OptiMOS™ Power-Transistor

Features

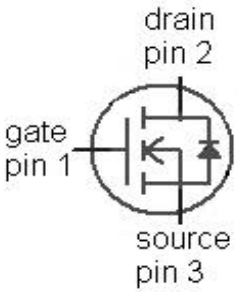
- Optimized for synchronous rectification
- 100% avalanche tested
- Superior thermal resistance
- N-channel, normal level
- Qualified according to JEDEC[1] for target applications
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21

RoHS Halogen-Free Pb-Free

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	2.5	mΩ
I_D	90	A
Q_{OSS}	81	nC
Q_G(0V..10V)	71	nC

Type	IPD025N06N
	
Package	TO-252-3
Marking	025N06N



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	90	A
		V_{GS}=10 V, T_C=100 °C	90	
		V_{GS}=10 V, T_C=25 °C, R_{thJA} =50K/W	26	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	360	
Avalanche energy, single pulse[3]	E_{AS}	I_D=90 A, R_{GS}=25 Ω	210	mJ
Gate source voltage	V_{GS}		±20	V

[1] J-STD20 and JESD22

[2] See figure 3 for more detailed information

[3] See figure 13 for more detailed information

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

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

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	T_C=25 °C	167	W
		T_A=25 °C, R_{thJA}=50 K/W	3.0	
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

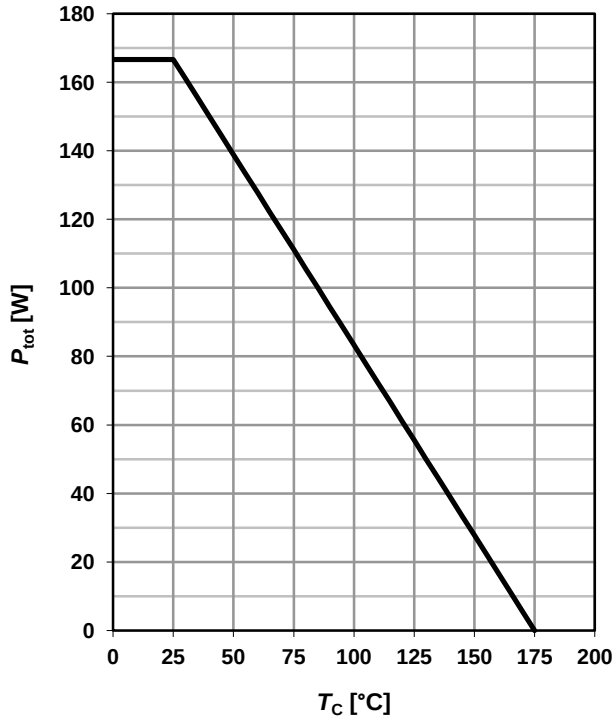
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	0.9	K/W
Device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm² cooling area[4)]	-	-	40	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=95 µA	2.1	2.8	3.3	
Zero gate voltage drain current	I_{DSS}	V_{DS}=60 V, V_{GS}=0 V, T_j=25 °C	-	0.5	1	µA
		V_{DS}=60 V, V_{GS}=0 V, T_j=125 °C	-	10	100	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=90 A	-	2.1	2.5	mΩ
		V_{GS}=6 V, I_D=22.5 A	-	2.7	3.8	
Gate resistance	R_G		-	1.7	2.6	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=90 A	80	160	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz	-	5200	6500	pF
Output capacitance	C_{oss}		-	1200	1500	
Reverse transfer capacitance	C_{rss}		-	48	96	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30 V, V_{GS}=10 V, I_D=90 A, $R_{G,ext}$,ext=1.6 Ω	-	16	-	ns
Rise time	t_r		-	20	-	
Turn-off delay time	$t_{d(off)}$		-	34	-	
Fall time	t_f		-	12	-	
Gate Charge Characteristics[5)]						
Gate to source charge	Q_{gs}	V_{DD}=30 V, I_D=90 A, V_{GS}=0 to 10 V	-	24	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	14	-	
Gate to drain charge	Q_{gd}		-	13	17	
Switching charge	Q_{sw}		-	23	-	
Gate charge total	Q_g		-	71	83	
Gate plateau voltage	$V_{plateau}$		-	4.7	-	V
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 10 V	-	62	-	nC
Output charge	Q_{oss}	V_{DD}=30 V, V_{GS}=0 V	-	81	-	
Reverse Diode						
Diode continuous forward current	I_S	T_C=25 °C	-	-	90	A
Diode pulse current	$I_{S,pulse}$		-	-	360	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=90 A, T_j=25 °C	-	1.0	1.2	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=I_S, di_F/dt=100 A/µs	-	83	133	ns
Reverse recovery charge	Q_{rr}		-	105		nC

[5)] See figure 16 for gate charge parameter definition

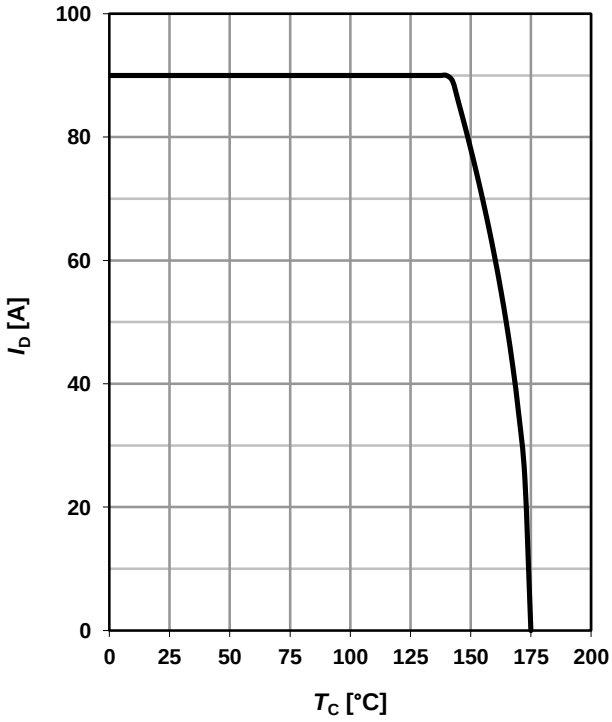
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

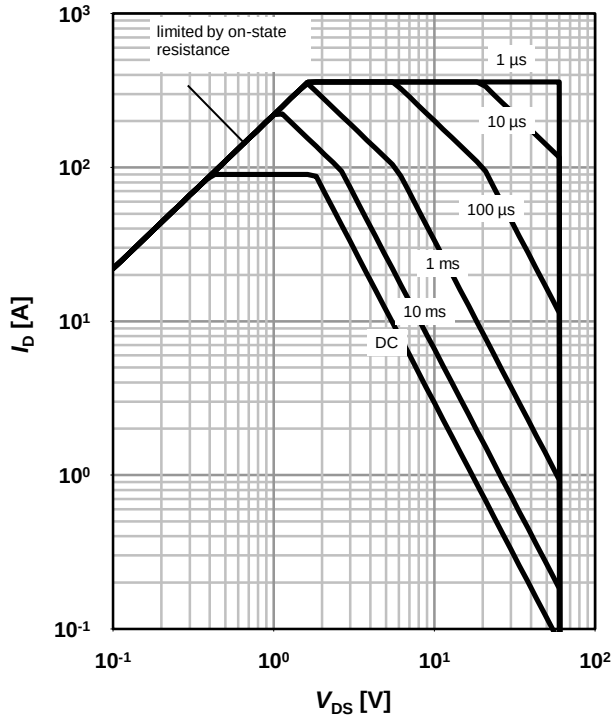
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

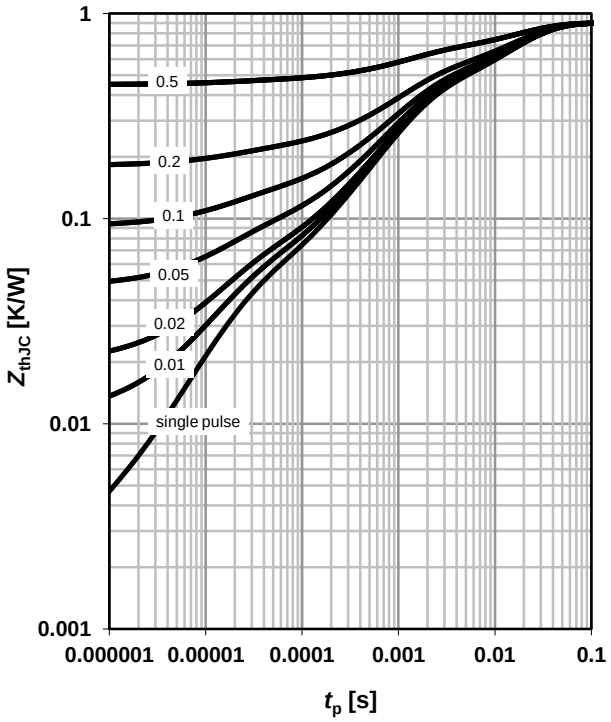
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

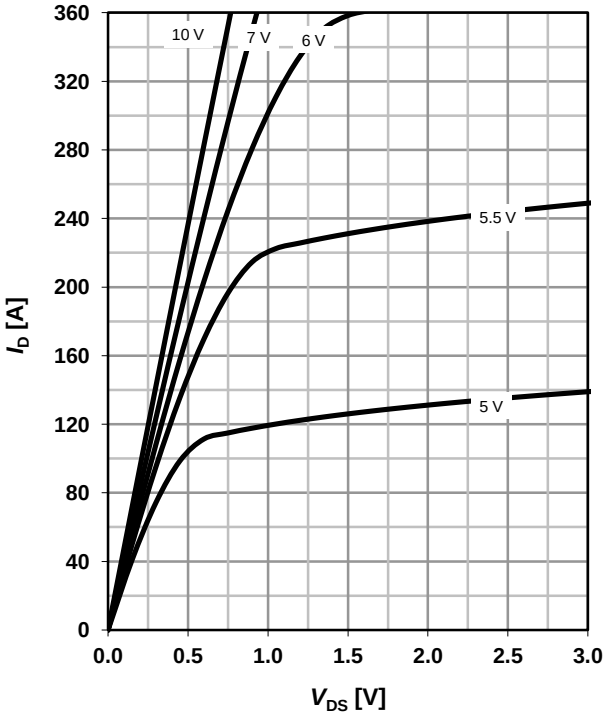
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

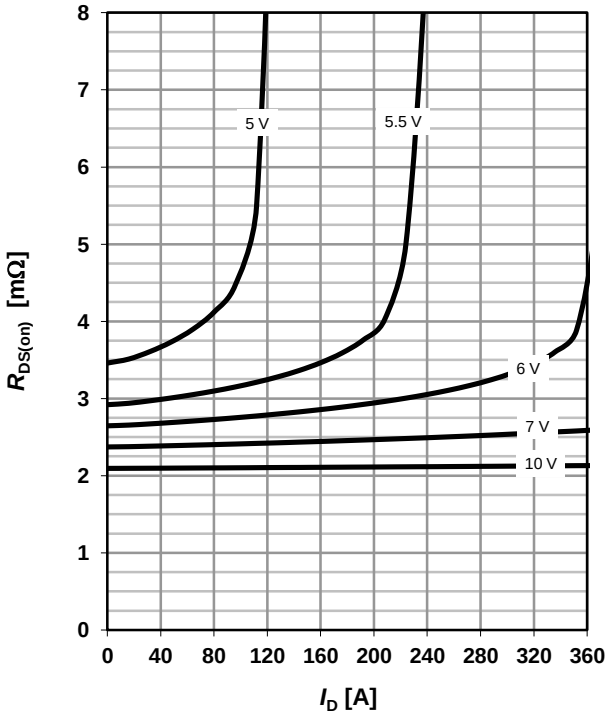
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

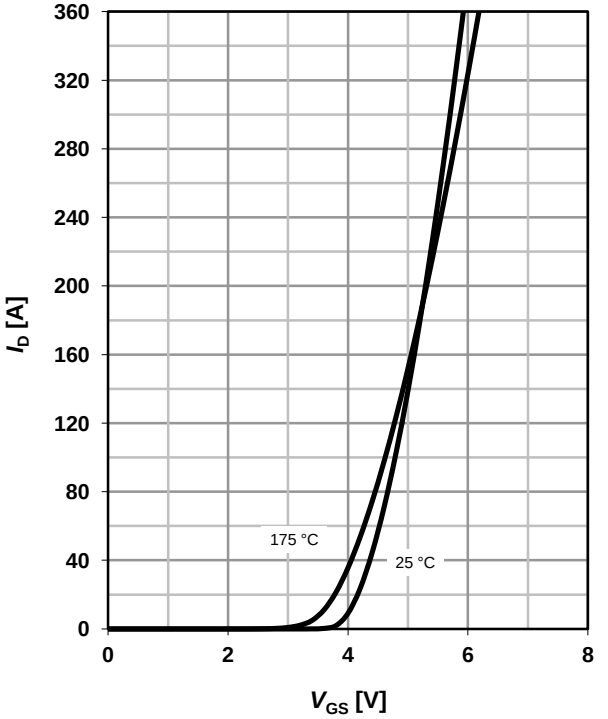
parameter: V_{GS}



7 Typ. transfer characteristics

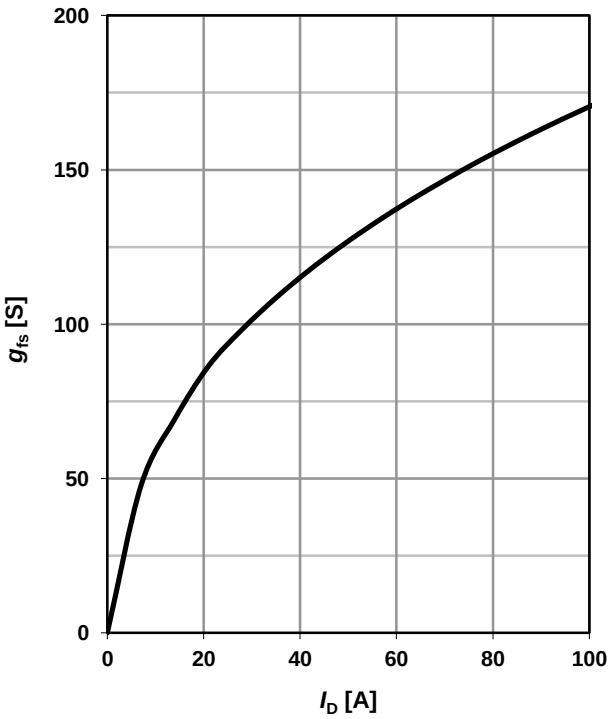
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



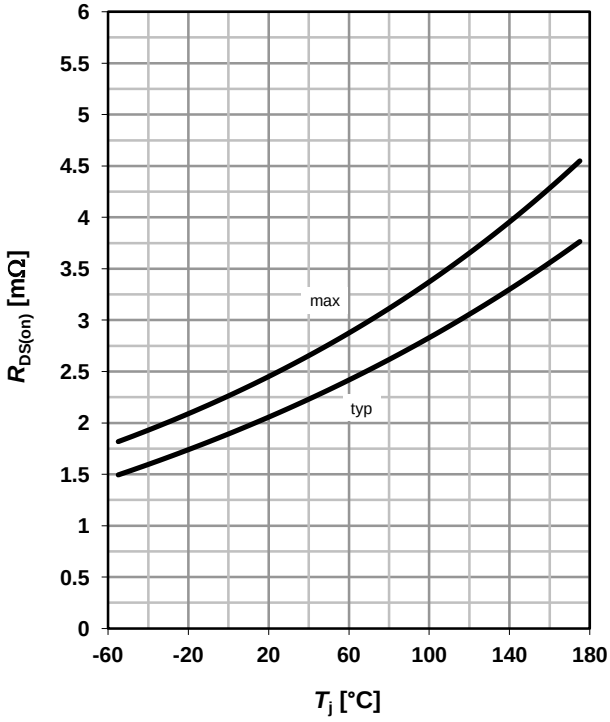
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



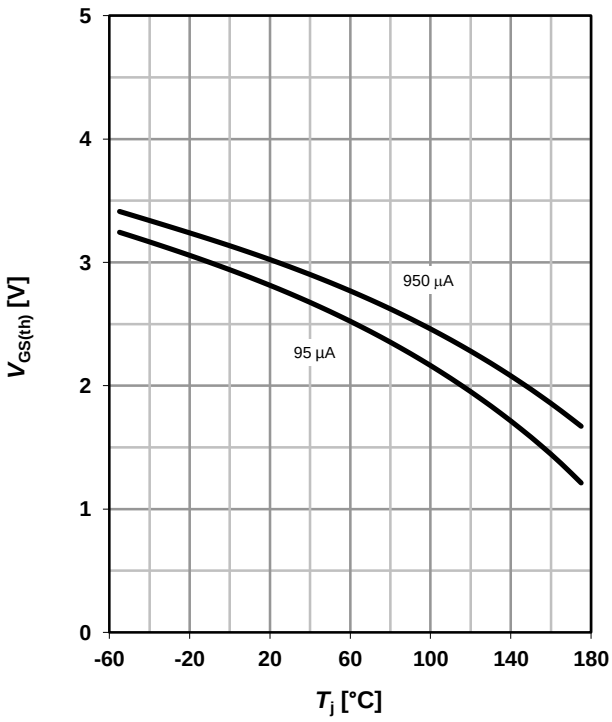
9 Drain-source on-state resistance

$R_{DS(on)}=f(T_j)$; $I_D=90$ A; $V_{GS}=10$ V



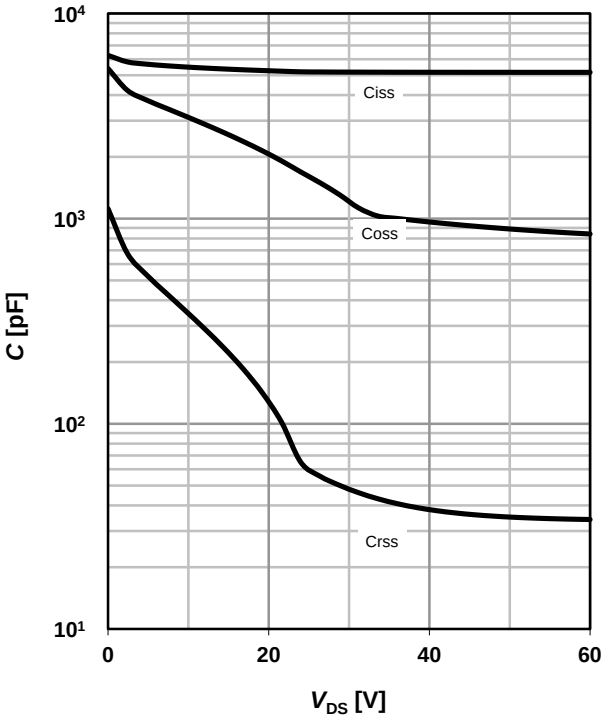
10 Typ. gate threshold voltage

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



11 Typ. capacitances

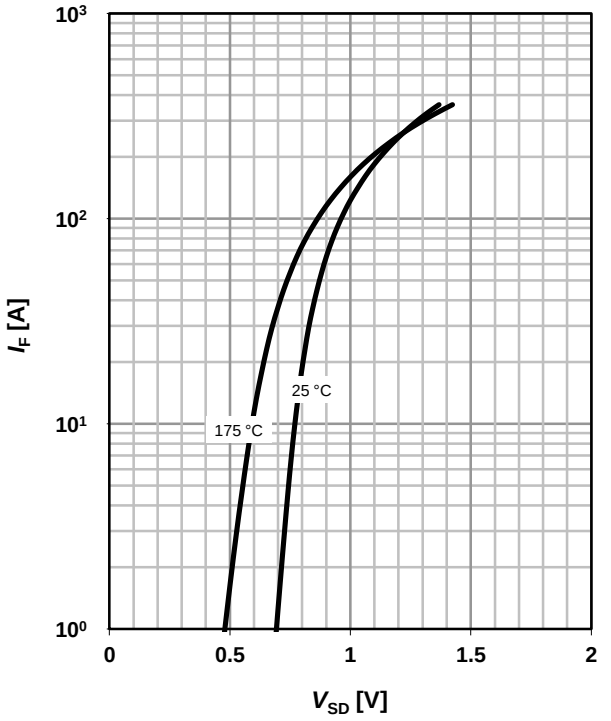
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

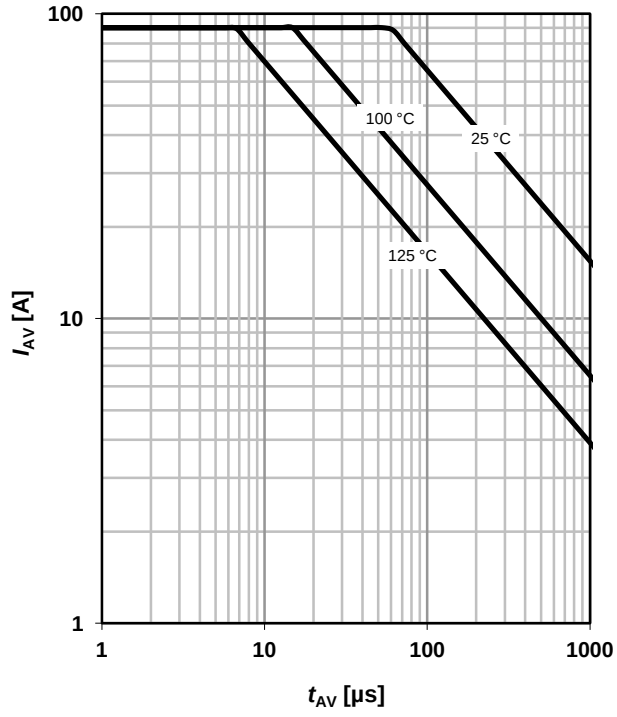
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

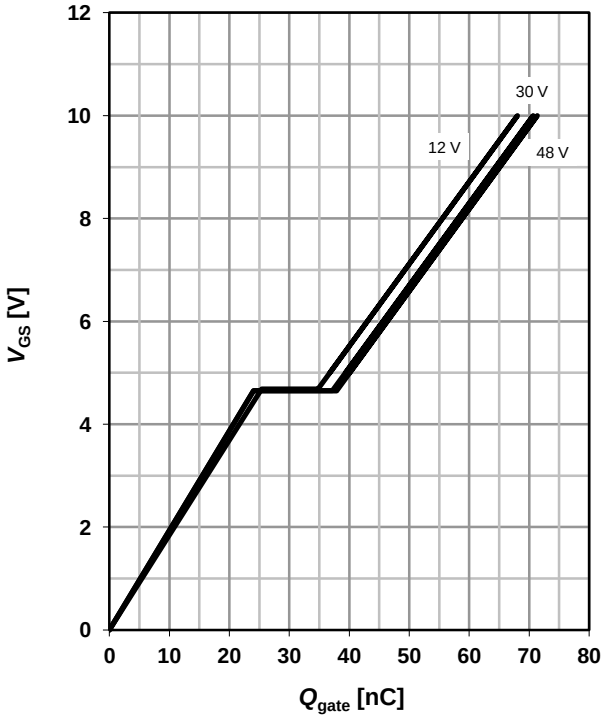
parameter: $T_{j(start)}$



14 Typ. gate charge

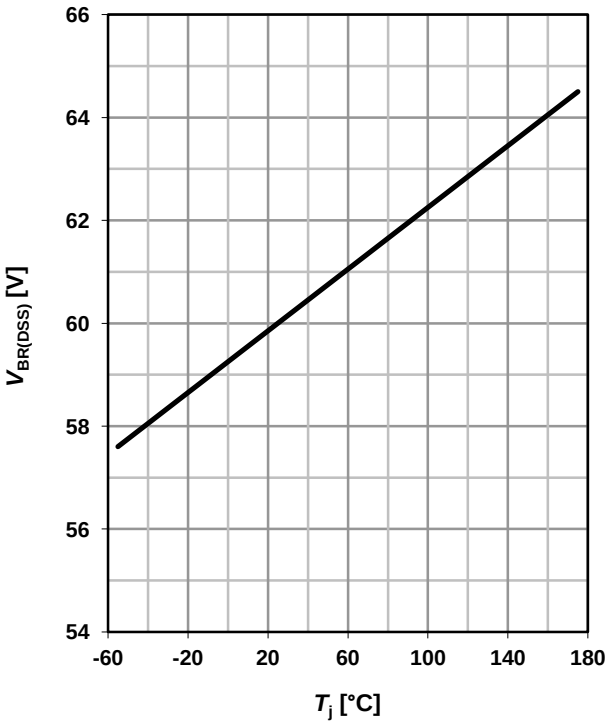
V_{GS}=f(Q_{gate}); I_D=90A pulsed

parameter: V_{DD}

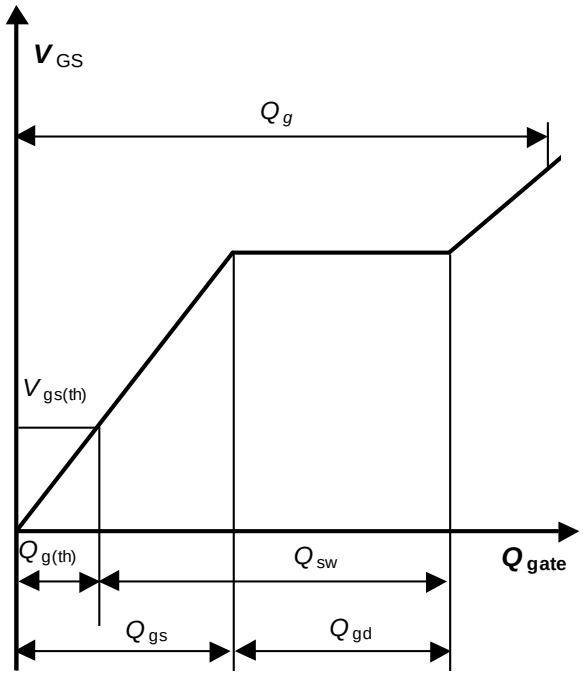


15 Drain-source breakdown voltage

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

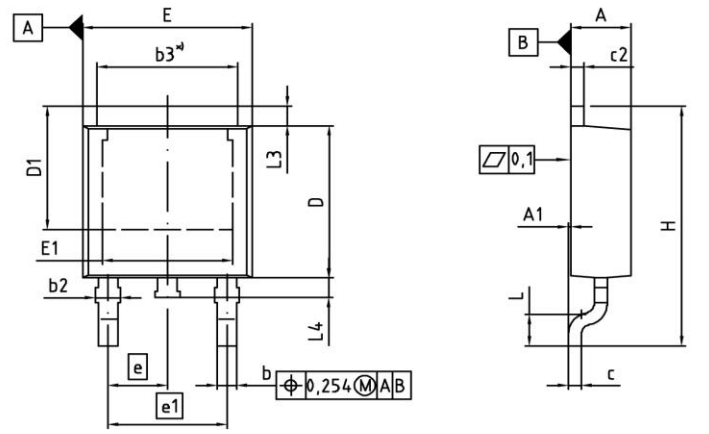


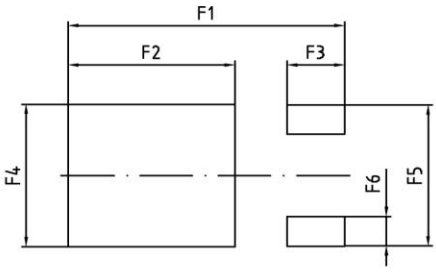
16 Gate charge waveforms



Package Outline

TO252-3 (DPAK)





*) mold flash not included

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.16	2.41	0.085	0.095
A1	0.00	0.15	0.000	0.006
b	0.64	0.89	0.025	0.035
b2	0.65	1.15	0.026	0.045
b3	5.00	5.50	0.197	0.217
c	0.46	0.60	0.018	0.024
c2	0.46	0.98	0.018	0.039
D	5.97	6.22	0.235	0.245
D1	5.02	5.84	0.198	0.230
E	6.40	6.73	0.252	0.265
E1	4.70	5.21	0.185	0.205
e	2.29 (BSC)		0.090 (BSC)	
e1	4.57		0.180	
N	3		3	
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L3	0.90	1.25	0.035	0.049
L4	0.51	1.00	0.020	0.039
F1	10.60		0.417	
F2	6.40		0.252	
F3	2.20		0.087	
F4	5.80		0.228	
F5	5.76		0.227	
F6	1.20		0.047	

DOCUMENT NO.
Z8B00003328

SCALE 0 2.0 0 2.0 4mm

EUROPEAN PROJECTION

ISSUE DATE
16-02-2011

REVISION
04

Published by
Infineon Technologies AG
81726 Munich, Germany

Legal Disclaimer
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information
For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings
Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.