

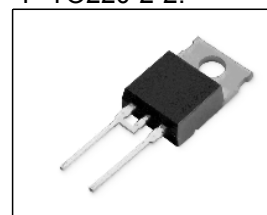
Silicon Carbide Schottky Diode

- Worlds first 600V Schottky diode
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery

Product Summary

V_{RRM}	600	V
Q_C	30	nC
I_F	12	A

P-TO220-2-2.



Type	Package	Ordering Code	Marking	Pin 1	Pin 2	Pin 3
SDT12S60	P-TO220-2-2.	Q67040-S4470	D12S60	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	12	A
RMS forward current, $f=50\text{Hz}$	I_{FRMS}	17	
Surge non repetitive forward current, sine halfwave $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	I_{FSM}	36	
Repetitive peak forward current $T_j=150^\circ\text{C}$, $T_C=100^\circ\text{C}$, $D=0.1$	I_{FRM}	49	
Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$	I_{FMAX}	120	
i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	$\int i^2 dt$	6.48	A^2s
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}	88.2	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}	-	-	1.7	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	

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

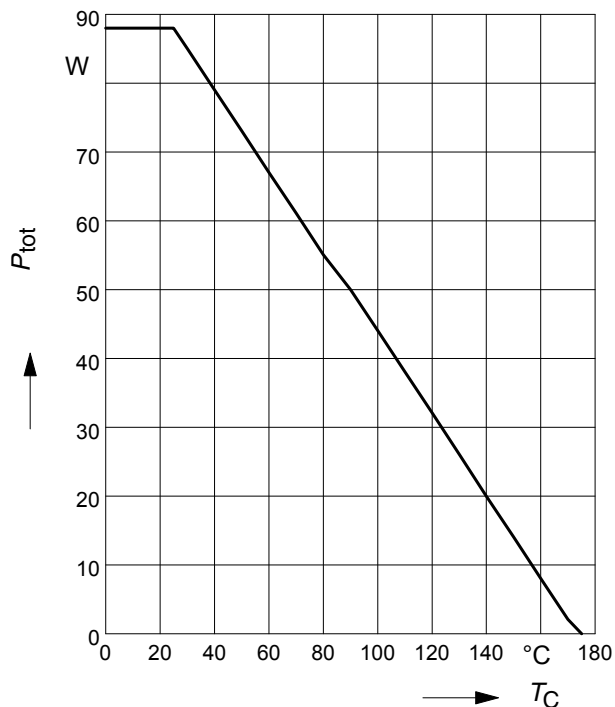
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage $I_F=12A, T_j=25^{\circ}C$ $I_F=12A, T_j=150^{\circ}C$	V_F	- -	1.5 1.7	1.7 2.1	V
Reverse current $V_R=600V, T_j=25^{\circ}C$ $V_R=600V, T_j=150^{\circ}C$	I_R	- -	40 100	400 2000	μA

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge $V_R=400V, I_F=12A, di_F/dt=200A/\mu s, T_j=150^{\circ}C$	Q_C	-	30	-	nC
Switching time $V_R=400V, I_F=12A, di_F/dt=200A/\mu s, T_j=150^{\circ}C$	t_{rr}	-	n.a.	-	ns
Total capacitance $V_R=1V, T_C=25^{\circ}C, f=1MHz$ $V_R=300V, T_C=25^{\circ}C, f=1MHz$ $V_R=600V, T_C=25^{\circ}C, f=1MHz$	C	- - -	450 45 43	- - -	pF

1 Power dissipation

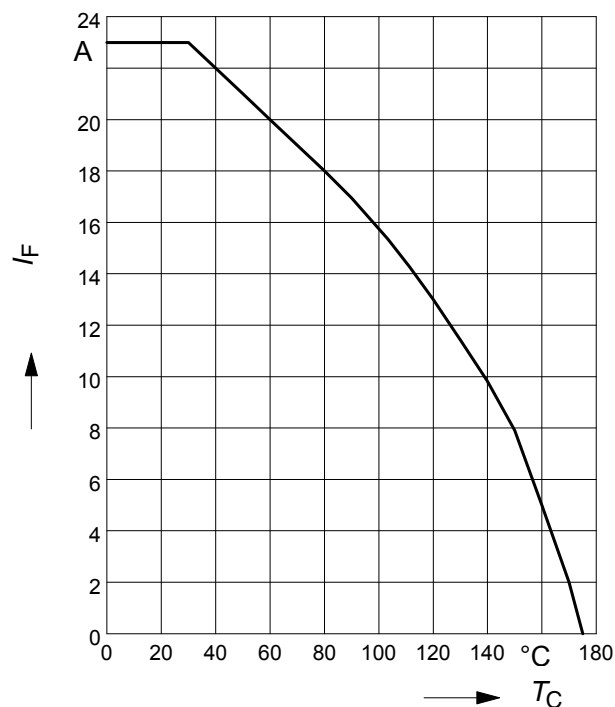
$$P_{\text{tot}} = f(T_C)$$



2 Diode forward current

$$I_F = f(T_C)$$

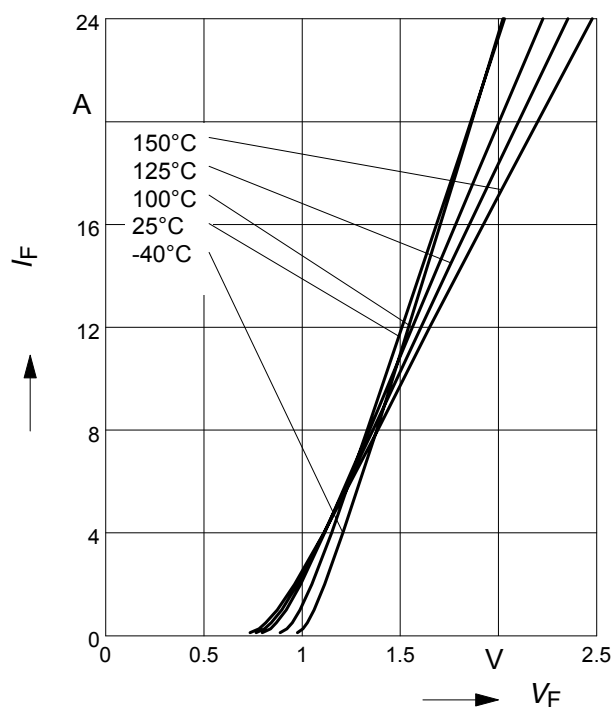
parameter: $T_j \leq 175^\circ\text{C}$



3 Typ. forward characteristic

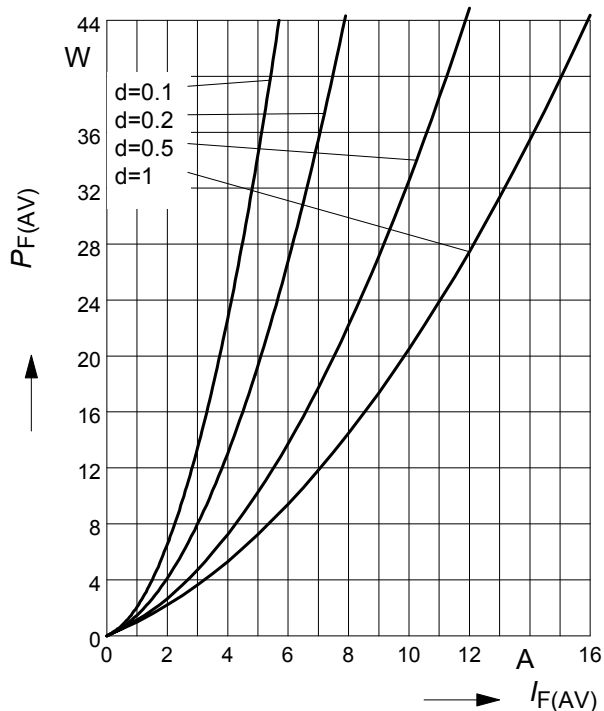
$$I_F = f(V_F)$$

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



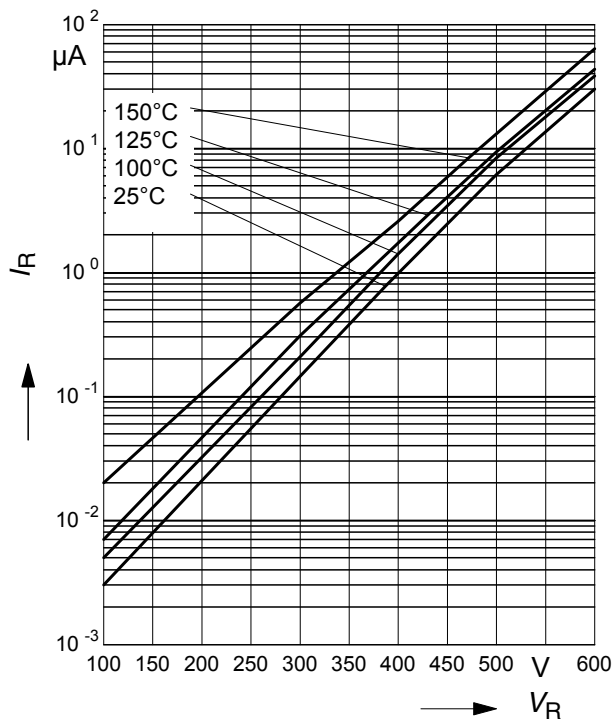
4 Typ. forward power dissipation vs. average forward current

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



5 Typ. reverse current vs. reverse voltage

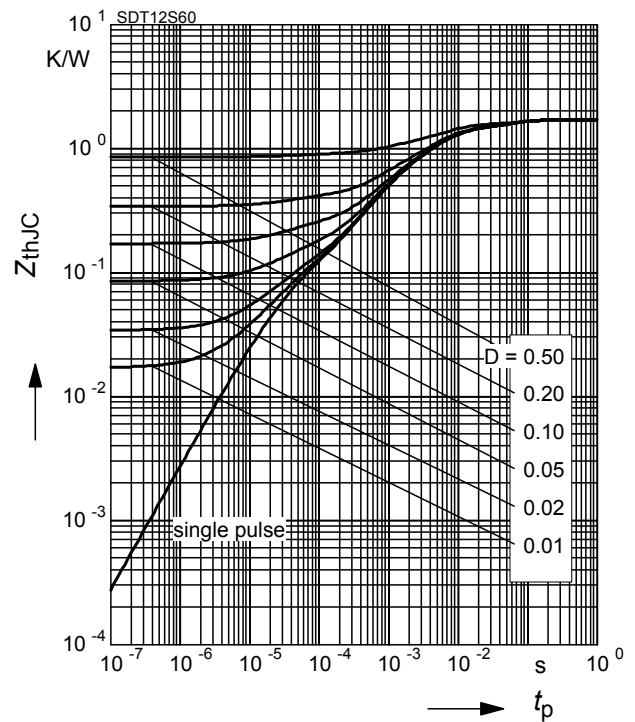
$$I_R = f(V_R)$$



6 Transient thermal impedance

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

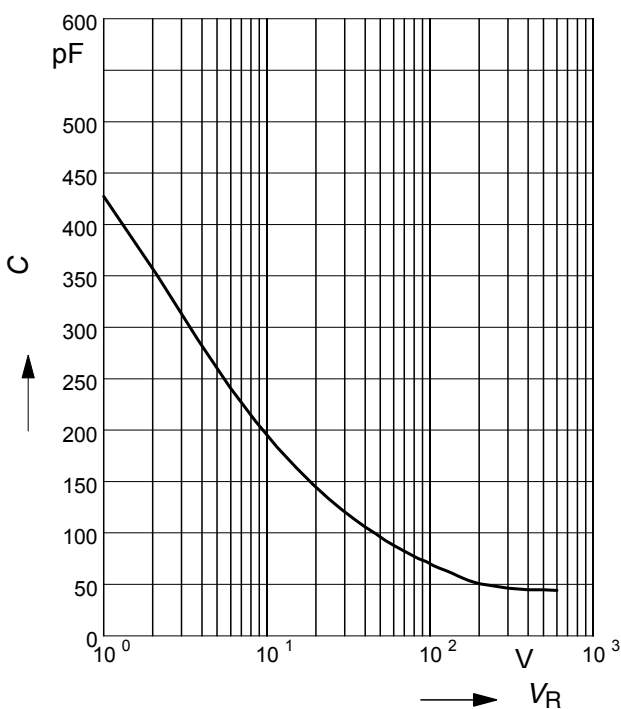
$$\text{parameter : } D = t_p/T$$



7 Typ. capacitance vs. reverse voltage

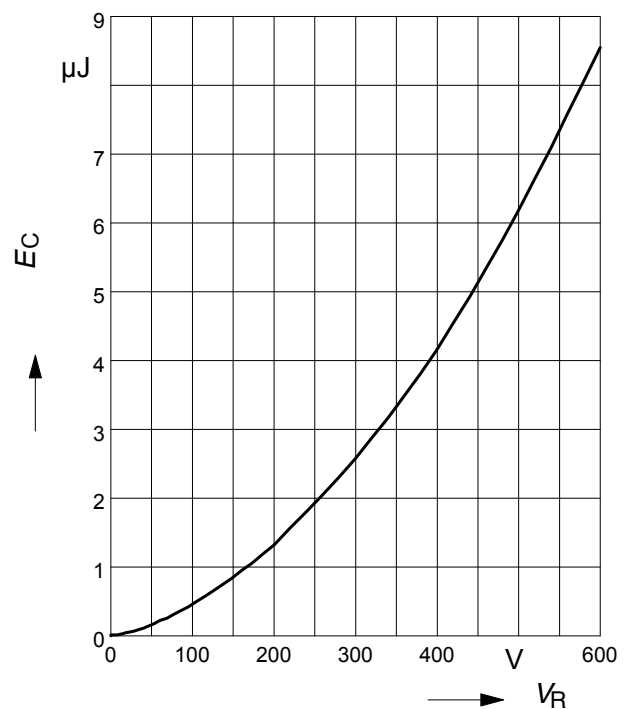
$$C = f(V_R)$$

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



8 Typ. C stored energy

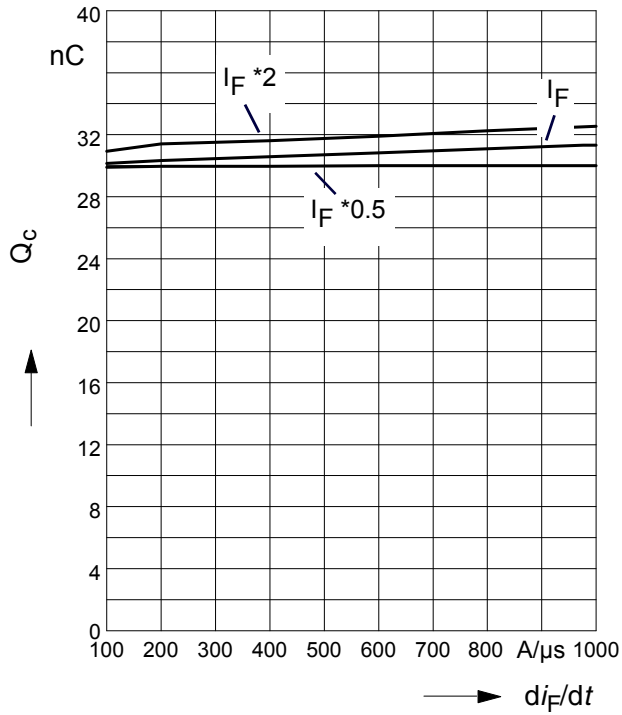
$$E_C = f(V_R)$$

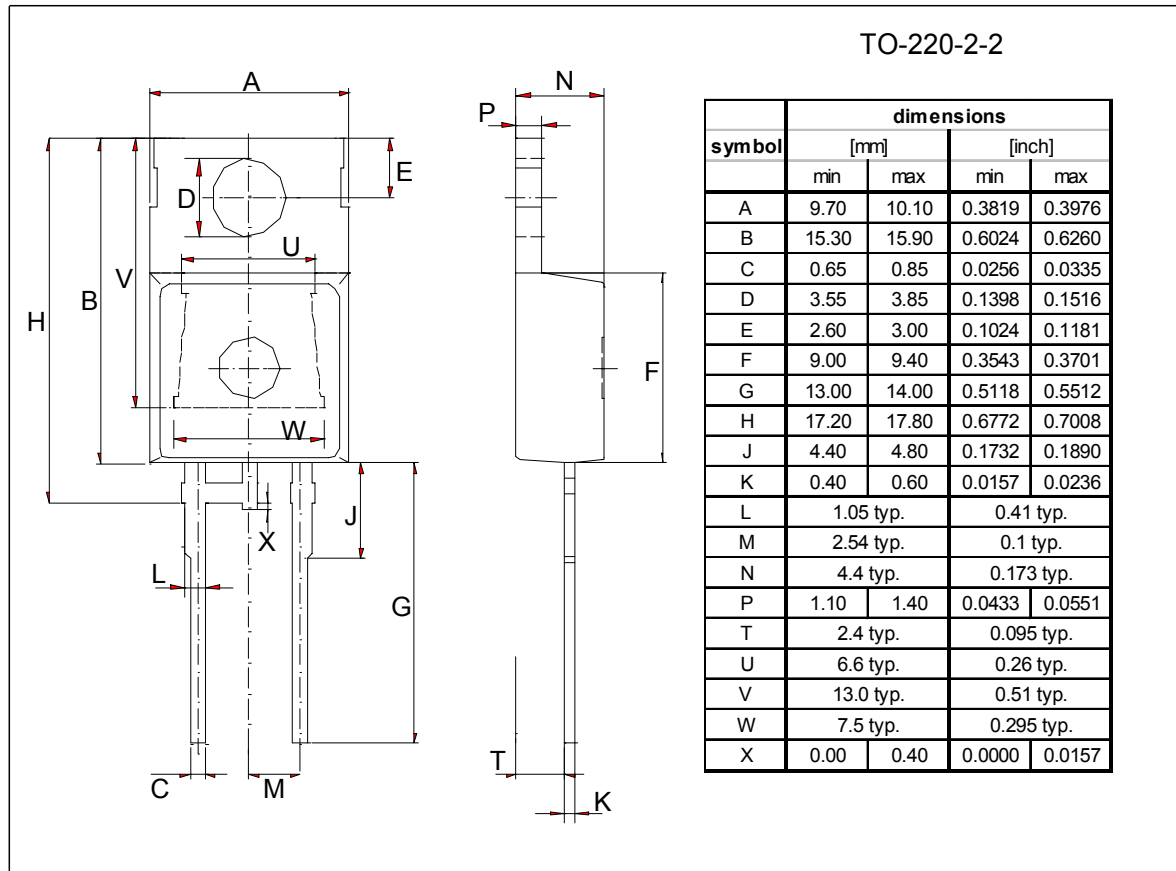


9 Typ. capacitive charge vs. current slope

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

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





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