MOSFET

Metal Oxide Semiconductor Field Effect Transistor

OptiMOS™ Power-Transistor, 80V

OptiMOS™3 Power-Transistor
IPA100N08N3 G

Data Sheet

Rev. 2.2
Final

Power Management & Multimarket

OptiMOS(TM)3 Power-Transistor

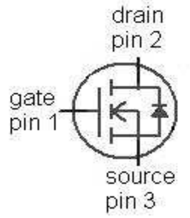
Product Summary

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

Features

- Ideal for high frequency switching and sync. rec.
- Optimized technology for DC/DC converters
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- N-channel, normal level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC[1] for target applications
- Halogen-free according to IEC61249-2-21
- Fully isolated package (2500 VAC; 1 minute)

Type	IPA100N08N3 G
	
Package	PG-TO220-FP
Marking	100N08N



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C[2]	40	A
		T_C=100 °C	30	
Pulsed drain current[3]	$I_{D,pulse}$	T_C=25 °C	160	
Avalanche energy, single pulse[4]	E_{AS}	I_D=40 A, R_{GS}=25 Ω	110	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	35	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

1) J-STD20 and JESD22

2) Current is limited by package; with an R_{thJC}=1.5 K/W in a standard TO-220 package the chip is able to carry 72A.

3) See figure 3 for more detailed information

4) See figure 13 for more detailed information

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	4.3	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint	-	-	62	
		6 cm^2 cooling area[5)]	-	-	40	

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}=0 V, I_D=1 mA	80	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=46 µA	2	2.8	3.5	
Zero gate voltage drain current	I_{DSS}	V_{DS}=80 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=80 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	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=40 A	-	8.4	10	mΩ
		V_{GS}=6 V, I_D=20 A	-	10.9	18.2	
Gate resistance	R_G		-	1.6	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=40 A	28	55	-	S

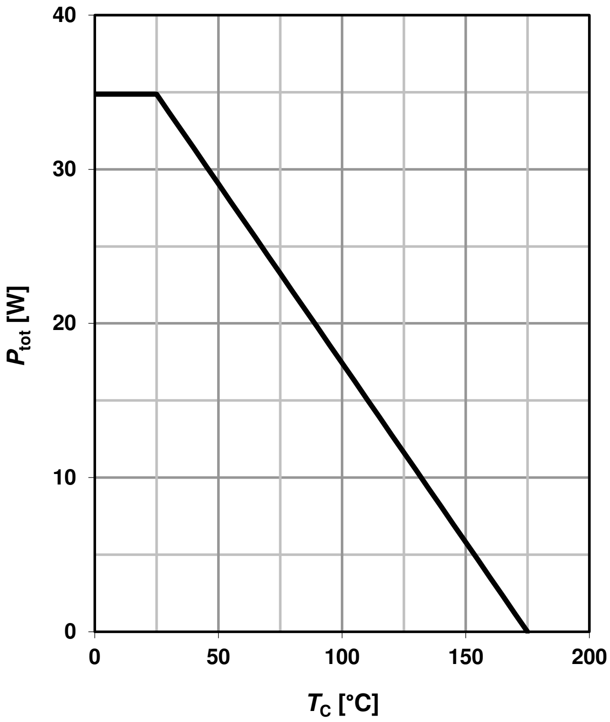
[5)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz	-	1810	2410	pF
Output capacitance	C_{oss}		-	490	652	
Reverse transfer capacitance	C_{rss}		-	20	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=40 V, V_{GS}=10 V, I_D=40 A, $R_{G,ext}$=1.6 Ω	-	13	-	ns
Rise time	t_r		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	23	-	
Fall time	t_f		-	5	-	
Gate Charge Characteristics[6)]						
Gate to source charge	Q_{gs}	V_{DD}=40 V, I_D=40 A, V_{GS}=0 to 10 V	-	9	-	nC
Gate to drain charge	Q_{gd}		-	5	-	
Switching charge	Q_{sw}		-	10	-	
Gate charge total	Q_g		-	26	35	
Gate plateau voltage	$V_{plateau}$		-	5.1	-	V
Output charge	Q_{oss}	V_{DD}=40 V, V_{GS}=0 V	-	35	47	nC
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	40	A
Diode pulse current	$I_{S,pulse}$		-	-	160	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=40 A, T_j=25 °C	-	1.0	1.2	V
Reverse recovery time	t_{rr}	V_R=40 V, I_F=40A, di_F/dt=100 A/µs	-	57	-	ns
Reverse recovery charge	Q_{rr}		-	91	-	nC

6) See figure 16 for gate charge parameter definition

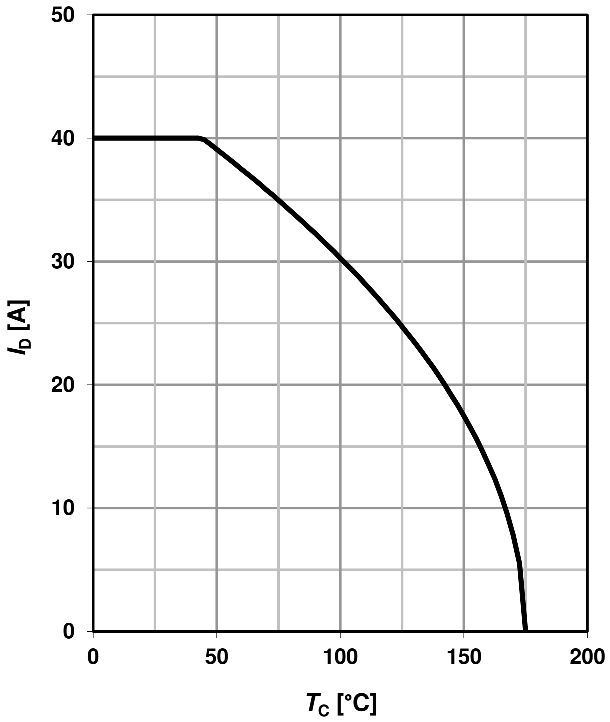
1 Power dissipation

P_{tot}=f(T_C)



2 Drain current

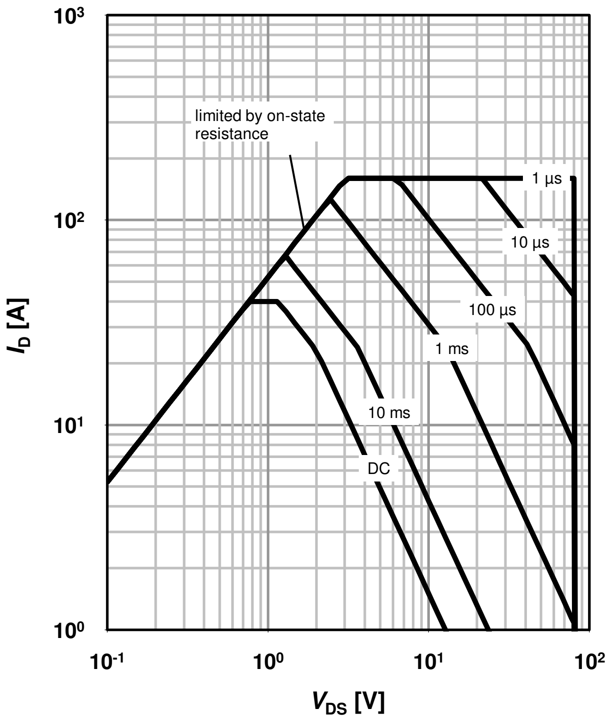
I_D=f(T_C); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

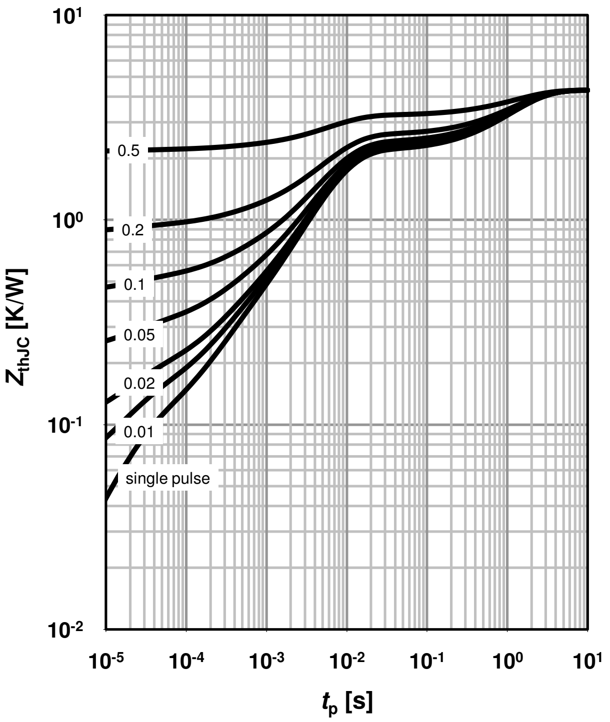
parameter: t_p



4 Max. transient thermal impedance

Z_{thJC}=f(t_p)

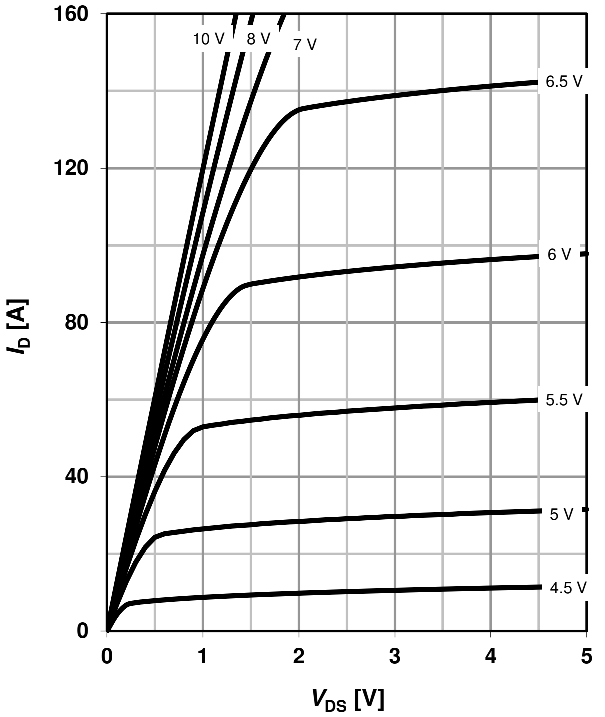
parameter: D=t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

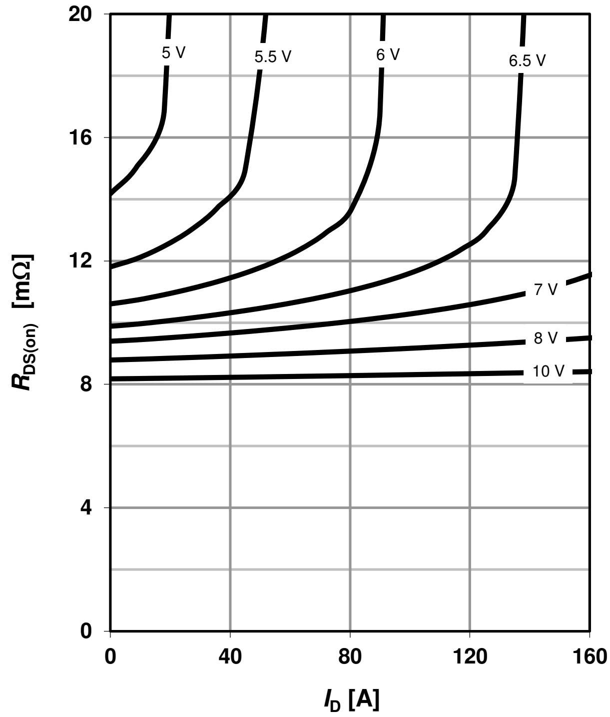
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

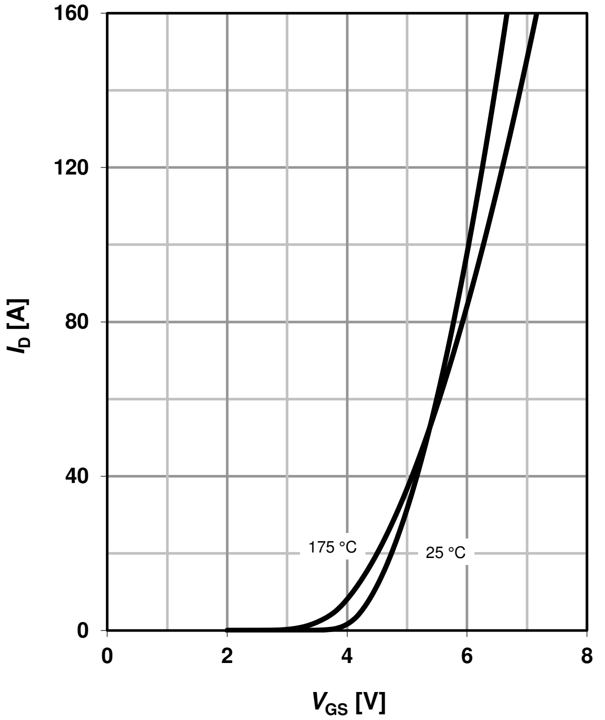
parameter: V_{GS}



7 Typ. transfer characteristics

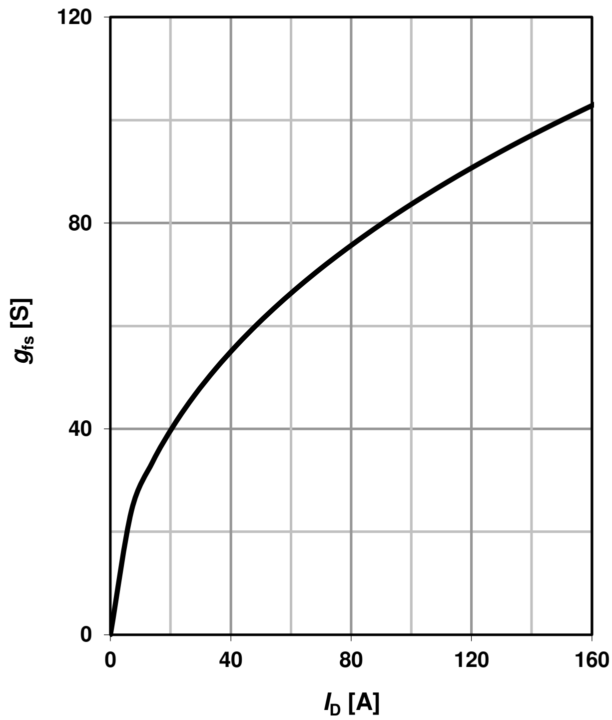
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



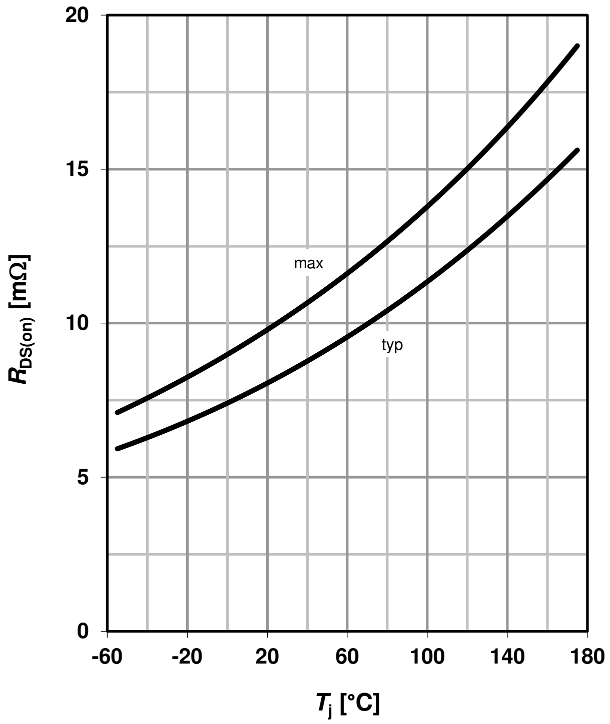
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

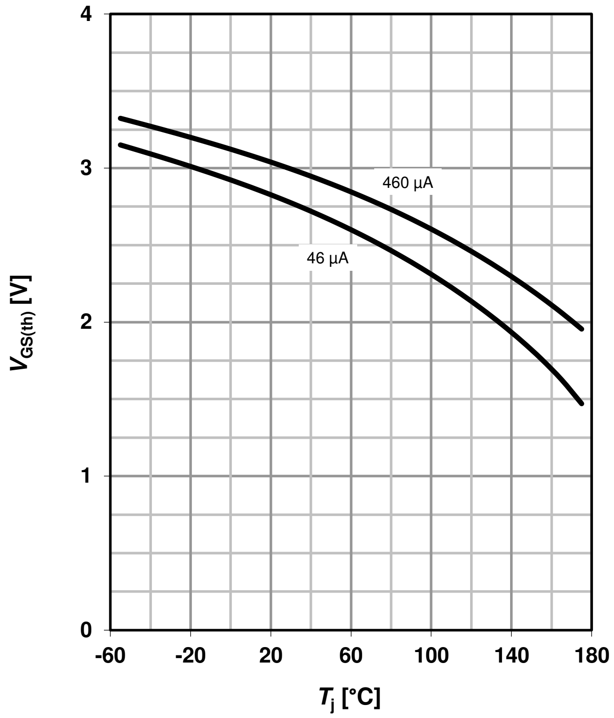
$R_{DS(on)}$=f(T_j); I_D=40 A; V_{GS}=10 V



10 Typ. gate threshold voltage

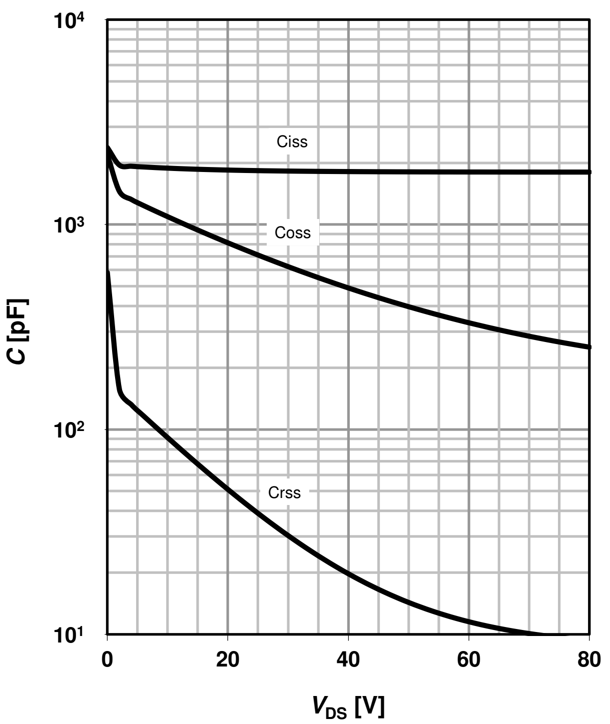
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

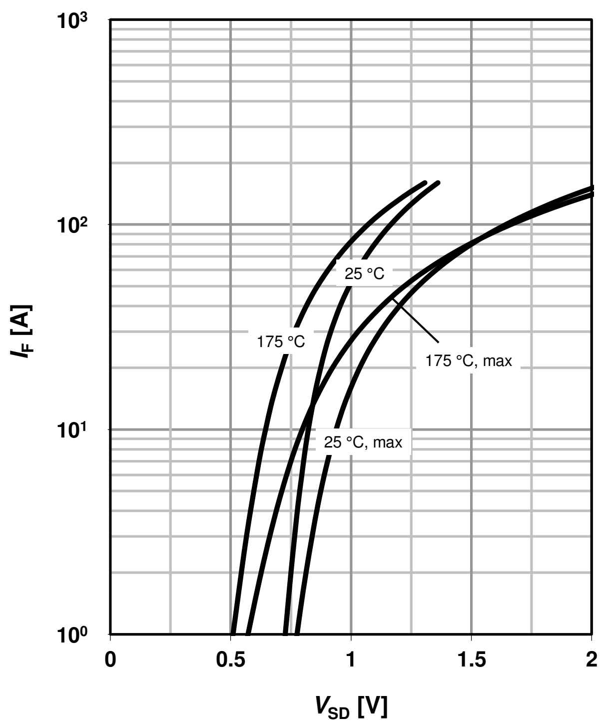
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

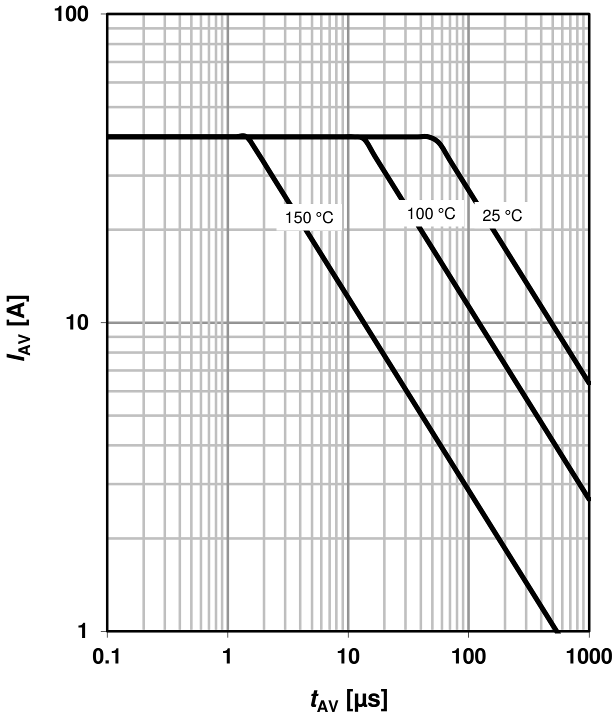
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

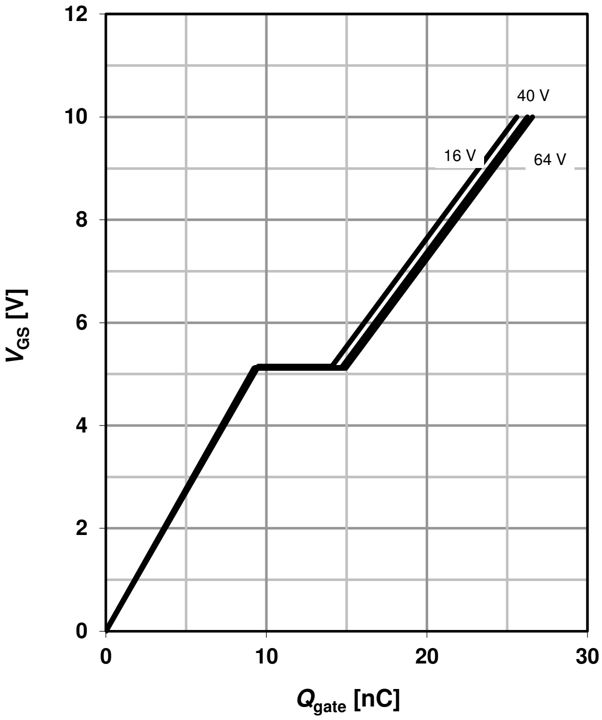
parameter: $T_{j(start)}$



14 Typ. gate charge

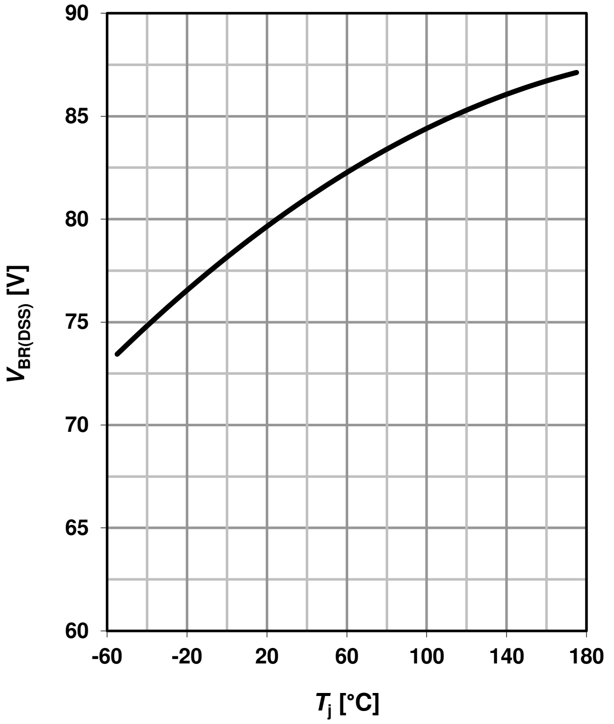
V_{GS}=f(Q_{gate}); I_D=40 A pulsed

parameter: V_{DD}

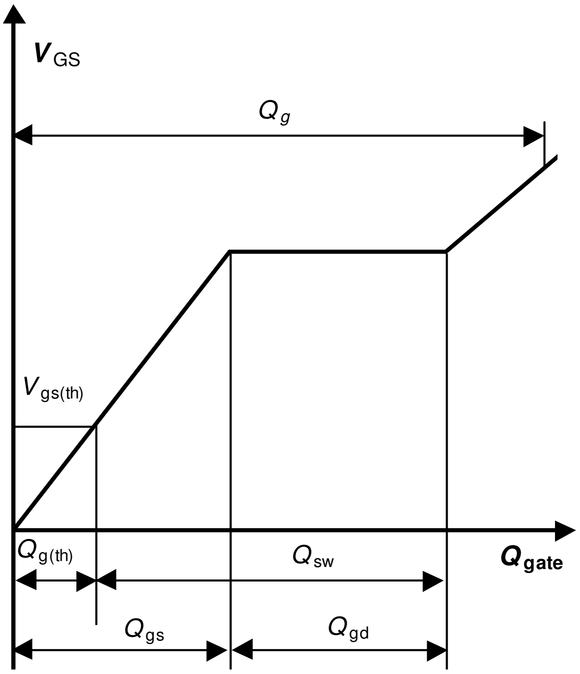


15 Drain-source breakdown voltage

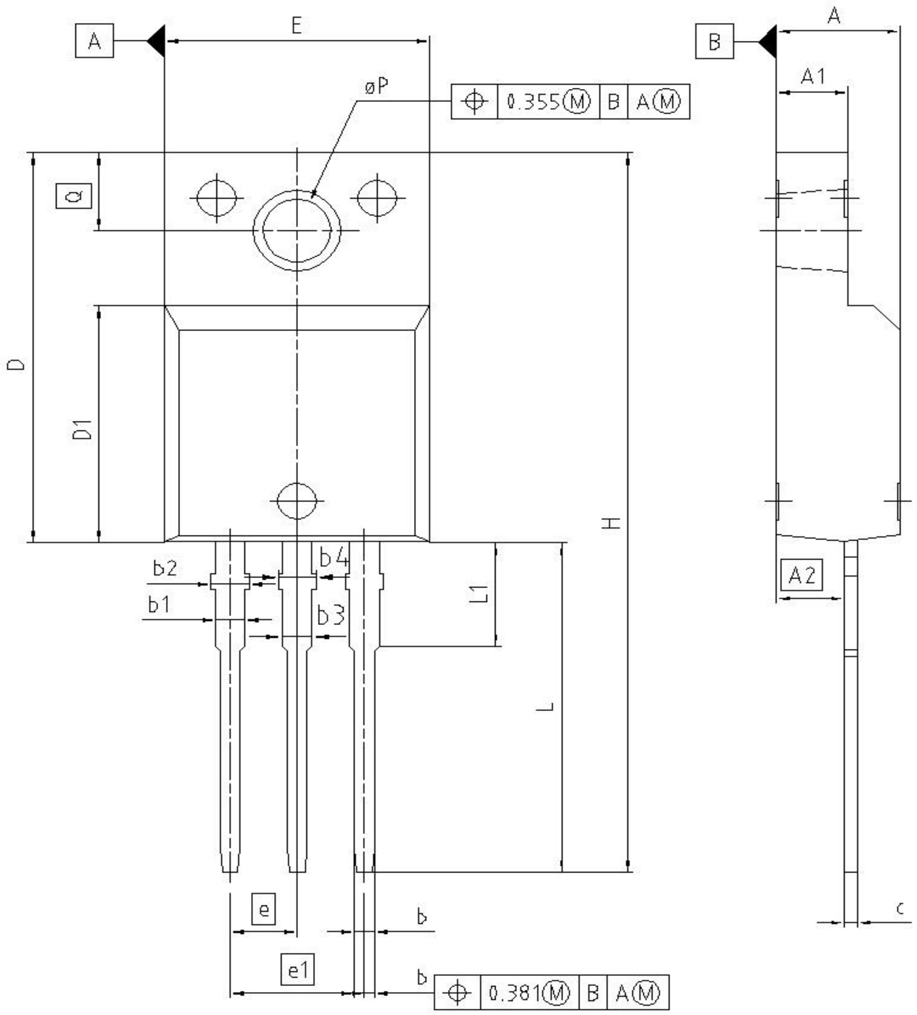
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



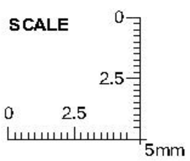
PG-TO220-3-FP



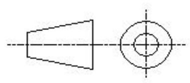
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.55	4.85	0.179	0.191
A1	2.55	2.85	0.100	0.112
A2	2.42	2.72	0.095	0.107
b	0.65	0.85	0.026	0.033
b1	0.95	1.33	0.037	0.052
b2	0.95	1.51	0.037	0.059
b3	0.65	1.33	0.026	0.052
b4	0.65	1.51	0.026	0.059
c	0.40	0.63	0.016	0.025
D	15.85	16.15	0.624	0.636
D1	9.53	9.83	0.375	0.387
E	10.35	10.65	0.407	0.419
e	2.54		0.100	
e1	5.08		0.200	
N	3		3	
H	29.45	29.75	1.159	1.171
L	13.45	13.75	0.530	0.541
L1	3.15	3.45	0.124	0.136
øP	2.95	3.20	0.116	0.126
Q	3.15	3.50	0.124	0.138

REFERENCE
../..

SCALE



EUROPEAN PROJECTION



ISSUE DATE
08-01-2007

FILE
TO220_2

Revision History

IPA100N08N3 G

Revision: 2015-08-27, Rev. 2.2

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.2	2015-08-27	Update features: "Fully isolated package..."

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