IPD10N03LA Datasheet

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DiGi Electronics Part Number	IPD10N03LA-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IPD10N03LA
Description	MOSFET N-CH 25V 30A TO252-3
Detailed Description	N-Channel 25 V 30A (Tc) 52W (Tc) Surface Mount PG -TO252-3-11

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IPD10N03LA	Infineon Technologies
Series:	Packaging:
OptiMOS™	Tape & Reel (TR)
Part Status:	FET Type:
Obsolete	N-Channel
Technology:	Drain to Source Voltage (Vdss):
MOSFET (Metal Oxide)	25 V
Current - Continuous Drain (Id) @ 25°C:	Drive Voltage (Max Rds On, Min Rds On):
30A (Tc)	4.5V, 10V
Rds On (Max) @ Id, Vgs:	Vgs(th) (Max) @ Id:
10.4mOhm @ 30A, 10V	2V @ 20µA
Gate Charge (Qg) (Max) @ Vgs:	Vgs (Max):
11 nC @ 5 V	±20V
Input Capacitance (Ciss) (Max) @ Vds:	FET Feature:
1358 pF @ 15 V	-
Power Dissipation (Max):	Operating Temperature:
52W (Tc)	-55°C ~ 175°C (TJ)
Mounting Type:	Supplier Device Package:
Surface Mount	PG-TO252-3-11
Package / Case:	Base Product Number:
TO-252-3, DPAK (2 Leads + Tab), SC-63	IPD10N

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
RoHS non-compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

IPD10N03LA G **IPF10N03LA G**
IPS10N03LA G **IPU10N03LA G**

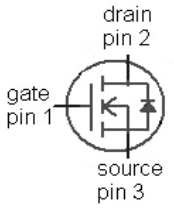
OptiMOS®2 Power-Transistor

Features

- Ideal for high-frequency dc/dc converters
- Qualified according to JEDEC[1)] for target application
- N-channel, logic level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Superior thermal resistance
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant

Product Summary

V_{DS}	25	V
$R_{DS(on),max}$	10.4	mΩ
I_D	30	A



Type	IPD10N03LA	IPF10N03LA	IPS10N03LA	IPU10N03LA
				
Package	P-TO252-3-11	P-TO252-3-23	P-TO251-3-11	P-TO251-3-1
Marking	10N03LA	10N03LA	10N03LA	10N03LA

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)]	30	A
		T_C=100 °C	30	
Pulsed drain current	$I_{D,pulse}$	T_C=25 °C[3)]	210	
Avalanche energy, single pulse	E_{AS}	I_D=30 A, R_{GS}=25 Ω	80	mJ
Reverse diode dv/dt	dv/dt	I_D=30 A, V_{DS}=20 V, di/dt=200 A/µs, $T_{j,max}$=175 °C	6	kV/µs
Gate source voltage[4)]	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	52	W
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}		-	-	2.9	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	75	
		6 cm^2 cooling area[5]	-	-	50	
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	25	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=20 µA	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}	V_{DS}=25 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=25 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}=4.5 V, I_D=20 A	-	13.9	17.4	mΩ
		V_{GS}=10 V, I_D=30 A	-	8.7	10.4	
Gate resistance	R_G		-	1	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=30 A	20	41	-	S

[1] J-STD20 and JESD22

[2] Current is limited by bondwire; with an R_{thJC}=2.9 K/W the chip is able to carry 53 A.

[3] See figure 3

[4] $T_{j,max}$=150 °C and duty cycle D <0.25 for V_{GS}<-5 V

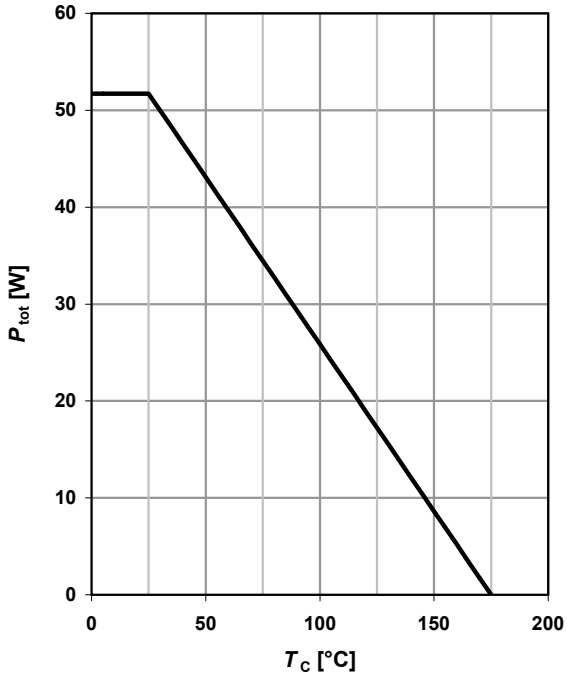
[5] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz	-	1021	1358	pF
Output capacitance	C_{oss}		-	393	522	
Reverse transfer capacitance	C_{rss}		-	52	78	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15 V, V_{GS}=10 V, I_D=15 A, R_G=2.7 Ω	-	6.3	9.4	ns
Rise time	t_r		-	4.8	7.2	
Turn-off delay time	$t_{d(off)}$		-	18	27	
Fall time	t_f		-	2.8	4.2	
Gate Charge Characteristics+A40[6)]						
Gate to source charge	Q_{gs}	V_{DD}=15 V, I_D=15 A, V_{GS}=0 to 5 V	-	3.4	4.5	nC
Gate charge at threshold	$Q_{g(th)}$		-	1.6	2.2	
Gate to drain charge	Q_{gd}		-	2.3	3.5	
Switching charge	Q_{sw}		-	4.1	5.8	
Gate charge total	Q_g		-	8.2	11	
Gate plateau voltage	$V_{plateau}$		-	3.3	-	V
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 5 V	-	7.2	9.6	nC
Output charge	Q_{oss}	V_{DD}=15 V, V_{GS}=0 V	-	8.5	11	
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	30	A
Diode pulse current	$I_{S,pulse}$		-	-	210	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=30 A, T_j=25 °C	-	0.93	1.2	V
Reverse recovery charge	Q_{rr}	V_R=15 V, I_F=I_S, di_F/dt=400 A/µs	-	-	10	nC

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

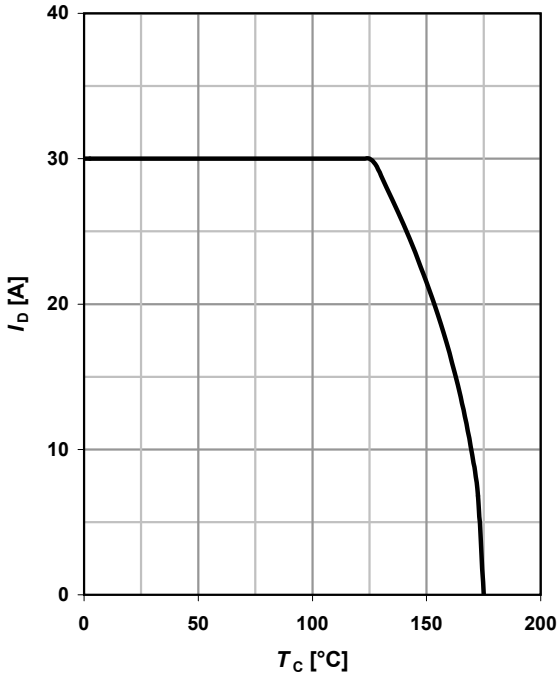
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

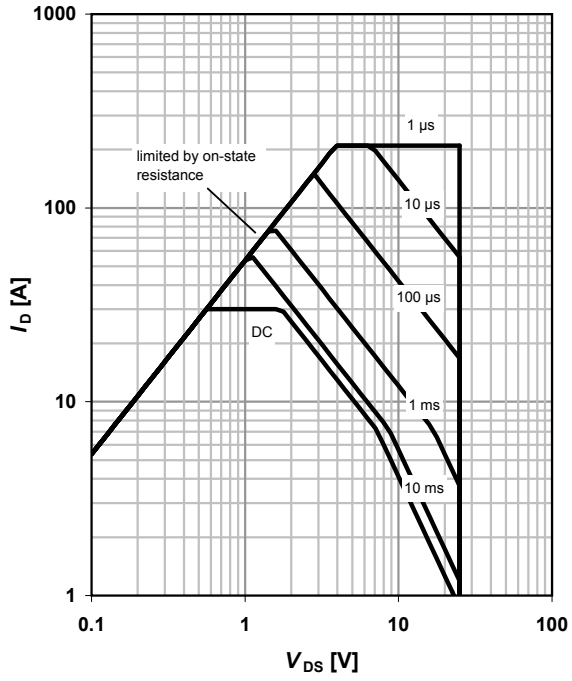
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

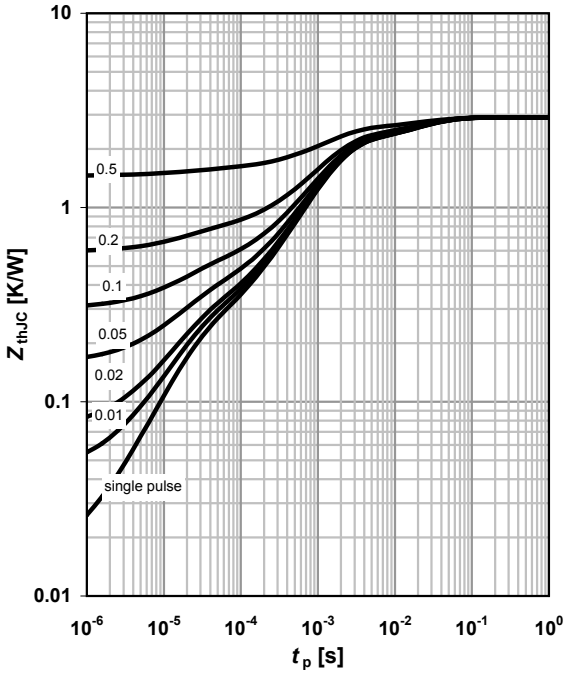
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

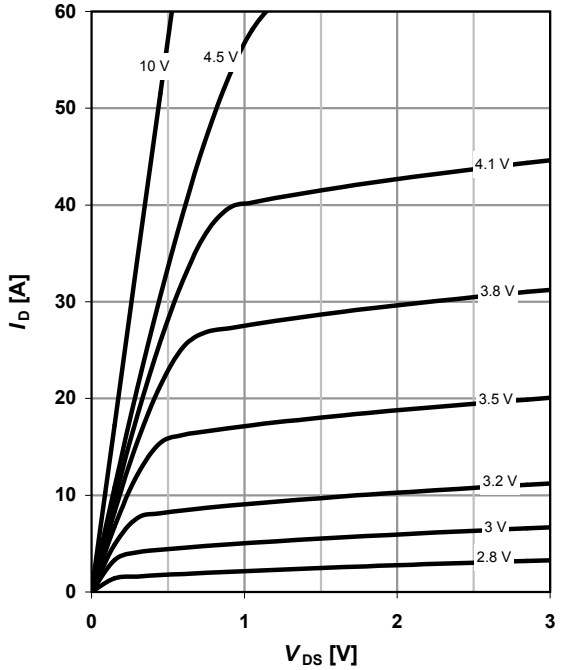
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

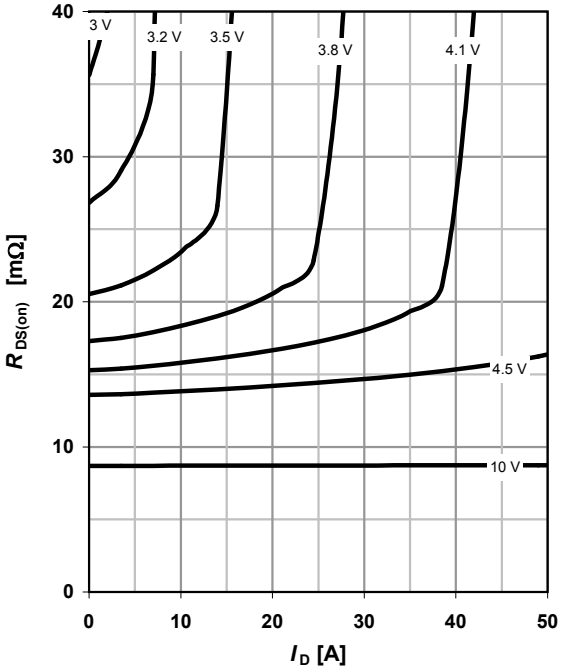
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

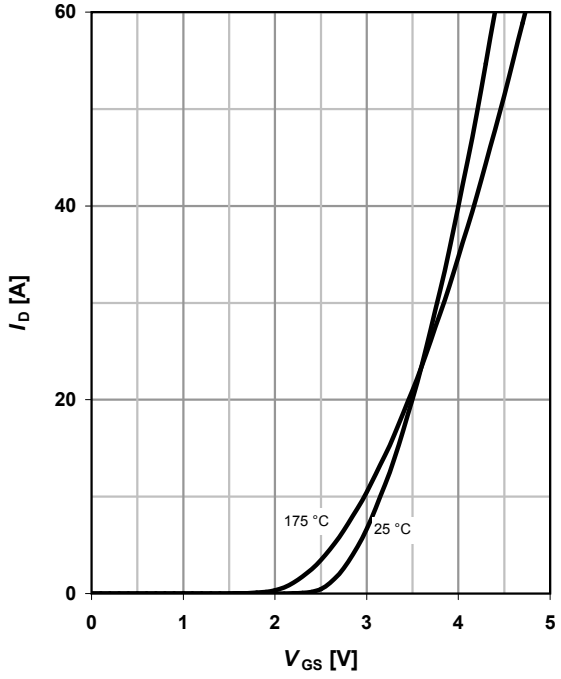
parameter: V_{GS}



7 Typ. transfer characteristics

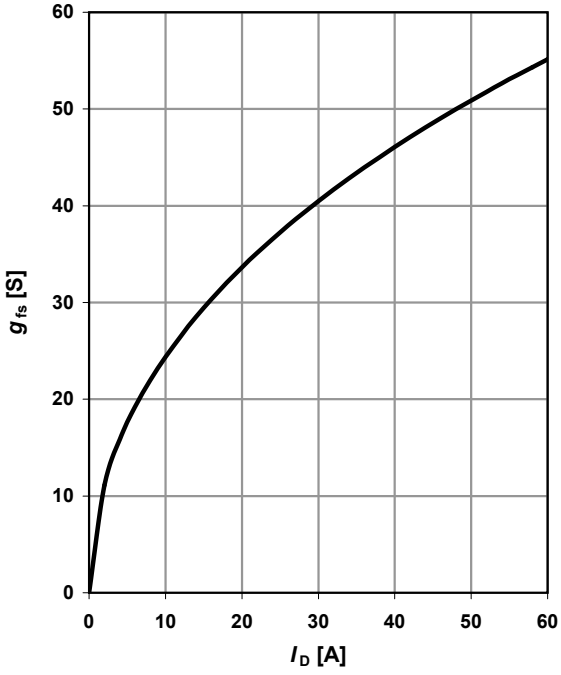
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



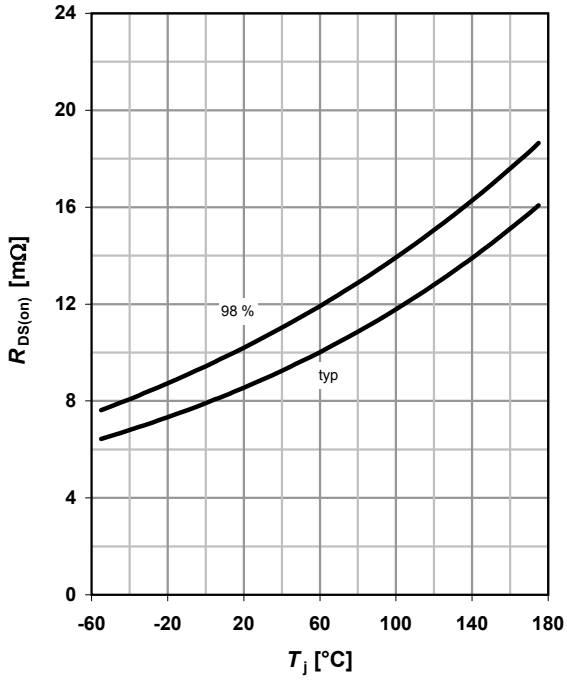
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

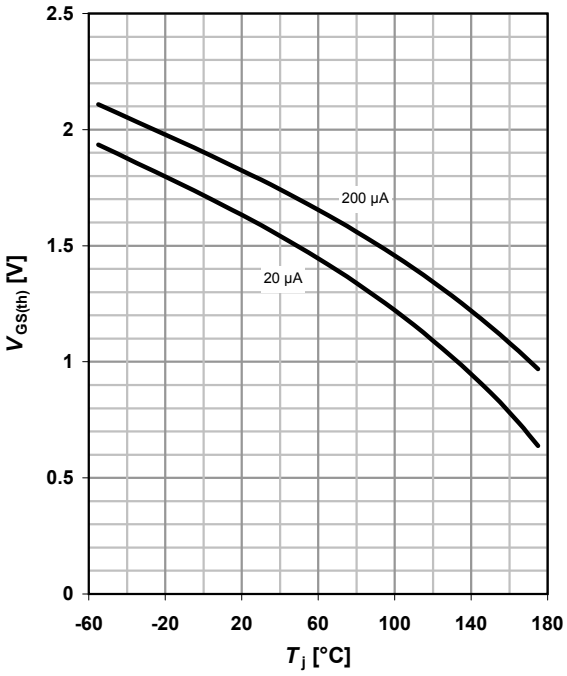
$R_{DS(on)}$=f(T_j); I_D=30 A; V_{GS}=10 V



10 Typ. gate threshold voltage

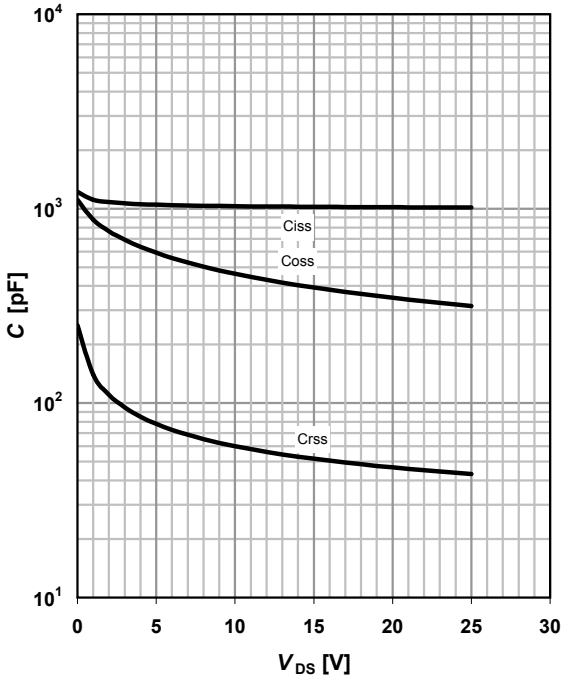
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

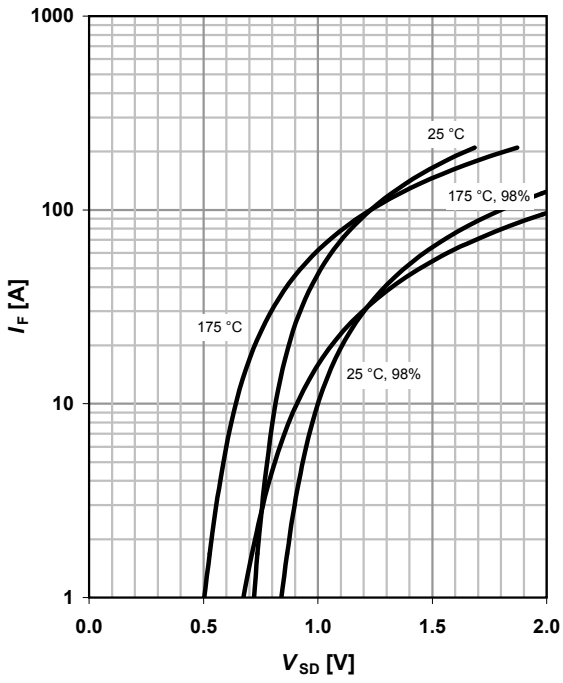
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

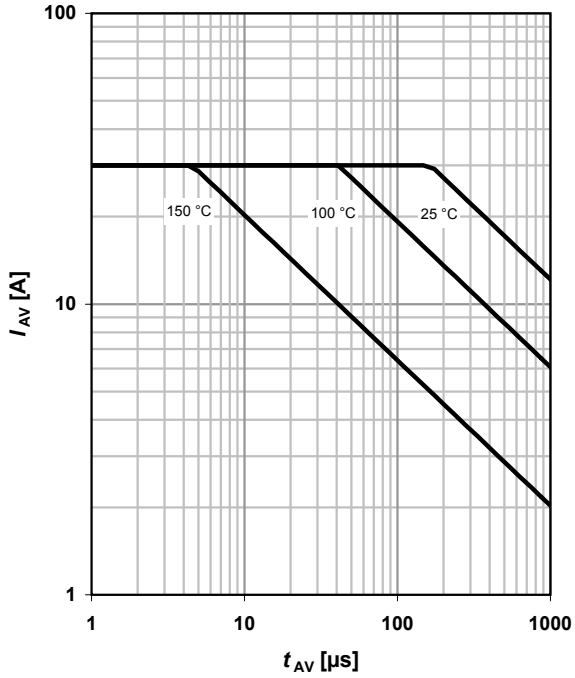
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

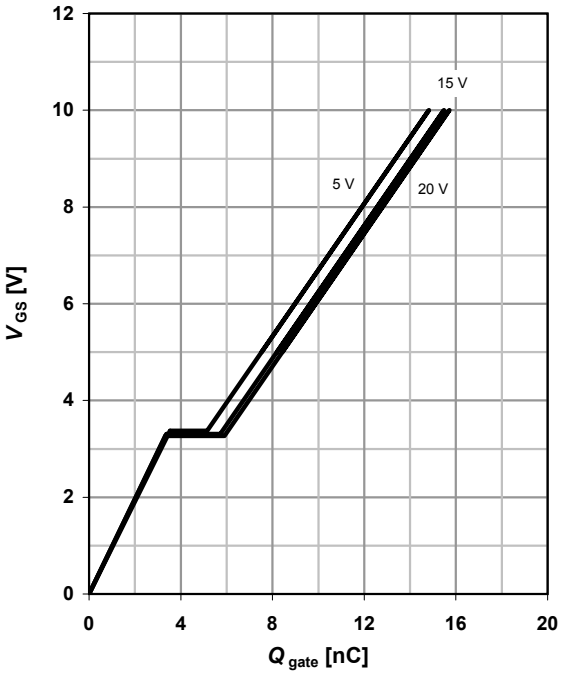
parameter: $T_{j(start)}$



14 Typ. gate charge

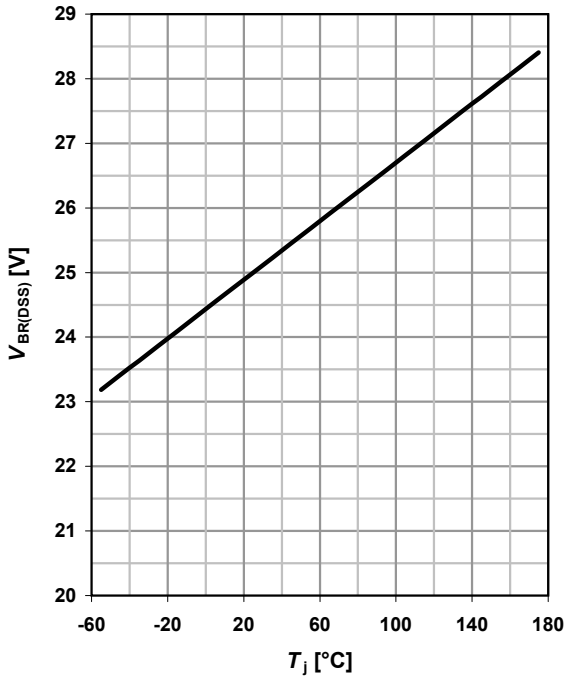
V_{GS}=f(Q_{gate}); I_D=15 A pulsed

parameter: V_{DD}

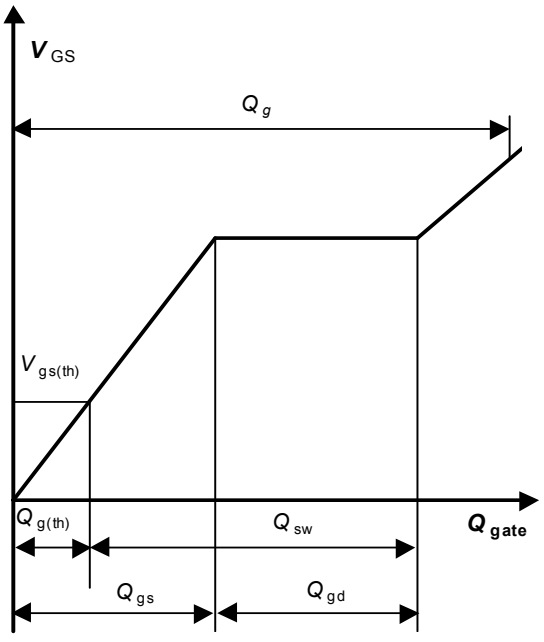


15 Drain-source breakdown voltage

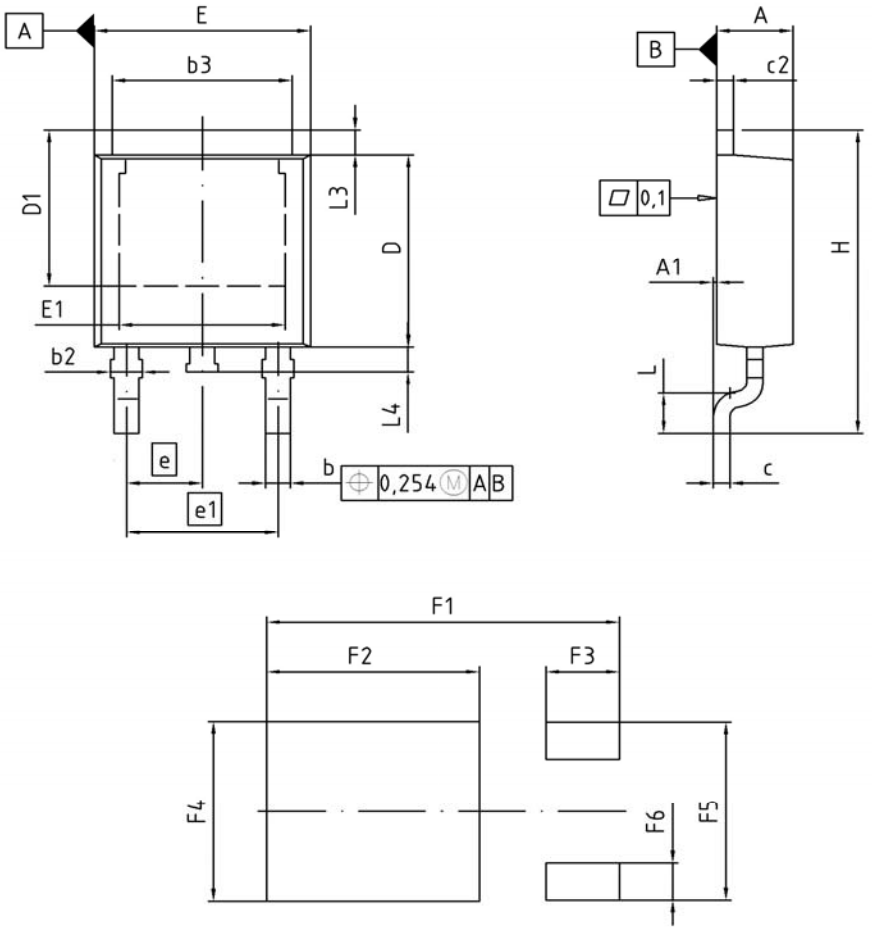
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



Package Outline **PG-TO252-3-11**



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		0.090	
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	10.50	10.70	0.413	0.421
F2	6.30	6.50	0.248	0.256
F3	2.10	2.30	0.083	0.091
F4	5.70	5.90	0.224	0.232
F5	5.66	5.86	0.223	0.231
F6	1.10	1.30	0.043	0.051

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SCALE 0 2.0 0 2.0 4mm

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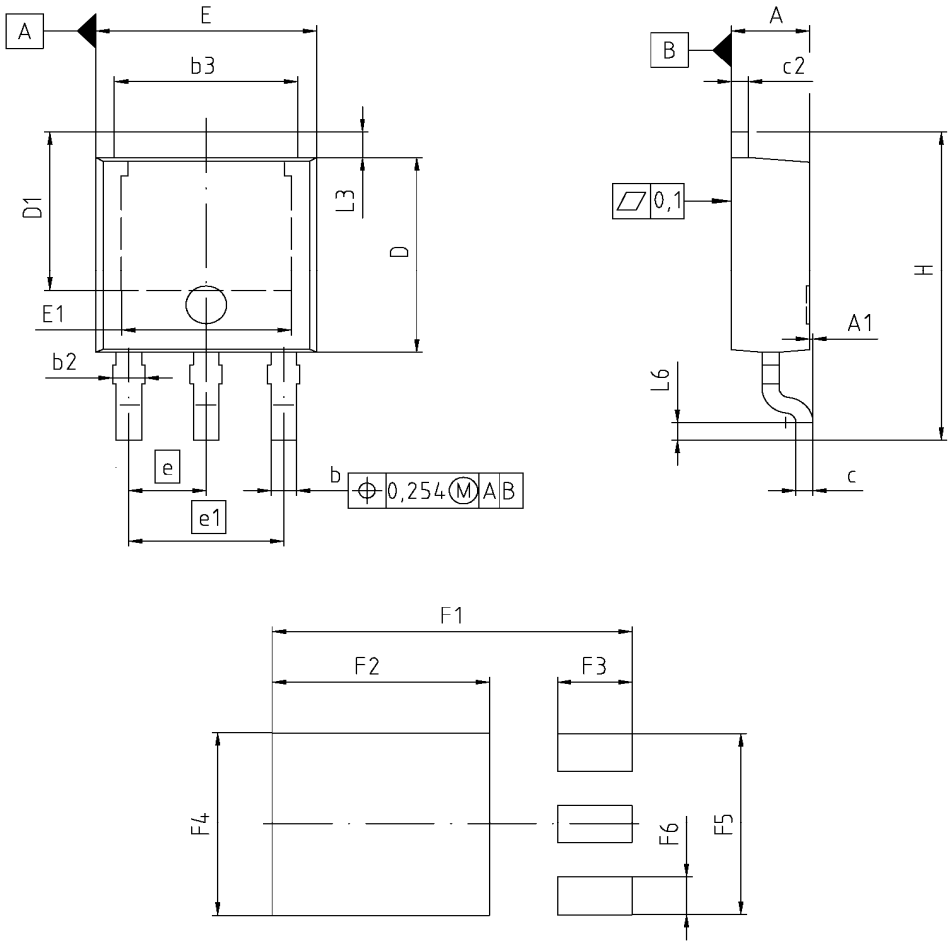
Package Outline **PG-TO252-3-23**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.159	2.413	0.085	0.095
A1	0.000	0.150	0.000	0.006
b	0.635	0.889	0.025	0.035
b2	0.650	1.150	0.026	0.045
b3	5.004	5.500	0.197	0.217
c	0.457	0.580	0.018	0.023
c2	0.460	0.980	0.018	0.039
D	5.969	6.223	0.235	0.245
D1	5.020	5.842	0.198	0.230
E	6.400	6.731	0.252	0.265
E1	4.850	5.207	0.191	0.205
e	2.286		0.090	
e1	4.572		0.180	
N	3		3	
H	9.400	10.480	0.370	0.413
L3	0.900	1.143	0.035	0.045
L4	0.584	0.950	0.023	0.037
L6	0.510	0.686	0.020	0.027
F1	10.500	10.700	0.413	0.421
F2	6.300	6.500	0.248	0.256
F3	2.100	2.300	0.083	0.091
F4	5.700	5.900	0.224	0.232
F5	5.660	5.860	0.222	0.231
F6	1.100	1.300	0.043	0.051

REFERENCE - / -
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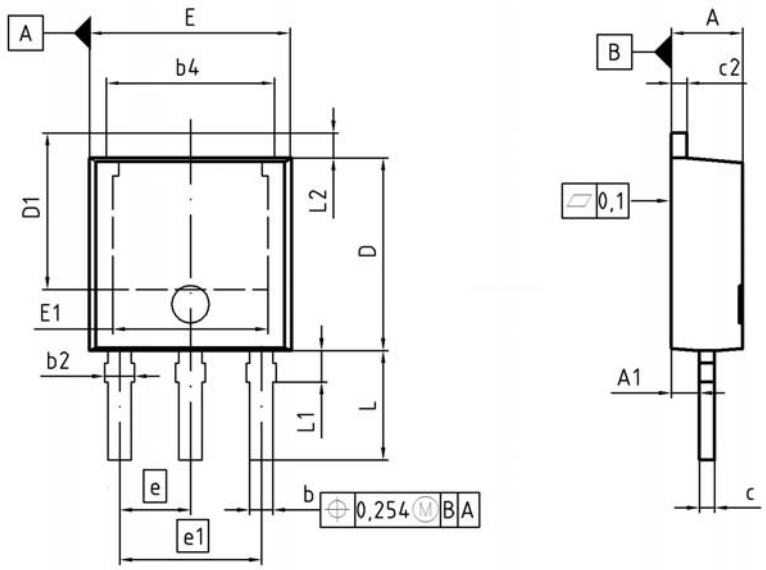
ISSUE DATE 21-09-2005
FILE TO252_2

Package Outline **PG-TO251-3-11**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.39	0.086	0.094
A1	0.80	1.14	0.031	0.045
b	0.64	0.89	0.025	0.035
b2	0.65	1.15	0.026	0.045
b4	4.95	5.50	0.195	0.217
c	0.46	0.58	0.018	0.023
c2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.04	5.44	0.198	0.214
E	6.35	6.73	0.250	0.265
E1	4.90	5.10	0.193	0.201
e	2.29		0.090	
e1	4.57		0.180	
N	3		3	
L	3.40	3.60	0.134	0.142
L1	0.90	1.10	0.035	0.043
L2	0.90	1.10	0.035	0.043

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SCALE 0 2.0 0 2.0 4mm

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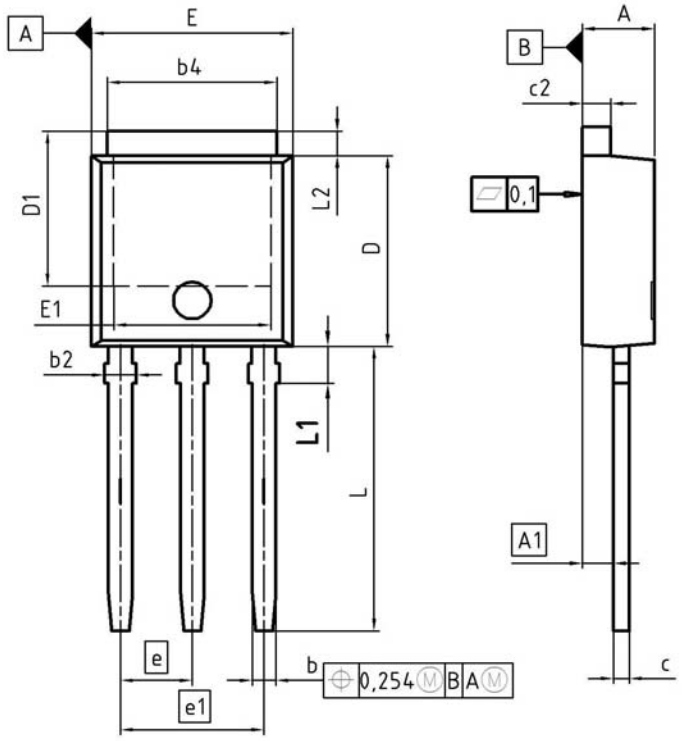
Package Outline **PG-TO251-3-21**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.16	2.41	0.085	0.095
A1	0.90	1.14	0.035	0.045
b	0.64	0.89	0.025	0.035
b2	0.65	1.15	0.026	0.045
b4	4.95	5.50	0.195	0.217
c	0.46	0.60	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.04	5.77	0.198	0.227
E	6.35	6.73	0.250	0.265
E1	4.70	5.21	0.185	0.205
e	2.29		0.090	
e1	4.57		0.180	
N	3		3	
L	8.89	9.65	0.350	0.380
L1	1.90	2.29	0.075	0.090
L2	0.89	1.37	0.035	0.054

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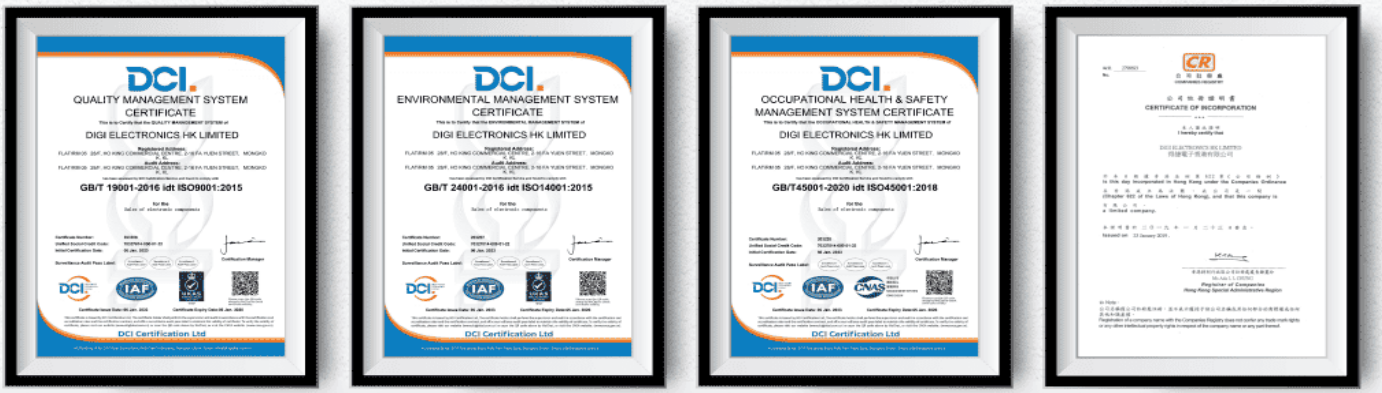

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