

2nd Generation thinQ!™ SiC Schottky Diode

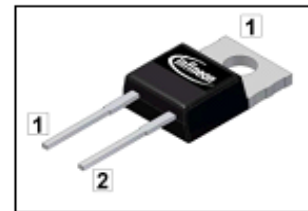
Features

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery/ No forward recovery
- No temperature influence on the switching behavior
- High surge current capability
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target applications
- Breakdown voltage tested at 5mA²⁾

Product Summary

V_{DC}	600	V
Q_c	24	nC
I_F	10	A

PG-TO220-2



thinQ! 2G Diode specially designed for fast switching applications like:

- CCM PFC
- Motor Drives

Type	Package	Marking	Pin 1	Pin 2
IDH10S60C	PG-TO220-2	D10S60C	C	A

Maximum ratings, at $T_J=25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	$T_C < 140\text{ °C}$	10	A
RMS forward current	$I_{F,RMS}$	$f=50\text{ Hz}$	15	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$T_C=25\text{ °C}, t_p=10\text{ ms}$	84	
Repetitive peak forward current	$I_{F,RM}$	$T_J=150\text{ °C}, T_C=100\text{ °C}, D=0.1$	39	
Non-repetitive peak forward current	$I_{F,max}$	$T_C=25\text{ °C}, t_p=10\text{ μs}$	350	
i^2t value	$\int i^2 dt$	$T_C=25\text{ °C}, t_p=10\text{ ms}$	35	A ² s
Repetitive peak reverse voltage	V_{RRM}		600	V
Diode dv/dt ruggedness	dv/dt	$V_R = 0 \dots 480V$	50	V/ns
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	100	W
Operating and storage temperature	T_J, T_{stg}		-55 ... 175	°C
Mounting torque		M3 and M3.5 screws	60	Mcm
Soldering temperature, wavesoldering only allowed at leads	T_{sld}	1.6mm (0.063 in.) from case for 10s	260	°C

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.5	K/W
Thermal resistance, junction - ambient	R_{thJA}	leaded	-	-	62	
Electrical characteristics, at T_j =25 °C, unless otherwise specified						
Static characteristics						
DC blocking voltage	V_{DC}	I_R =0.14 mA	600	-	-	V
Diode forward voltage	V_F	I_F =10 A, T_j =25 °C	-	1.5	1.7	
		I_F =10 A, T_j =150 °C	-	1.7	2.1	
Reverse current	I_R	V_R =600 V, T_j =25 °C	-	1.4	140	µA
		V_R =600 V, T_j =150 °C	-	5	1400	
AC characteristics						
Total capacitive charge	Q_c	V_R =400 V, I_F ≤ $I_{F,max}$, di_F/dt =200 A/µs, T_j =150 °C	-	24	-	nC
Switching time ³⁾	t_c		-	-	<10	ns
Total capacitance	C	V_R =1 V, f =1 MHz	-	480	-	pF
		V_R =300 V, f =1 MHz	-	60	-	
		V_R =600 V, f =1 MHz	-	60	-	

¹⁾ J-STD20 and JESD22

²⁾ All devices tested under avalanche conditions, for a time periode of 5ms, at 5mA.

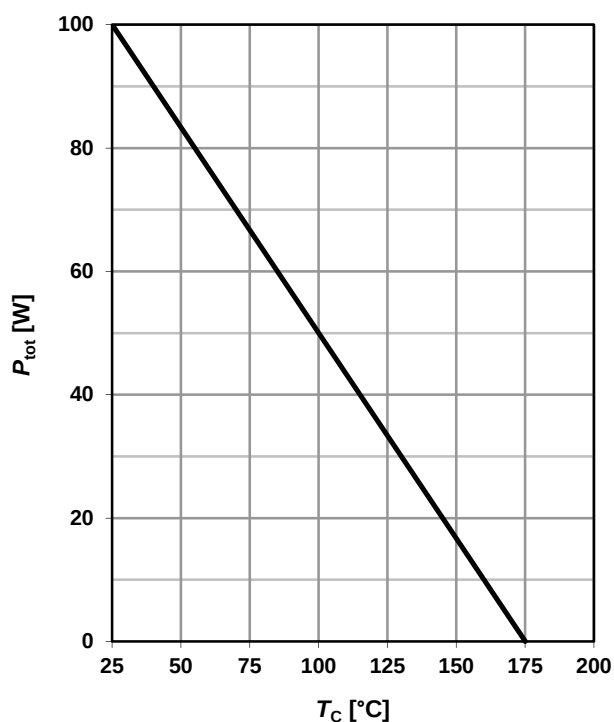
³⁾ t_c is the time constant for the capacitive displacement current waveform (independent from T_j , I_{LOAD} and di/dt), different from t_{rr} , which is dependent on T_j , I_{LOAD} , di/dt . No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

⁴⁾ Only capacitive charge occuring, guaranteed by design.

1 Power dissipation

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

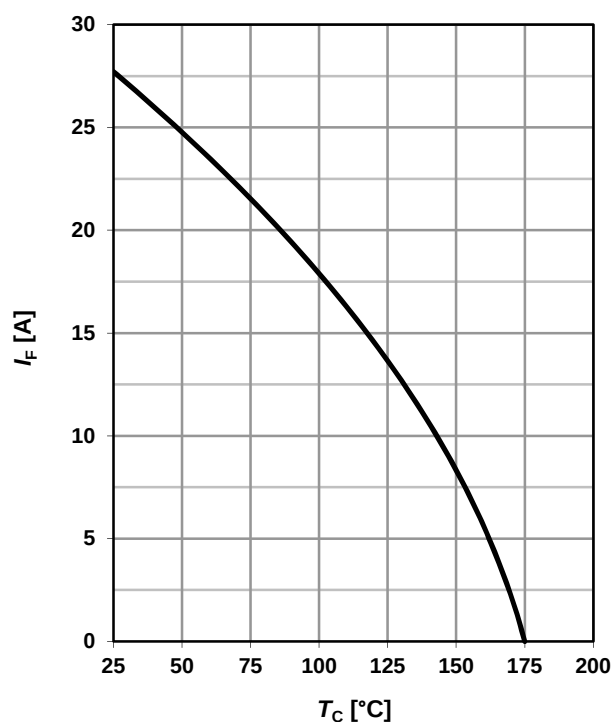
parameter: $R_{\text{thJC(max)}}$



2 Diode forward current

$$I_F = f(T_C); T_j \leq 175 \text{ °C}$$

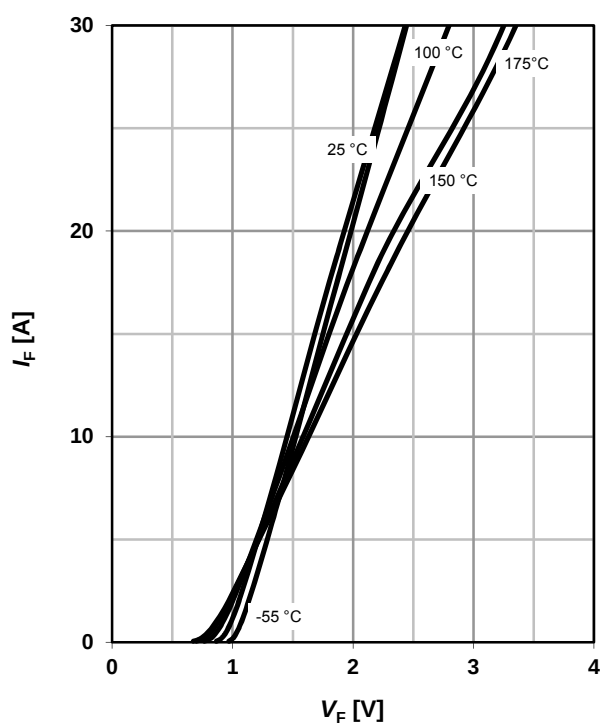
parameter: $R_{\text{thJC(max)}}$; $V_{F(\text{max})}$



3 Typ. forward characteristic

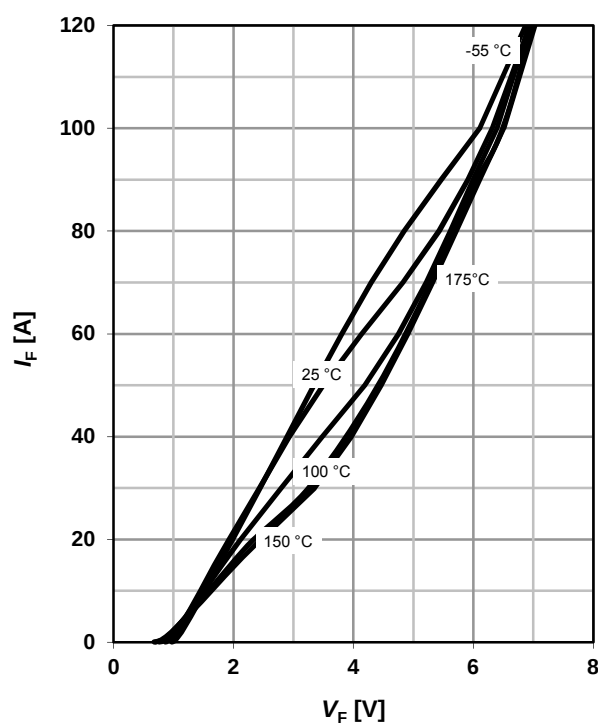
$$I_F = f(V_F); t_p = 400 \text{ } \mu\text{s}$$

parameter: T_j



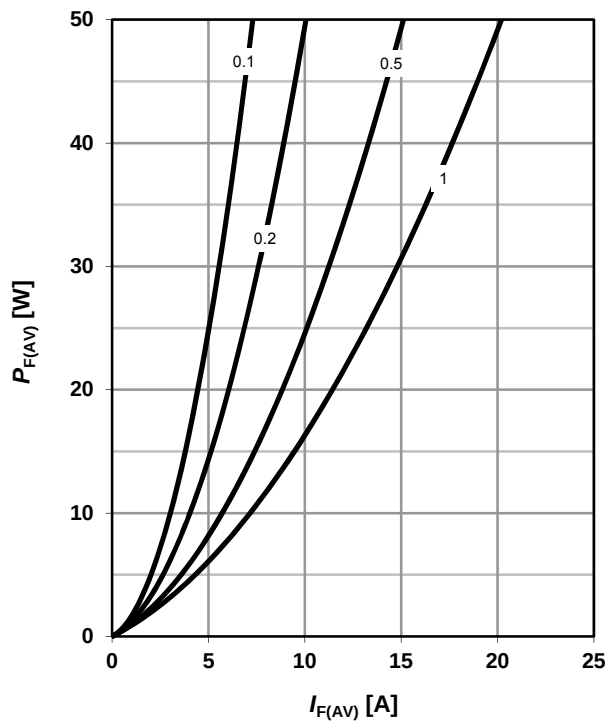
4 Typ. forward characteristic in surge current mode

$$I_F = f(V_F); t_p = 400 \text{ } \mu\text{s}; \text{ parameter: } T_j$$



5 Typ. forward power dissipation vs. average forward current

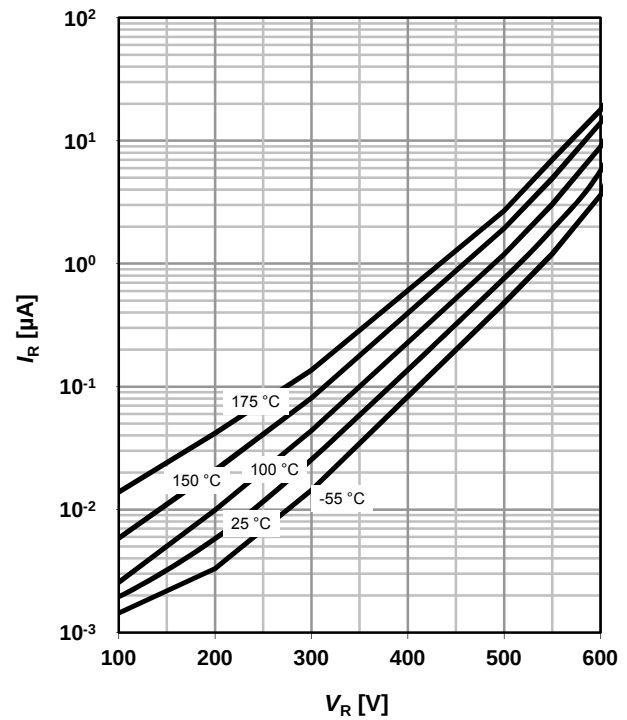
$P_{F(AV)} = f(I_{F(AV)})$, $T_C = 100^\circ\text{C}$, parameter: $D = t_p/T$



6 Typ. reverse current vs. reverse voltage

$I_R = f(V_R)$

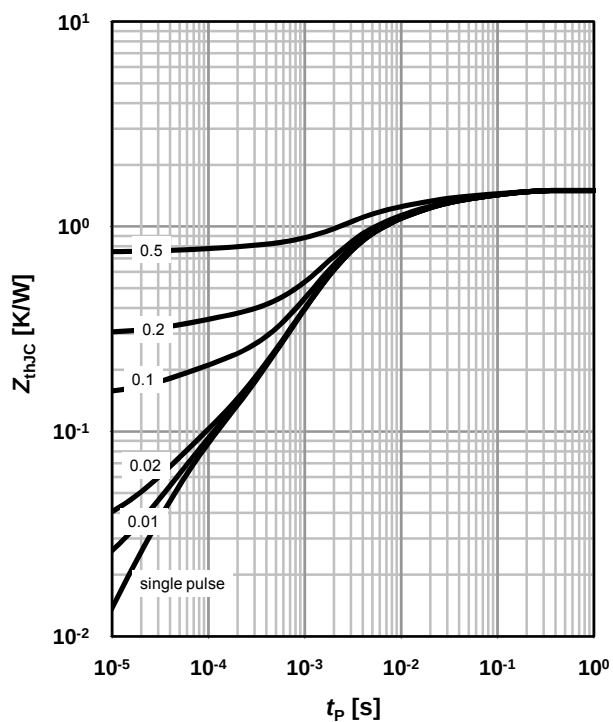
parameter: T_j



7 Transient thermal impedance

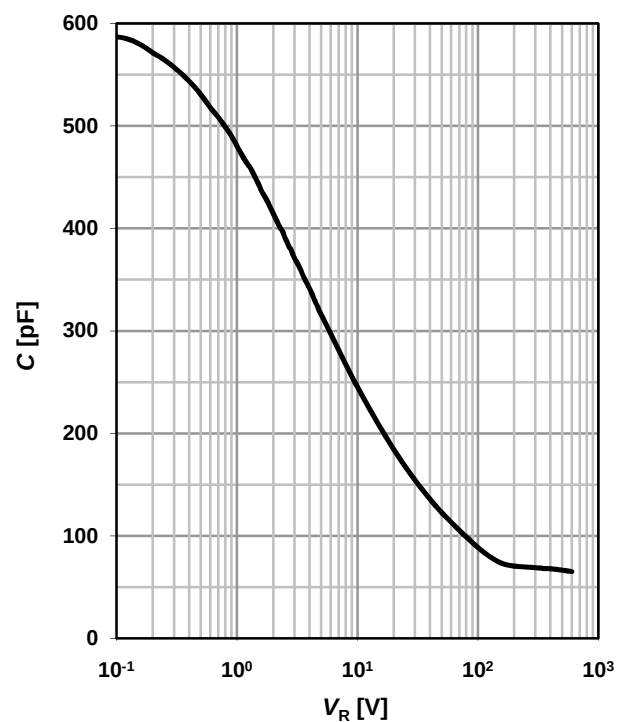
$Z_{thJC} = f(t_p)$

parameter: $D = t_p/T$



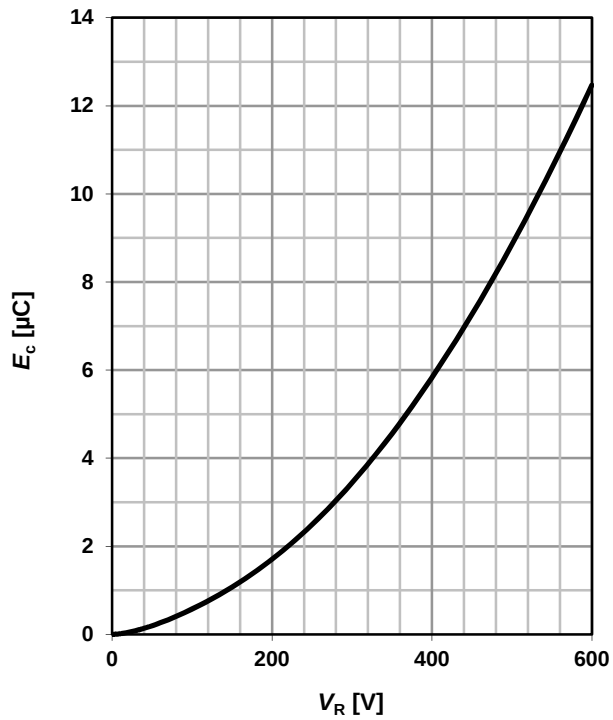
8 Typ. capacitance vs. reverse voltage

$C = f(V_R)$; $T_C = 25^\circ\text{C}$, $f = 1\text{ MHz}$



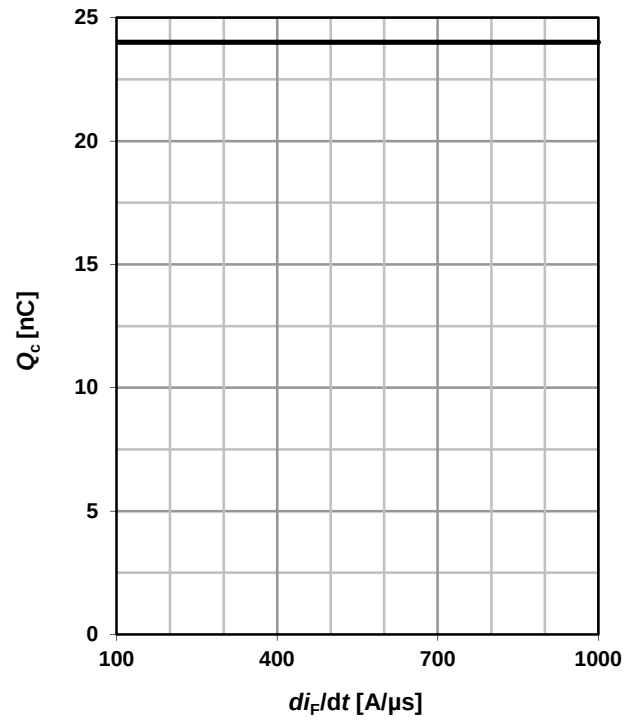
9 Typ. C stored energy

$$E_C = f(V_R)$$

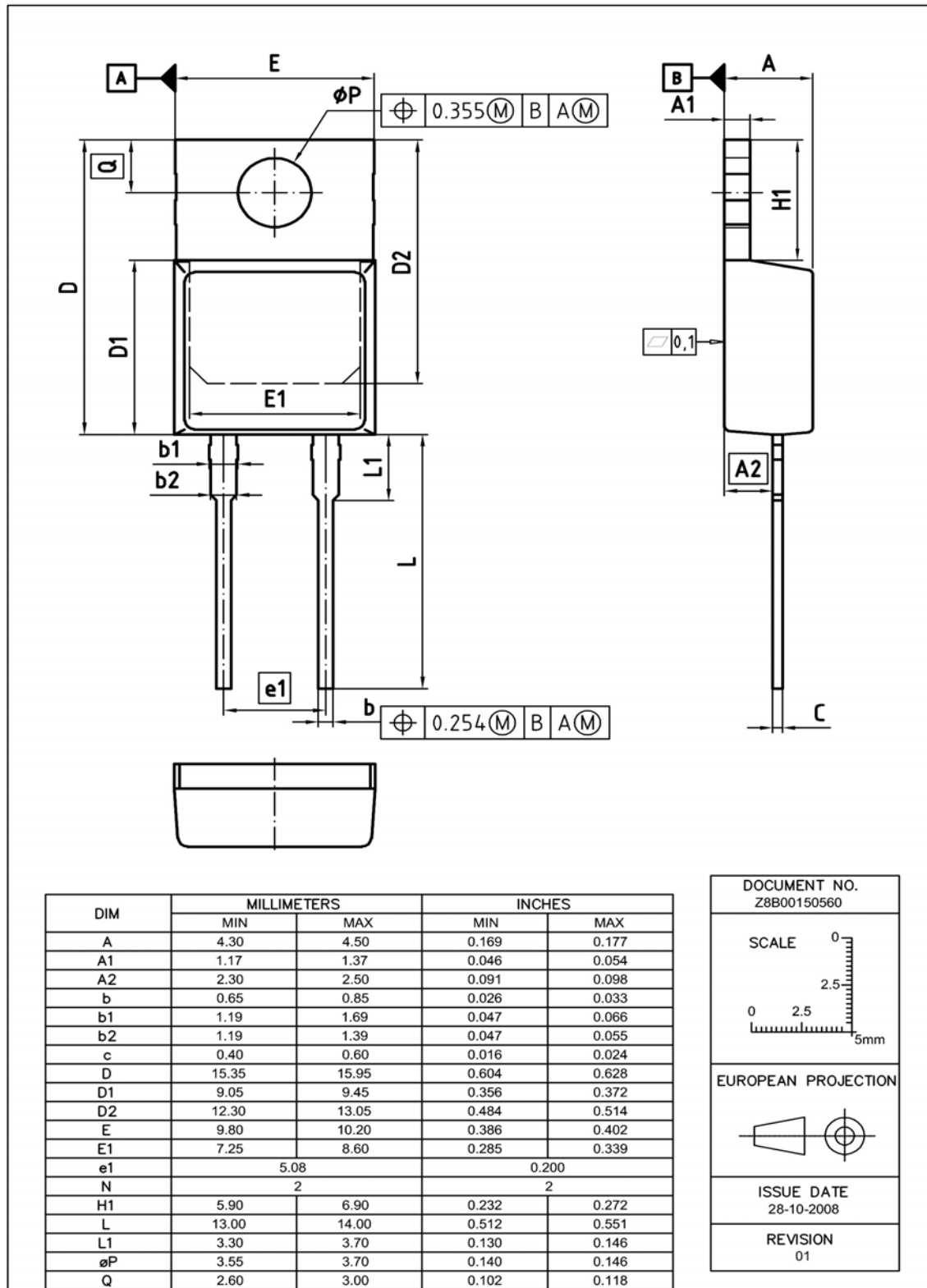


10 Typ. Capacitive charge vs. current slope

$$Q_C = f(di_F/dt)^{4/3}; T_j = 150^\circ\text{C}; I_F \leq I_{F,\text{max}}$$



PG-TO220-2: Outline



Dimensions in mm/inches

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