OptiMOS™ Power-Transistor

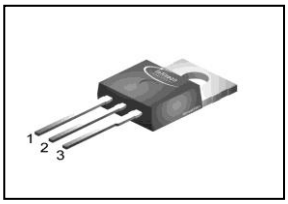
Features

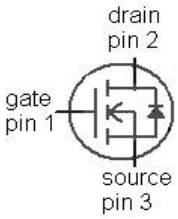
- Optimized for high performance SMPS, e.g. sync. rec.
- 100% avalanche tested
- Superior thermal resistance
- N-channel
- Qualified according to JEDEC[1] for target applications
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	4.0	mΩ
I_D	80	A
Q_{OSS}	44	nC
Q_G(0V..10V)	38	nC

PG-TO220-3





Type	Package	Marking
IPP040N06N	PG-TO220-3	040N06N

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	80	A
		V_{GS}=10 V, T_C=100 °C	80	
		V_{GS}=10 V, T_C=25 °C, R_{thJA} =50K/W	20	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	320	
Avalanche energy, single pulse[3]	E_{AS}	I_D=80 A, R_{GS}=25 Ω	70	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	107	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	

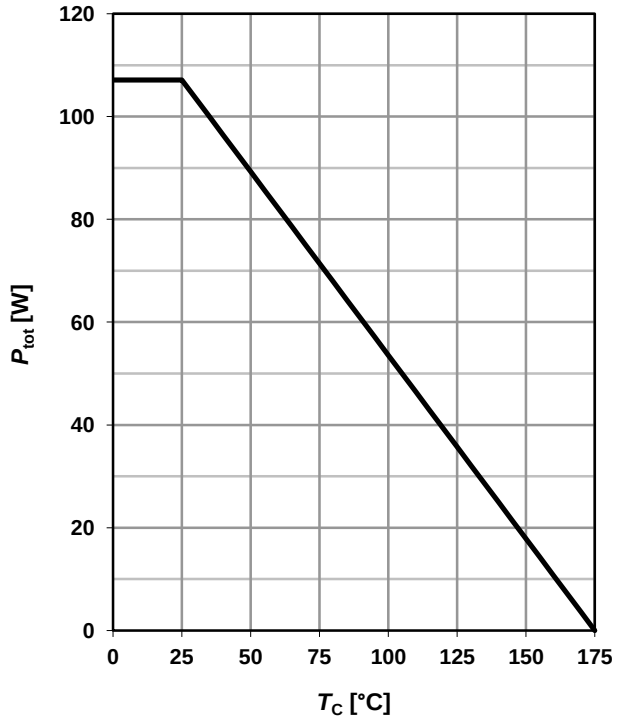
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.4	K/W
Device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm² cooling area[4)]	-	-	40	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
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=50 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=80 A	-	3.6	4.0	mΩ
		V_{GS}=6 V, I_D=20 A	-	4.7	6.0	
Gate resistance	R_G		-	1.3	1.95	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=80 A	60	120	-	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	-	2700	3375	pF
Output capacitance	C_{oss}		-	670	838	
Reverse transfer capacitance	C_{rss}		-	28	56	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30 V, V_{GS}=10 V, I_D=80 A, $R_{G,ext}$=3 Ω	-	19	-	ns
Rise time	t_r		-	16	-	
Turn-off delay time	$t_{d(off)}$		-	30	-	
Fall time	t_f		-	9	-	
Gate Charge Characteristics[5)]						
Gate to source charge	Q_{gs}	V_{DD}=30 V, I_D=80 A, V_{GS}=0 to 10 V	-	13	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	8	-	
Gate to drain charge	Q_{gd}		-	7	9	
Switching charge	Q_{sw}		-	13	-	
Gate charge total	Q_g		-	38	44	
Gate plateau voltage	$V_{plateau}$		-	4.9	-	V
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 10 V	-	33	-	nC
Output charge	Q_{oss}	V_{DD}=30 V, V_{GS}=0 V	-	44	-	
Reverse Diode						
Diode continuous forward current	I_S	T_C=25 °C	-	-	80	A
Diode pulse current	$I_{S,pulse}$		-	-	320	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=80 A, T_j=25 °C	-	1.0	1.2	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=80 A, di_F/dt=100 A/µs	-	34	54	ns
Reverse recovery charge	Q_{rr}		-	34	-	nC

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

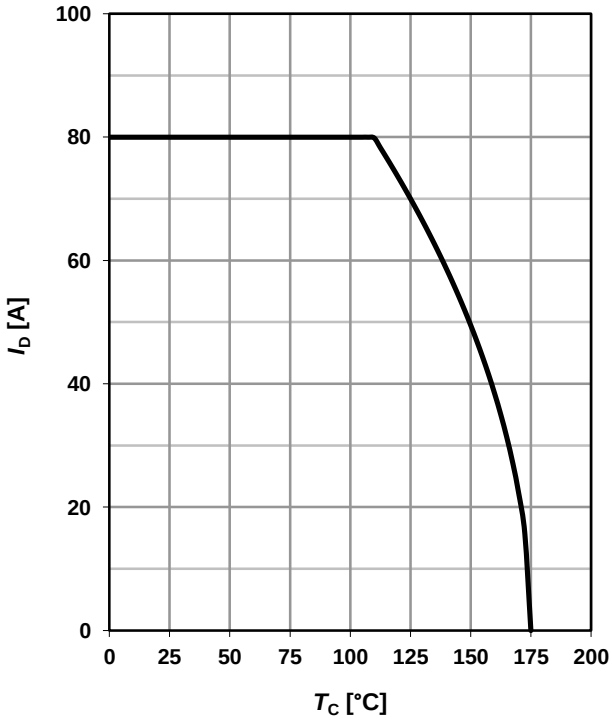
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

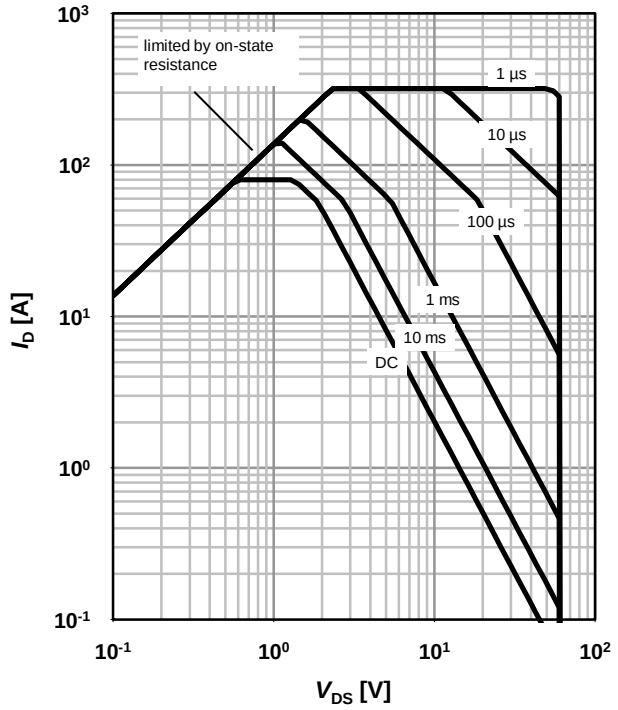
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

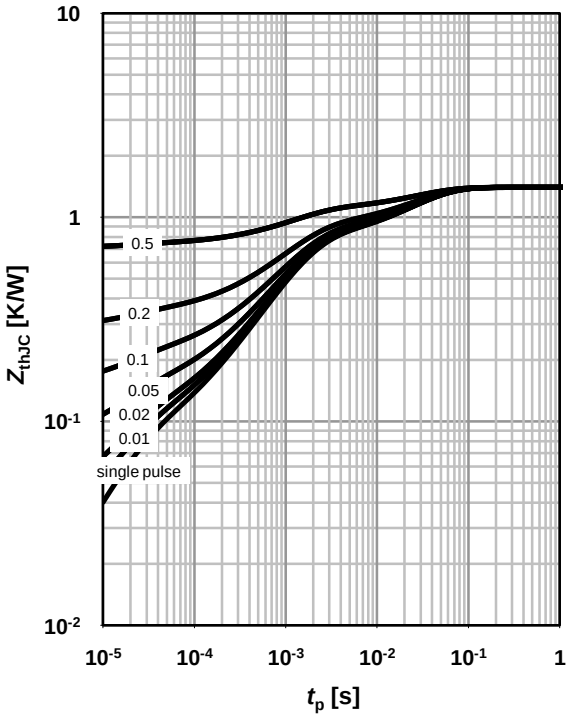
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

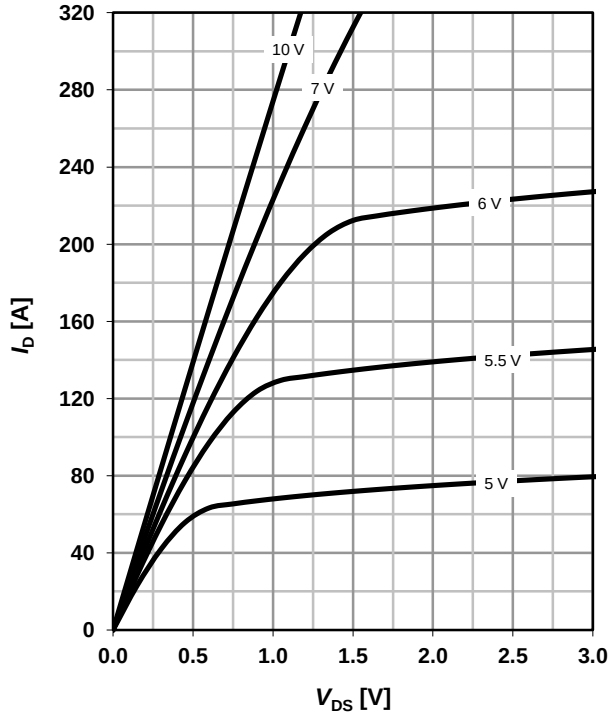
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

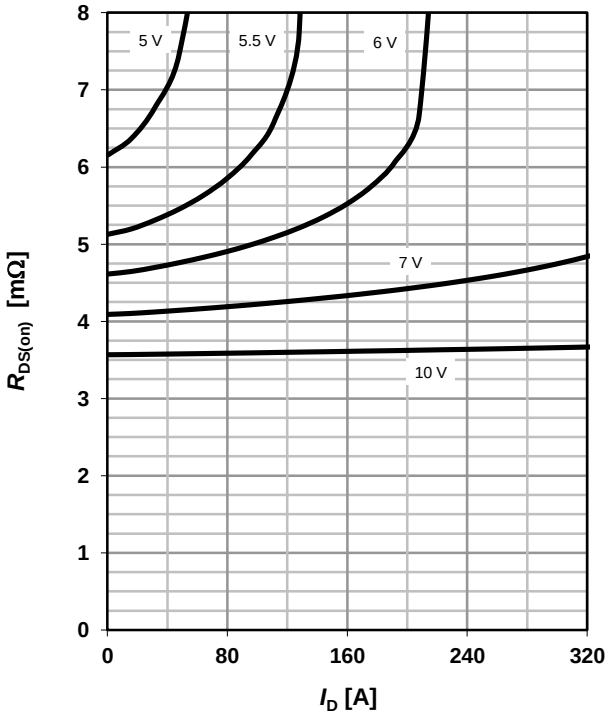
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

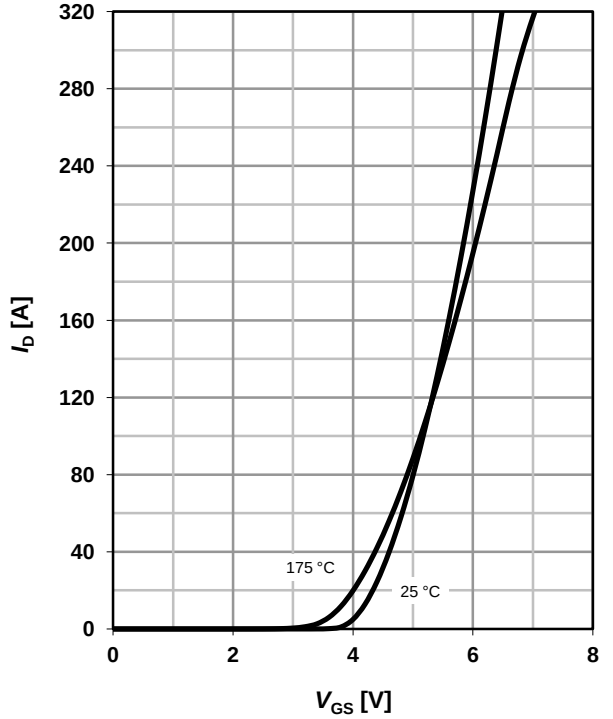
parameter: V_{GS}



7 Typ. transfer characteristics

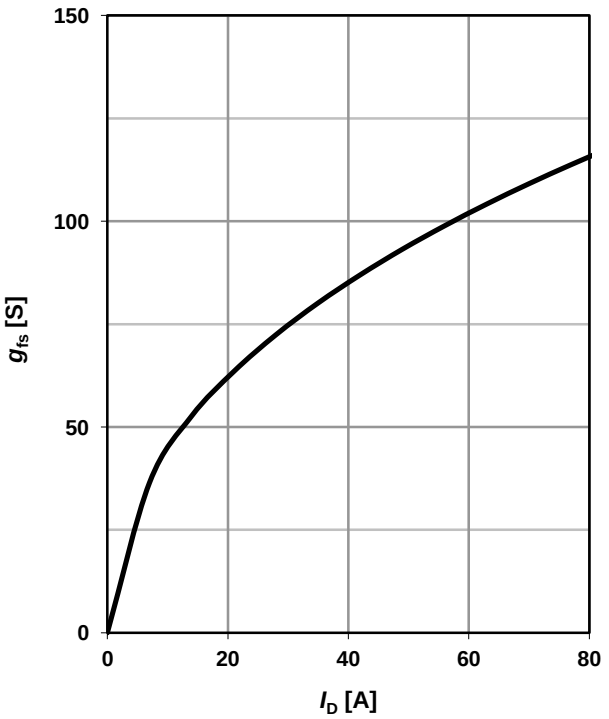
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



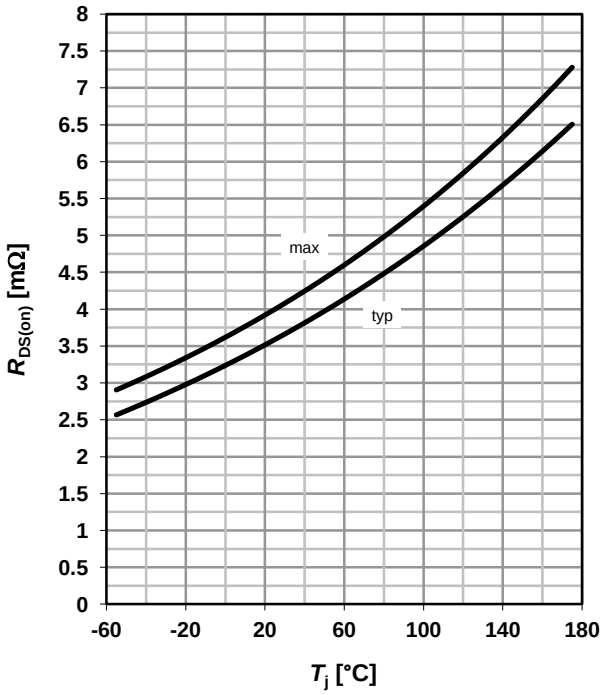
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



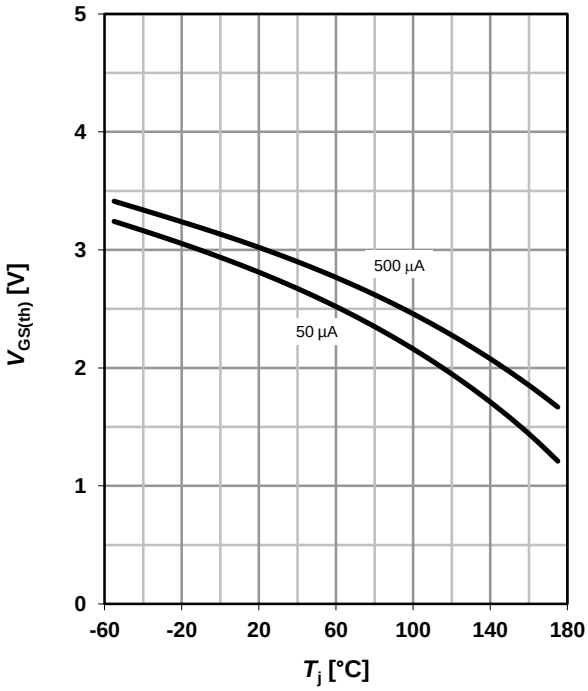
9 Drain-source on-state resistance

$R_{DS(on)}=f(T_j)$; $I_D=80$ A; $V_{GS}=10$ V



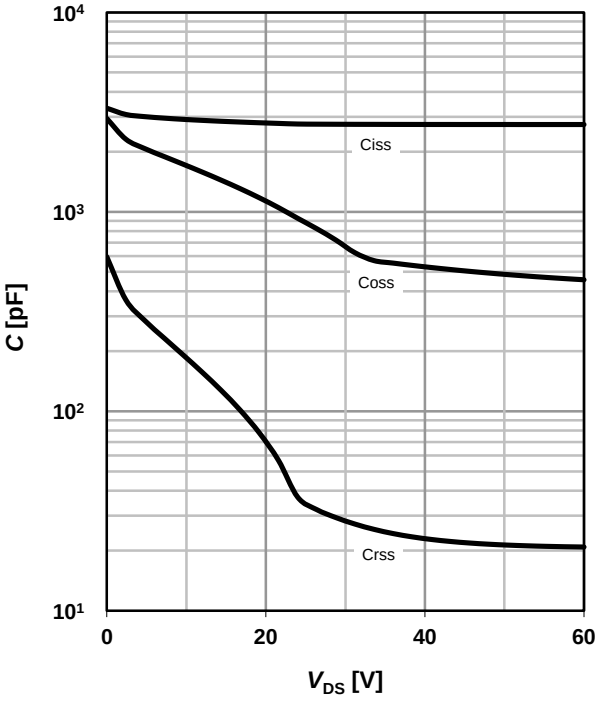
10 Typ. gate threshold voltage

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



11 Typ. capacitances

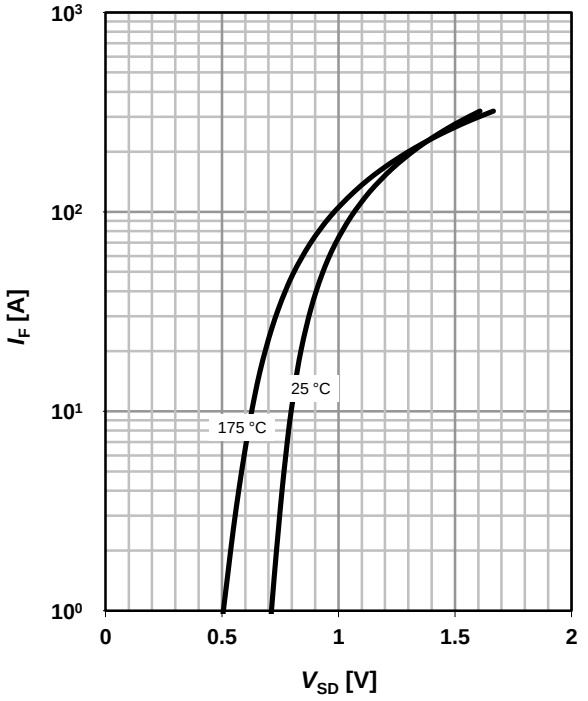
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

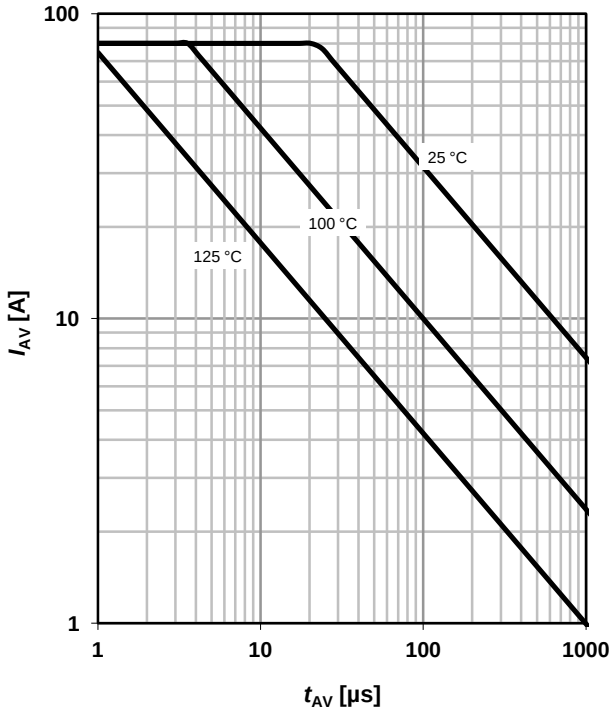
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

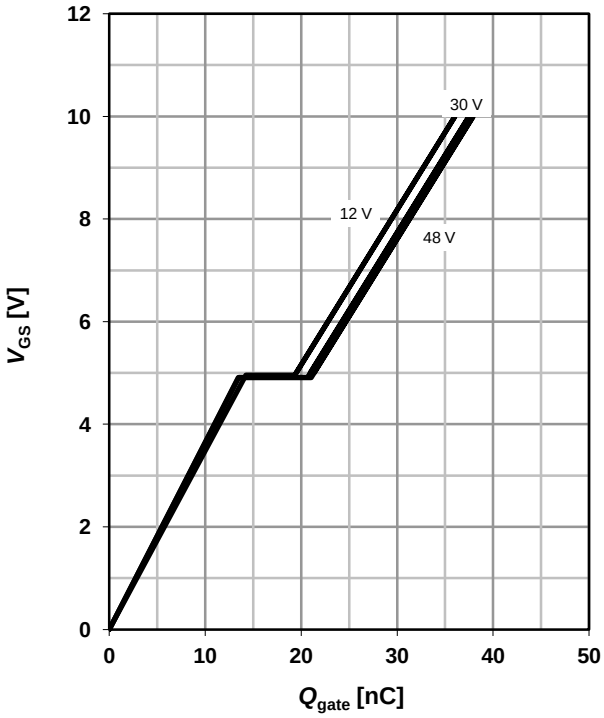
parameter: $T_{j(start)}$



14 Typ. gate charge

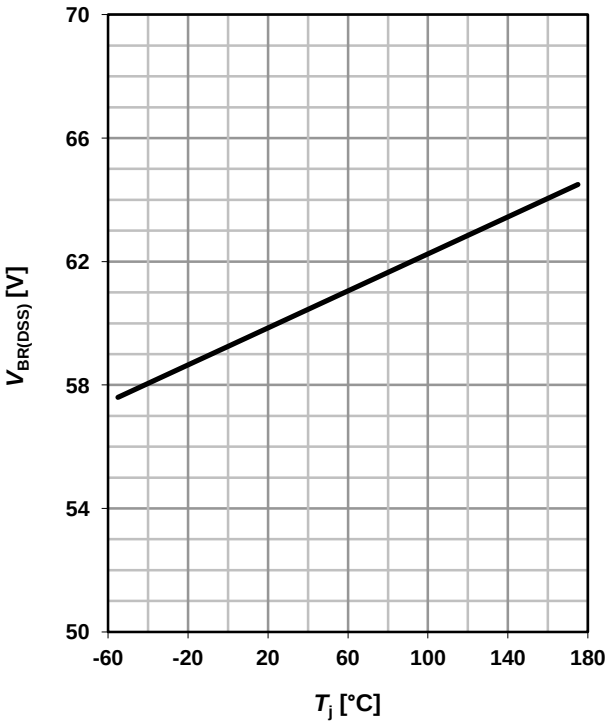
V_{GS}=f(Q_{gate}); I_D=80 A pulsed

parameter: V_{DD}

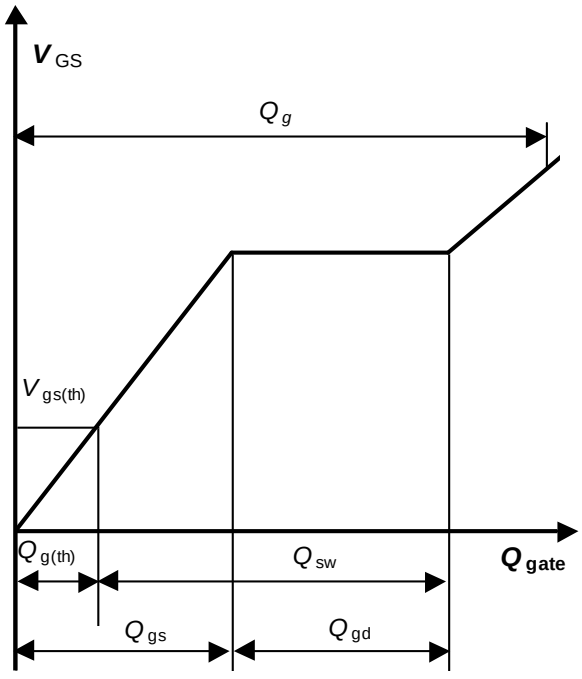


15 Drain-source breakdown voltage

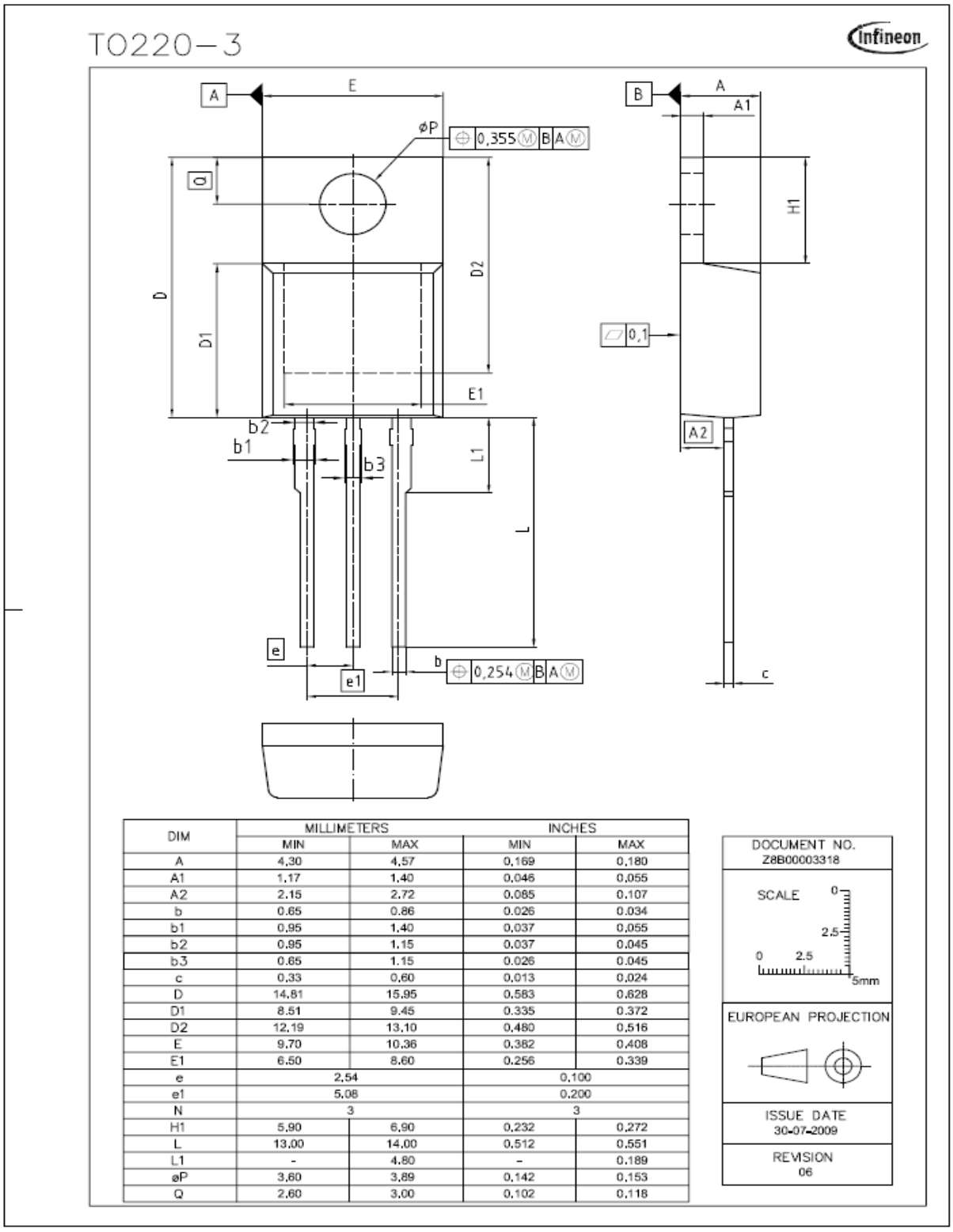
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



Package Outline **PG-TO220-3**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4,30	4,57	0,169	0,180
A1	1,17	1,40	0,046	0,055
A2	2,15	2,72	0,085	0,107
b	0,65	0,86	0,026	0,034
b1	0,95	1,40	0,037	0,055
b2	0,95	1,15	0,037	0,045
b3	0,65	1,15	0,026	0,045
c	0,33	0,60	0,013	0,024
D	14,81	15,95	0,583	0,628
D1	8,51	9,45	0,335	0,372
D2	12,19	13,10	0,480	0,516
E	9,70	10,36	0,382	0,408
E1	6,50	8,60	0,256	0,339
e	2,54		0,100	
e1	5,08		0,200	
N	3		3	
H1	5,90	6,90	0,232	0,272
L	13,00	14,00	0,512	0,551
L1	-	4,80	-	0,189
øP	3,60	3,89	0,142	0,153
Q	2,60	3,00	0,102	0,118

DOCUMENT NO.
Z8B00003318

SCALE 0 2.5 0 2.5 5mm

EUROPEAN PROJECTION

ISSUE DATE
30-07-2009

REVISION
06

Published by
Infineon Technologies AG
81726 Munich, Germany
© 2011 Infineon Technologies AG
All Rights Reserved.

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.

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

Infineon Technologies:

SPP06N80C3 BGM781N11E6327XUSA1 BTS 5210 G XMC4800F144K1024AAXQMA1 BSC320N20NS3 G IGCM10F60GAXKMA1 IPB320P10LMATMA1 IRF3710PBF TLE4971A120N5E0001XUMA1 TLF80511TCATMA2 TLS208D1EJV33XUMA1 EVALPMG1B1DRPTOBO1 FP150R12N3T4PB81BPSA1 IPD60R650CEAUMA1 ISZ75DP15LMATMA1 BAT5405WH6327XTSA1 IPT014N08NM5ATMA1 TC1782F320F180HRBAKXUMA2 2EDS8265HXUMA2 BSZ050N03LSGATMA1 BTS70302EPADAUGHBRDTOBO1 CY8C29466-24PVXI IKD10N60RFATMA1 FS100R12KT4GPBPSA1 IPL60R185C7AUMA1 FS75R12KE3B9BOSA1 AIMW120R060M1HXKSA1 CY8C24894-24LTXI TLE493DW2B6A0HTSA1 IM241S6S1BAUMA1