

Silicon Carbide Schottky Diode

- Worlds first 600V Schottky diode
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- Ideal diode for Power Factor Correction up to 1200W¹⁾
- No forward recovery
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC⁰⁾ for target applications

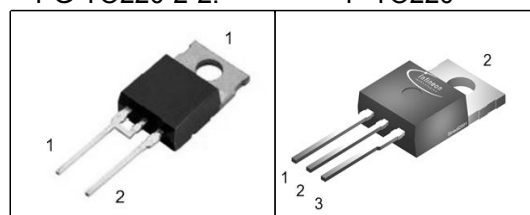
thinQ!™ SiC Schottky Diode

Product Summary

V_{RRM}	600	V
Q_C	21	nC
I_F	6	A

PG-TO220-2-2.

P-TO220



Type	Package	Ordering Code	Marking	Pin 1	Pin 2	Pin 3
SDP06S60	P-TO220-3	Q67040-S4371	D06S60	n.c.	C	A
SDT06S60	PG-TO220-2-2.	Q67040-S4446	D06S60	C	A	

Maximum Ratings, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous forward current, $T_C=100^\circ\text{C}$	I_F	6	A
RMS forward current, $f=50\text{Hz}$	I_{FRMS}	8.4	
Surge non repetitive forward current, sine halfwave $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	I_{FSM}	21.5	
Repetitive peak forward current $T_j=150^\circ\text{C}$, $T_C=100^\circ\text{C}$, $D=0.1$	I_{FRM}	28	
Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$	I_{FMAX}	60	
i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	$\int i^2 dt$	2.3	A ² s
Repetitive peak reverse voltage	V_{RRM}	600	V
Surge peak reverse voltage	V_{RSM}	600	
Power dissipation, $T_C=25^\circ\text{C}$	P_{tot}	57.6	W
Operating and storage temperature	T_j, T_{stg}	-55... +175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	2.6	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage	V_F				V
$I_F=6A, T_j=25^{\circ}C$		-	1.5	1.7	
$I_F=6A, T_j=150^{\circ}C$		-	1.7	2.1	
Reverse current	I_R				μA
$V_R=600V, T_j=25^{\circ}C$		-	20	200	
$V_R=600V, T_j=150^{\circ}C$		-	50	1000	

⁰J-STD20 and JESD22

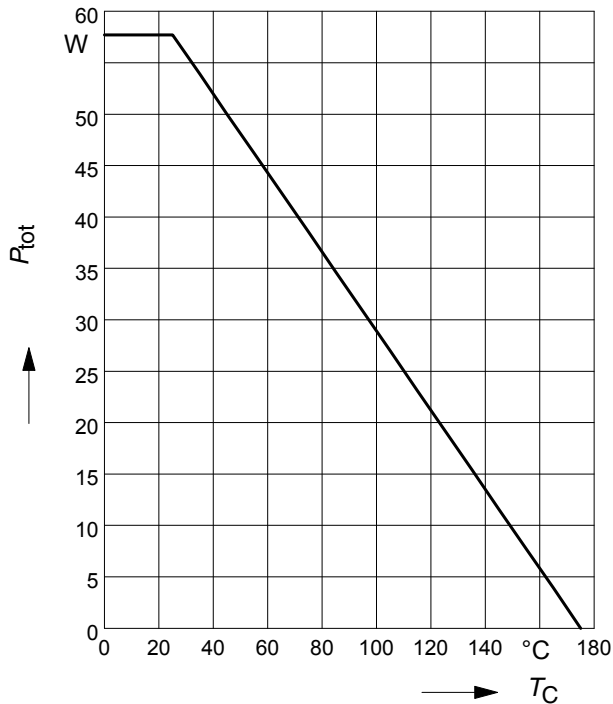
¹CCM, $V_{IN} = 85\text{VAC}$, $T_j = 150^\circ\text{C}$, $T_C = 100^\circ\text{C}$, $\eta = 93\%$, $\Delta I_{IN} = 30\%$
²Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge $V_R=400V, I_F=6A, di_F/dt=200A/\mu s, T_j=150^{\circ}C$	Q_C	-	21	-	nC
Switching time $V_R=400V, I_F=6A, di_F/dt=200A/\mu s, T_j=150^{\circ}C$	t_{rr}	-	n.a.	-	ns
Total capacitance $V_R=0V, T_C=25^{\circ}C, f=1MHz$ $V_R=300V, T_C=25^{\circ}C, f=1MHz$ $V_R=600V, T_C=25^{\circ}C, f=1MHz$	C	- - -	300 20 15	- - -	pF

1 Power dissipation

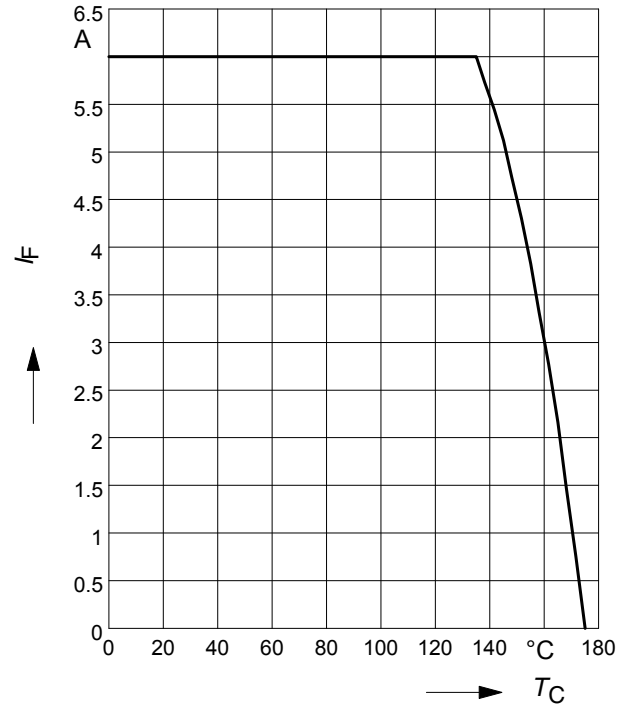
$$P_{\text{tot}} = f(T_C)$$



2 Diode forward current

$$I_F = f(T_C)$$

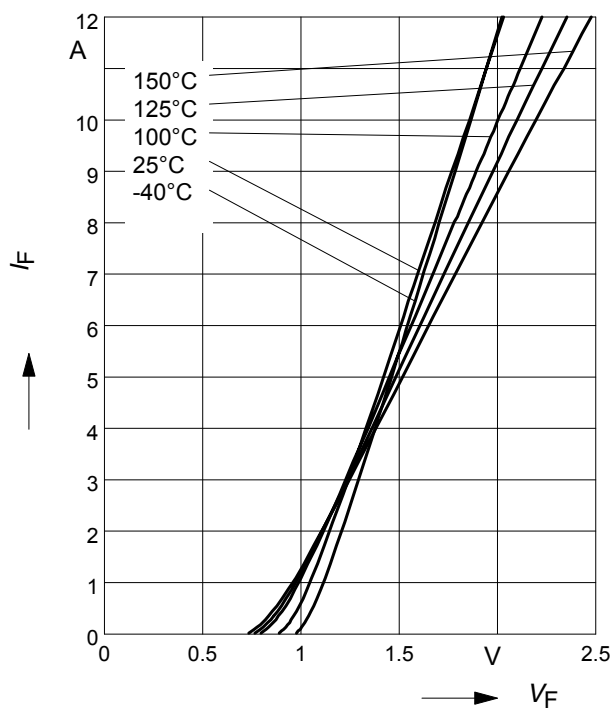
parameter: $T_j \leq 175^\circ\text{C}$



3 Typ. forward characteristic

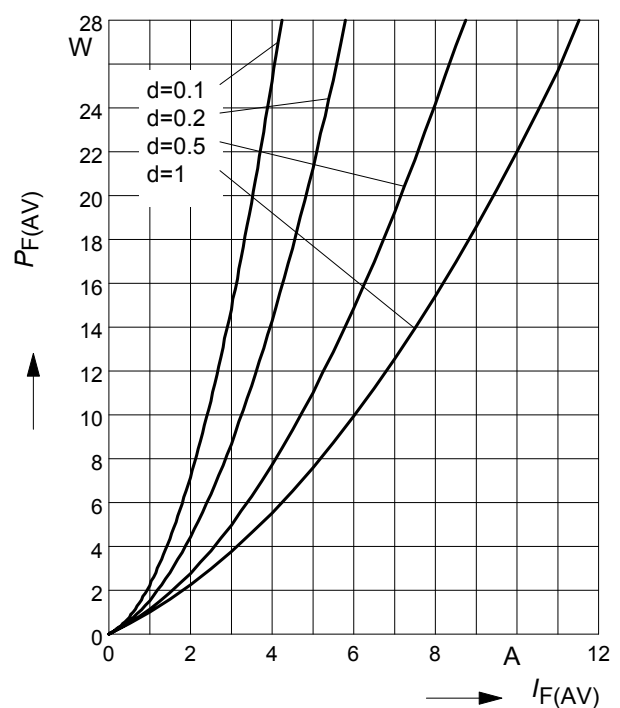
$$I_F = f(V_F)$$

parameter: T_j , $t_p = 350 \mu\text{s}$



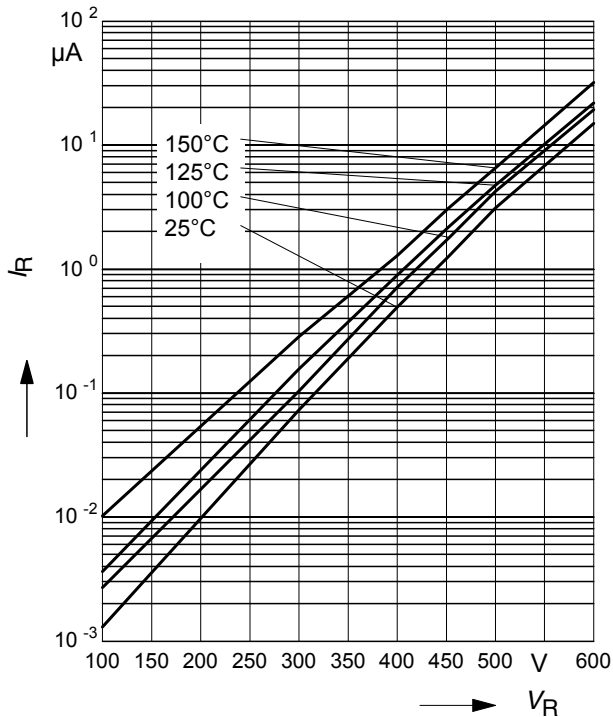
4 Typ. forward power dissipation vs. average forward current

$$P_{F(AV)} = f(I_F) \quad T_C = 100^\circ\text{C}, d = t_p/T$$



5 Typ. reverse current vs. reverse voltage

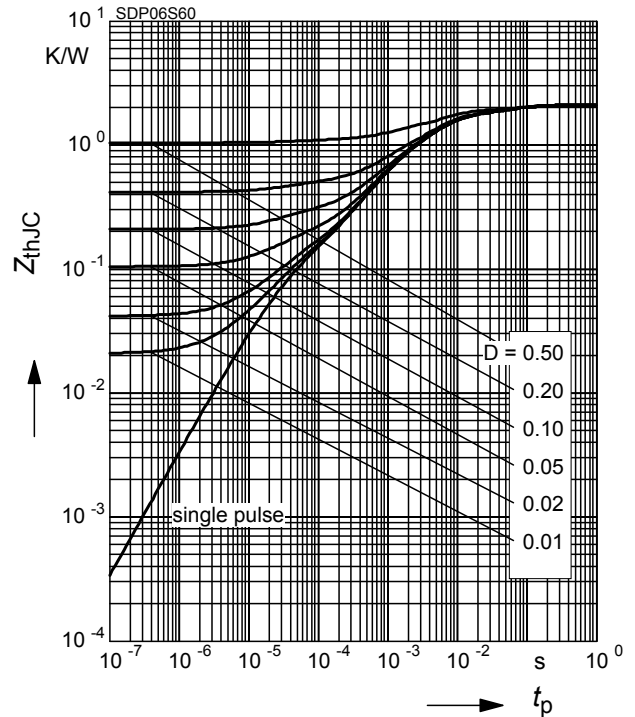
$$I_R = f(V_R)$$



6 Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

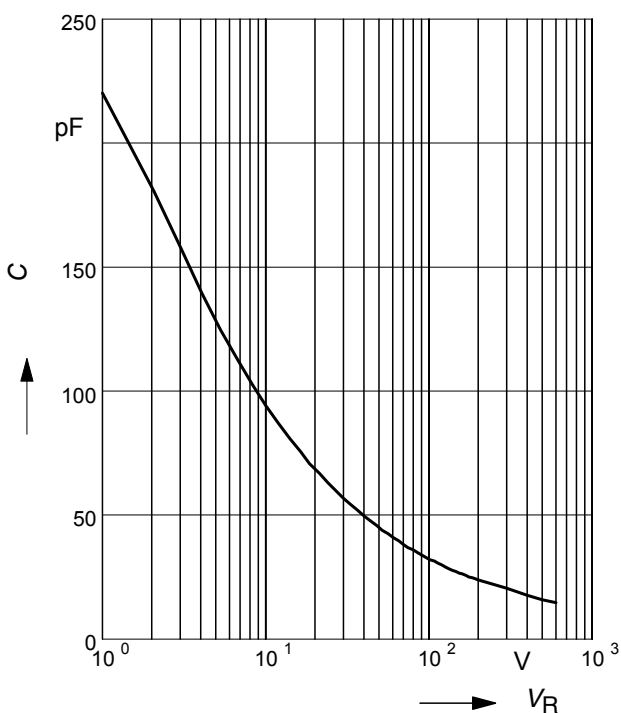
$$\text{parameter: } D = t_p/T$$



7 Typ. capacitance vs. reverse voltage

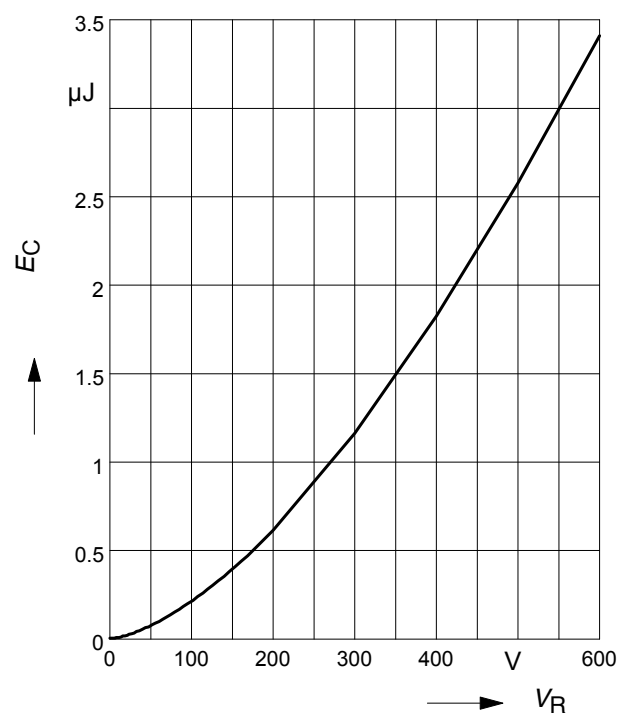
$$C = f(V_R)$$

parameter: $T_C = 25^\circ C$, $f = 1$ MHz



8 Typ. C stored energy

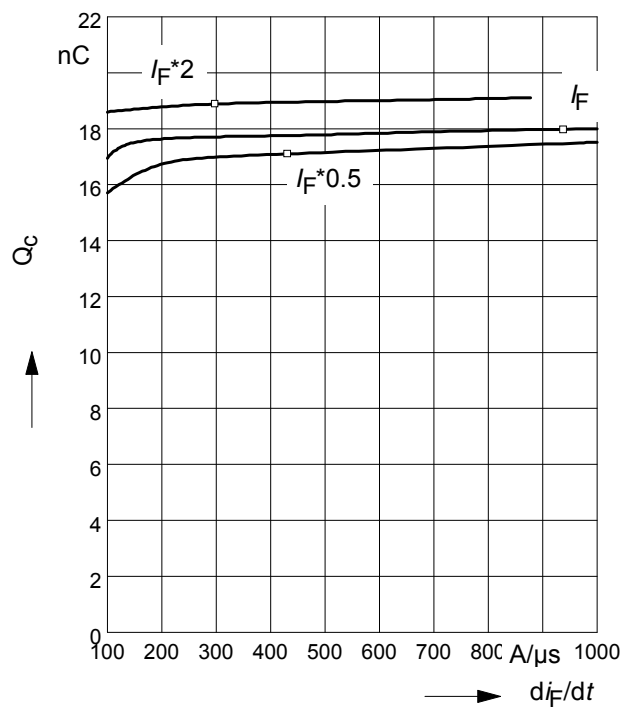
$$E_C = f(V_R)$$



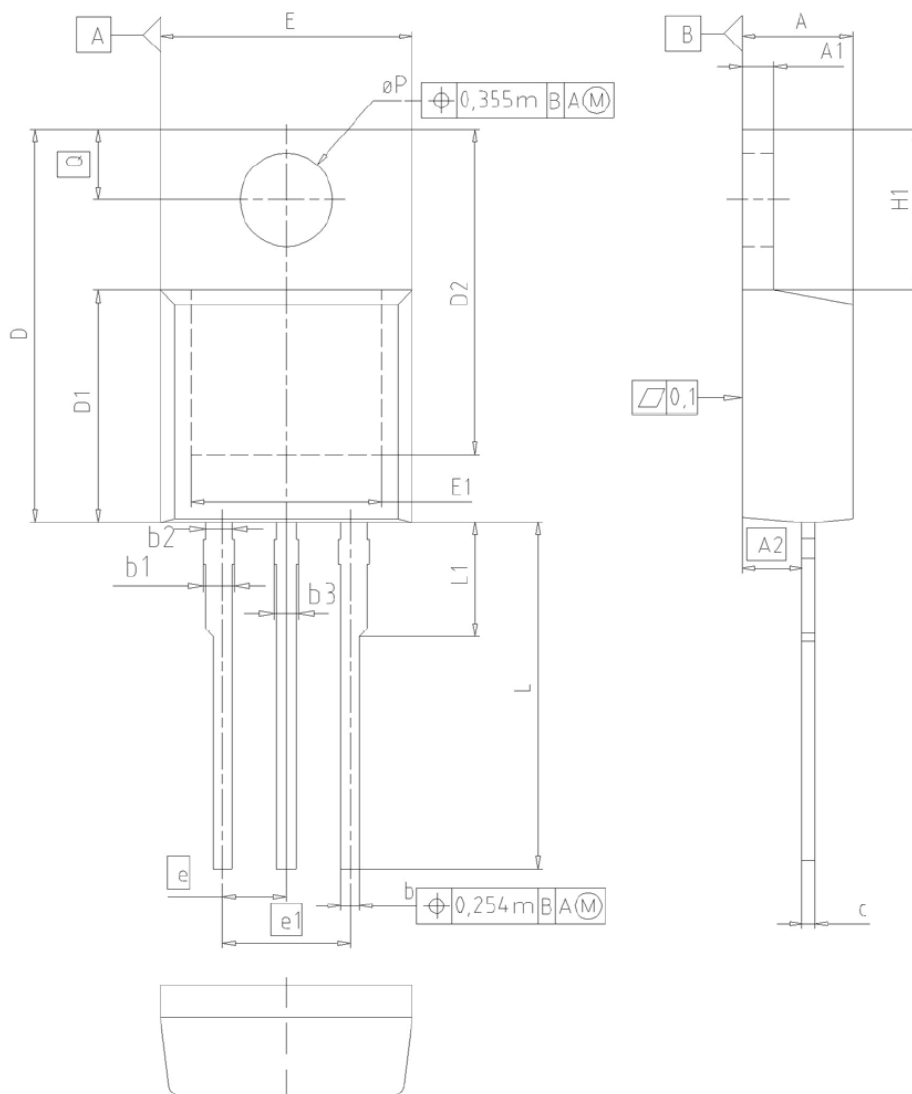
9 Typ. capacitive charge vs. current slope

$$Q_C = f(di_F/dt)$$

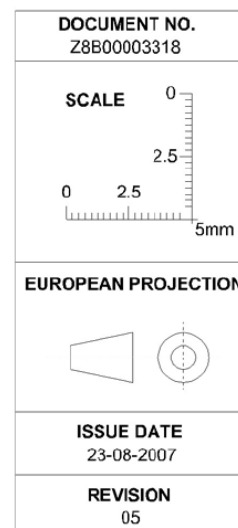
parameter: $T_j = 150\text{ }^{\circ}\text{C}$



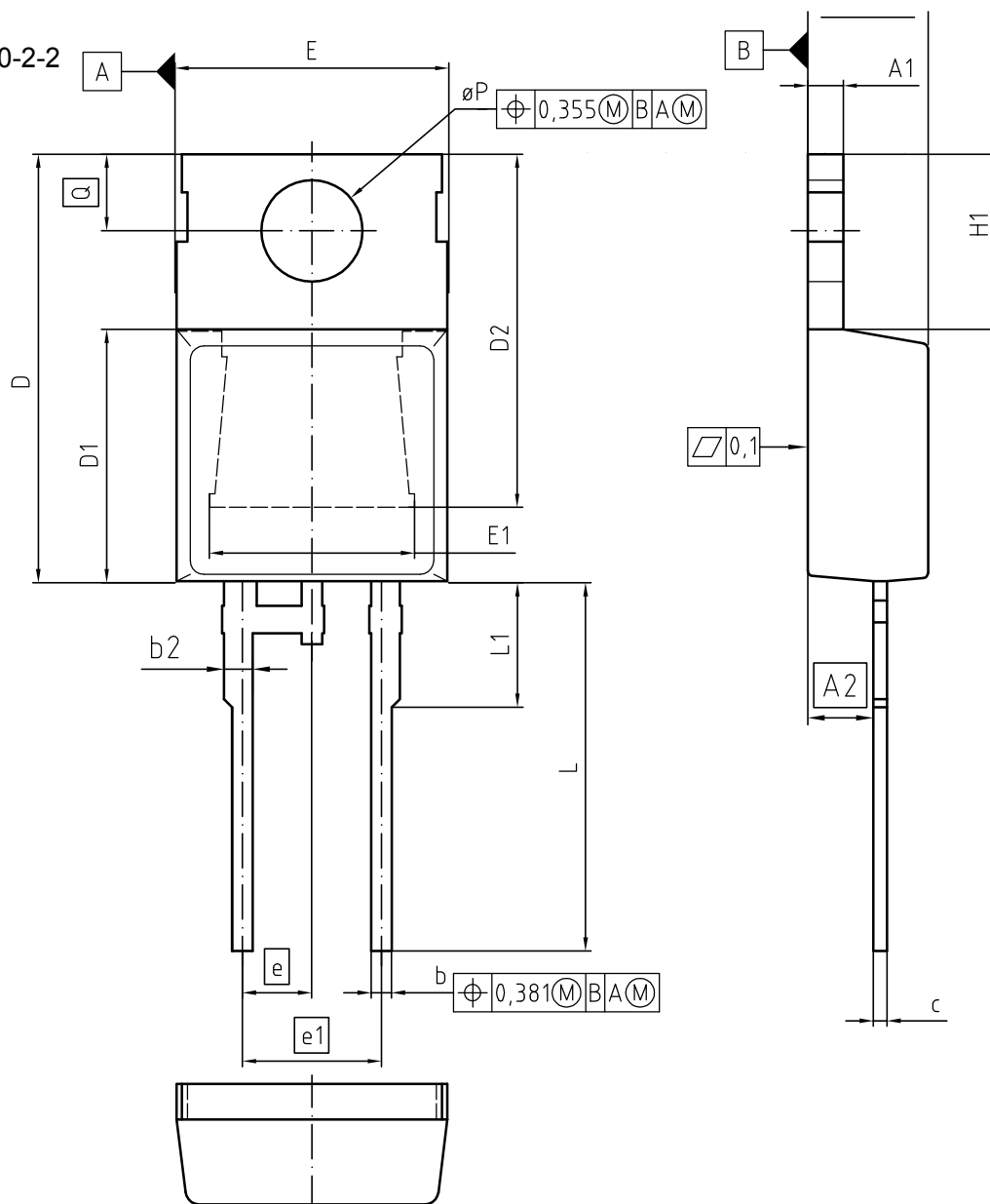
P-TO220-3-1, P-TO220-3-21



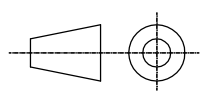
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	1.17	1.40	0.046	0.055
A2	2.15	2.72	0.085	0.107
b	0.65	0.86	0.026	0.034
b1	0.95	1.40	0.037	0.055
b2	0.95	1.15	0.037	0.045
b3	0.65	1.15	0.026	0.045
c	0.33	0.60	0.013	0.024
D	14.81	15.95	0.583	0.628
D1	8.51	9.45	0.335	0.372
D2	12.19	13.10	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
ϕP	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118



PG-TO-220-2-2



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.191	4.699	0.165	0.185
A1	1.170	1.400	0.046	0.055
A2	2.215	2.718	0.087	0.107
b	0.635	0.889	0.025	0.035
b2	0.950	1.651	0.037	0.065
c	0.330	0.635	0.013	0.025
D	14.808	15.950	0.583	0.628
D1	8.509	9.450	0.335	0.372
D2	12.850	14.245	0.506	0.561
E	9.677	10.363	0.381	0.408
E1	6.500	8.788	0.256	0.346
e	2.540		0.100	
e1	5.080		0.200	
N	2		2	
H1	5.900	6.900	0.232	0.272
L	12.700	14.000	0.500	0.551
L1	3.048	4.800	0.120	0.189
øP	3.550	3.886	0.140	0.153
Q	2.540	3.048	0.100	0.120

DOCUMENT NO. Z8B00003320
SCALE 0 2.5 5mm
EUROPEAN PROJECTION 
ISSUE DATE 28-02-2007
REVISION 02

Published by
Infineon Technologies AG
81726 Munich, Germany
© 2008 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

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.