

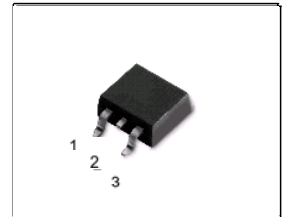
Silicon Carbide Schottky Diode

- 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

thinQ!™ SiC Schottky Diode
Product Summary

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

P-TO220-3.SMD



Type	Package	Ordering Code	Marking	Pin 1	Pin 2	Pin 3
SDB06S60	P-TO220-3.SMD	Q67040-S4370	D06S60	n.c.	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	
SMD version, device on PCB:	R_{thJA}				
P-TO263-3-2: @ min. footprint		-	-	62	
P-TO263-3-2: @ 6 cm ² cooling area ²⁾		-	35	-	
P-TO252-3-1: @ min. footprint		-	-	75	
P-TO252-3-1: @ 6 cm ² cooling area ²⁾		-	-	50	

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

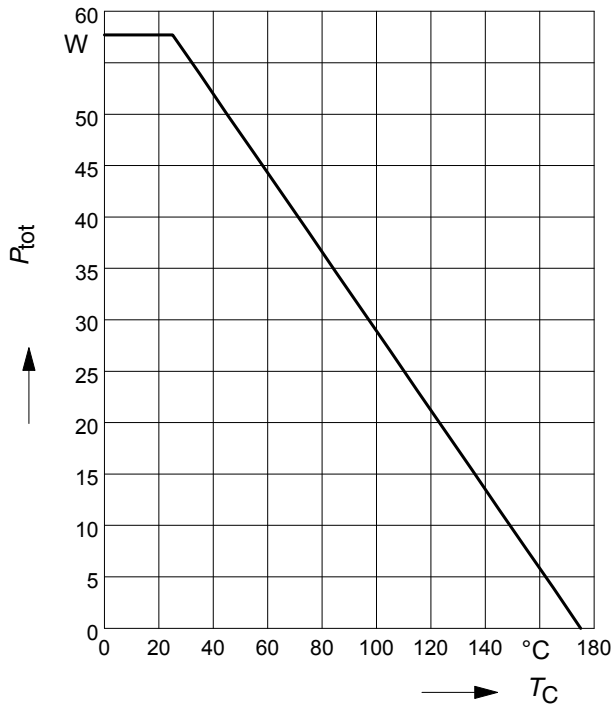
¹CCM, $V_{IN} = 85\text{VAC}$, $T_j = 150\text{°C}$, $T_C = 100\text{°C}$, $\eta = 93\%$, $\Delta I_{IN} = 30\%$
²Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

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

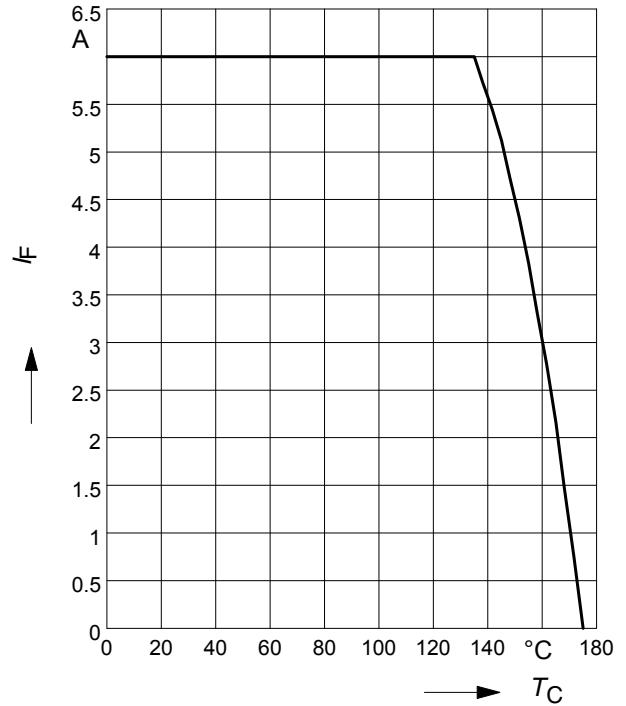
$$P_{\text{tot}} = f(T_C)$$



2 Diode forward current

$$I_F = f(T_C)$$

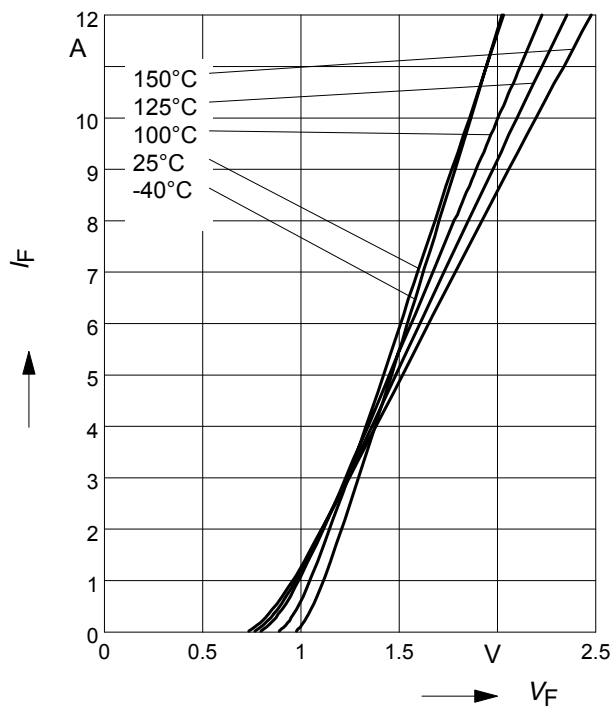
parameter: $T_j \leq 175^\circ\text{C}$



3 Typ. forward characteristic

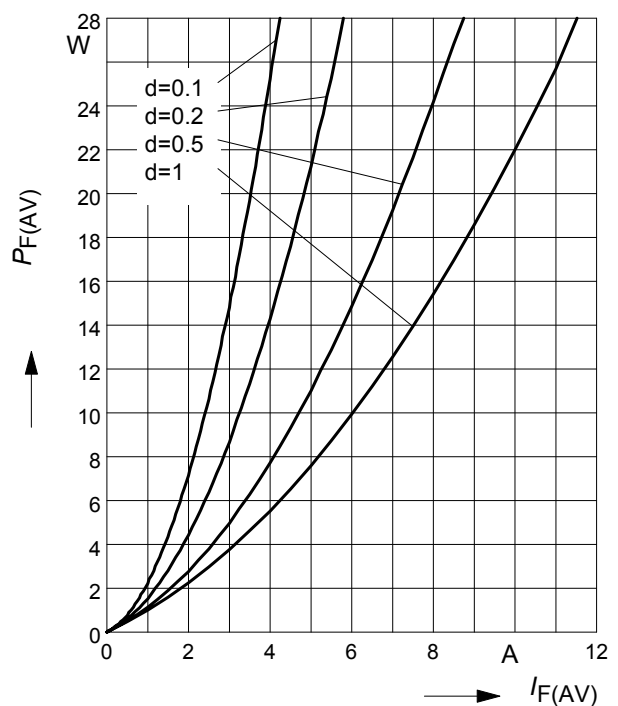
$$I_F = f(V_F)$$

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



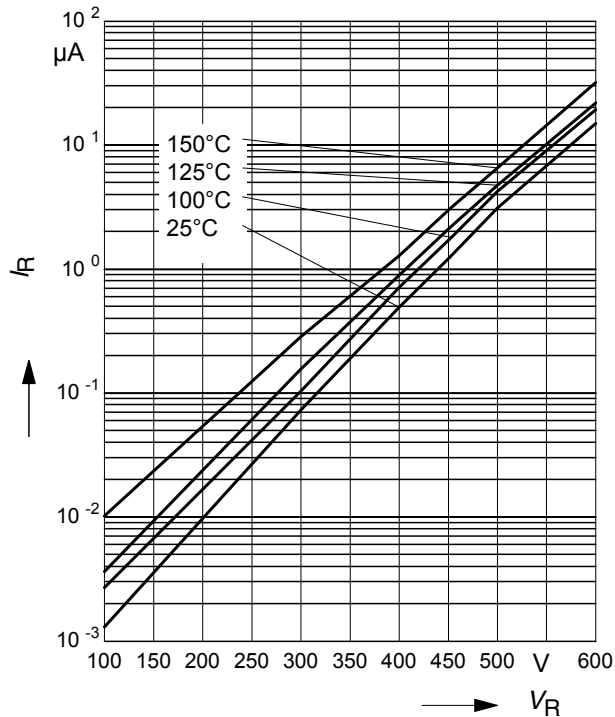
4 Typ. forward power dissipation vs. average forward current

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



5 Typ. reverse current vs. reverse voltage

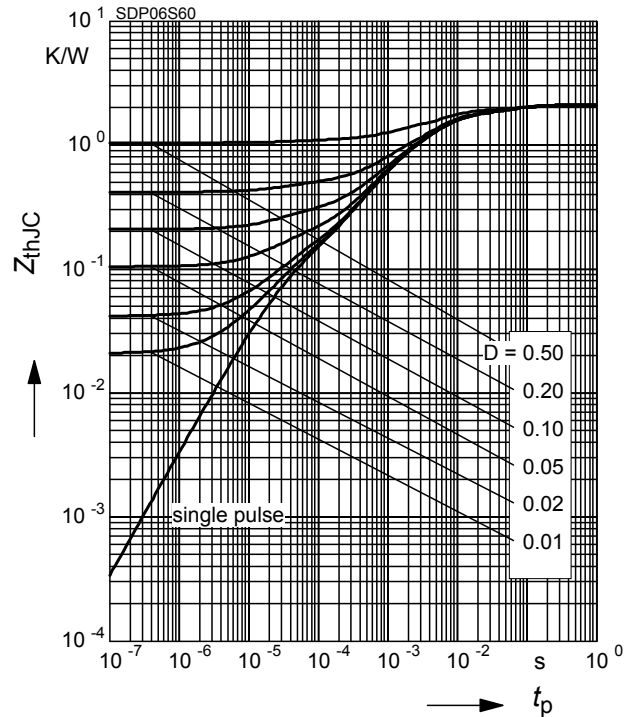
$$I_R = f(V_R)$$



6 Transient thermal impedance

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

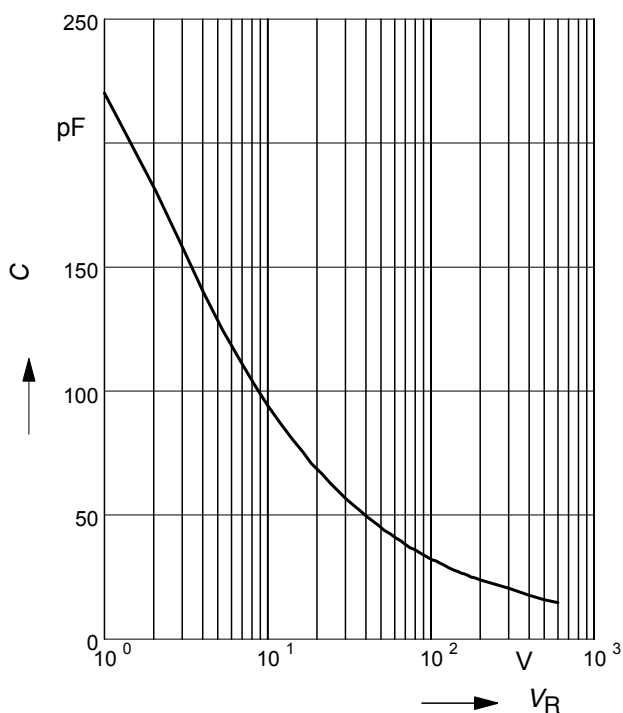
$$\text{parameter : } D = t_p/T$$



7 Typ. capacitance vs. reverse voltage

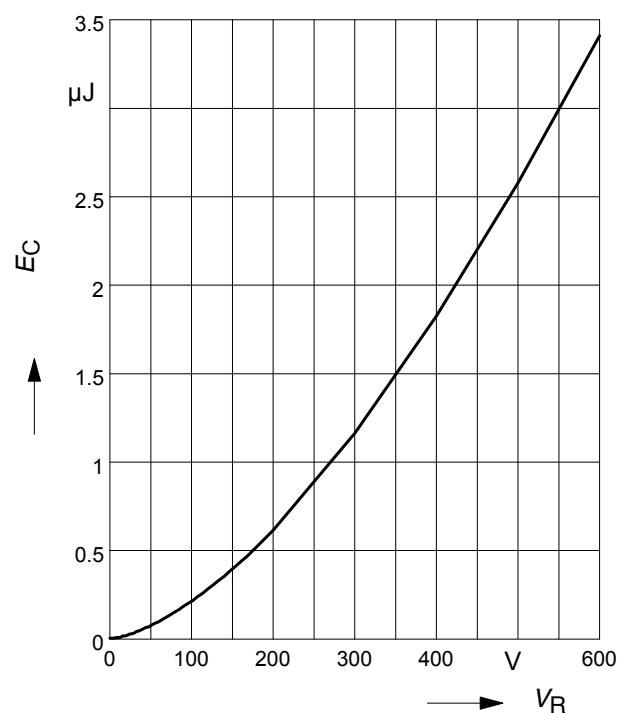
$$C = f(V_R)$$

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



8 Typ. C stored energy

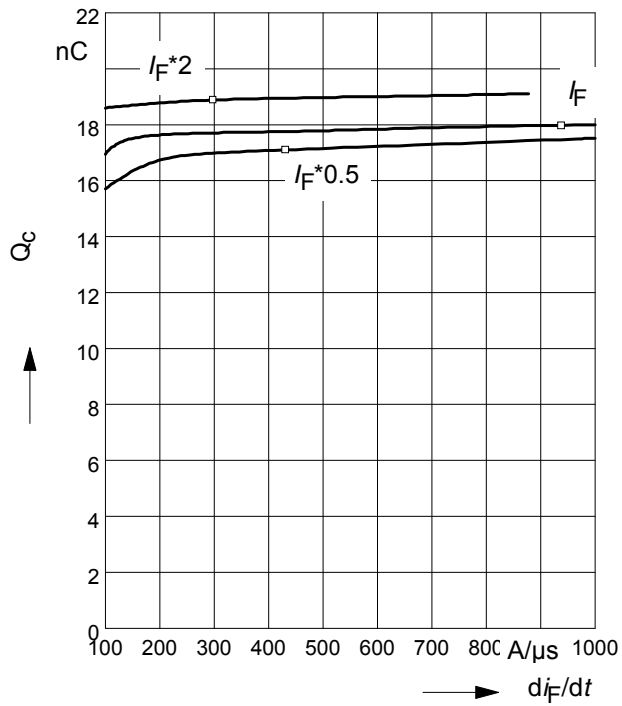
$$E_C = f(V_R)$$

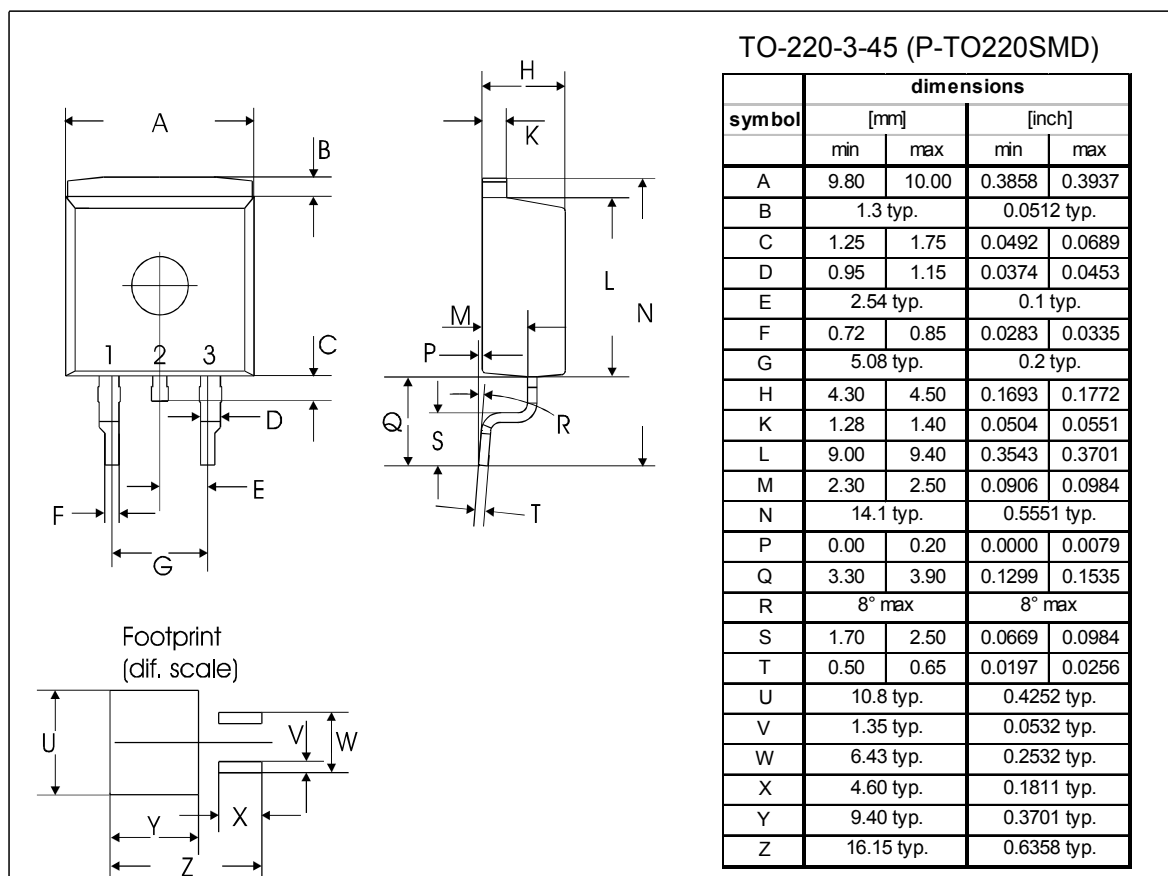


9 Typ. capacitive charge vs. current slope

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

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





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