SPI08N50C3XKSA1 Datasheet

DiGi Electronics Part Number	SPI08N50C3XKSA1-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	SPI08N50C3XKSA1
Description	MOSFET N-CH 560V 7.6A TO262-3
Detailed Description	N-Channel 560 V 7.6A (Tc) 83W (Tc) Through Hole PG-TO262-3-1

https://www.DiGi-Electronics.com

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RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
SPI08N50C3XKSA1	Infineon Technologies
Series:	Product Status:
CoolMOS™	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
560 V	7.6A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	600mOhm @ 4.6A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
3.9V @ 350µA	32 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	750 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	83W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
PG-TO262-3-1	TO-262-3 Long Leads, I2PAK, TO-262AA
Base Product Number:	
SPI08N	

Environmental & Export classification

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

SPP08N50C3, SPI08N50C3
SPA08N50C3

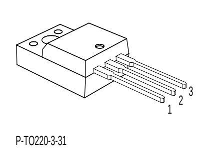
Cool MOS™ Power Transistor

V_{DS} @ T_{jmax}	560	V
$R_{DS(on)}$	0.6	Ω
I_D	7.6	A

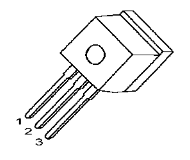
Feature

- New revolutionary high voltage technology
- Ultra low gate charge
- Periodic avalanche rated
- Extreme dv/dt rated
- Ultra low effective capacitances
- Improved transconductance
- PG-TO-220-3-31;-3-111: Fully isolated package (2500 VAC; 1 minute)
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[0)] for target applications

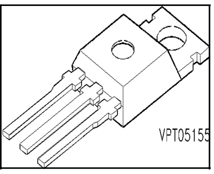
PG-TO220FP



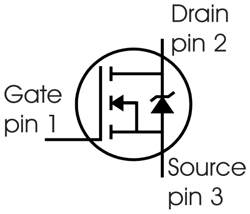
PG-TO262



PG-TO220



Type	Package	Ordering Code	Marking
SPP08N50C3	PG-TO220	Q67040-S4567	08N50C3
SPI08N50C3	PG-TO262	Q67040-S4568	08N50C3
SPA08N50C3	PG-TO220FP	SP000216306	08N50C3



Maximum Ratings

Parameter	Symbol	Value		Unit
		SPP_I	SPA	
Continuous drain current	I_D			A
T_C = 25 °C		7.6	7.6[1)]	
T_C = 100 °C		4.6	4.6[1)]	
Pulsed drain current, t_p limited by T_{jmax}	$I_{D\ puls}$	22.8	22.8	A
Avalanche energy, single pulse I_D=5.5A, V_{DD}=50V	E_{AS}	230	230	mJ
Avalanche energy, repetitive t_{AR} limited by T_{jmax}[2)] I_D=7.6A, V_{DD}=50V	E_{AR}	0.5	0.5	
Avalanche current, repetitive t_{AR} limited by T_{jmax}	I_{AR}	7.6	7.6	A
Gate source voltage	V_{GS}	±20	±20	V
Gate source voltage AC (f >1Hz)	V_{GS}	±30	±30	
Power dissipation, T_C = 25°C	P_{tot}	83	32	W
Operating and storage temperature	T_j , T_{stg}	-55...+150		°C
Reverse diode dv/dt [6)]	dv/dt	15		V/ns

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain Source voltage slope V_{DS} = 400 V, I_D = 7.6 A, T_j = 125 °C	dv/dt	50	V/ns

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Thermal resistance, junction - case	R_{thJC}	-	-	1.5	K/W
Thermal resistance, junction - case, FullPAK	R_{thJC_FP}	-	-	3.9	
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
Thermal resistance, junction - ambient, FullPAK	R_{thJA_FP}	-	-	80	
Soldering temperature, wavesoldering 1.6 mm (0.063 in.) from case for 10s [3]	T_{sold}	-	-	260	°C

Electrical Characteristics, at T_j=25°C unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=0.25mA	500	-	-	V
Drain-Source avalanche breakdown voltage	$V_{(BR)DS}$	V_{GS}=0V, I_D=7.6A	-	600	-	
Gate threshold voltage	$V_{GS(th)}$	I_D=350µA, V_{GS}=V_{DS}	2.1	3	3.9	
Zero gate voltage drain current	I_{DSS}	V_{DS}=500V, V_{GS}=0V, T_j=25°C T_j=150°C	 - -	 0.5 -	 1 100	µA
Gate-source leakage current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=4.6A T_j=25°C T_j=150°C	 - -	 0.5 1.5	 0.6 -	Ω
Gate input resistance	R_G	f=1MHz, open drain	-	1.2	-	

Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Transconductance	g_{fs}	$V_{DS}\geq 2*I_D*R_{DS(on)max}$, I_D=4.6A	-	6	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	750	-	pF
Output capacitance	C_{oss}		-	350	-	
Reverse transfer capacitance	C_{rss}		-	12	-	
Effective output capacitance,[4] energy related	$C_{o(er)}$	V_{GS}=0V, V_{DS}=400	-	56	-	
Effective output capacitance,[5] time related	$C_{o(tr)}$		-	30	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=380V, V_{GS}=0/10V, I_D=7.6A, R_G=12Ω	-	6	-	ns
Rise time	t_r		-	5	-	
Turn-off delay time	$t_{d(off)}$		-	60	-	
Fall time	t_f		-	7	-	

Gate Charge Characteristics

Gate to source charge	Q_{gs}	V_{DD}=400V, I_D=7.6A	-	3	-	nC
Gate to drain charge	Q_{gd}		-	17	-	
Gate charge total	Q_g	V_{DD}=400V, I_D=7.6A, V_{GS}=0 to 10V	-	32	-	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=400V, I_D=7.6A	-	5	-	V

[0] J-STD20 and JESD22

[1] Limited only by maximum temperature

[2] Repetitve avalanche causes additional power losses that can be calculated as $P_{AV}=E_{AR}*f$.

[3] Soldering temperature for TO-263: 220°C, reflow

[4] $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}.

[5] $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}.

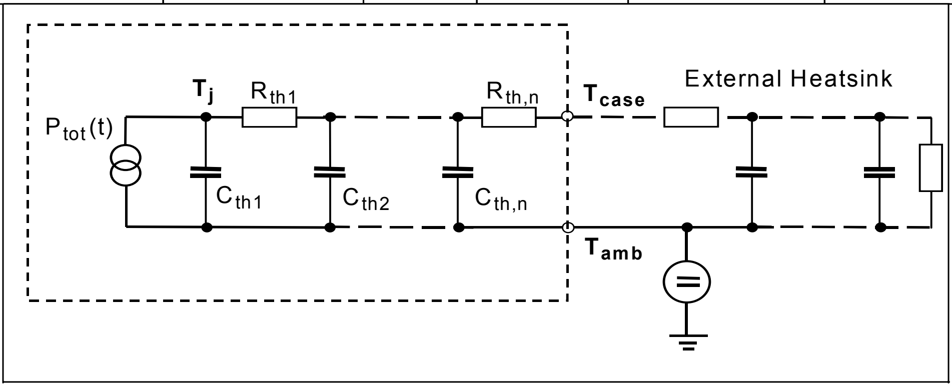
[6] $I_{SD}<=I_D$, di/dt<=400A/us, V_{DClink}=400V, $V_{peak}<V_{BR, DSS}$, $T_j<T_{j,max}$.
Identical low-side and high-side switch.

Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Inverse diode continuous forward current	I_S	T_C=25°C	-	-	7.6	A
Inverse diode direct current, pulsed	I_{SM}		-	-	22.8	
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, I_F=I_S	-	1	1.2	V
Reverse recovery time	t_{rr}	V_R=400V, I_F=I_S , di_F/dt=100A/µs	-	370	-	ns
Reverse recovery charge	Q_{rr}		-	3.6	-	µC
Peak reverse recovery current	I_{rrm}		-	25	-	A
Peak rate of fall of reverse recovery current	di_{rr}/dt	T_j=25°C	-	700	-	A/µs

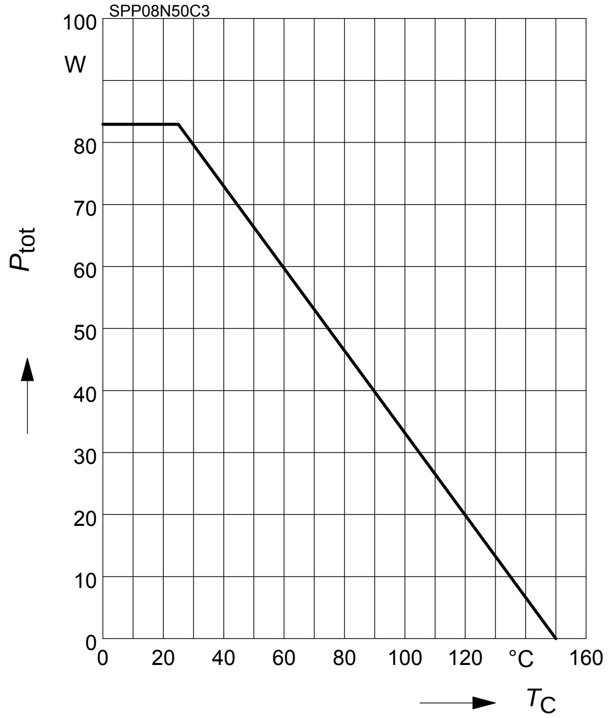
Typical Transient Thermal Characteristics

Symbol	Value		Unit	Symbol	Value		Unit
	SPP_I	SPA			SPP_I	SPA	
R_{th1}	0.024	0.024	K/W	C_{th1}	0.00012	0.00012	Ws/K
R_{th2}	0.046	0.046		C_{th2}	0.0004578	0.0004578	
R_{th3}	0.085	0.085		C_{th3}	0.000645	0.000645	
R_{th4}	0.308	0.195		C_{th4}	0.001867	0.001867	
R_{th5}	0.317	0.45		C_{th5}	0.004795	0.007558	
R_{th6}	0.112	2.511		C_{th6}	0.045	0.412	



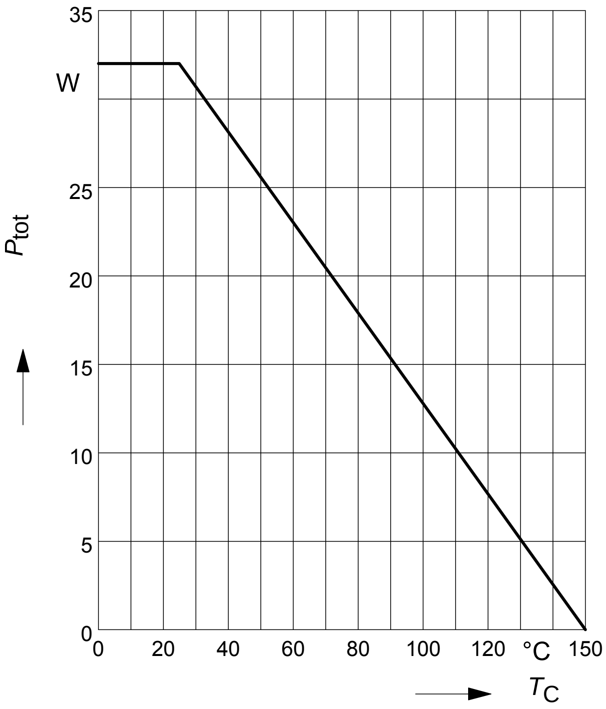
1 Power dissipation

$P_{tot} = f\,(T_C)$



2 Power dissipation FullPAK

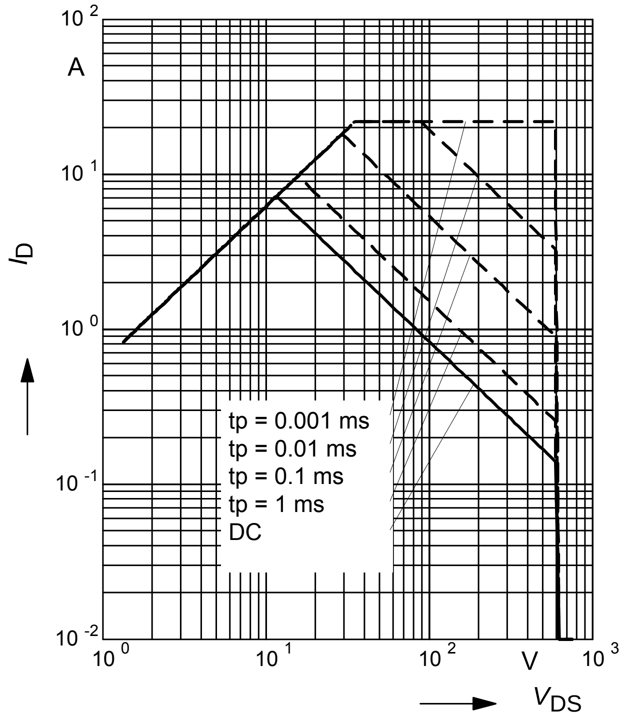
$P_{tot} = f\,(T_C)$



3 Safe operating area

$I_D = f\,(\,V_{DS}\,)$

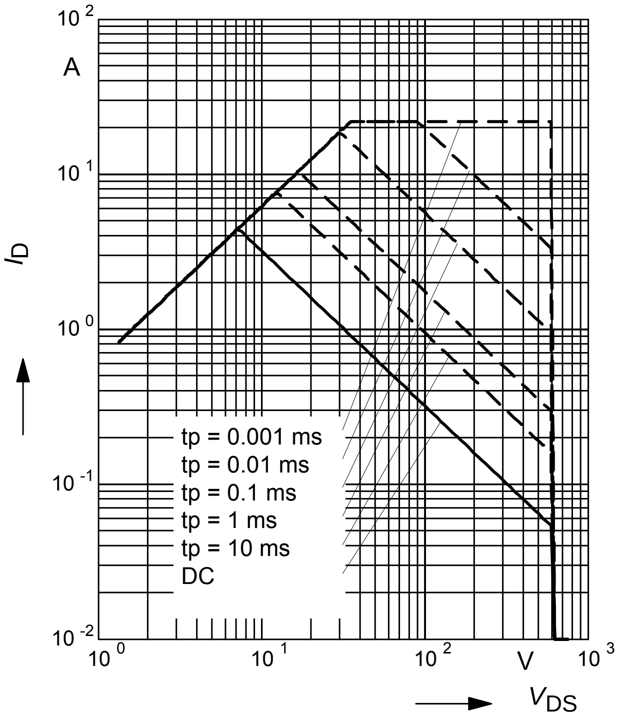
parameter : $D = 0$, T_C=25°C



4 Safe operating area FullPAK

$I_D = f\,(V_{DS})$

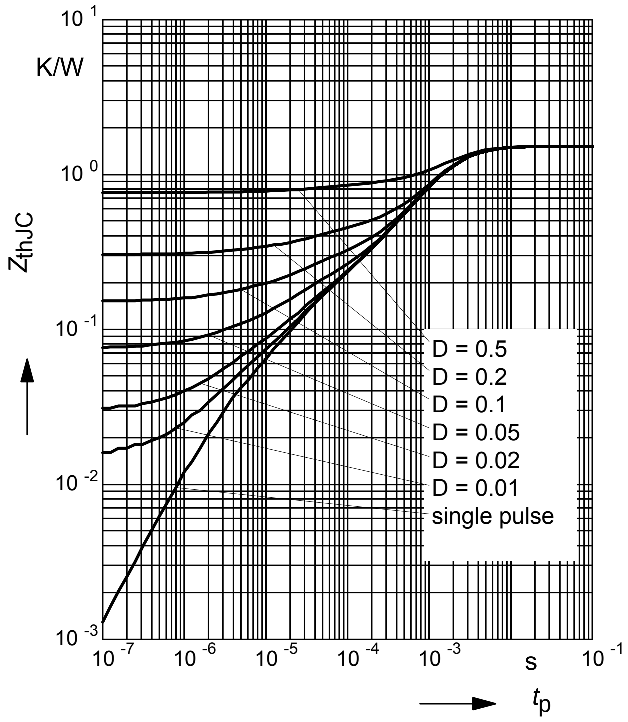
parameter: $D = 0$, T_C = 25°C



5 Transient thermal impedance

$Z_{thJC} = f(t_p)$

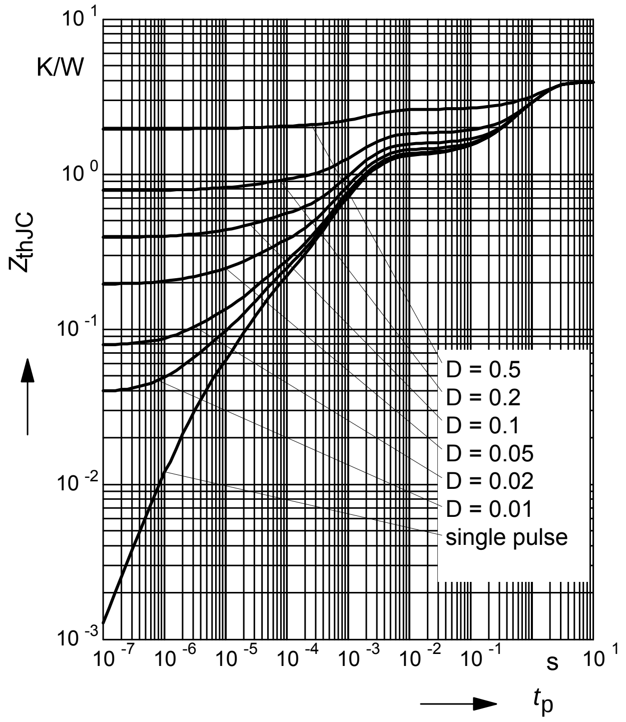
parameter: $D = t_p/T$



6 Transient thermal impedance FullPAK

$Z_{thJC} = f(t_p)$

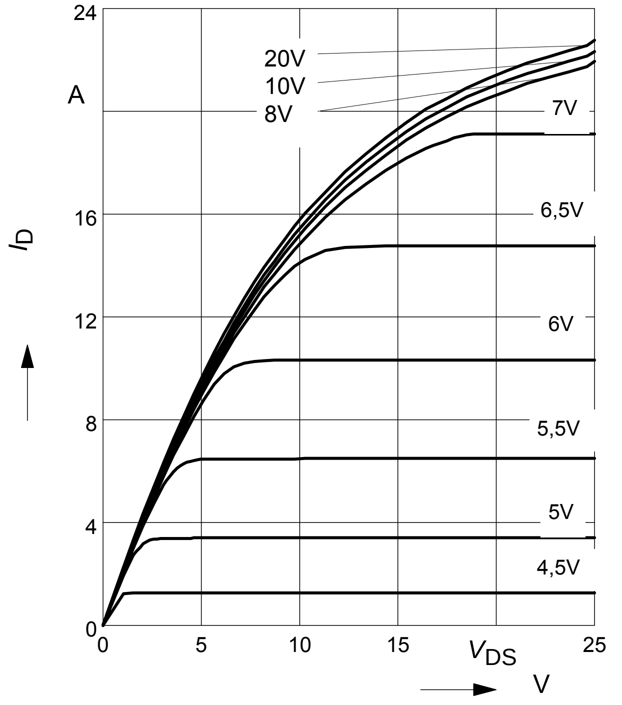
parameter: $D = t_p/t$



7 Typ. output characteristic

$I_D = f(V_{DS})$; T_j=25°C

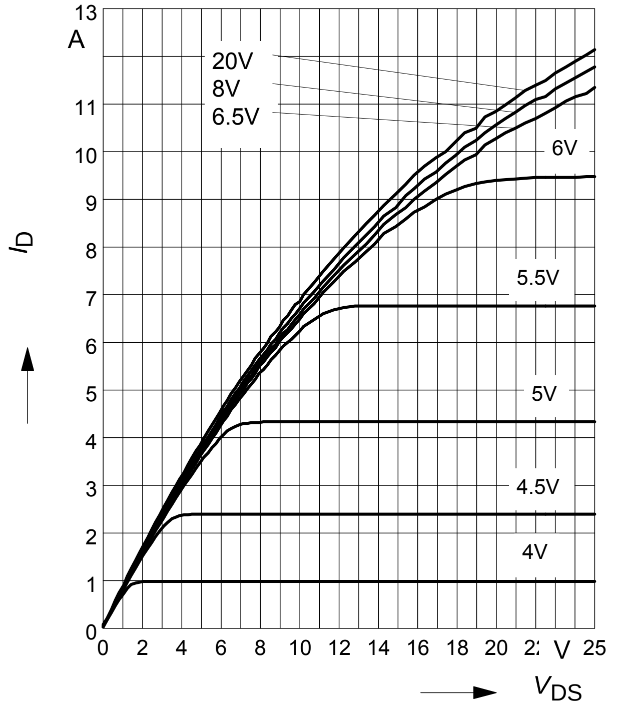
parameter: t_p = 10 µs, V_{GS}



8 Typ. output characteristic

$I_D = f(V_{DS})$; T_j=150°C

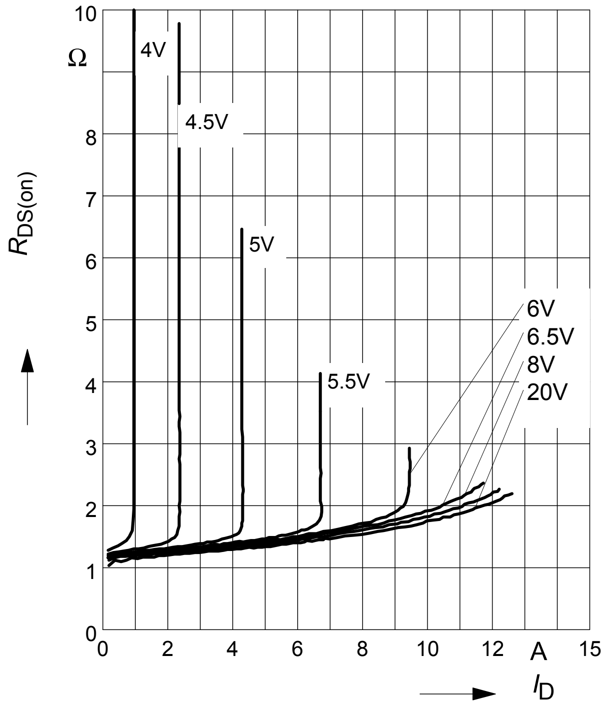
parameter: t_p = 10 µs, V_{GS}



9 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$

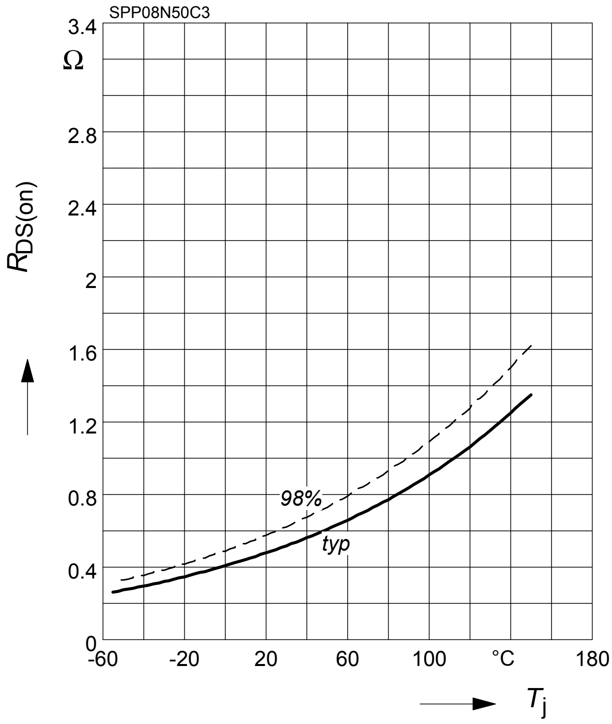
parameter: T_j=150°C, V_{GS}



10 Drain-source on-state resistance

$R_{DS(on)} = f(T_j)$

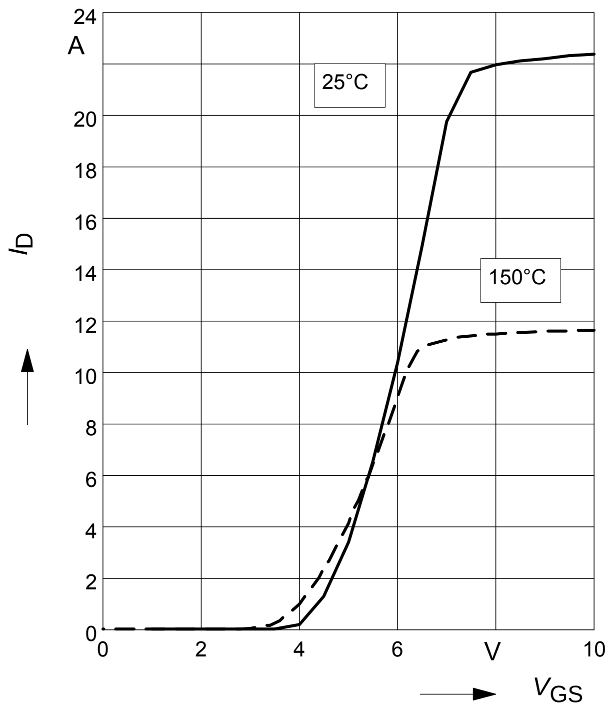
parameter : I_D = 4.6 A, V_{GS} = 10 V



11 Typ. transfer characteristics

$I_D = f(V_{GS})$; $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$

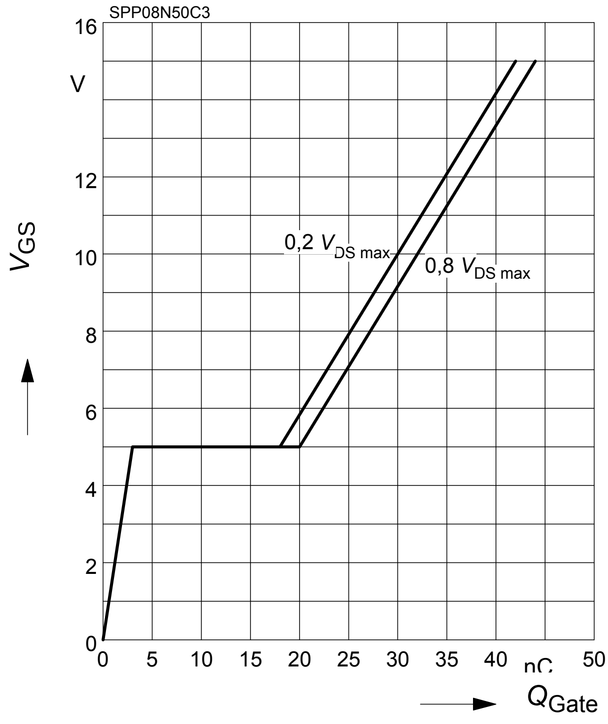
parameter: t_p = 10 µs



12 Typ. gate charge

$V_{GS} = f(Q_{Gate})$

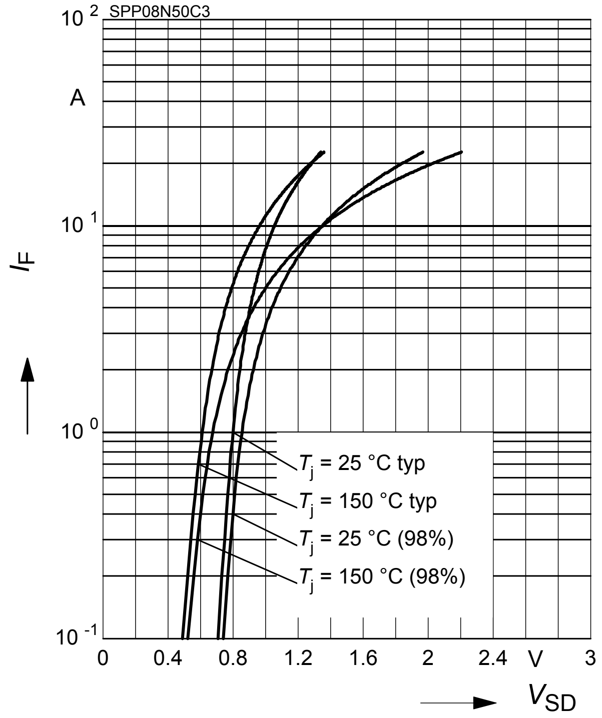
parameter: I_D = 7.6 A pulsed



13 Forward characteristics of body diode

$I_F = f(V_{SD})$

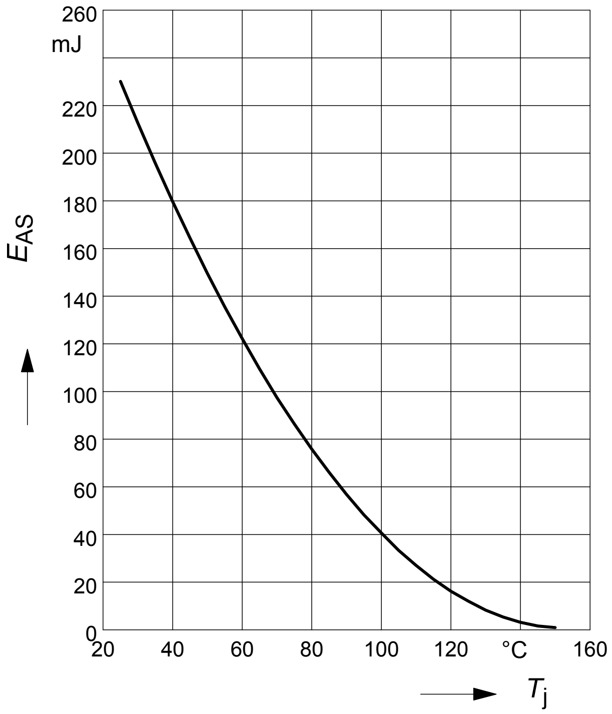
parameter: T_j , tp = 10 µs



15 Avalanche energy

$E_{AS} = f(T_j)$

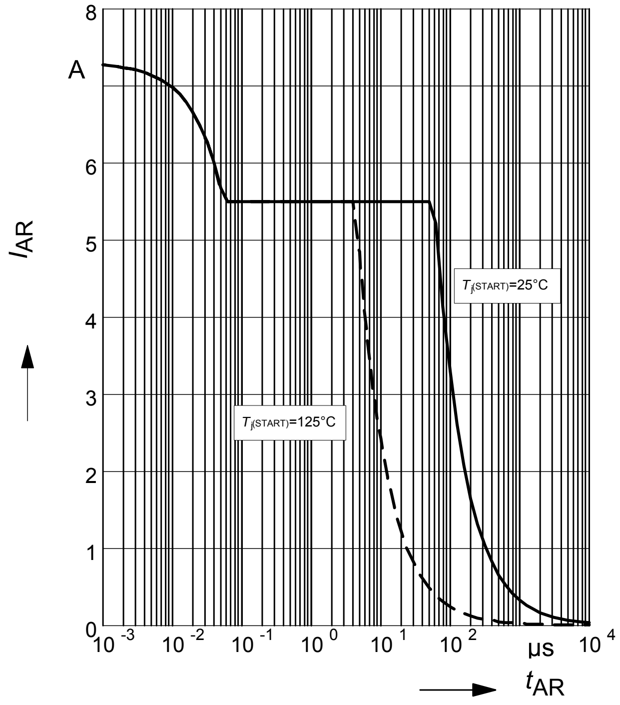
par.: I_D = 5.5 A, V_{DD} = 50 V



14 Avalanche SOA

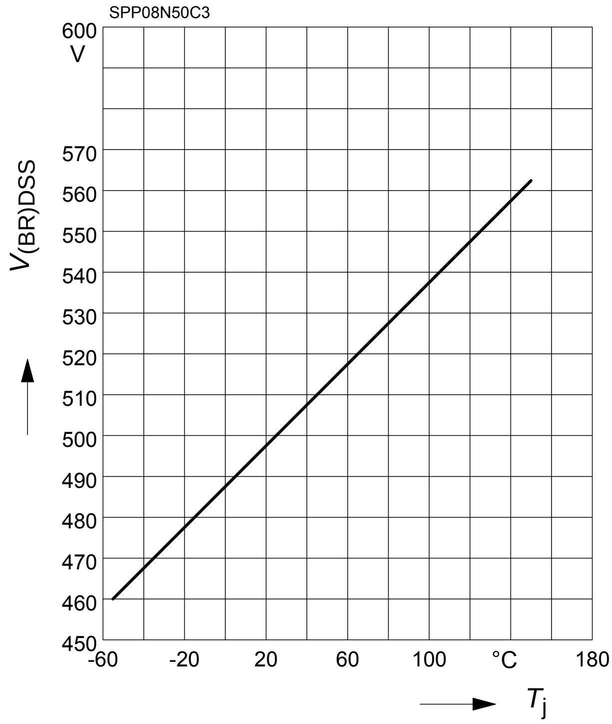
$I_{AR} = f(t_{AR})$

par.: $T_j \leq 150$ °C



16 Drain-source breakdown voltage

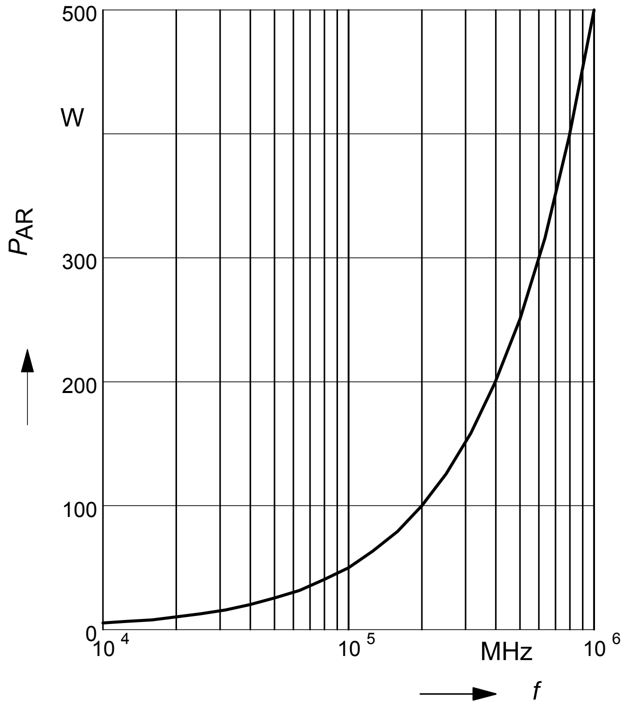
$V_{(BR)DSS} = f(T_j)$



17 Avalanche power losses

$P_{AR} = f(f)$

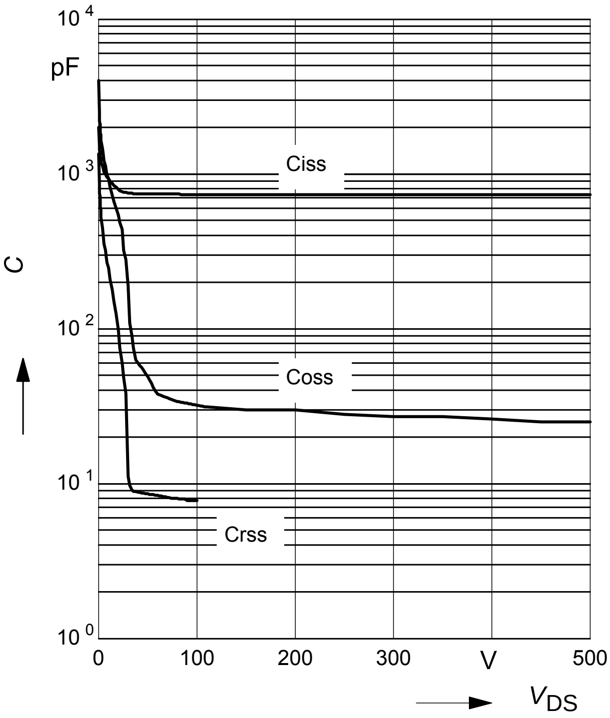
parameter: E_{AR}=0.5mJ



18 Typ. capacitances

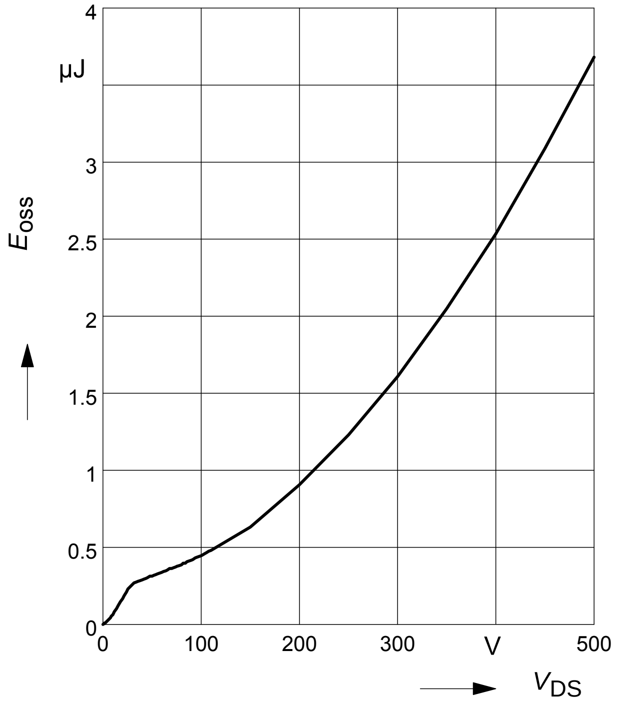
$C = f(V_{DS})$

parameter: V_{GS}=0V, f=1 MHz

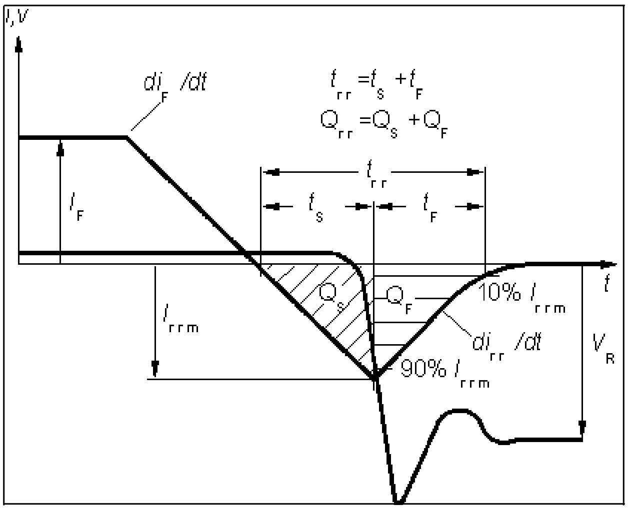


19 Typ. C_{oss} stored energy

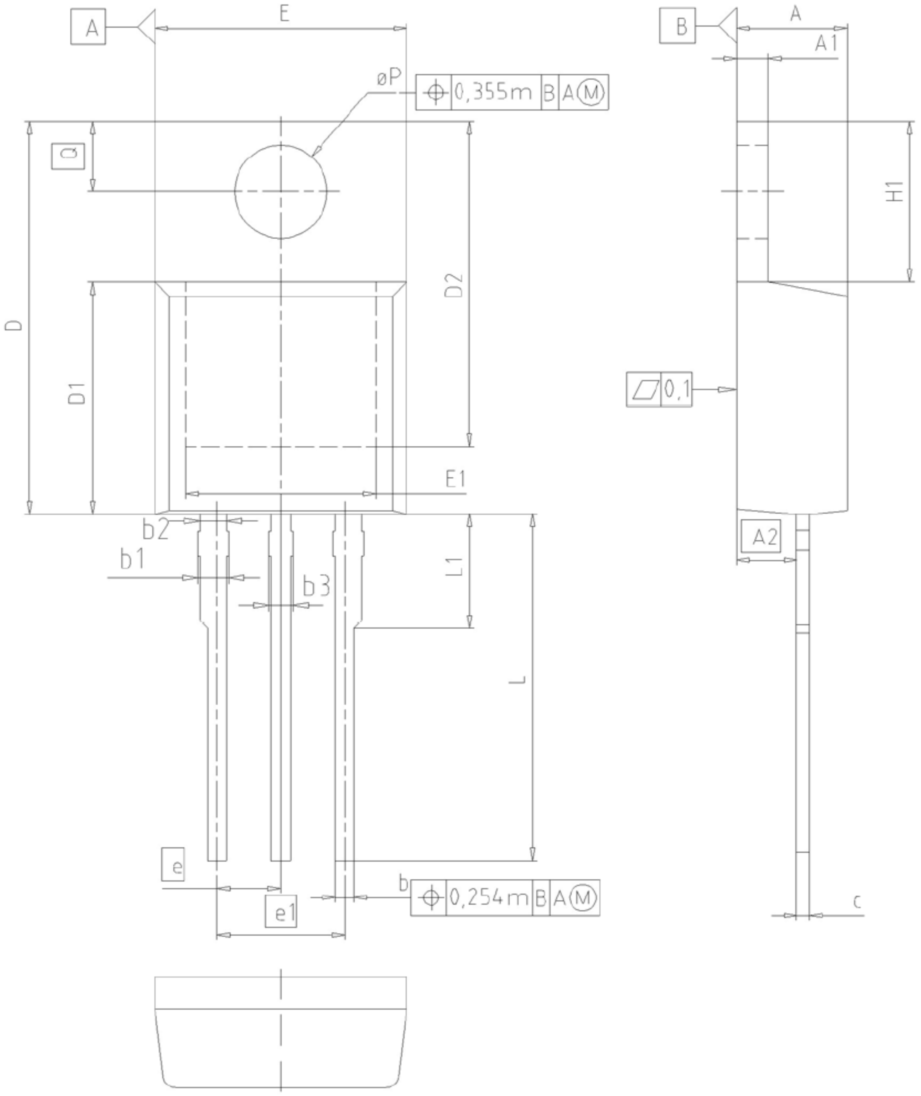
$E_{oss}=f(V_{DS})$



Definition of diodes switching characteristics



PG-TO220-3-1, PG-TO220-3-21



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

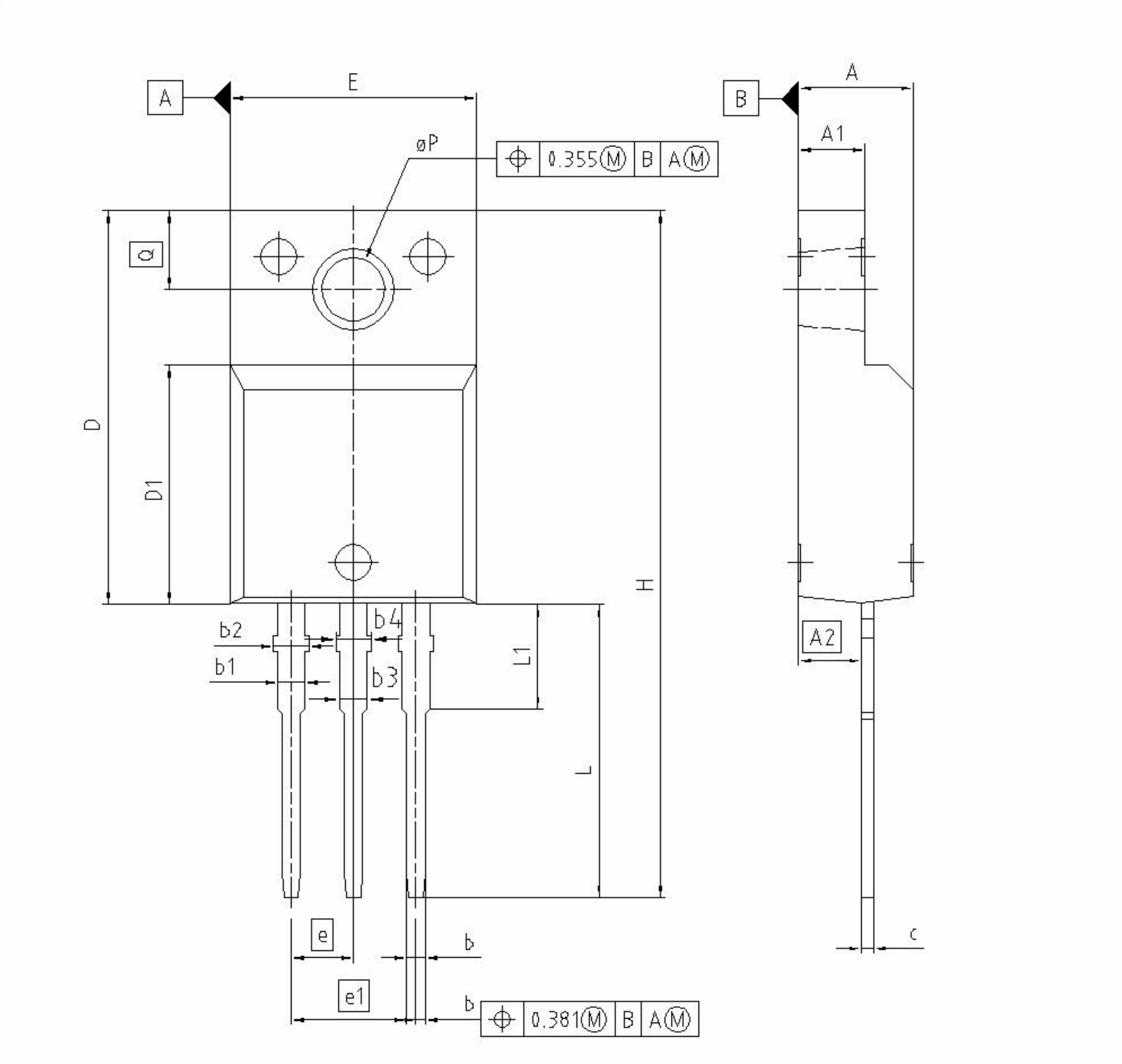
SCALE
0
2.5
0 2.5
5mm

EUROPEAN PROJECTION

ISSUE DATE
23-08-2007

REVISION
05

PG-TO-220-3-31/3-111 Fully isolated package (2500VAC; 1 minute)



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
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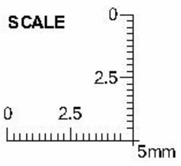
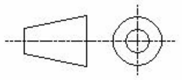
SCALE



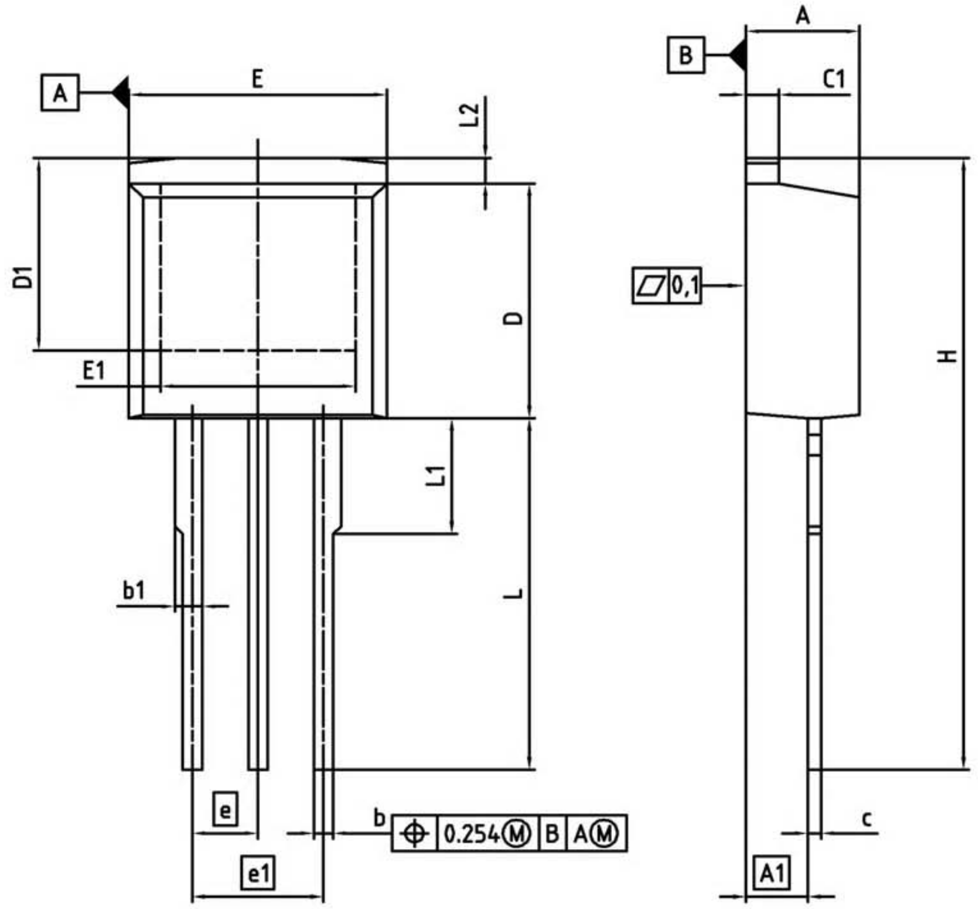
EUROPEAN PROJECTION



ISSUE DATE
08-01-2007

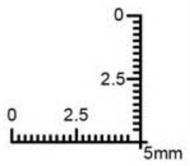
FILE
TO220_2

PG-TO262-3-1, PG-TO262-3-21 (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

REFERENCE
JEDEC TO262



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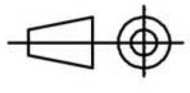

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Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

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I hereby certify that

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is this day incorporated in Hong Kong under the Companies Ordinance (Chapter 622 of the Laws of Hong Kong), and that this company is a limited company.

Issued on: 22 January 2019.

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