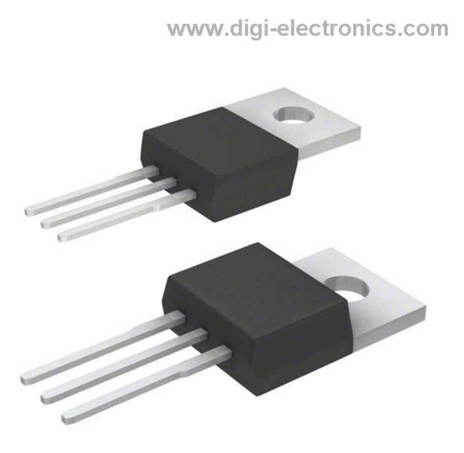
IPP114N12N3GXKSA1 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	IPP114N12N3GXKSA1-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IPP114N12N3GXKSA1
Description	MOSFET N-CH 120V 75A TO220-3
Detailed Description	N-Channel 120 V 75A (Tc) 136W (Tc) Through Hole PG-TO220-3

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IPP114N12N3GXKSA1	Infineon Technologies
Series:	Product Status:
OptiMOS™	Active
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
120 V	75A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	11.4mOhm @ 75A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
4V @ 83µA	65 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	4310 pF @ 60 V
FET Feature:	Power Dissipation (Max):
-	136W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 175°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
PG-TO220-3	TO-220-3
Base Product Number:	
IPP114	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

OptiMOS™3 Power-Transistor

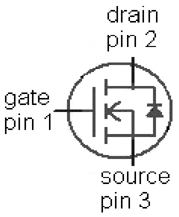
Product Summary

V_{DS}	120	V
$R_{DS(on)max}$	11.4	mΩ
I_D	75	A

Features

- N-channel, normal level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant; halogen free
- Qualified according to JEDEC[1] for target application
- Ideal for high-frequency switching and synchronous rectification

Type	IPP114N12N3 G
	
Package	PG-TO220-3
Marking	114N12N



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

Parameter	**Symbol**	**Conditions**	**Value**	**Unit**
Continuous drain current	I_D	T_C=25 °C	75	A
		T_C=100 °C	53	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	300	
Avalanche energy, single pulse	E_{AS}	I_D=75 A, R_{GS}=25 Ω	120	mJ
Gate source voltage[3]	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	136	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] see figure 3

[3] T_{jmax}=150°C and duty cycle D=0.01 for V_{gs}<-5V

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.1	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint	-	-	62	
		6 cm2 cooling area[4)]	-	-	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	120	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=83 µA	2	3	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=100 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=75 A	-	9.8	11.4	
Gate resistance	R_G		-	1.5	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=75 A	40	80	-	S

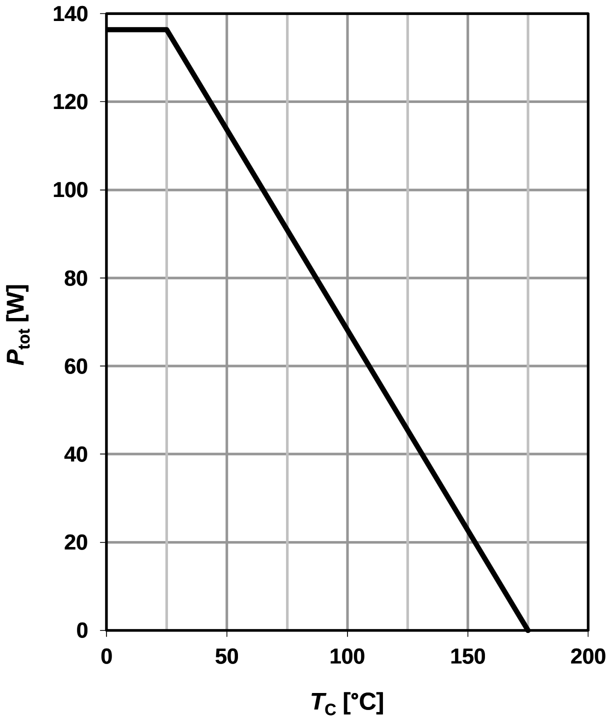
[4)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=60 V, f=1 MHz	-	3240	4310	pF
Output capacitance	C_{oss}		-	408	543	
Reverse transfer capacitance	C_{rss}		-	22	-	
Turn-on delay time	$t_{\mathrm{d(on)}}$	V_{DD}=60 V, V_{GS}=10 V, I_{D}=37 A, R_{G}=1.6 Ω	-	19	-	ns
Rise time	t_{r}		-	36	-	
Turn-off delay time	$t_{\mathrm{d(off)}}$		-	30	-	
Fall time	t_{f}		-	7	-	
Gate Charge Characteristics5)						
Gate to source charge	Q_{gs}	V_{DD}=60 V, I_{D}=75 A, V_{GS}=0 to 10 V	-	18	-	nC
Gate to drain charge	Q_{gd}		-	12	-	
Switching charge	Q_{sw}		-	20	-	
Gate charge total	Q_{g}		-	49	65	
Gate plateau voltage	V_{plateau}		-	5.6	-	V
Output charge	Q_{oss}	V_{DD}=60 V, V_{GS}=0 V	-	56	75	nC
Reverse Diode						
Diode continous forward current	I_{S}	T_{C}=25 °C	-	-	75	A
Diode pulse current	$I_{\mathrm{S,pulse}}$		-	-	300	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_{F}=75 A, T_{j}=25 °C	-	1	1.2	V
Reverse recovery time	t_{rr}	V_{R}=60 V, I_{F}=I_{S}, di_{F}/dt=100 A/µs	-	116		ns
Reverse recovery charge	Q_{rr}		-	232		nC

5) See figure 16 for gate charge parameter definition

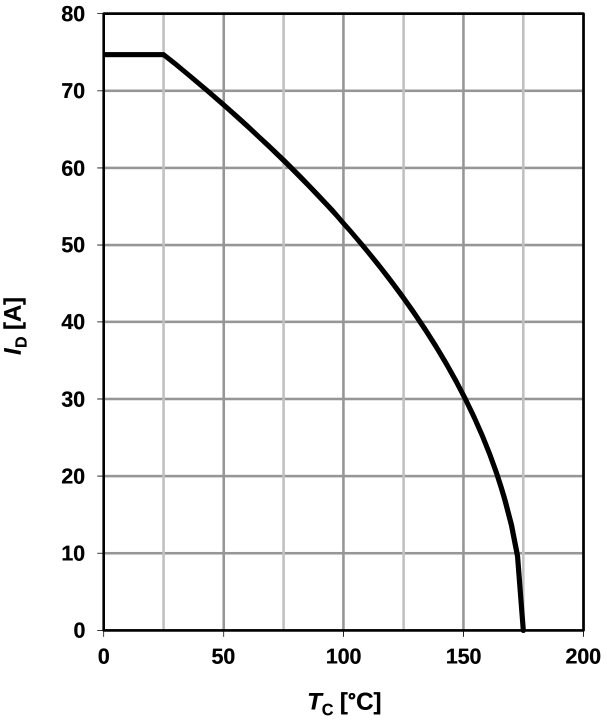
1 Power dissipation

$P_{\mathrm{tot}}=\mathrm{f}(T_{\mathrm{C}})$



2 Drain current

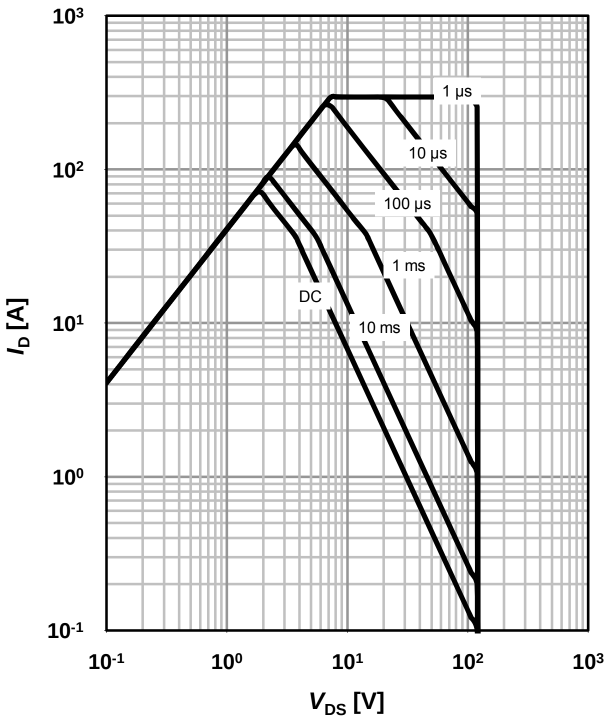
$I_{\mathrm{D}}=\mathrm{f}(T_{\mathrm{C}})$; $V_{\mathrm{GS}}\geq 10$ V



3 Safe operating area

$I_{\mathrm{D}}=\mathrm{f}(V_{\mathrm{DS}})$; $T_{\mathrm{C}}=25$ °C; $D=0$

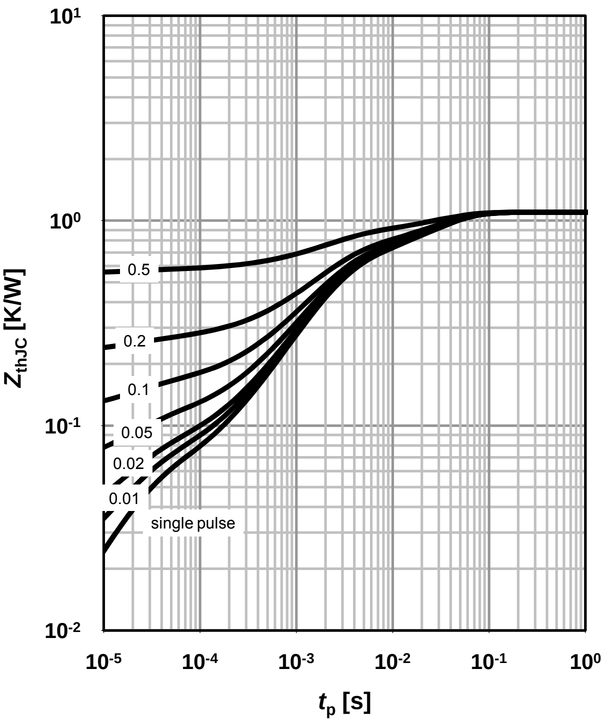
parameter: t_{p}



4 Max. transient thermal impedance

$Z_{\mathrm{thJC}}=\mathrm{f}(t_{\mathrm{p}})$

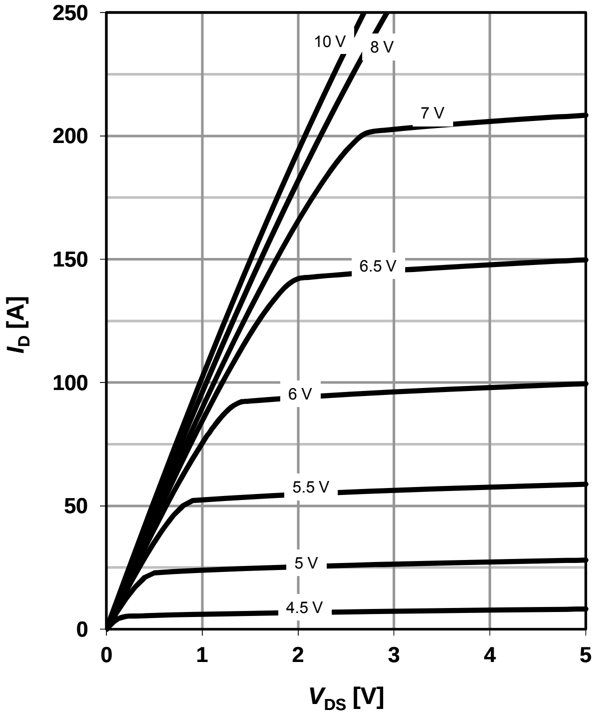
parameter: $D=t_{\mathrm{p}}/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

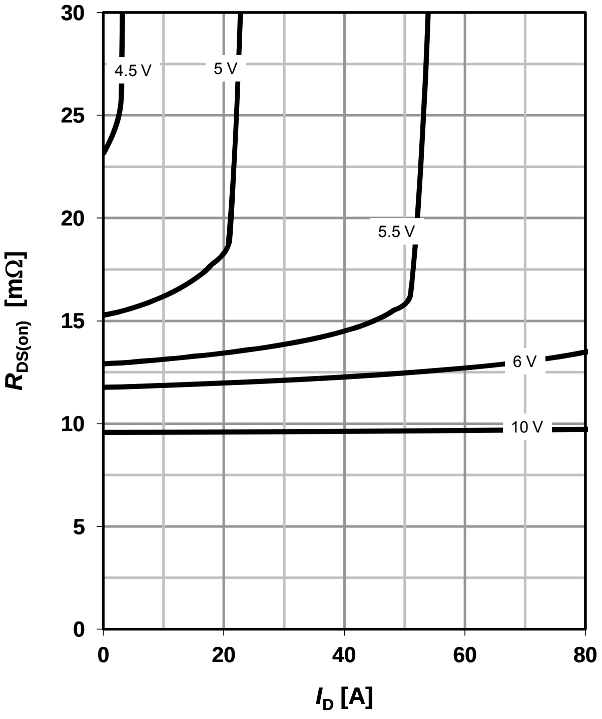
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

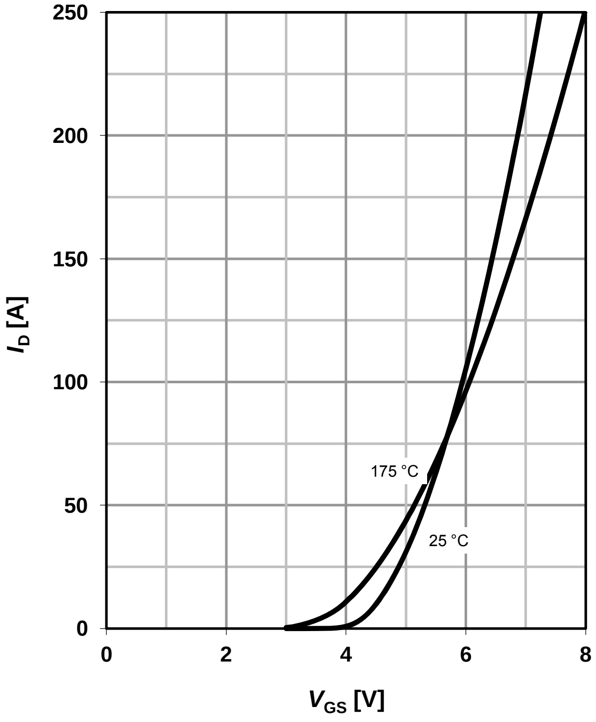
parameter: V_{GS}



7 Typ. transfer characteristics

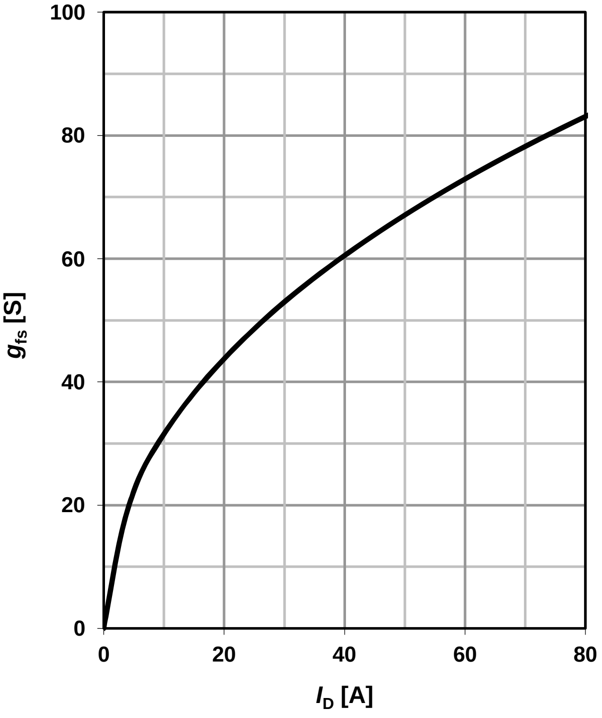
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



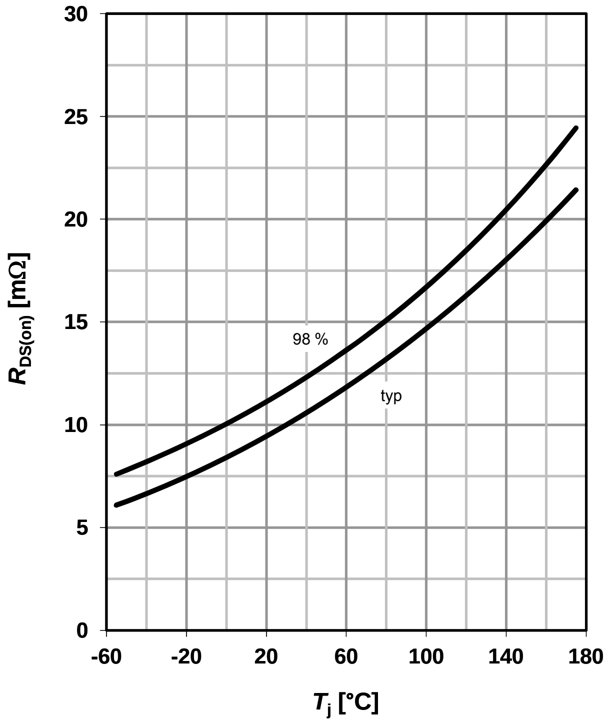
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

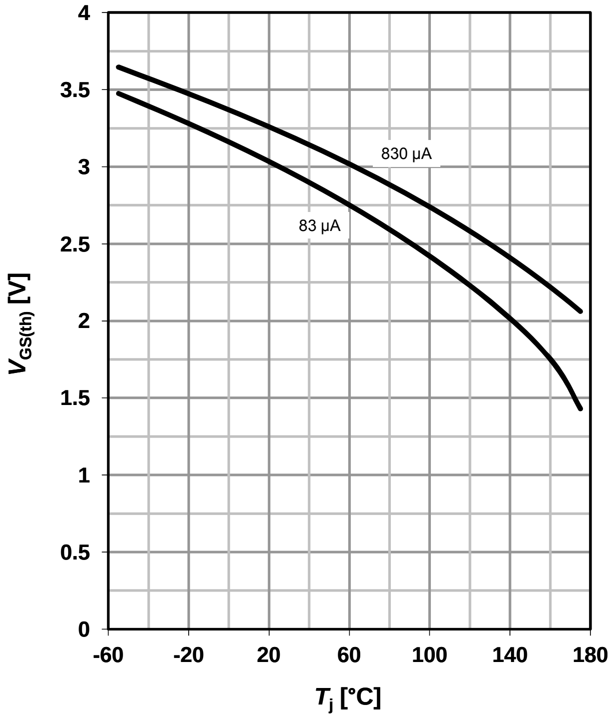
$R_{DS(on)}$=f(T_j); I_D=75 A; V_{GS}=10 V



10 Typ. gate threshold voltage

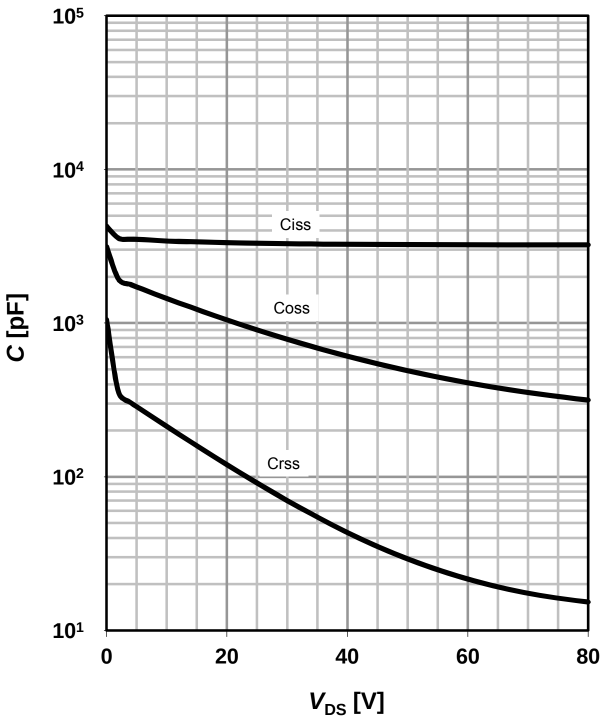
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

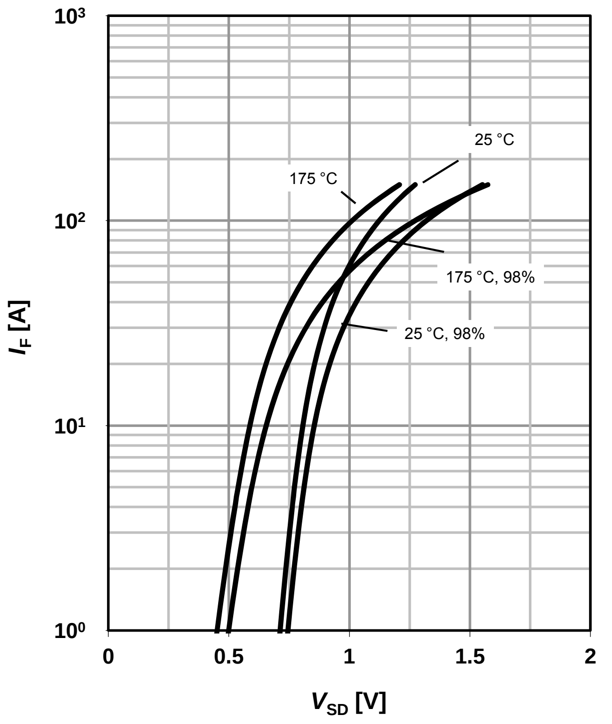
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

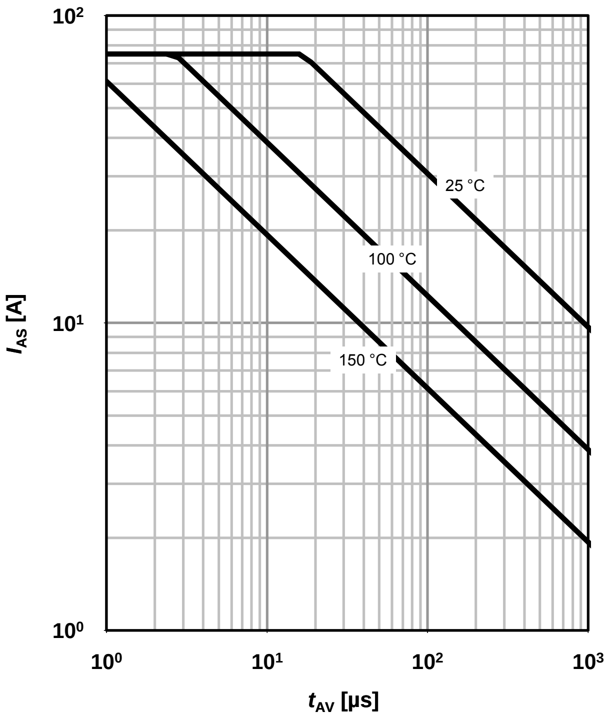
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

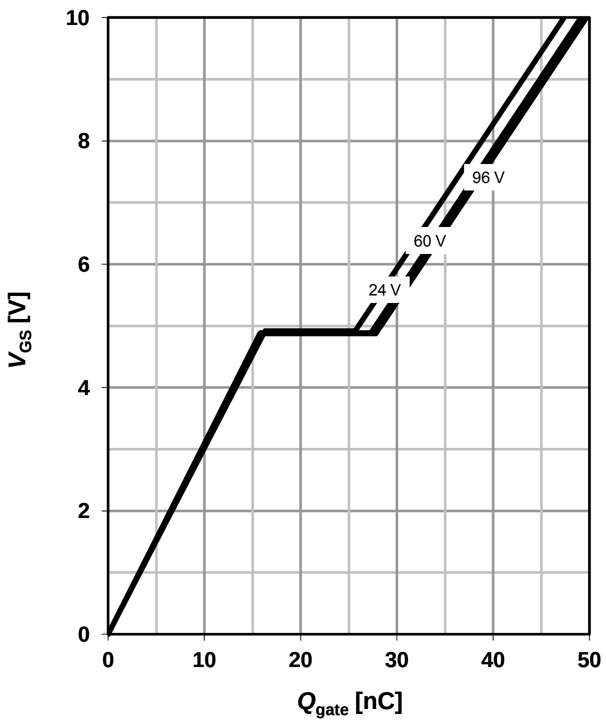
parameter: $T_{j(start)}$



14 Typ. gate charge

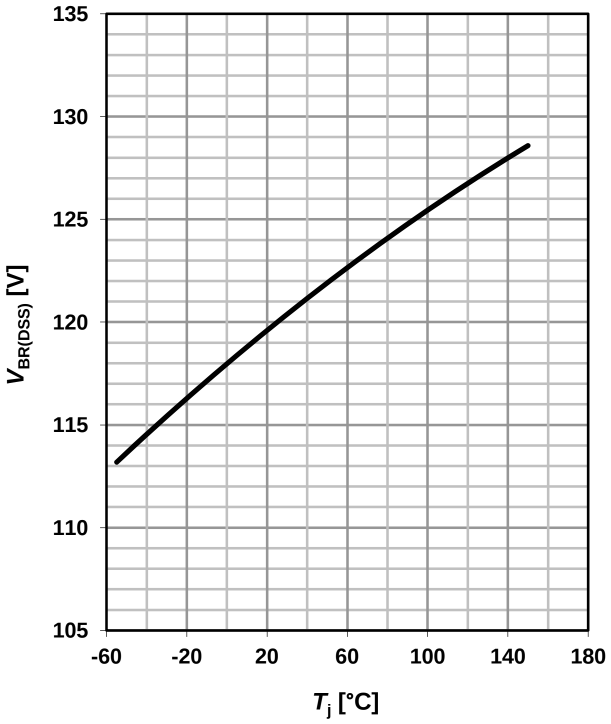
V_{GS}=f(Q_{gate}); I_D=75 A pulsed

parameter: V_{DD}

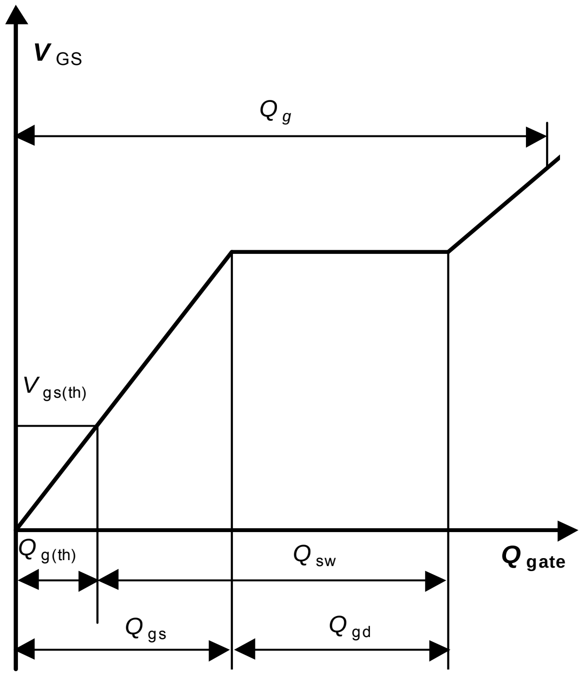


15 Drain-source breakdown voltage

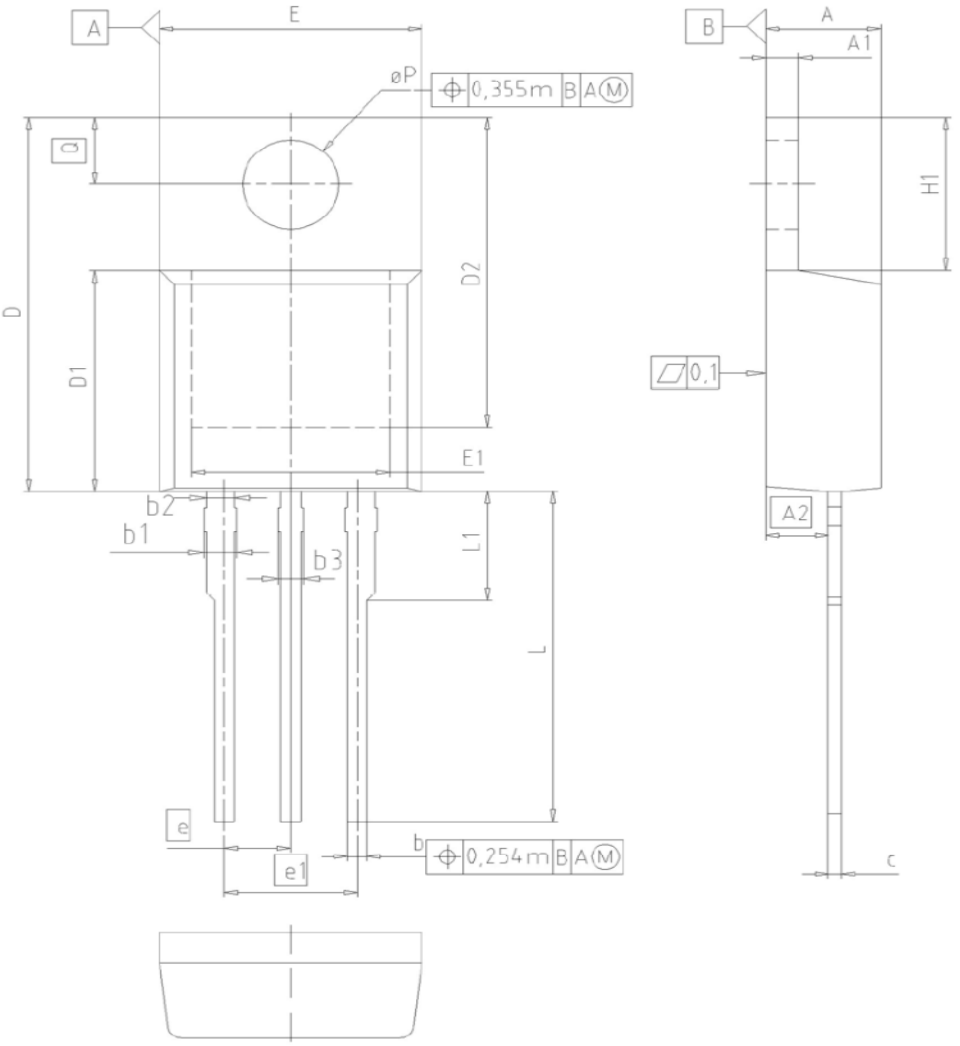
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



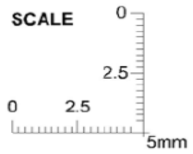
PG-TO220-3: Outline



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



EUROPEAN PROJECTION

ISSUE DATE
23-08-2007

REVISION
05

Published by
Infineon Technologies AG
81726 Munich, Germany

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.

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com

DCI.

QUALITY MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T 19001-2016 idt ISO9001:2015

DCI Certification Ltd

DCI.

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T 24001-2016 idt ISO14001:2015

DCI Certification Ltd

DCI.

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM CERTIFICATE

DIGI ELECTRONICS HK LIMITED

GB/T45001-2020 idt ISO45001:2018

DCI Certification Ltd

CR

CERTIFICATE OF INCORPORATION

ASA

MEMBERSHIP

Certificate

DIGI ELECTRONICS HK LIMITED

dun & bradstreet

A Dun & Bradstreet

D-U-N-S® Registered™ Business