
- Feasible for automatic optical inspection (AOI)

**PG-TSDSON-8**


Type	Package	Marking
IAUZ18N10S5L420	PG-TSDSON-8	5N1L420

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	$I_D$	$T_C=25\text{ °C}, V_{GS}=10\text{V}$	18	A
		$T_C=100\text{ °C}, V_{GS}=10\text{V}^{1)}$	13	
Pulsed drain current <sup>1)</sup>	$I_{D,pulse}$	$T_C=25\text{ °C}$	72	
Avalanche energy, single pulse <sup>1)</sup>	$E_{AS}$	$I_D=7\text{A}$	11	mJ
Avalanche current, single pulse	$I_{AS}$	-	7	A
Gate source voltage	$V_{GS}$	-	±20	V
Power dissipation	$P_{tot}$	$T_C=25\text{ °C}$ $T_J=175\text{ °C}$	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.	
<b>Thermal characteristics<sup>1)</sup></b>						
Thermal resistance, junction - case	$R_{thJC}$	-	-	-	5.0	K/W
Thermal resistance, junction - ambient	$R_{thJA}$	6 cm <sup>2</sup> cooling area <sup>2)</sup>	-	-	62	

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

**Static characteristics**

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1\text{mA}$	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=8\mu\text{A}$	1.2	1.7	2.2	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V, T_j=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{DS}=100V, V_{GS}=0V, T_j=125^\circ\text{C}^{1)}$	-	-	100	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=9A$	-	46	55	$\text{m}\Omega$
		$V_{GS}=10V, I_D=9A$	-	34.5	42	
Gate resistance <sup>1)</sup>	$R_G$		-	1.8	-	$\Omega$

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics<sup>1)</sup>**

Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=50V,$ $f=1MHz$	-	356	470	pF
Output capacitance	$C_{oss}$		-	68	88	
Reverse transfer capacitance	$C_{rss}$		-	6	9	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50V, V_{GS}=10V,$ $I_D=18A, R_G=3.5\Omega$	-	1	-	ns
Rise time	$t_r$		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	3	-	
Fall time	$t_f$		-	3	-	

**Gate Charge Characteristics<sup>1)</sup>**

Gate to source charge	$Q_{gs}$	$V_{DD}=50V, I_D=9A,$ $V_{GS}=0$ to 10V	-	1.2	1.7	nC
Gate to drain charge	$Q_{gd}$		-	1.2	2.0	
Gate charge total	$Q_g$		-	5.4	8	
Gate plateau voltage	$V_{plateau}$		-	3.3	-	V

**Reverse Diode**

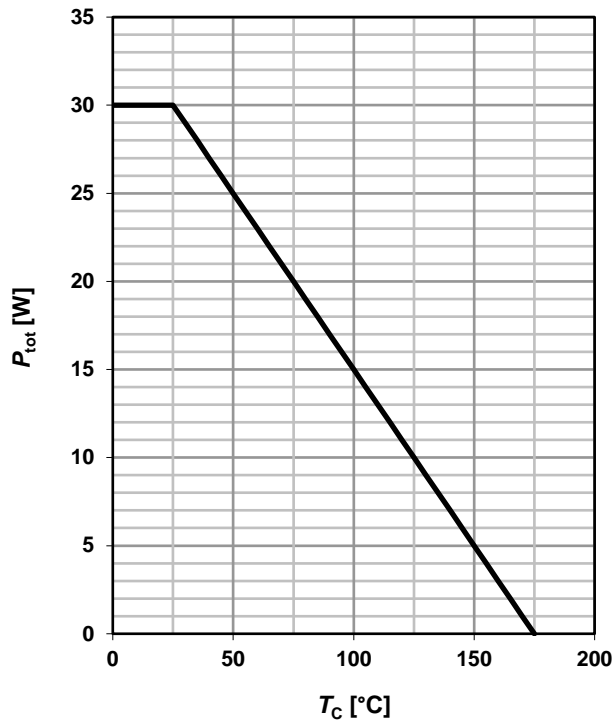
Diode continuous forward current <sup>1)</sup>	$I_S$	$T_C=25^\circ C$	-	-	18	A
Diode pulse current	$I_{S,pulse}$		-	-	72	
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_F=9A,$ $T_j=25^\circ C$	-	0.9	1.1	V
Reverse recovery time <sup>1)</sup>	$t_{rr}$	$V_R=50V, I_F=18A,$ $di_F/dt=100A/\mu s$	-	36	-	ns
Reverse recovery charge <sup>1)</sup>	$Q_{rr}$		-	33	-	nC

<sup>1)</sup> Specified by design. Not subject to production test.

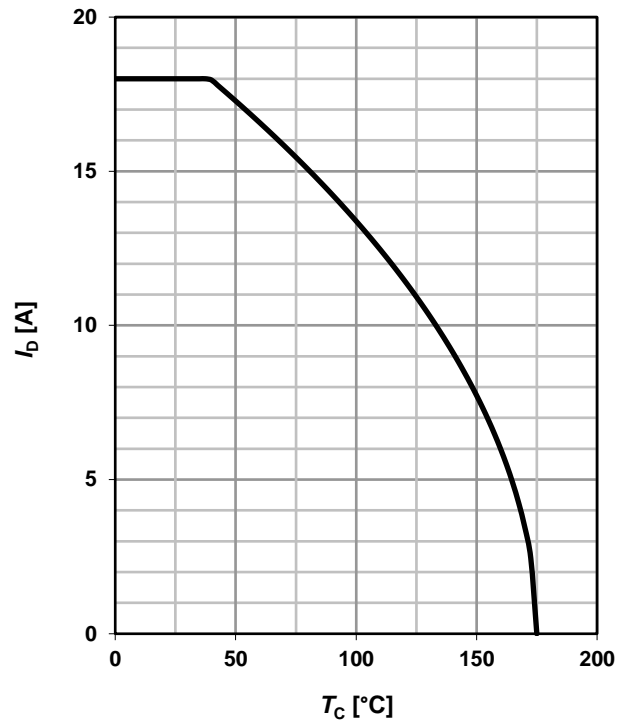
<sup>2)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

**1 Power dissipation**

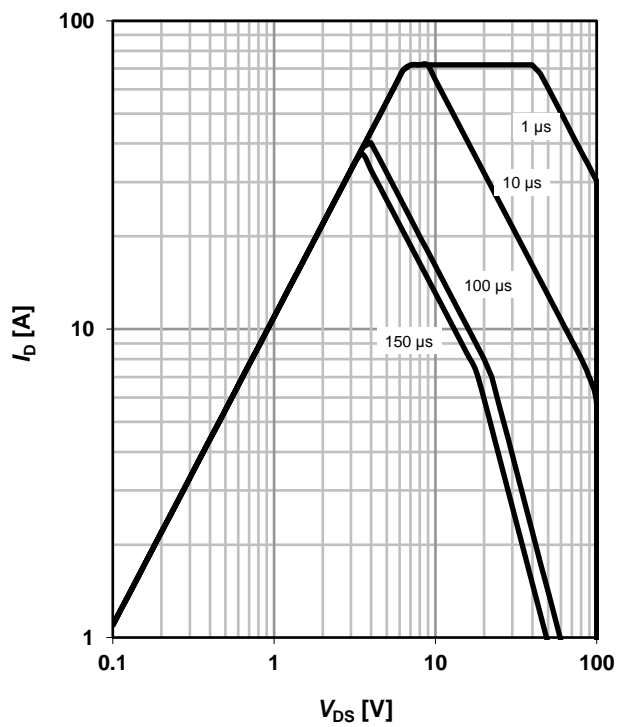
$$P_{\text{tot}} = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$


**2 Drain current**

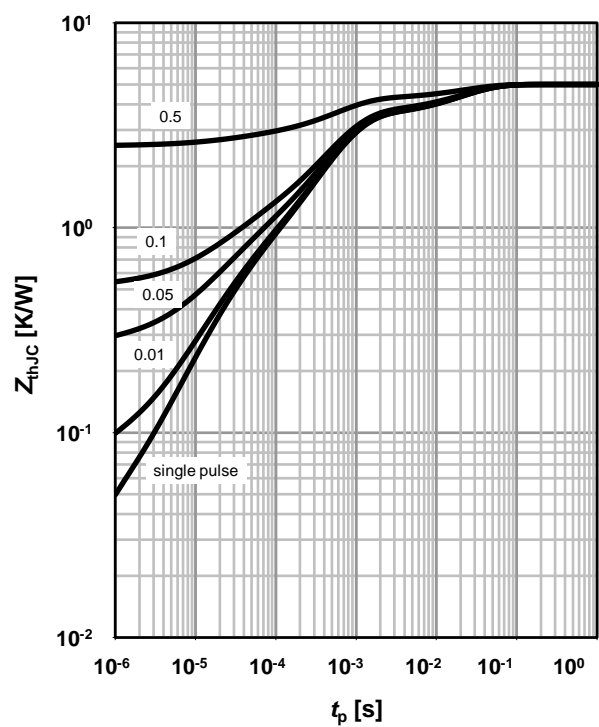
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$


**3 Safe operating area**

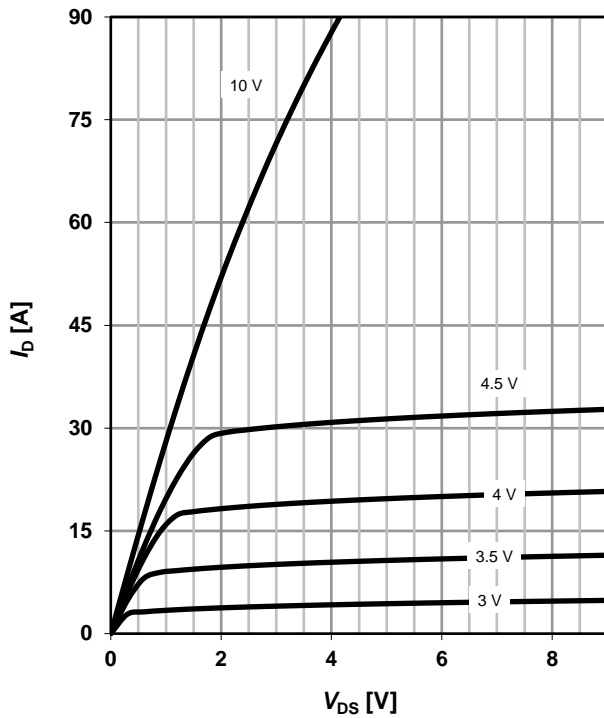
$$I_D = f(V_{\text{DS}}); T_C = 25 \text{ °C}; D = 0$$

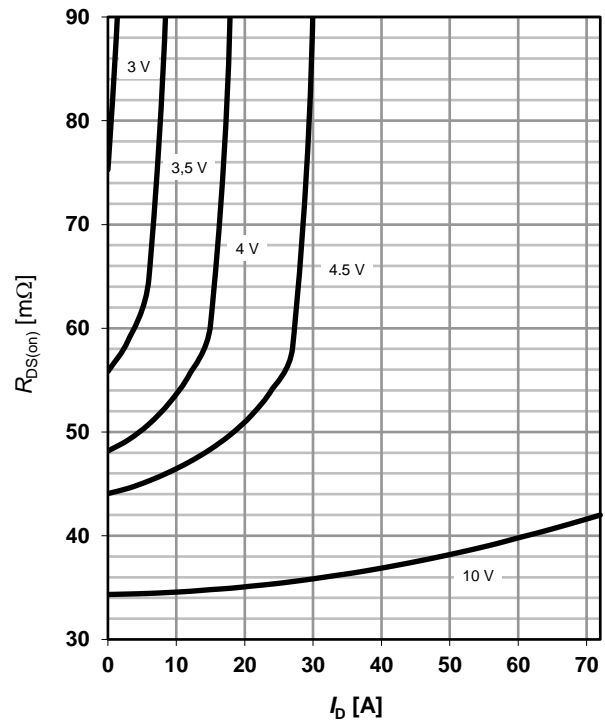
 parameter:  $t_p$ 

**4 Max. transient thermal impedance**

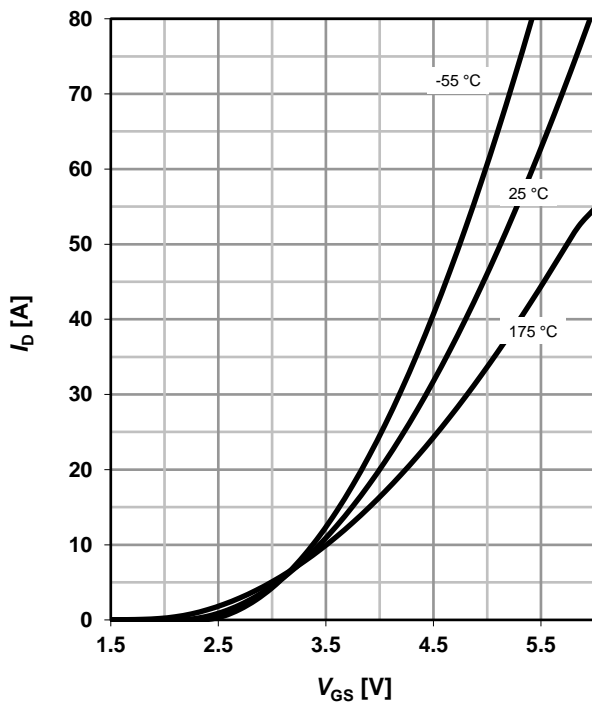
$$Z_{\text{thJC}} = f(t_p)$$

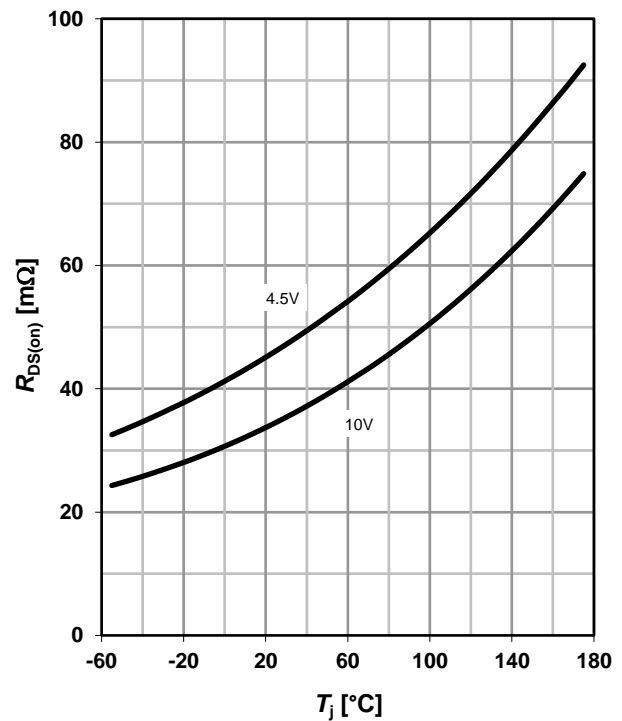
 parameter:  $D = t_p/T$ 


**5 Typ. output characteristics**
 $I_D = f(V_{DS}); T_j = 25\text{ °C}$ 

 parameter:  $V_{GS}$ 

**6 Typ. drain-source on-state resistance**
 $R_{DS(on)} = f(I_D); T_j = 25\text{ °C}$ 

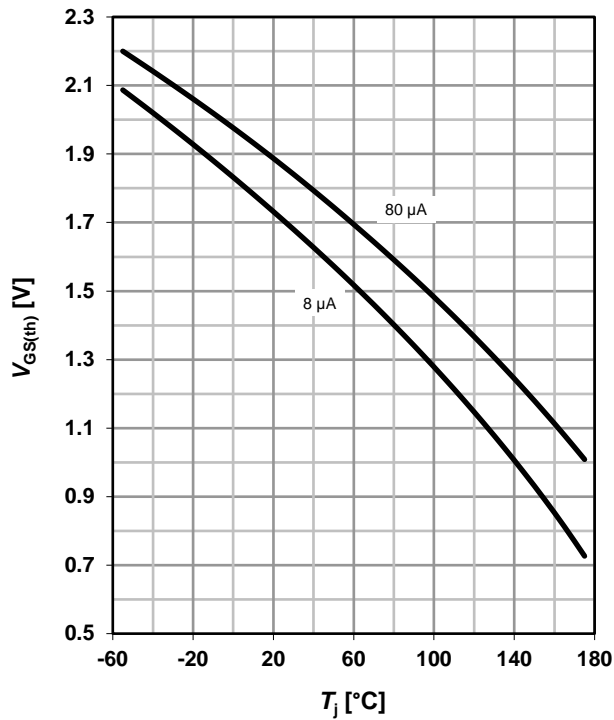
 parameter:  $V_{GS}$ 

**7 Typ. transfer characteristics**
 $I_D = f(V_{GS}); V_{DS} = 6V$ 

 parameter:  $T_j$ 

**8 Typ. drain-source on-state resistance**
 $R_{DS(on)} = f(T_j); I_D = 9\text{ A}$ 

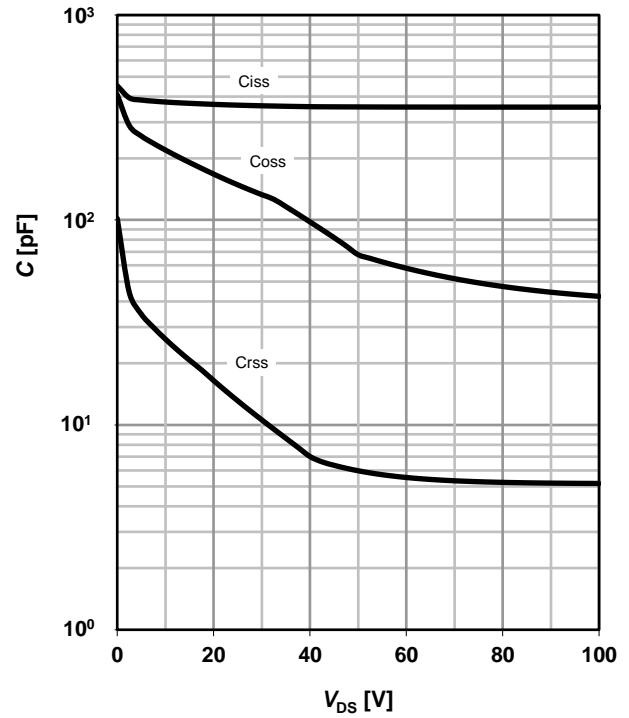
 Parameter:  $V_{GS}$ 


**9 Typ. gate threshold voltage**

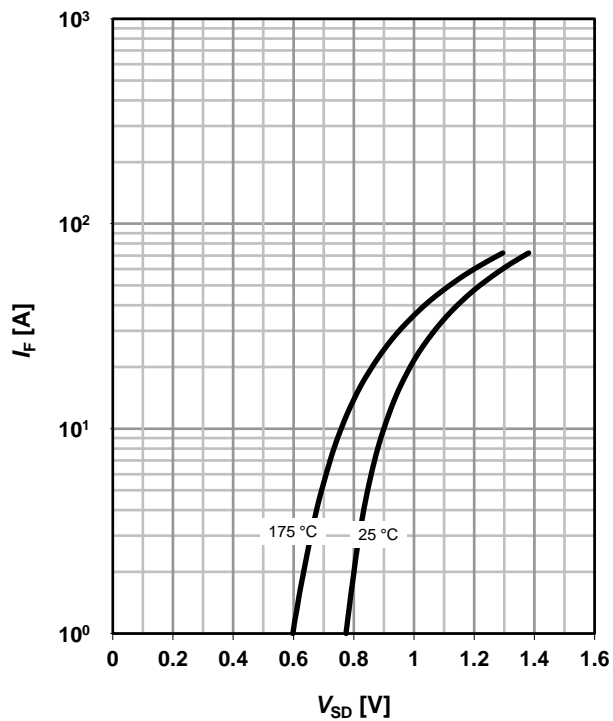
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

 parameter:  $I_D$ 

**10 Typ. capacitances**

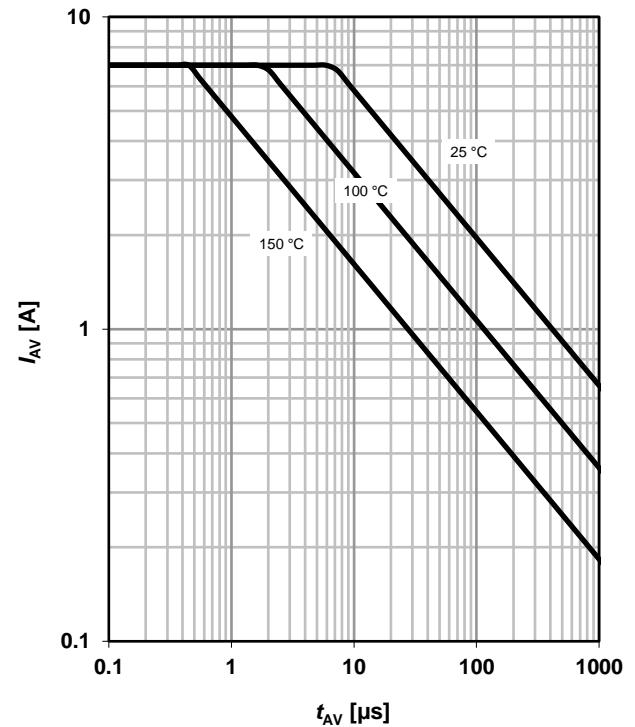
$$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$$


**11 Typical forward diode characteristics**

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

 parameter:  $T_j$ 

**12 Avalanche characteristics**

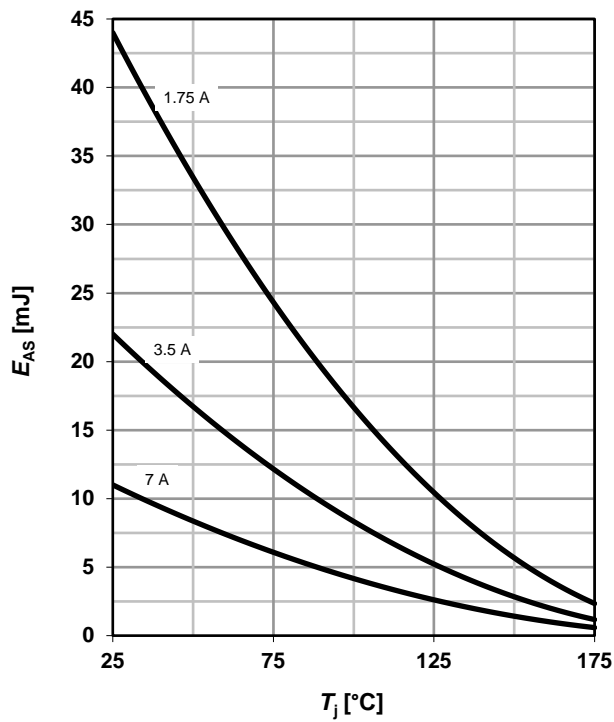
$$I_{AS} = f(t_{AV})$$

 parameter:  $T_{j(start)}$ 


### 13 Avalanche energy

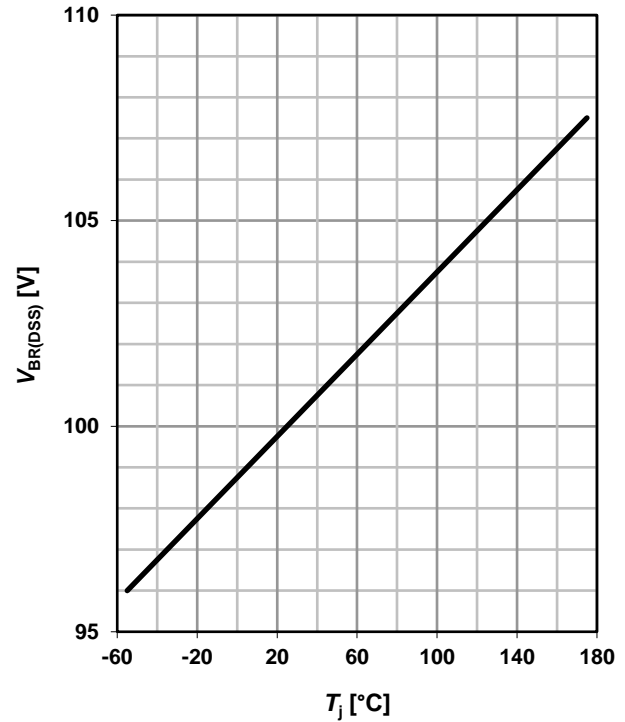
$$E_{AS} = f(T_j)$$

parameter:  $I_D$



### 14 Drain-source breakdown voltage

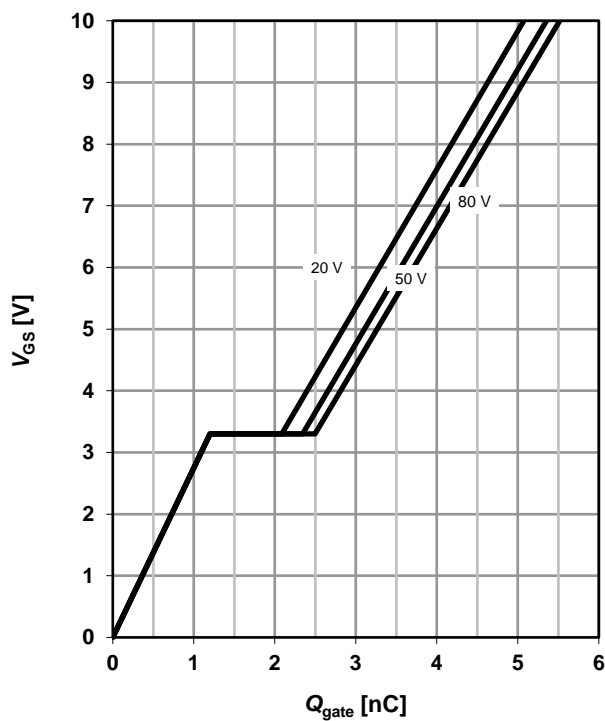
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$



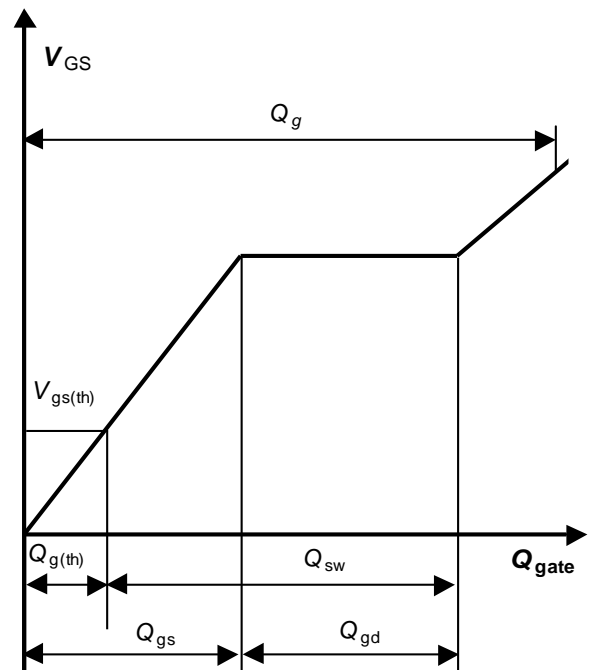
### 15 Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = 9 \text{ A pulsed}$$

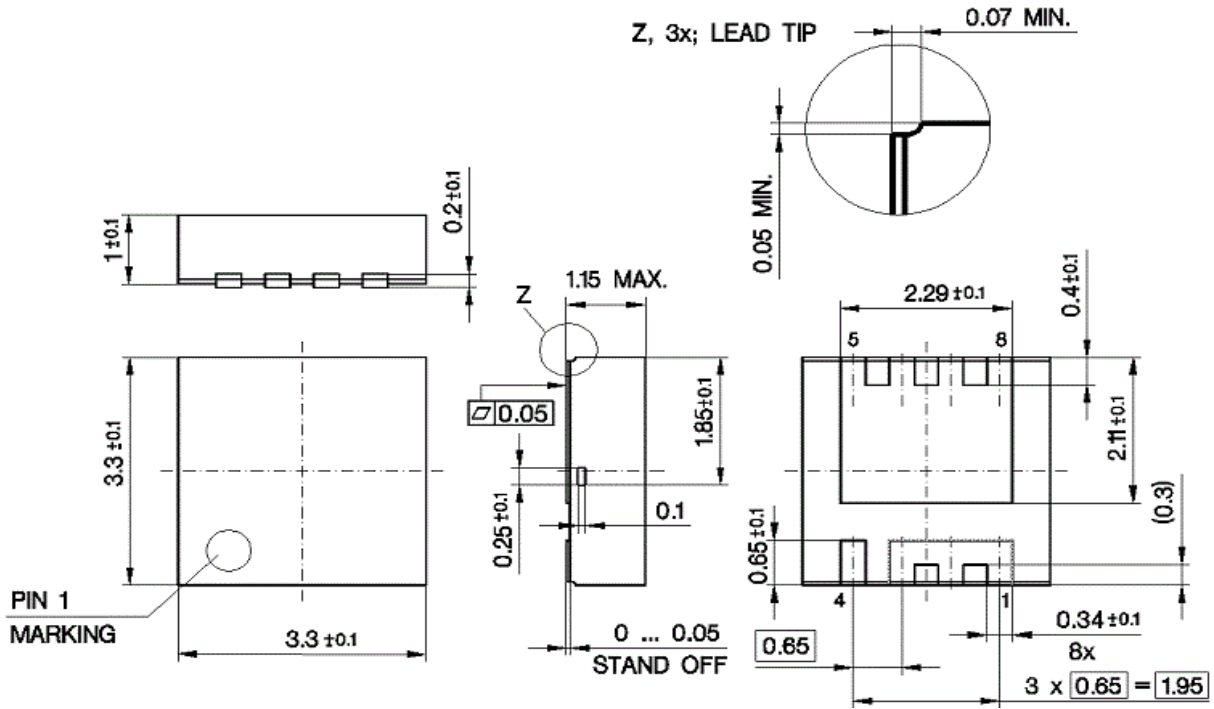
parameter:  $V_{DD}$



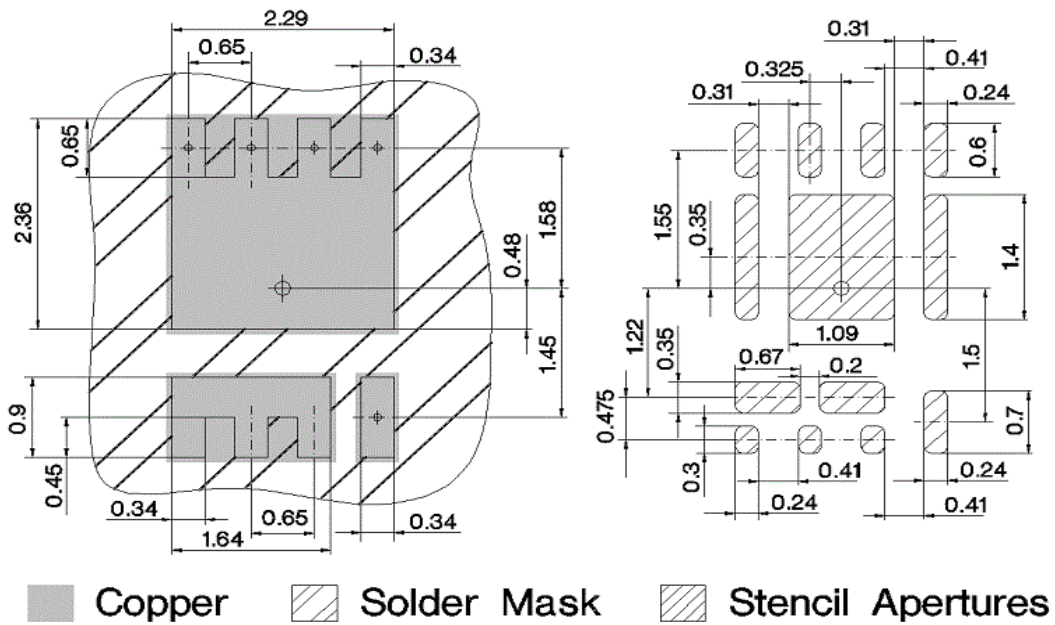
### 16 Gate charge waveforms



PG-TSDSON-8: Outline

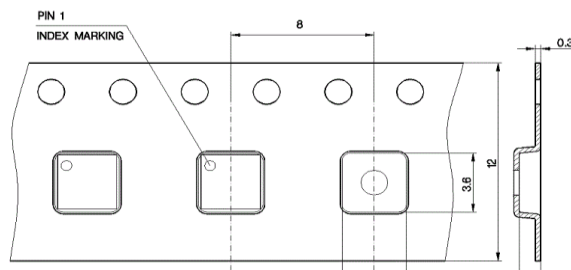


Footprint



Dimensions in mm

Packaging





**Published by**  
**Infineon Technologies AG**  
**85579 Neubiberg, Germany**

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If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

## Revision History

Version	Date	Changes
Revision 1.0	23.07.2019	Final Data Sheet