OptiMOS™-5 Power-Transistor

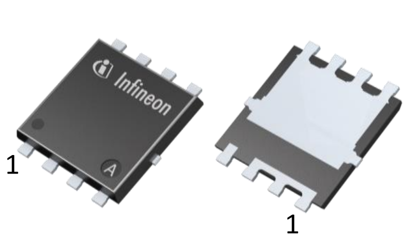
Product Summary

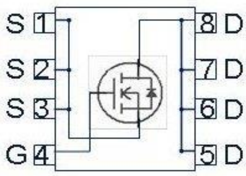
V_{DS}	100	V
$R_{DS(on)}$	30	mΩ
I_D	24	A

Features

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

PG-TDSON-8





Type	Package	Marking
IAUC24N10S5L300	PG-TDSON-8	5N10L300

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current[1)]	I_D	T_C=25°C, V_{GS}=10V	24	A
		T_C=100°C, V_{GS}=10V	16	
Pulsed drain current[1)]	$I_{D,pulse}$	T_C=25°C	96	
Avalanche energy, single pulse[1)]	E_{AS}	I_D=10A	15	mJ
Avalanche current, single pulse	I_{AS}	-	10	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	T_C=25°C, T_J =175°C	38	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics[1)]						
Thermal resistance, junction - case	R_{thJC}	-	-	-	3.9	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	6 cm^2 cooling area[2)]	-	-	50	

Electrical characteristics, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D= 1mA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D= 12µA	1.2	1.7	2.2	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_j=25 °C	-	-	1	µA
		V_{DS}=100V, V_{GS}=0V, T_j=125°C[1)]	-	-	20	
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=12A	-	31	37	mΩ
		V_{GS}=10 V, I_D=12 A	-	23.5	30	
Gate resistance[1)]	R_G		-	1.2	-	Ω

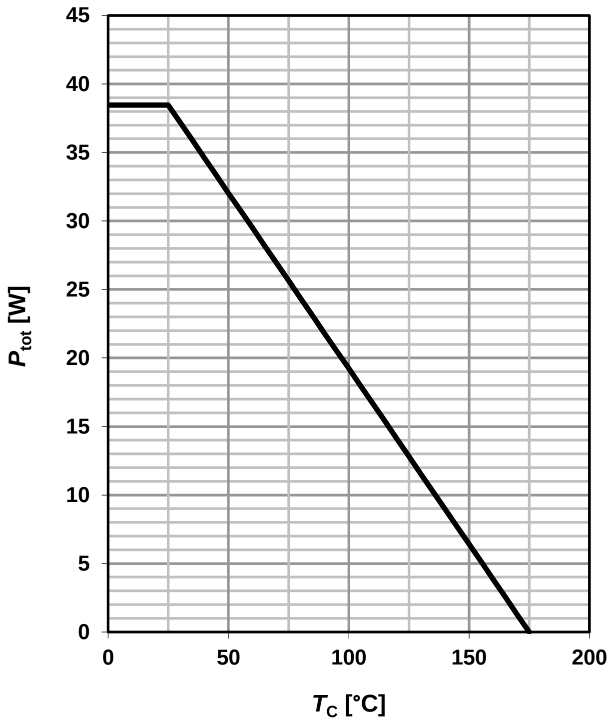
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[1)]						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=50V, f=1MHz	-	515	670	pF
Output capacitance	C_{oss}		-	93	121	
Reverse transfer capacitance	C_{rss}		-	7	11	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V, I_D=24A, R_G=3.5Ω	-	2	-	ns
Rise time	t_r		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	4	-	
Fall time	t_f		-	3	-	
Gate Charge Characteristics[1)]						
Gate to source charge	Q_{gs}	V_{DD}=50V, I_D=12A, V_{GS}=0 to 10V	-	1.7	2.2	nC
Gate to drain charge	Q_{gd}		-	1.6	2.4	
Gate charge total	Q_g		-	7.6	11	
Gate plateau voltage	$V_{plateau}$		-	3.3	-	V
Reverse Diode						
Diode continous forward current[1)]	I_S	T_C=25°C	-	-	24	A
Diode pulse current[1)]	$I_{S,pulse}$		-	-	96	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=12A, T_j=25°C	-	0.9	1.1	V
Reverse recovery time[1)]	t_{rr}	V_R=50V, I_F=24A, di_F/dt=100A/µs	-	37	-	ns
Reverse recovery charge[1)]	Q_{rr}		-	32	-	nC

[1)] Defined by design. Not subject to production test.

[2)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

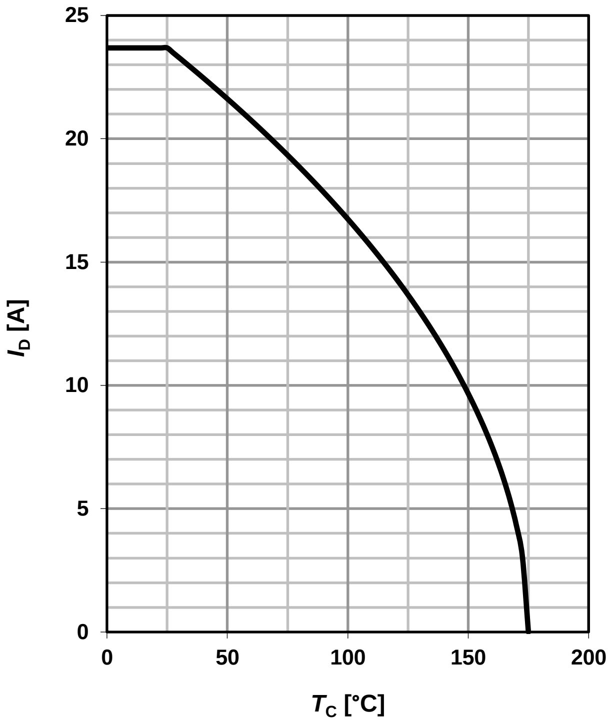
1 Power dissipation

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



2 Drain current

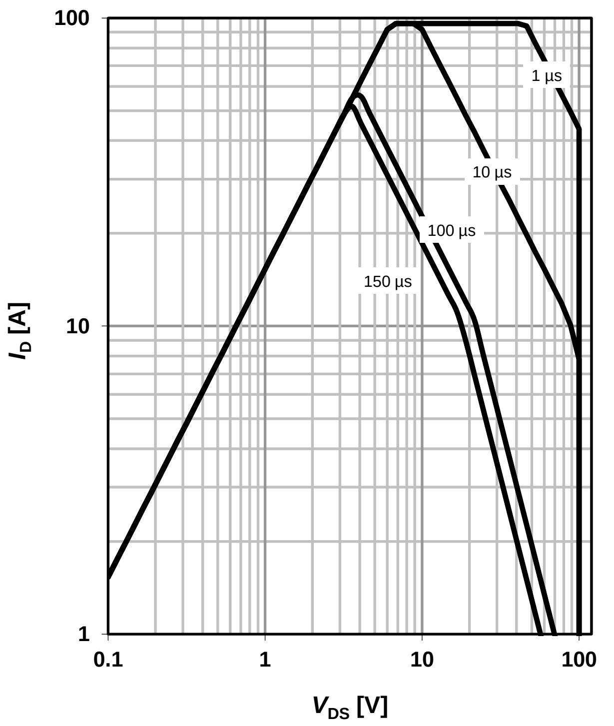
$I_D = f(T_C)$; $V_{GS} \geq 6$ V



3 Safe operating area

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

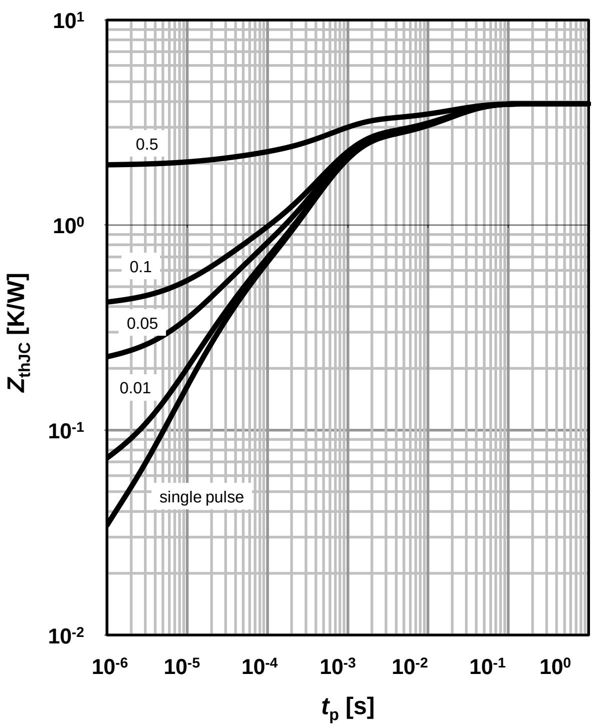
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

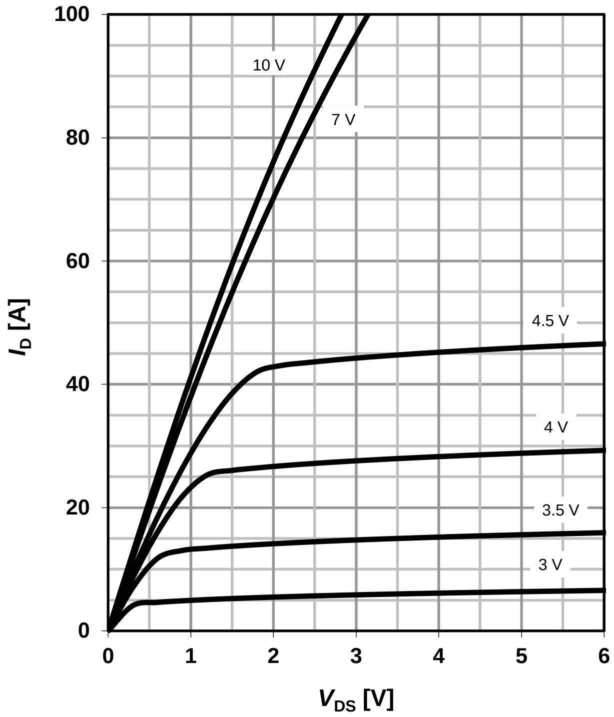
parameter: $D = t_p/T$



5 Typ. output characteristics

$I_D = f(V_{DS})$; $T_j = 25$ °C

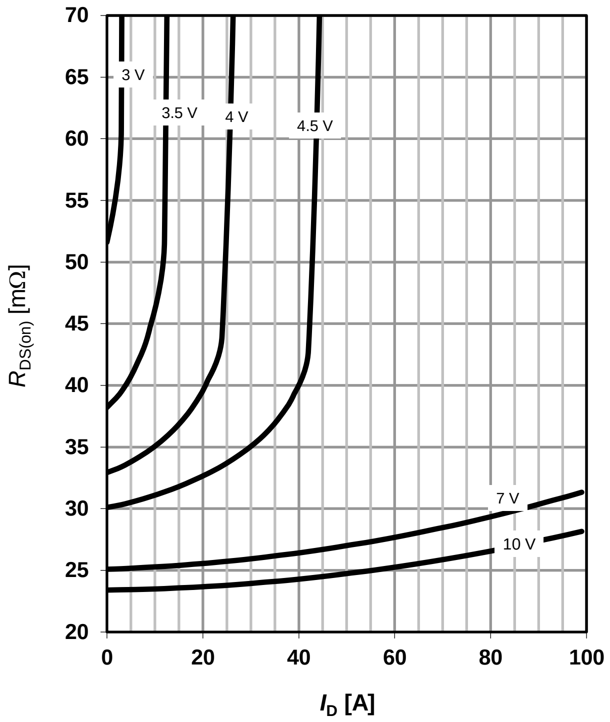
parameter: V_{GS}



6 Typ. drain-source on-state resistance

$R_{DS(on)} = f(I_D)$; $T_j = 25$ °C

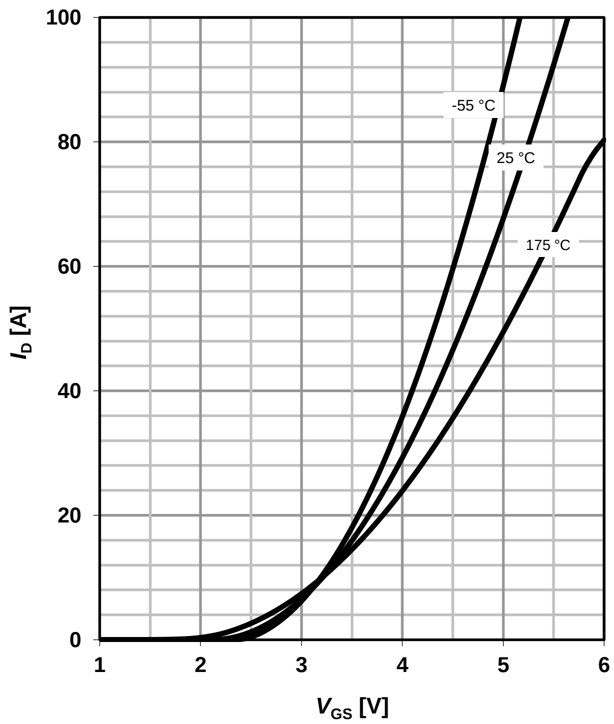
parameter: V_{GS}



7 Typ. transfer characteristics

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

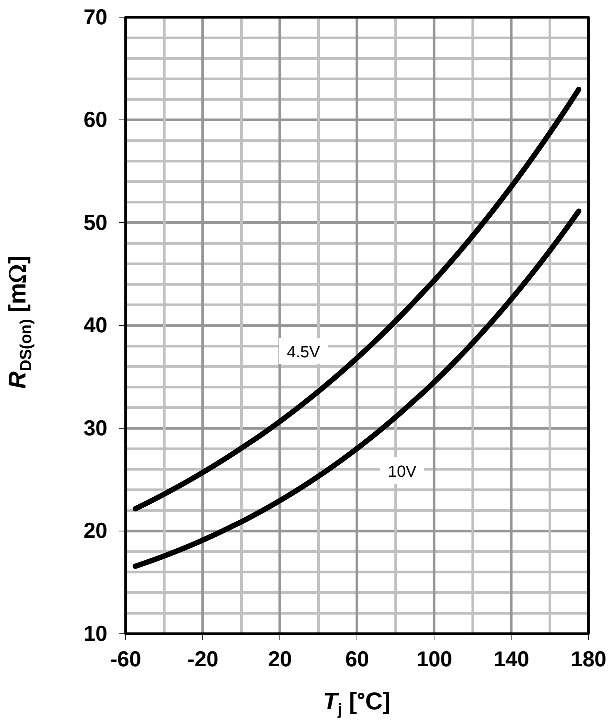
parameter: T_j



8 Typ. drain-source on-state resistance

$R_{DS(on)} = f(T_j)$; $I_D = 12$A

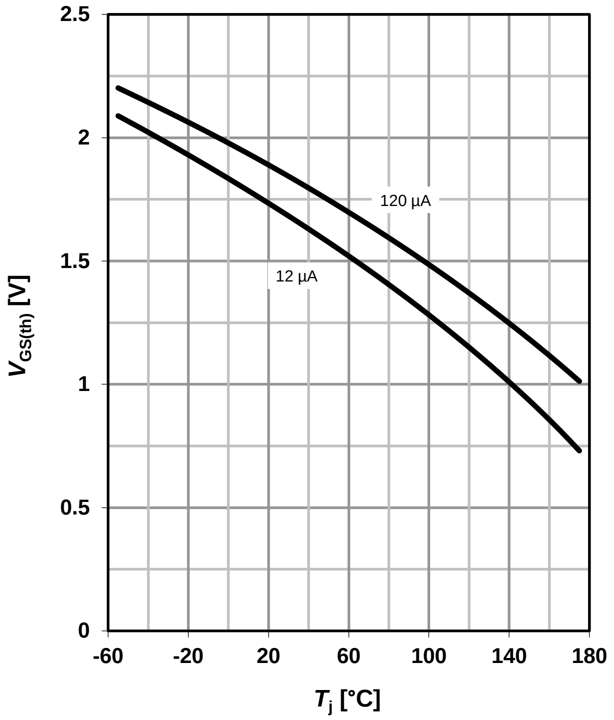
parameter: V_{GS}



9 Typ. gate threshold voltage

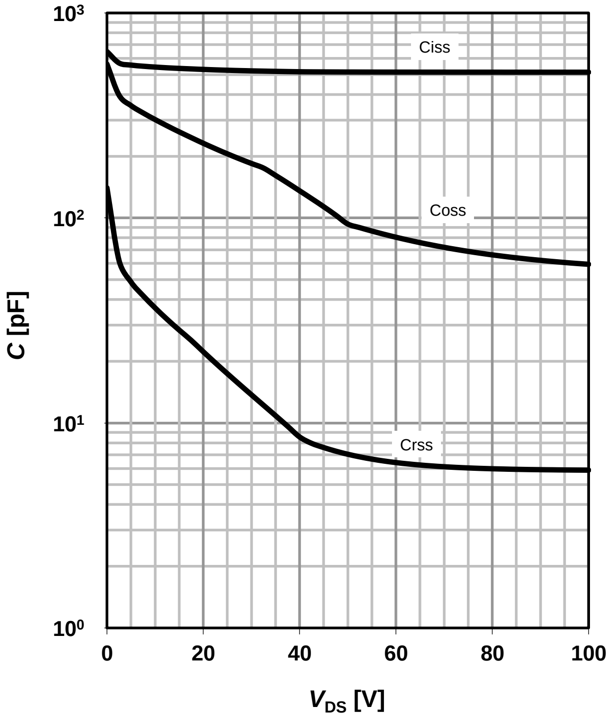
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 Typ. capacitances

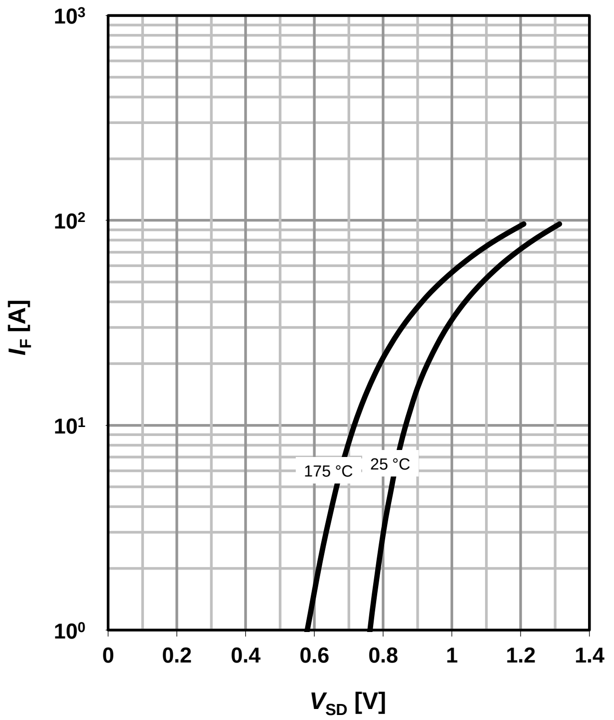
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 Typical forward diode characteristics

IF = f(V_{SD})

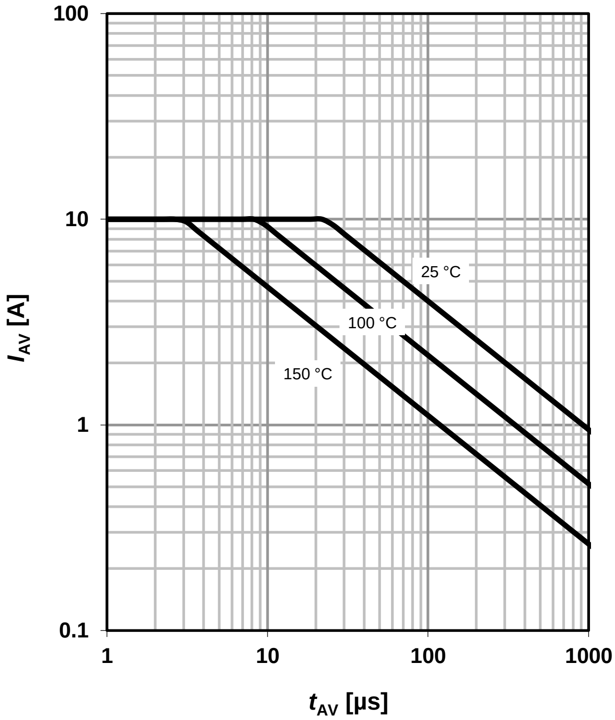
parameter: T_j



12 Typ. avalanche characteristics

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

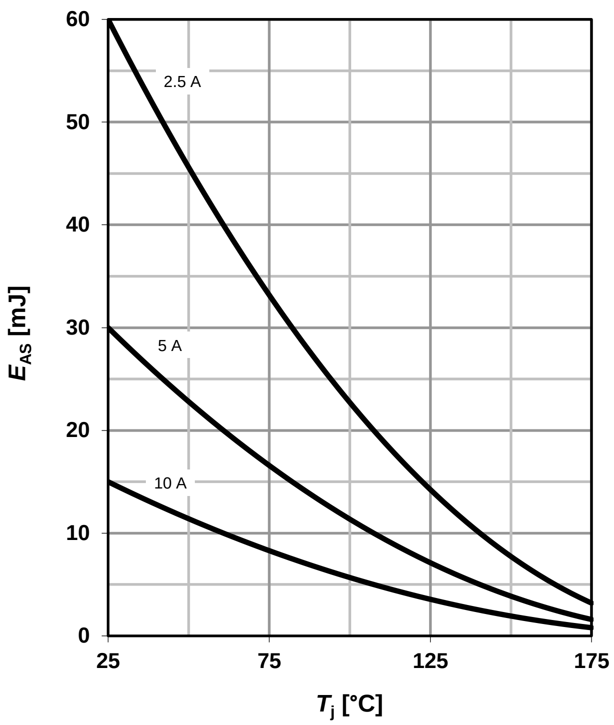
parameter: $T_{j(start)}$



13 Typical avalanche energy

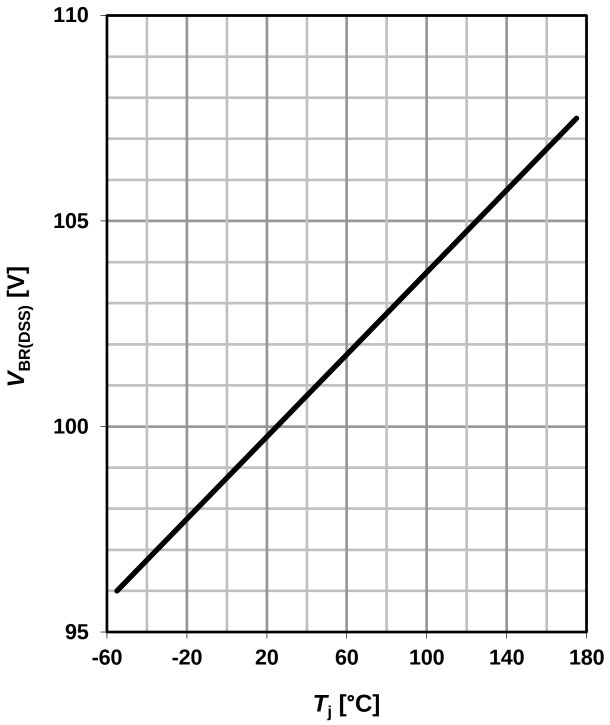
$E_{AS} = f(T_j)$

parameter: I_D



14 Drain-source breakdown voltage

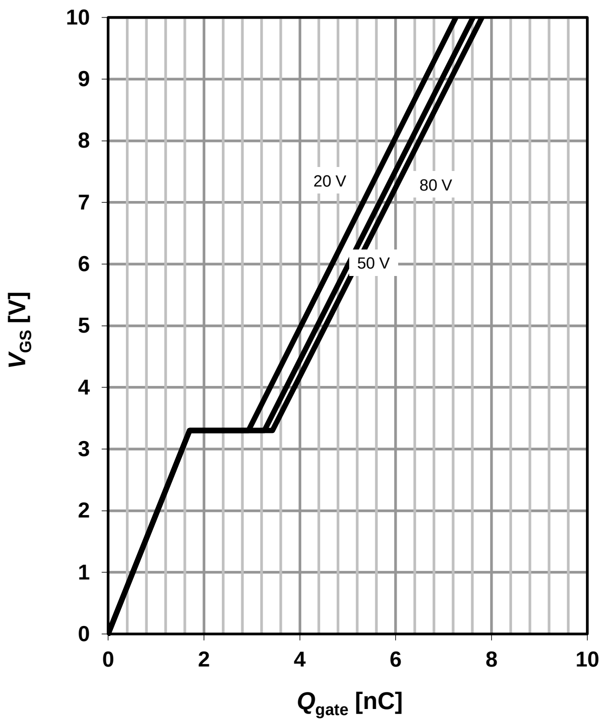
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA



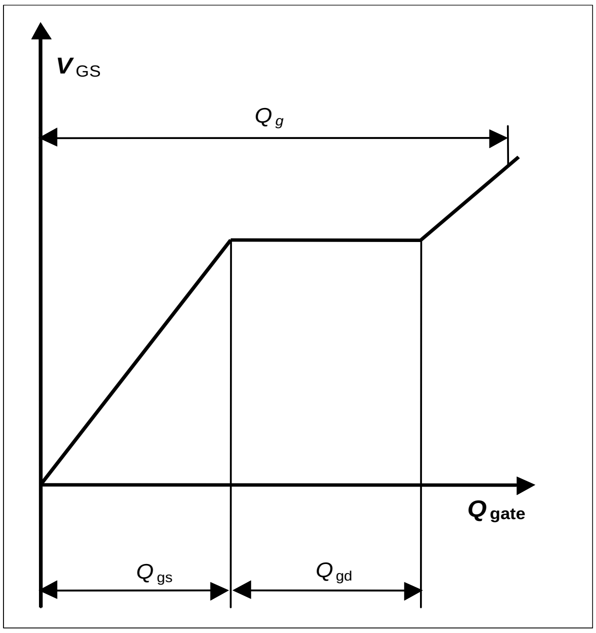
15 Typ. gate charge

$V_{GS} = f(Q_{gate})$; $I_D = 12$ A pulsed

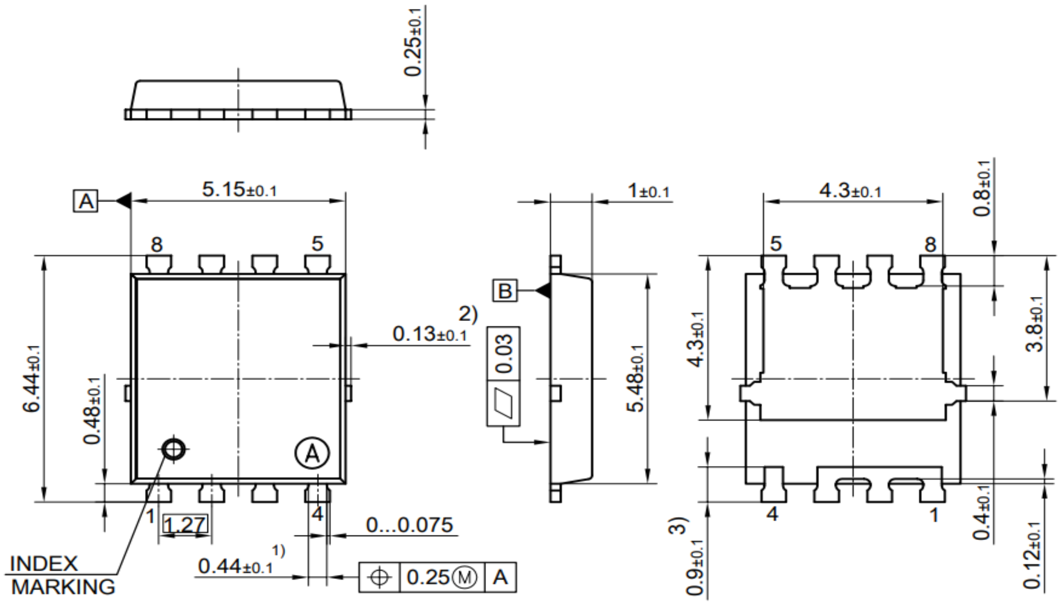
parameter: V_{DD}



16 Gate charge waveforms

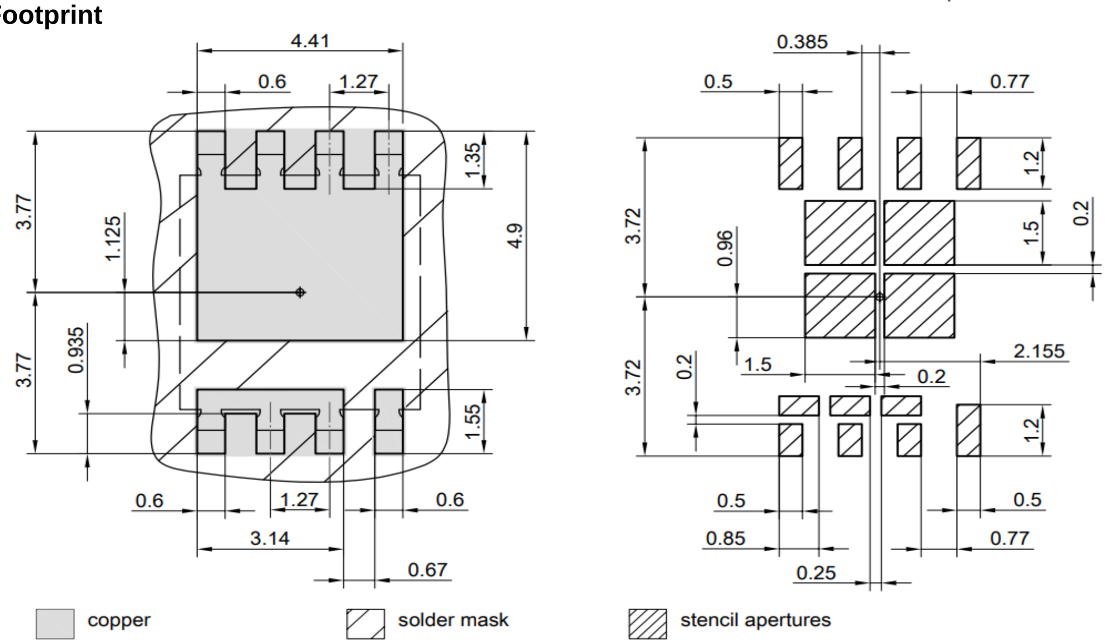


PG-TDSON-8: Outline



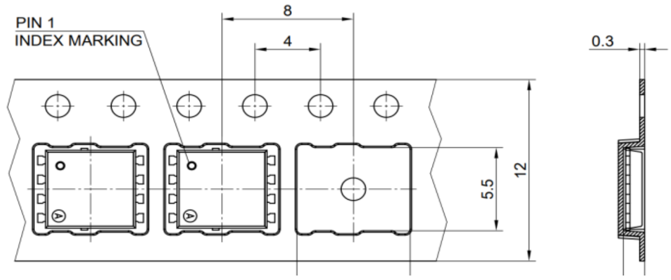
1) EXCLUDE MOLD FLASH
2) REMOVAL ON MOLD GATE, INTRUSION 0.1MM AND PROTRUSION 0.1MM
3) LEAD LENGTH UP TO ANTI FLASH LINE
4)ALL METAL SURFACE ARE PLATED, EXCEPT AREA OF CUT
ALL DIMENSIONS ARE IN UNITS MM
THE DRAWING IS IN COMPLIANCE WITH ISO 128 & PROJECTION METHOD 1 [ ]

Footprint



Dimensions in mm

Packaging



Published by
Infineon Technologies AG
85579 Neubiberg, Germany

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Revision History

Version	Date	Changes
Revision 1.0	23.07.2019	Final Data Sheet

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