IPI057N08N3 G Datasheet

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DiGi Electronics Part Number	IPI057N08N3 G-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IPI057N08N3 G
Description	MOSFET N-CH 80V 80A TO262-3
Detailed Description	N-Channel 80 V 80A (Tc) 150W (Tc) Through Hole PG-TO262-3

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IPI057N08N3 G	Infineon Technologies
Series:	Product Status:
OptiMOS™	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
80 V	80A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
6V, 10V	5.7mOhm @ 80A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
3.5V @ 90µA	69 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	4750 pF @ 40 V
FET Feature:	Power Dissipation (Max):
-	150W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 175°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
PG-TO262-3	TO-262-3 Long Leads, I2PAK, TO-262AA
Base Product Number:	
IPI057N	

Environmental & Export classification

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

IPP057N08N3 G IPI057N08N3 G
IPB054N08N3 G

OptiMOS™3 Power-Transistor

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
- Qualified according to JEDEC[1] for target application
- Ideal for high-frequency switching and synchronous rectification
- Halogen-free according to IEC61249-2-21

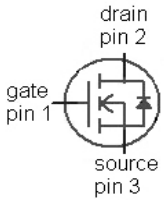
RoHS Halogen-Free

Product Summary

V_{DS}	80	V
$R_{DS(on),max\ (SMD)}$	5.4	mΩ
I_D	80	A

previous engineering sample codes: IPP06CN08N

Type	IPP057N08N3 G	IPI057N08N3 G	IPB054N08N3 G
			
Package	PG-TO220-3	PG-TO262-3	PG-TO263-3
Marking	057N08N	057N08N	054N08N



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]	80	A
		T_C=100 °C	80	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	320	
Avalanche energy, single pulse	E_{AS}	I_D=80 A, R_{GS}=25 Ω	210	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	150	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}		-	-	1	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint	-	-	62	
		6 cm^2 cooling area[3]	-	-	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	80	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=90 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=80 A	-	4.9	5.7	mΩ
		V_{GS}=6 V, I_D=40 A	-	6.3	9.9	
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=80 A, (SMD)	-	4.6	5.4	
		V_{GS}=6 V, I_D=40 A, (SMD)	-	6.0	9.6	
Gate resistance	R_G		-	2.2	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=80 A	52	103	-	S

[1] J-STD20 and JESD22

[2] See figure 3

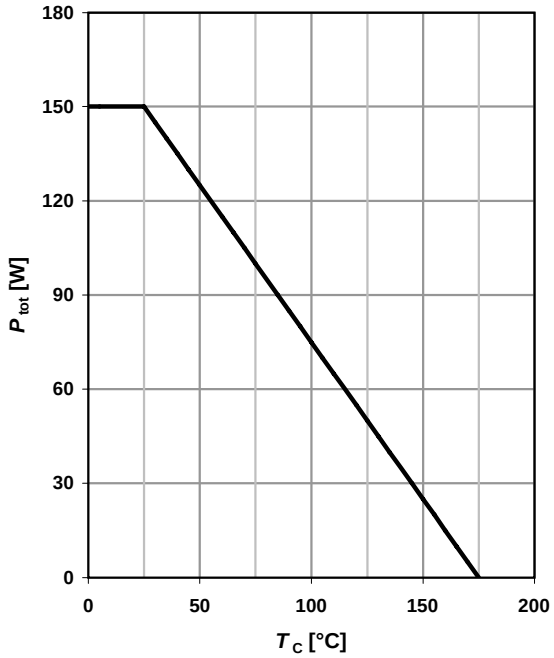
[3] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

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	-	3570	4750	pF
Output capacitance	C_{oss}		-	963	1280	
Reverse transfer capacitance	C_{rss}		-	36	54	
Turn-on delay time	$t_{d(on)}$	V_{DD}=40 V, V_{GS}=10 V, I_D=80 A, R_G=1.6 Ω	-	18	-	ns
Rise time	t_r		-	66	-	
Turn-off delay time	$t_{d(off)}$		-	38	-	
Fall time	t_f		-	10	-	
Gate Charge Characteristics[4)]						
Gate to source charge	Q_{gs}	V_{DD}=40 V, I_D=80 A, V_{GS}=0 to 10 V	-	19	25	nC
Gate to drain charge	Q_{gd}		-	11	16	
Switching charge	Q_{sw}		-	19	27	
Gate charge total	Q_g		-	52	69	
Gate plateau voltage	$V_{plateau}$		-	5.2	-	V
Output charge	Q_{oss}	V_{DD}=40 V, V_{GS}=0 V	-	70	93	nC
Reverse Diode						
Diode continous 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=40 V, I_F=I_S, di_F/dt=100 A/µs	-	72	-	ns
Reverse recovery charge	Q_{rr}		-	130	-	nC

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

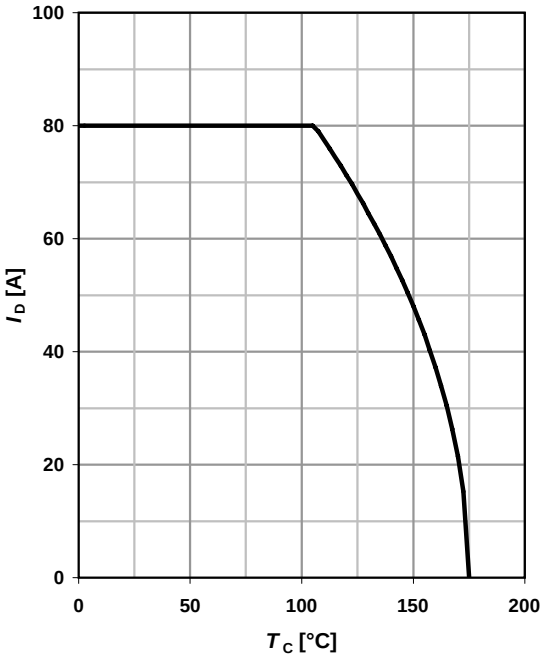
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

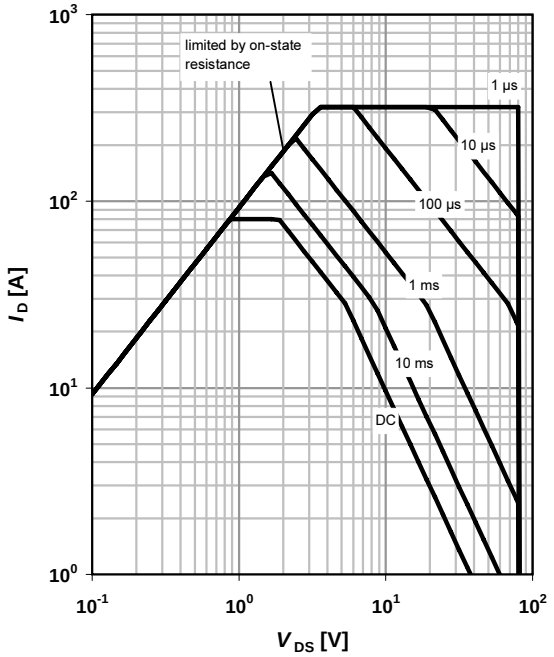
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

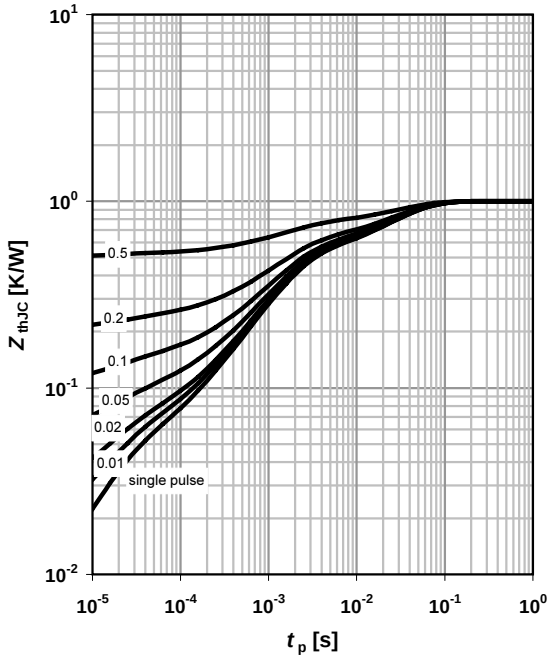
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

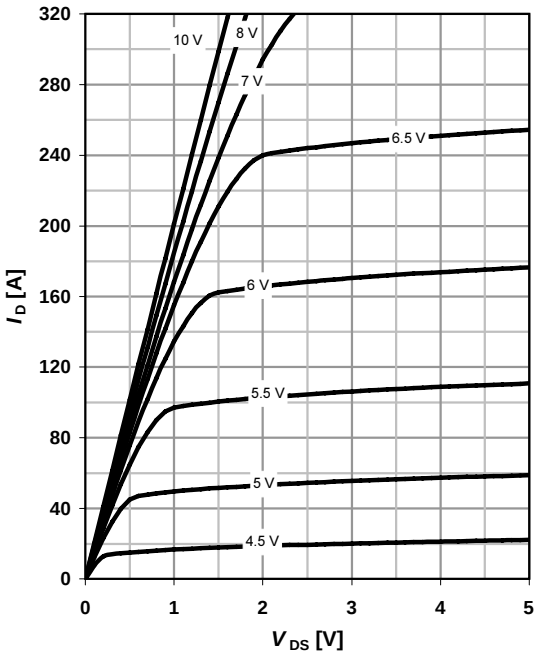
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

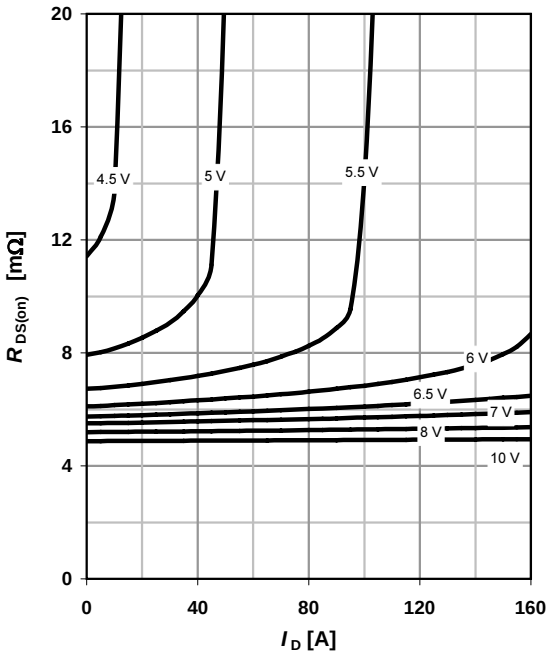
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

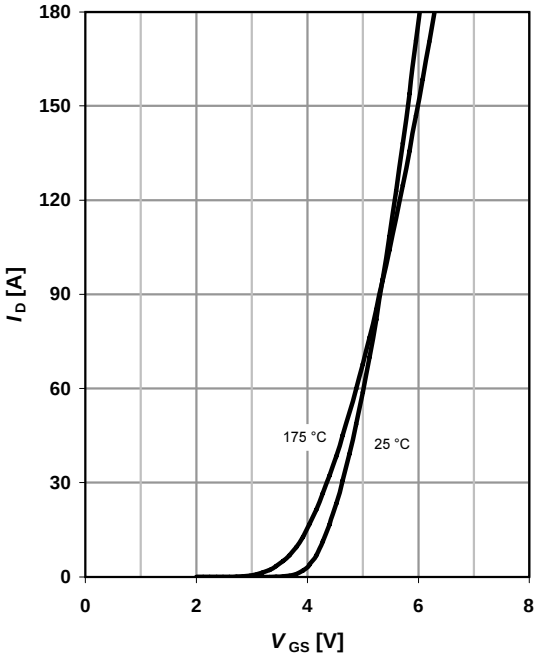
parameter: V_{GS}



7 Typ. transfer characteristics

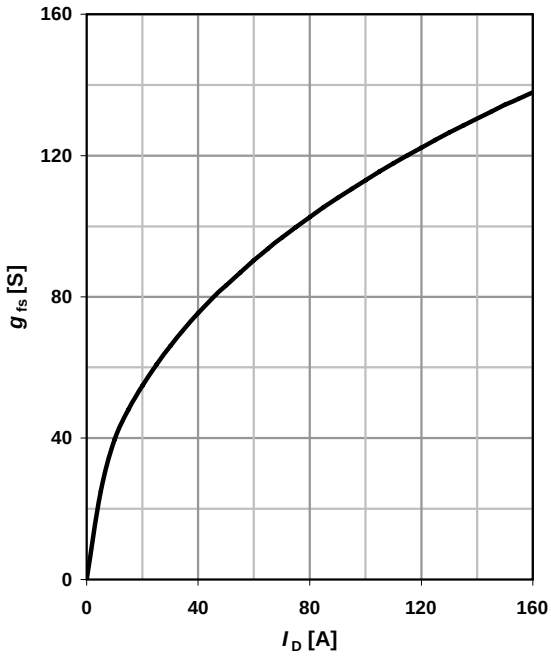
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



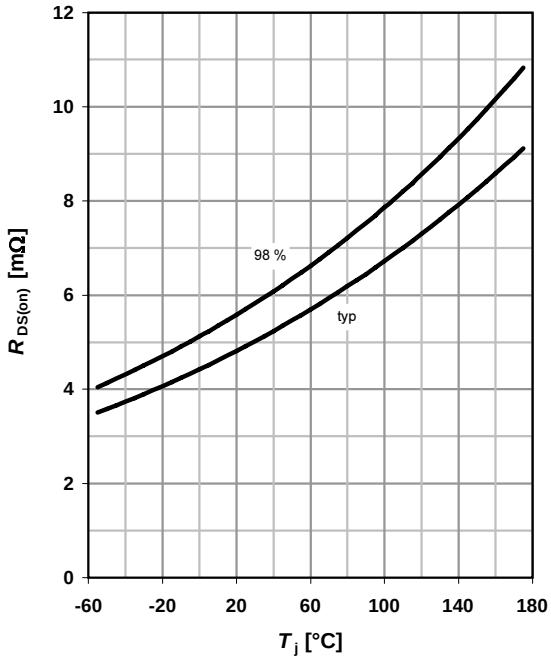
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



9 Drain-source on-state resistance

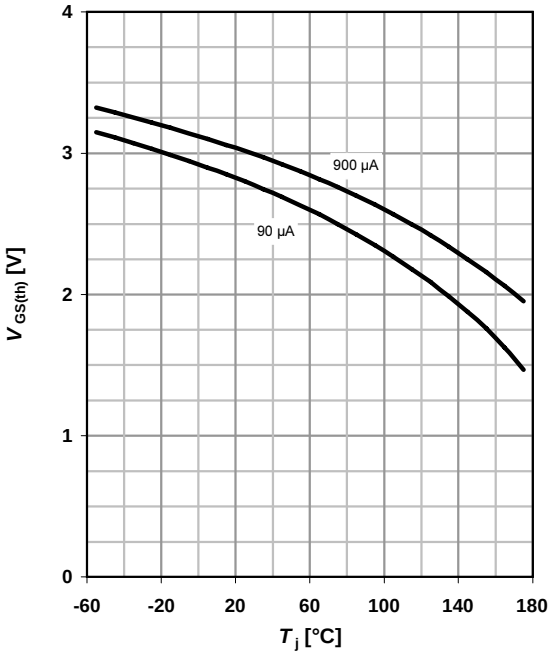
$R_{DS(on)}=f(T_j)$; $I_D=80$ A; $V_{GS}=10$ V



10 Typ. gate threshold voltage

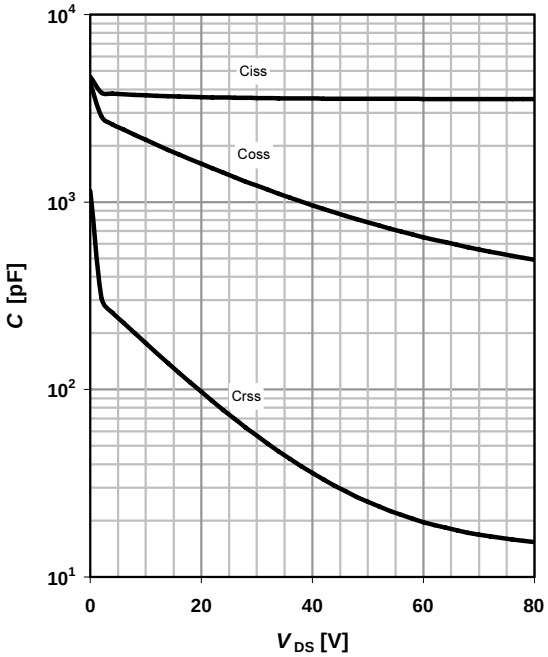
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

parameter: I_D



11 Typ. capacitances

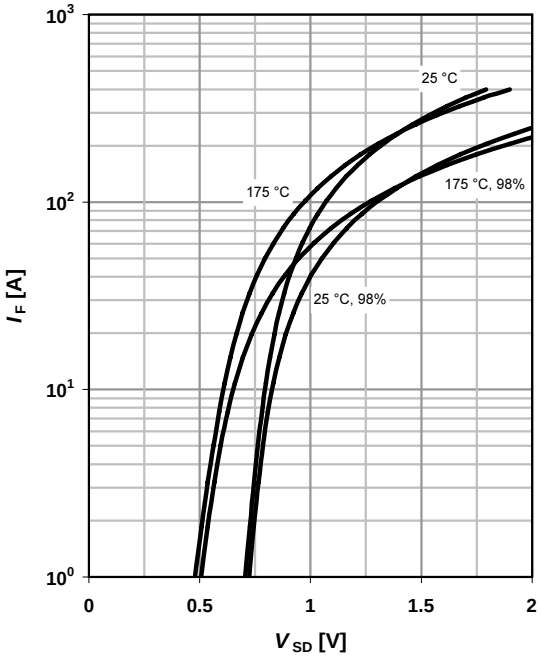
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

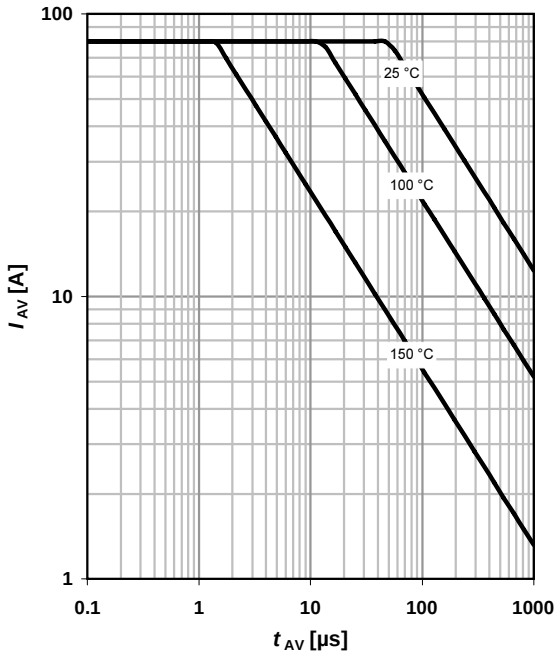
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

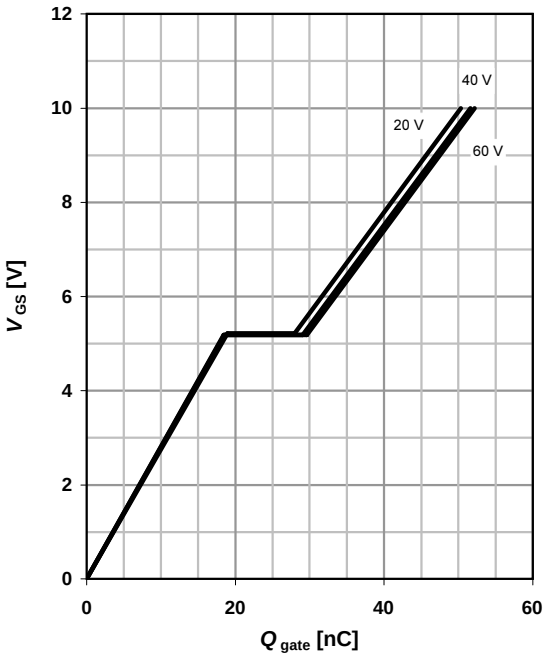
parameter: $T_{j(start)}$



14 Typ. gate charge

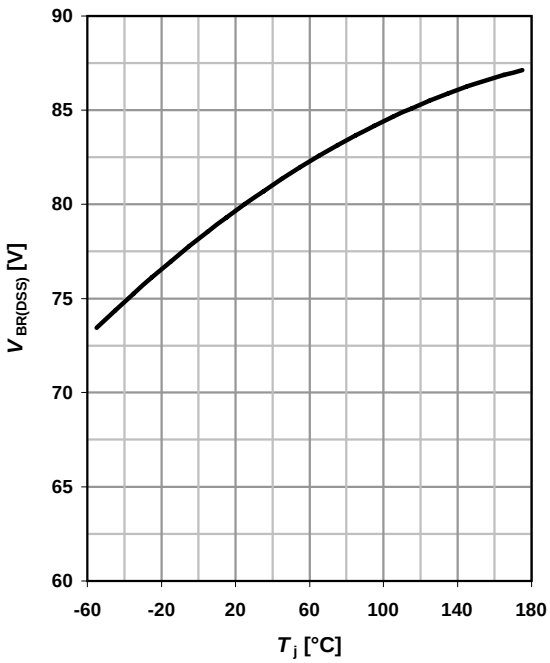
V_{GS}=f(Q_{gate}); I_D=80 A pulsed

parameter: V_{DD}

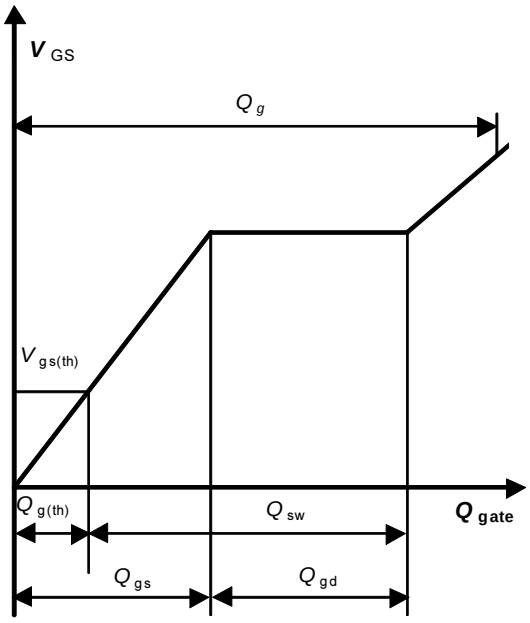


15 Drain-source breakdown voltage

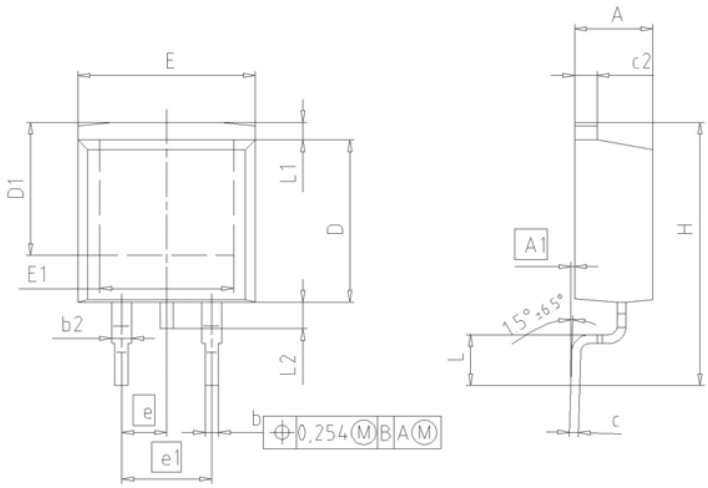
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



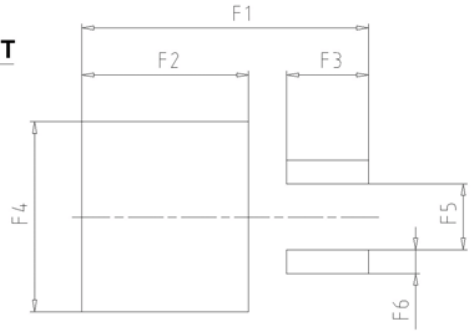
16 Gate charge waveforms



PG-TO263-3 (D²-Pak)



FOOTPRINT



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	0.00	0.25	0.000	0.010
b	0.65	0.85	0.026	0.033
b2	0.95	1.15	0.037	0.045
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.51	9.45	0.335	0.372
D1	7.10	7.90	0.280	0.311
E	9.80	10.31	0.386	0.406
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	2		2	
H	14.61	15.88	0.575	0.625
L	2.29	3.00	0.090	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
F1	16.05	16.25	0.632	0.640
F2	9.30	9.50	0.366	0.374
F3	4.50	4.70	0.177	0.185
F4	10.70	10.90	0.421	0.429
F5	3.65	3.85	0.144	0.152
F6	1.25	1.45	0.049	0.057

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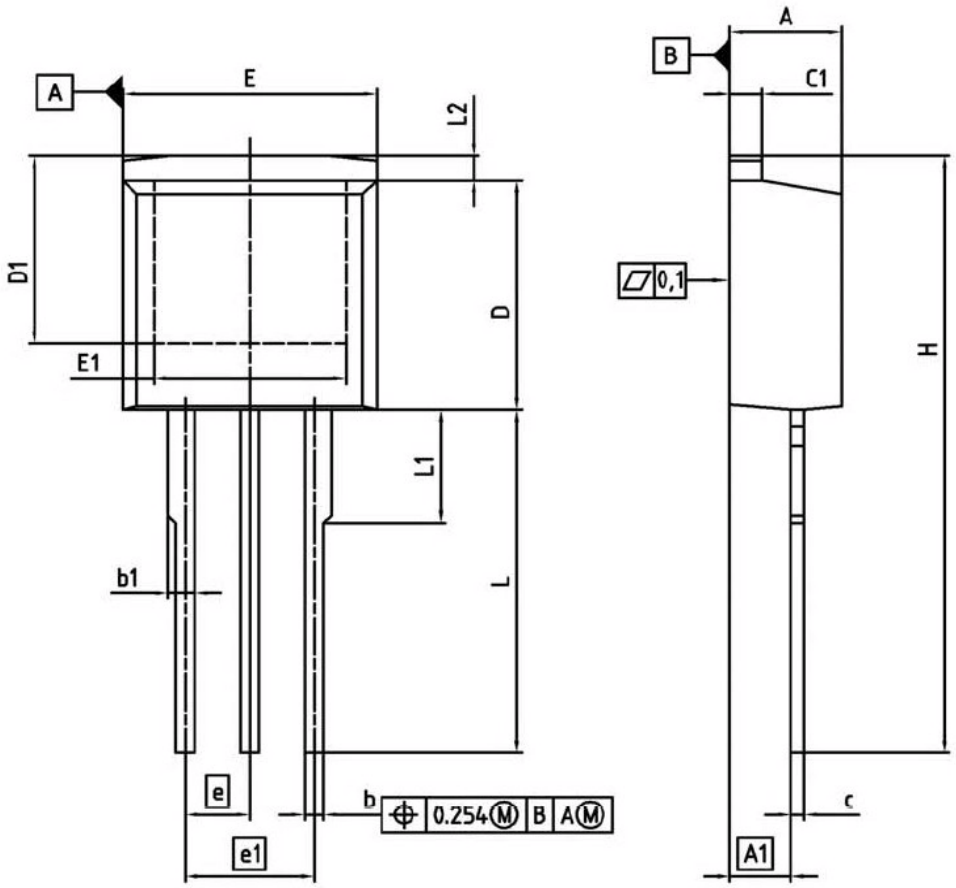
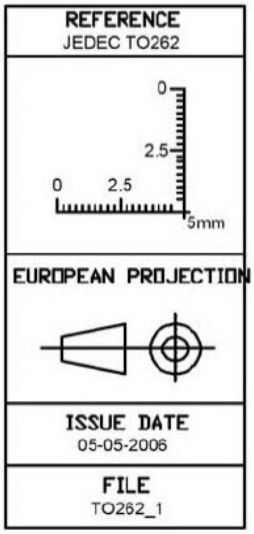
SCALE 0 5 5 7.5mm
EUROPEAN PROJECTION
ISSUE DATE 30-08-2007
REVISION 01

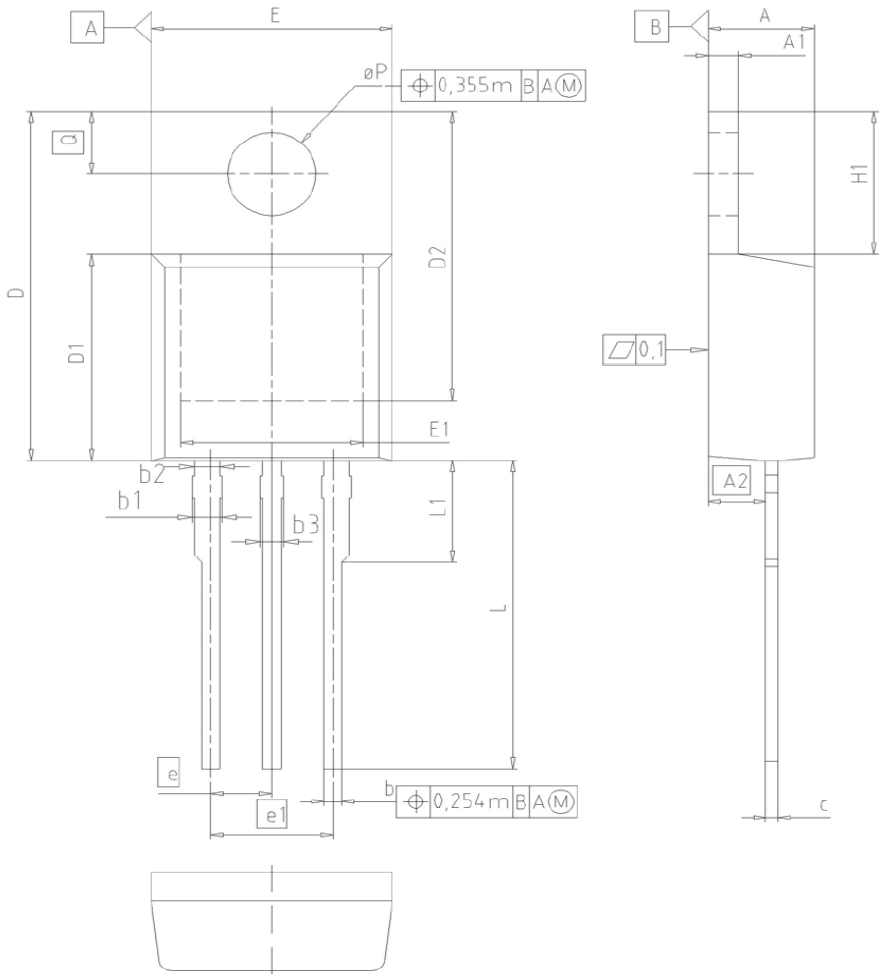
PG-TO262-3 (I²-Pak)



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.300	4.572	0.169	0.180
A1	2.150	2.718	0.085	0.107
b	0.650	0.864	0.026	0.034
b1	0.635	1.400	0.025	0.055
c	0.330	0.600	0.013	0.024
c1	1.170	1.400	0.046	0.055
D	8.509	9.450	0.335	0.372
D1	6.900	-	0.272	-
E	9.700	10.363	0.382	0.408
E1	6.500	8.600	0.256	0.339
e	2.540		0.100	
e1	5.080		0.200	
N	3		3	
L	13.000	14.000	0.512	0.551
L1	-	4.800	-	0.189
L2	-	1.727	-	0.068



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

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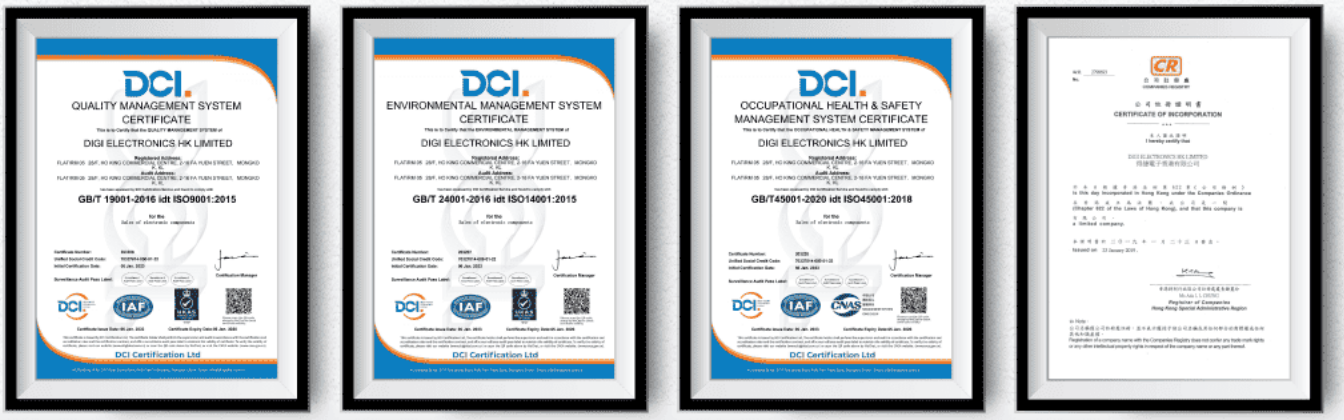

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