

2nd Generation thinQ!™ SiC Schottky Diode

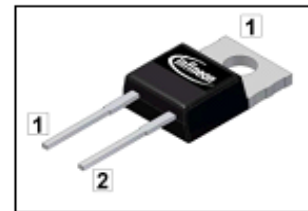
Features

- 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	12	nC
I_F	5	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
IDH05S60C	PG-TO220-2	D05S60C	C	A

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

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	$T_C < 140\text{ °C}$	5	A
RMS forward current	$I_{F,RMS}$	$f=50\text{ Hz}$	7.5	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$T_C=25\text{ °C}$, $t_p=10\text{ ms}$	42	
Repetitive peak forward current	$I_{F,RM}$	$T_J=150\text{ °C}$, $T_C=100\text{ °C}$, $D=0.1$	21	
Non-repetitive peak forward current	$I_{F,max}$	$T_C=25\text{ °C}$, $t_p=10\text{ μs}$	180	
i^2t value	$\int i^2 dt$	$T_C=25\text{ °C}$, $t_p=10\text{ ms}$	9	A ² s
Repetitive peak reverse voltage	V_{RRM}		600	V
Diode dv/dt ruggedness	dv/dt	$V_R = 0 \dots 480\text{ V}$	50	V/ns
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	55	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}		-	-	2.7	K/W
Thermal resistance, junction - ambient	R_{thJA}	leaded	-	-	62	

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

Static characteristics

DC blocking voltage	V_{DC}	$I_R=0.07\text{ mA}$	600	-	-	V
Diode forward voltage	V_F	$I_F=5\text{ A}, T_j=25\text{ }^{\circ}\text{C}$	-	1.5	1.7	
		$I_F=5\text{ A}, T_j=150\text{ }^{\circ}\text{C}$	-	1.7	2.1	
Reverse current	I_R	$V_R=600\text{ V}, T_j=25\text{ }^{\circ}\text{C}$	-	0.6	70	μA
		$V_R=600\text{ V}, T_j=150\text{ }^{\circ}\text{C}$	-	2.5	700	

AC characteristics

Total capacitive charge	Q_c	$V_R=400\text{ V}, I_F \leq I_{F,max},$ $di_F/dt=200\text{ A}/\mu\text{s},$ $T_j=150\text{ }^{\circ}\text{C}$	-	12	-	nC
Switching time ³⁾	t_c		-	-	<10	ns
	C	$V_R=1\text{ V}, f=1\text{ MHz}$	-	240	-	pF
		$V_R=300\text{ V}, f=1\text{ MHz}$	-	30	-	
		$V_R=600\text{ V}, f=1\text{ MHz}$	-	30	-	

¹⁾ J-STD20 and JESD22

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

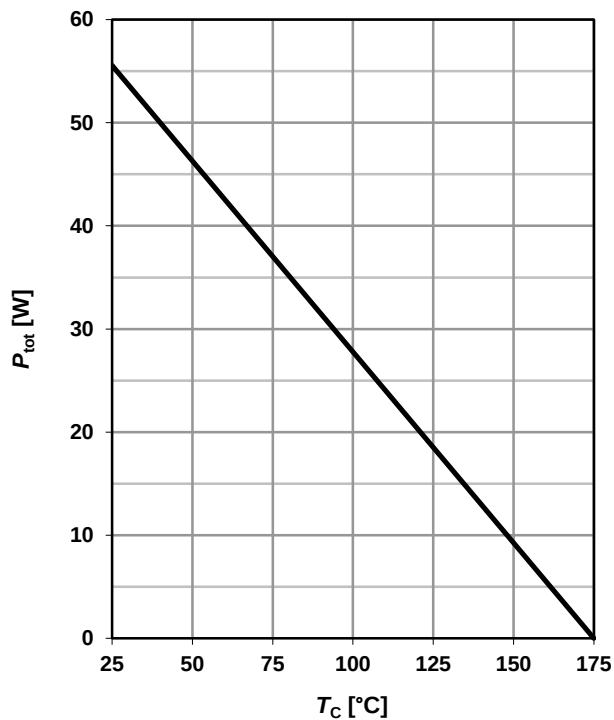
³⁾ t_c is the time constant for the capacitive displacement current waveform (independent from T_j , I_{LOAD} and di/dt), different from t_{rr} , which is dependent on T_j , I_{LOAD} , di/dt . No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

⁴⁾ Only capacitive charge occuring, guaranteed by design.

1 Power dissipation

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

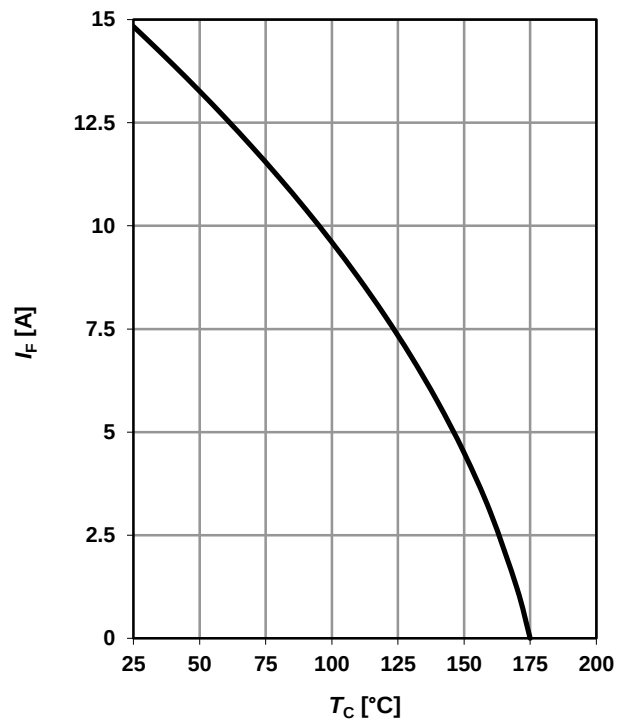
parameter: $R_{\text{thJC(max)}}$



2 Diode forward current

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

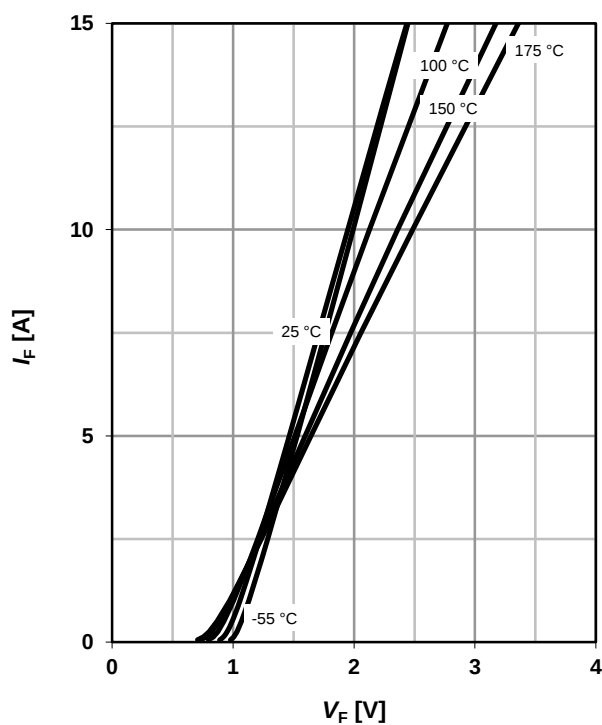
parameter: $R_{\text{thJC(max)}}$; $V_{F(\text{max})}$



3 Typ. forward characteristic

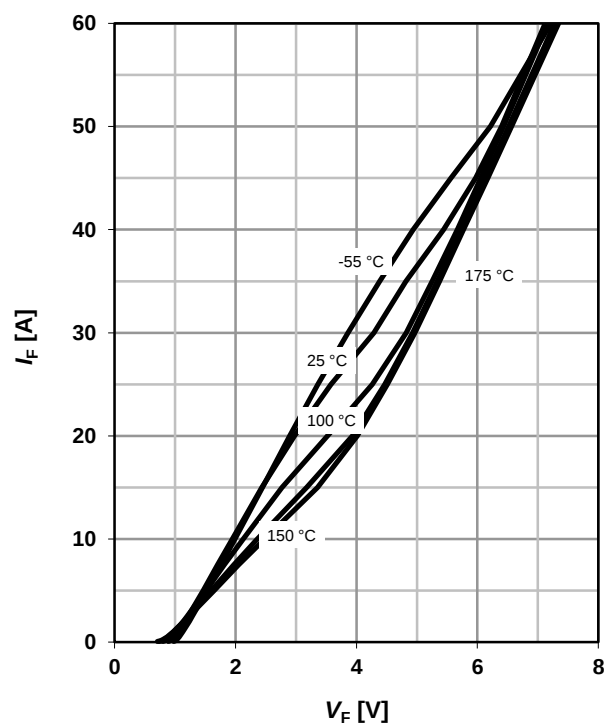
$$I_F = f(V_F); t_p = 400 \text{ } \mu\text{s}$$

parameter: T_j



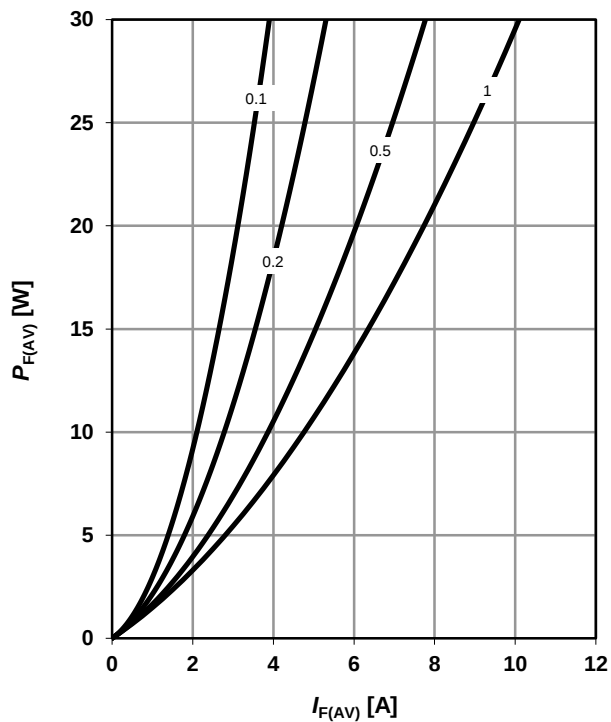
4 Typ. forward characteristic in surge current mode

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



5 Typ. forward power dissipation vs. average forward current

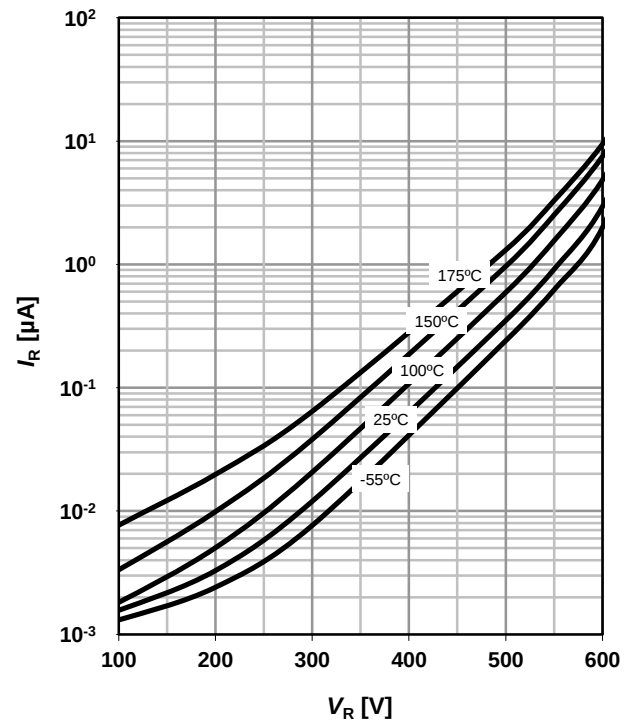
$P_{F,AV} = f(I_F)$, $T_C = 100^\circ\text{C}$, parameter: $D = t_p/T$



6 Typ. reverse current vs. reverse voltage

$I_R = f(V_R)$

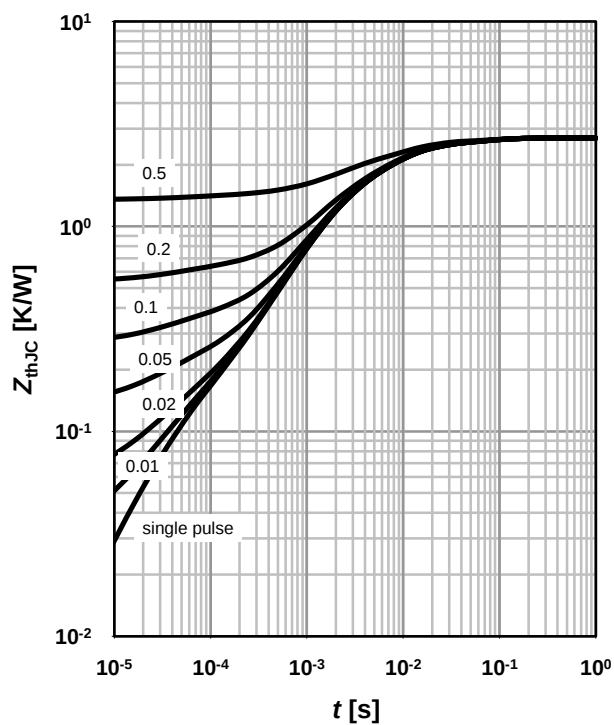
parameter: T_j



7 Transient thermal impedance

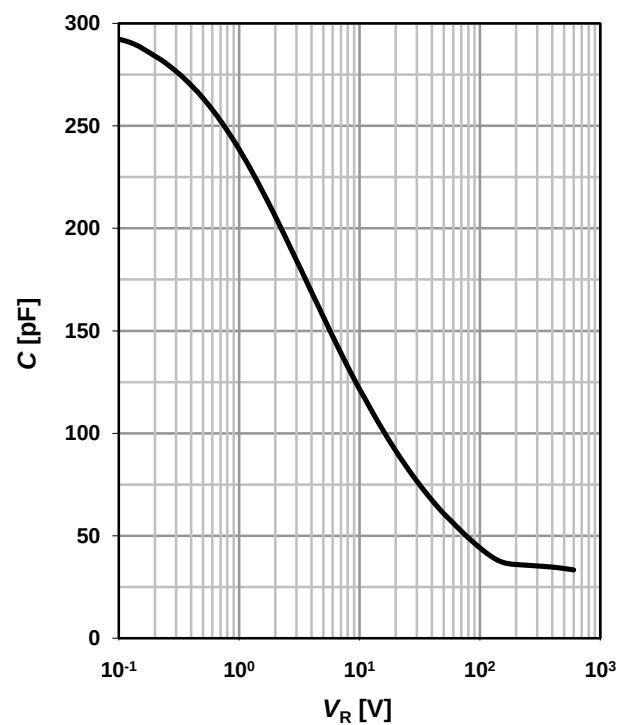
$Z_{thJC} = f(t_p)$

parameter: $D = t_p/T$



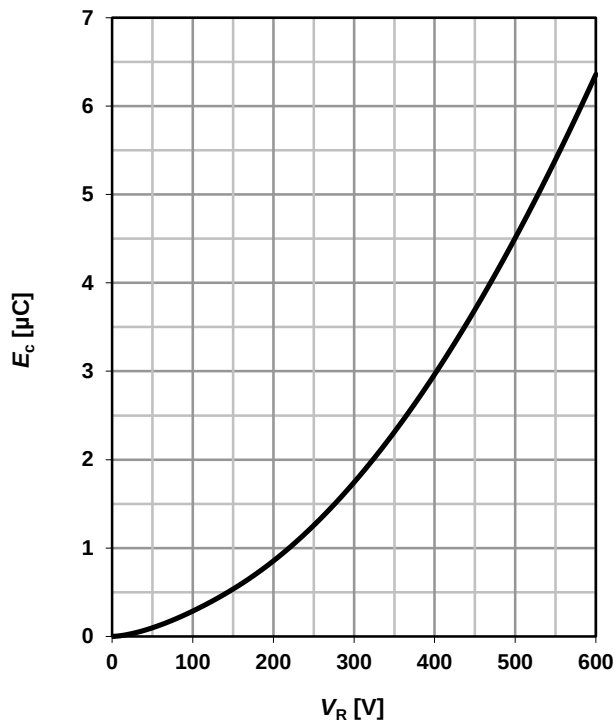
8 Typ. capacitance vs. reverse voltage

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



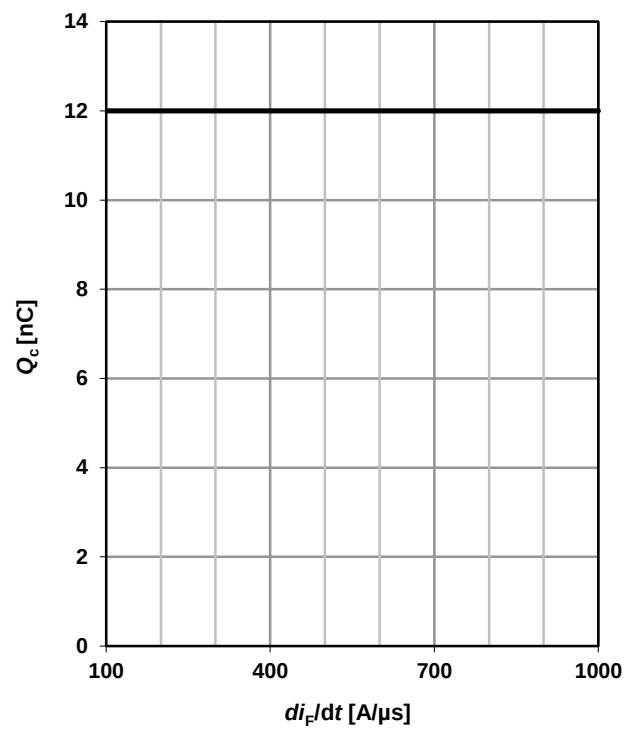
9 Typ. C stored energy

$$E_C = f(V_R)$$

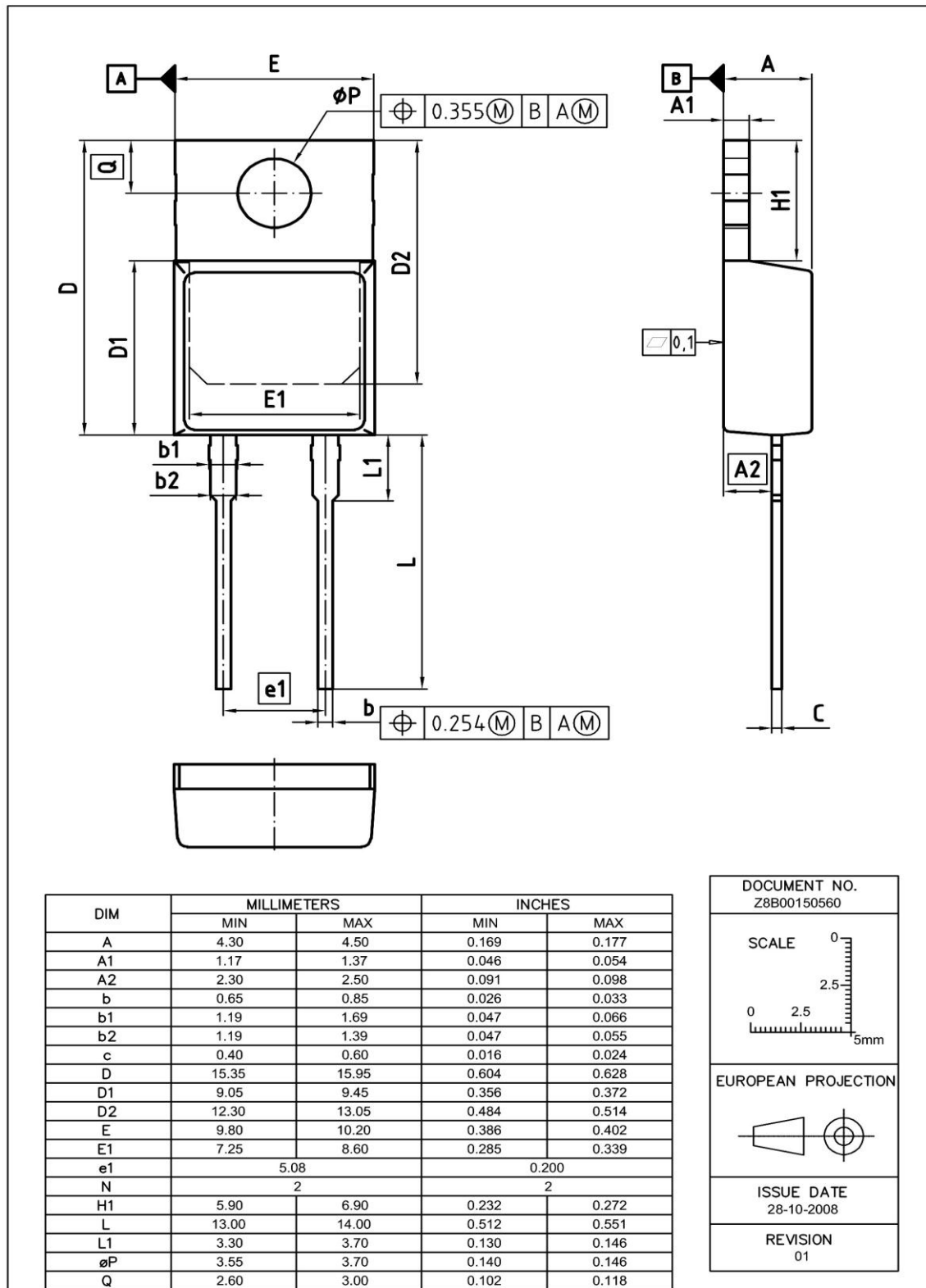


10 Typ. capacitance charge vs. current slope

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



PG-TO220-2: Outline



Dimensions in mm/inches

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