Silicon Carbide Schottky Diode

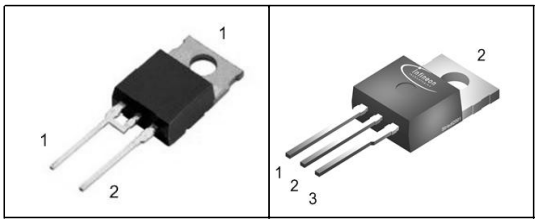
thinQ!™ SiC Schottky Diode

- 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 1200W[1)]
- No forward recovery
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[0)] for target applications

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 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous forward current, T_C=100°C	I_F	6	A
RMS forward current, f=50Hz	I_{FRMS}	8.4	
Surge non repetitive forward current, sine halfwave T_C=25°C, t_p=10ms	I_{FSM}	21.5	
Repetitive peak forward current T_j=150°C, T_C=100°C, D=0.1	I_{FRM}	28	
Non repetitive peak forward current t_p=10µs, T_C=25°C	I_{FMAX}	60	
i^2t value, T_C=25°C, t_p=10ms	$\int i^2dt$	2.3	A²s
Repetitive peak reverse voltage	V_{RRM}	600	V
Surge peak reverse voltage	V_{RSM}	600	
Power dissipation, T_C=25°C	P_{tot}	57.6	W
Operating and storage temperature	T_j , T_{stg}	-55... +175	°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 °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°C		-	1.5	1.7	
I_F=6A, T_j=150°C		-	1.7	2.1	
Reverse current	I_R				µA
V_R=600V, T_j=25°C		-	20	200	
V_R=600V, T_j=150°C		-	50	1000	

[0]J-STD20 and JESD22

[1]CCM, V_{IN}= 85VAC, T_j = 150°C, T_C =100°C, η = 93%, Δ I_{IN} = 30%

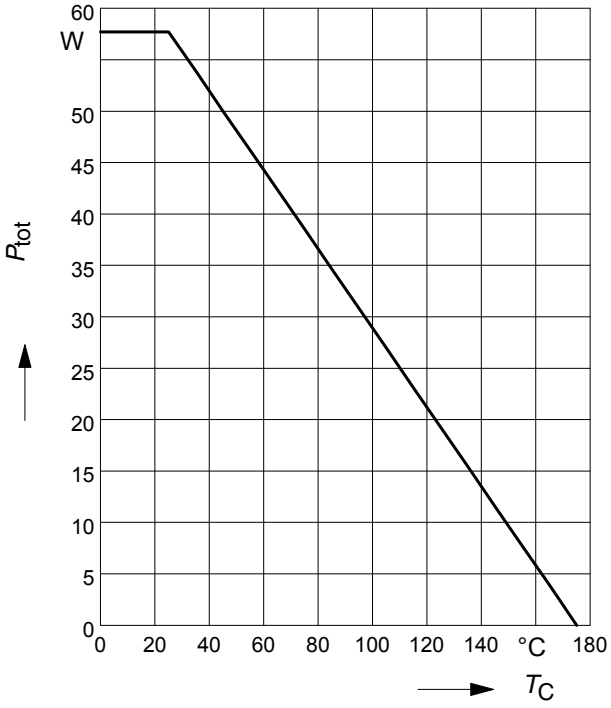
[2]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at T_j = 25 °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/µs, T_j=150°C	Q_c	-	21	-	nC
Switching time V_R=400V, I_F=6A, di_F/dt=200A/µs, T_j=150°C	t_{rr}	-	n.a.	-	ns
Total capacitance	C				pF
V_R=0V, T_C=25°C, f=1MHz		-	300	-	
V_R=300V, T_C=25°C, f=1MHz		-	20	-	
V_R=600V, T_C=25°C, f=1MHz		-	15	-	

1 Power dissipation

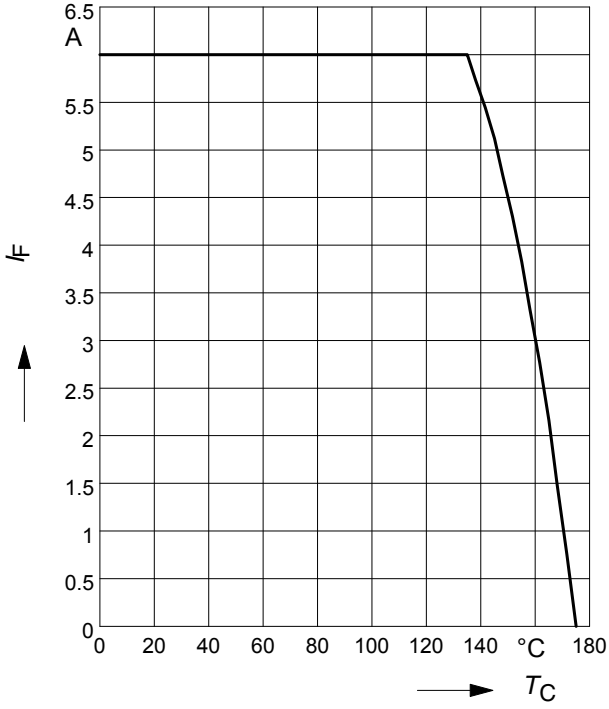
$P_{tot} = f(T_C)$



2 Diode forward current

$I_F = f(T_C)$

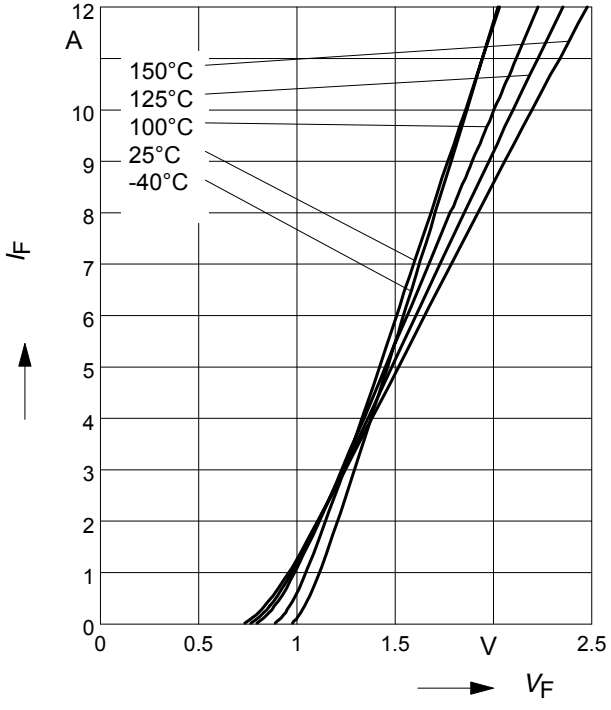
parameter: $T_j \leq 175$ °C



3 Typ. forward characteristic

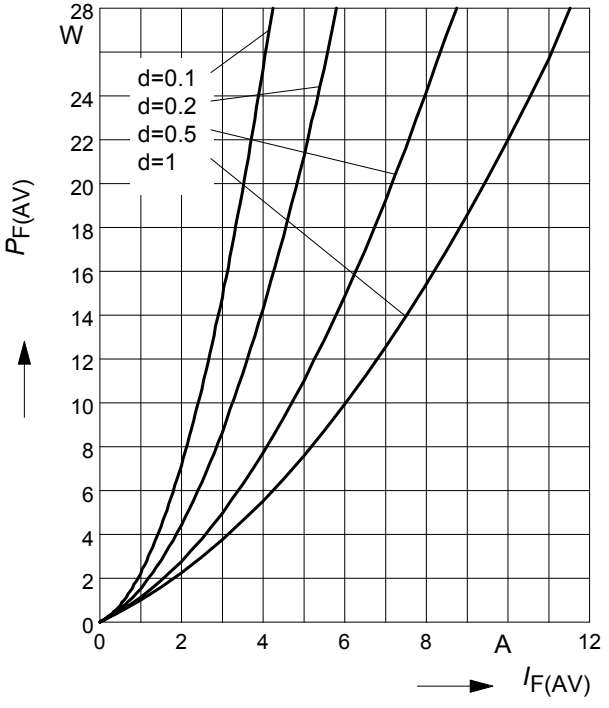
$I_F = f(V_F)$

parameter: T_j , tp = 350 µs



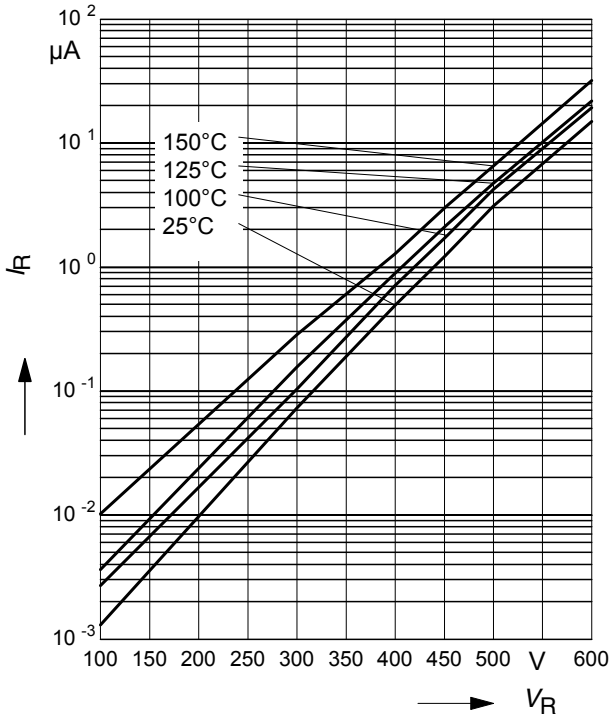
4 Typ. forward power dissipation vs. average forward current

$P_{F(AV)}=f(I_F)$ T_C=100°C, $d = t_p/T$



5 Typ. reverse current vs. reverse voltage

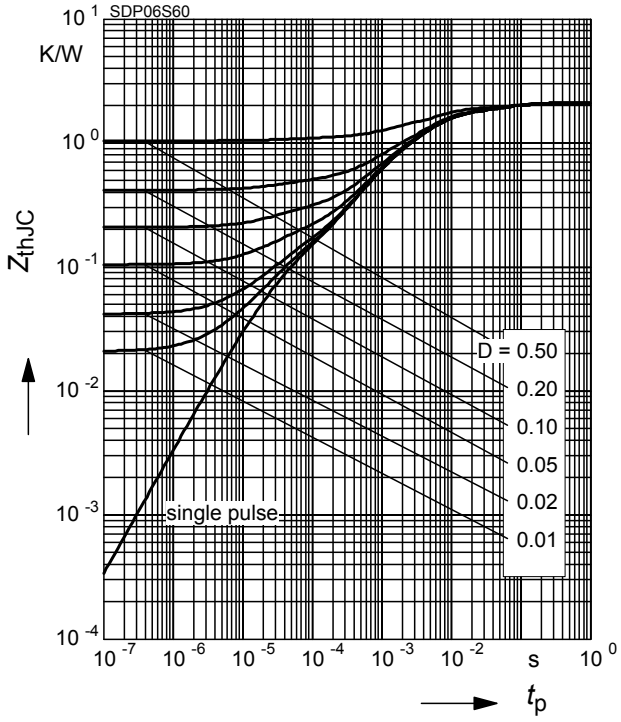
$I_R=f(V_R)$



6 Transient thermal impedance

$Z_{thJC} = f(t_p)$

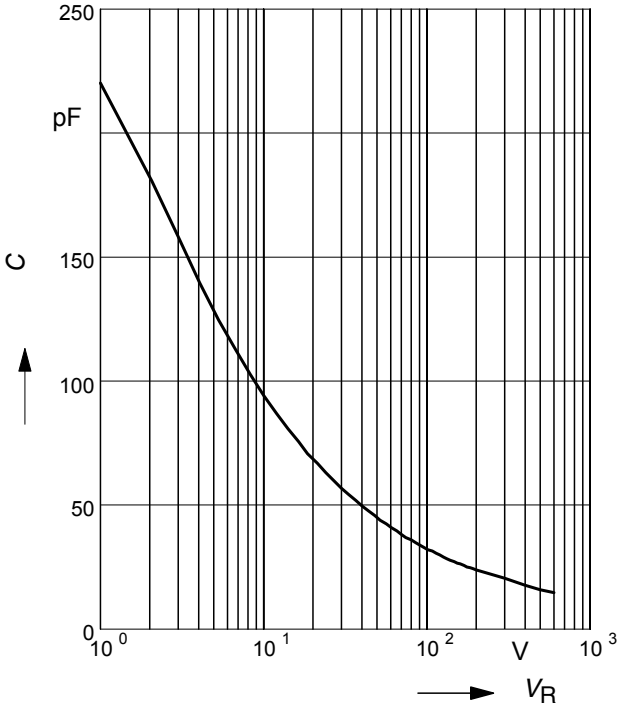
parameter : $D = t_p/T$



7 Typ. capacitance vs. reverse voltage

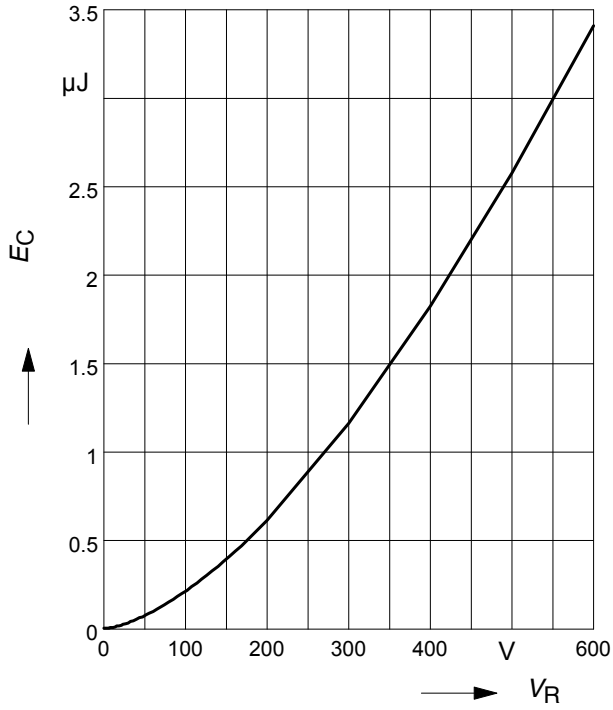
$C= f(V_R)$

parameter: T_C = 25 °C, f = 1 MHz



8 Typ. C stored energy

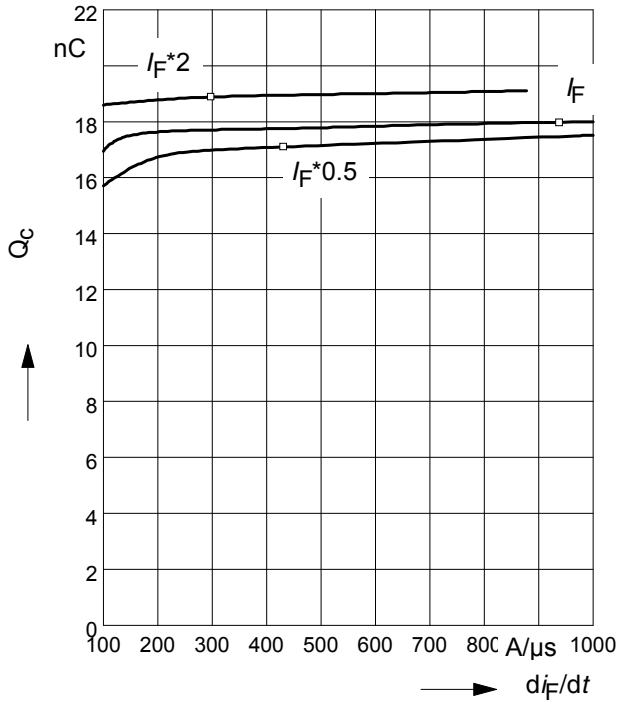
$E_C=f(V_R)$



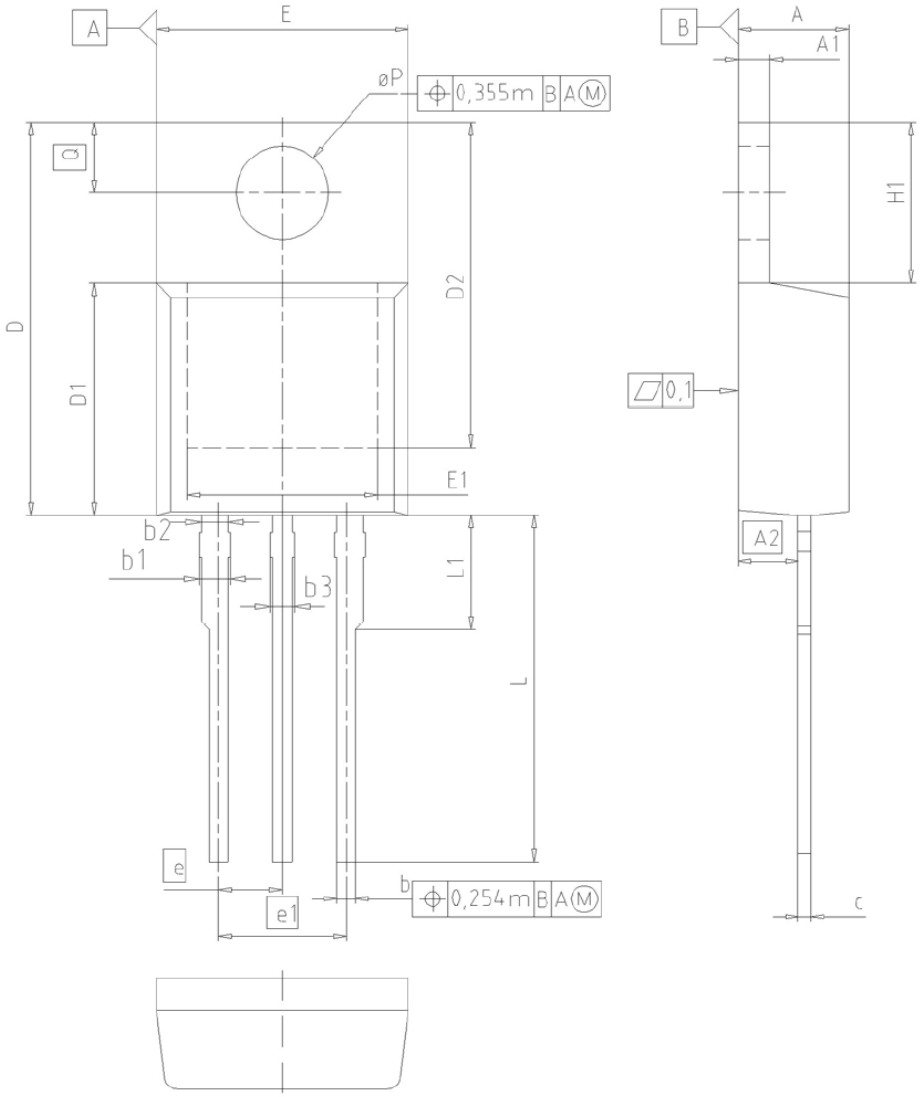
9 Typ. capacitive charge vs. current slope

$Q_c = f(di_F/dt)$

parameter: T_j = 150 °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
øP	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118

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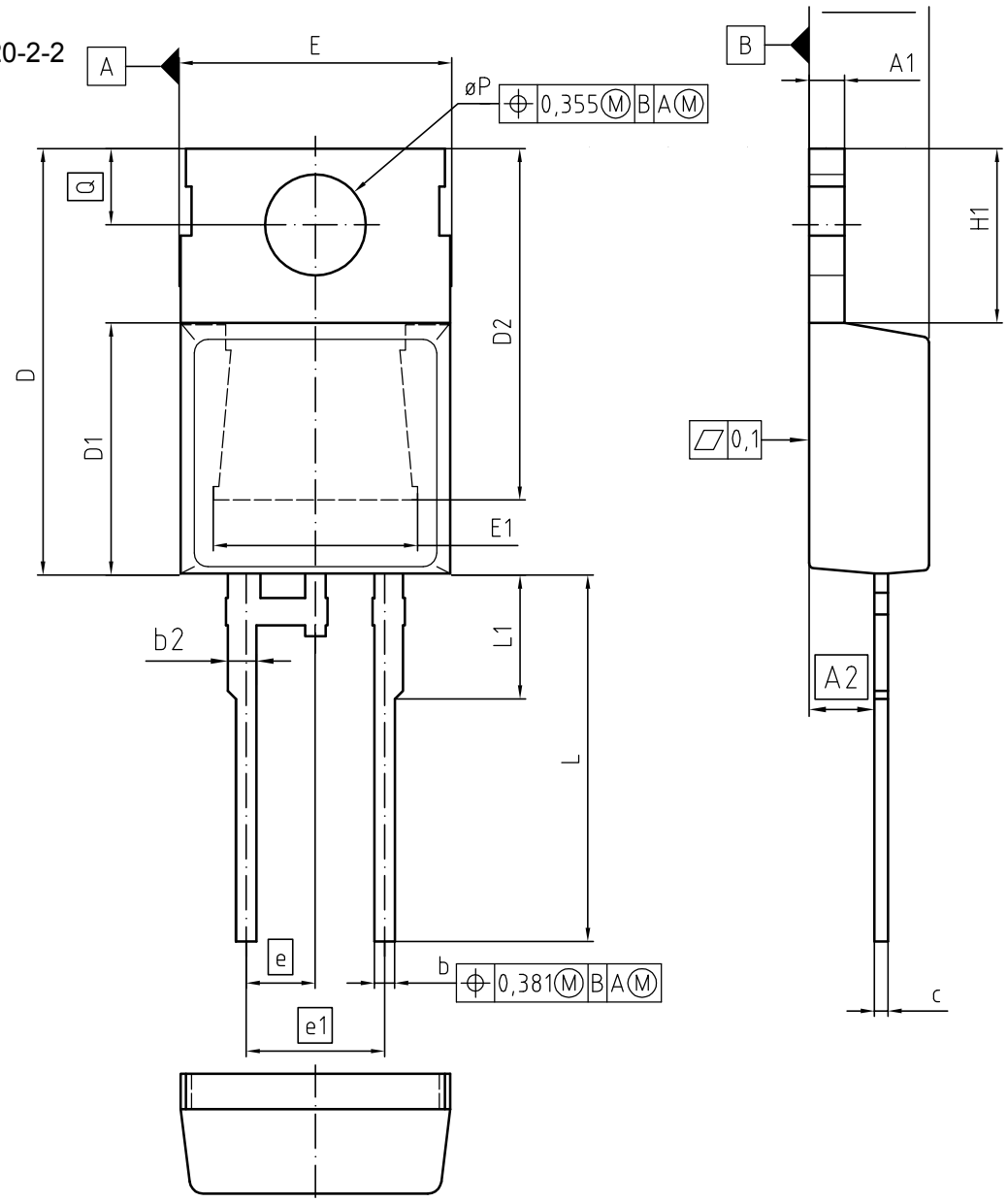
SCALE
0
2.5
0 2.5
5mm

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05

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

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