

Silicon Carbide Schottky Diode

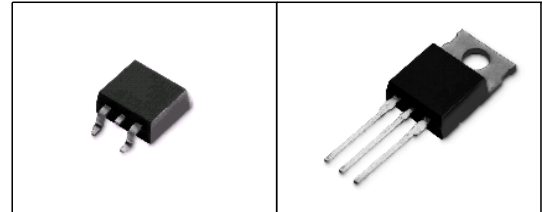
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery

Product Summary

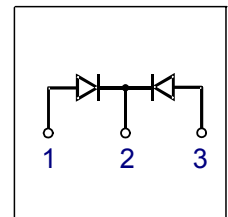
V_{RRM}	300	V
Q_C	23	nC
I_F	2x10	A

P-TO220-3.SMD

P-TO220-3-1.



Type	Package	Ordering Code	Marking
SDP20S30	P-TO220-3-1.	Q67040-S4419	D20S30
SDB20S30	P-TO220-3.SMD	Q67040-S4374	S20S30



Maximum Ratings, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified (per leg)

Parameter	Symbol	Value	Unit
Continuous forward current, $T_C=100^\circ\text{C}$	I_F	10	A
RMS forward current, $f=50\text{Hz}$	I_{FRMS}	14	
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}	45	
Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$	I_{FMAX}	100	
i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	$\int i^2 dt$	6.5	A^2s
Repetitive peak reverse voltage	V_{RRM}	300	V
Surge peak reverse voltage	V_{RSM}	300	
Power dissipation, single diode mode, $T_C=25^\circ\text{C}$	P_{tot}	65	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 (per leg)	R_{thJC}	-	-	2.3	K/W
SMD version, device on PCB:	R_{thJA}				
P-TO263-3-2: @ min. footprint		-	-	62	
P-TO263-3-2: @ 6 cm ² cooling area ¹⁾		-	35	-	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage	V_F				V
$I_F=10\text{A}, T_j=25^\circ\text{C}$		-	1.5	1.7	
$I_F=10\text{A}, T_j=150^\circ\text{C}$		-	1.5	1.9	
Reverse current	I_R				μA
$V_R=300\text{V}, T_j=25^\circ\text{C}$		-	15	200	
$V_R=300\text{V}, T_j=150^\circ\text{C}$		-	20	1000	

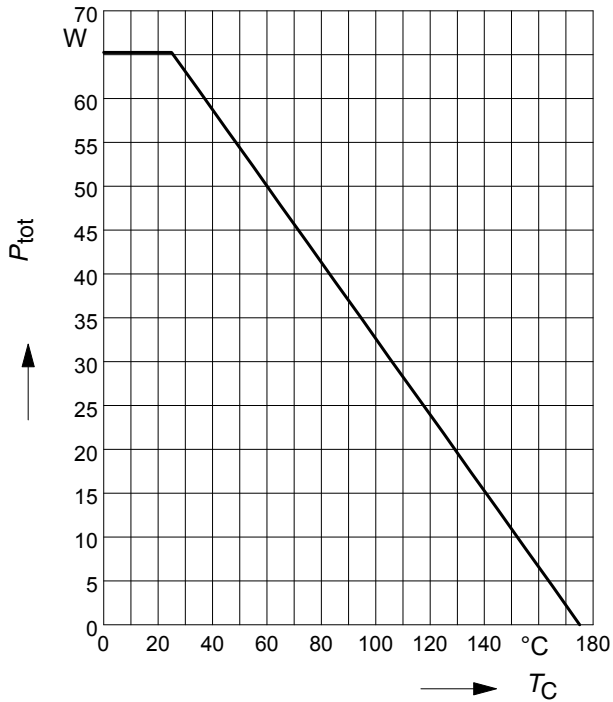
¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified (per leg)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge ¹⁾ $V_R=200\text{V}$, $I_F=10\text{A}$, $di_F/dt=-200\text{A}/\mu\text{s}$, $T_j=150\text{°C}$	Q_C	-	23	-	nC
Switching time ²⁾ $V_R=200\text{V}$, $I_F=10\text{A}$, $di_F/dt=-200\text{A}/\mu\text{s}$, $T_j=150\text{°C}$	t_{rr}	-	n.a.	-	ns
Total capacitance $V_R=0\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$ $V_R=150\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$ $V_R=300\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$	C	-	600 55 40	-	pF

1 Power dissipation (per leg)

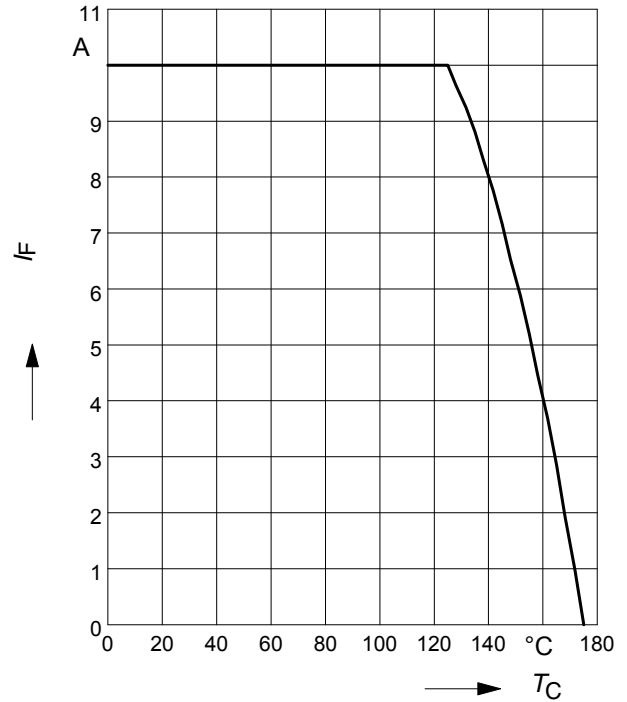
$P_{tot} = f(T_C)$



2 Diode forward current (per leg)

$I_F = f(T_C)$

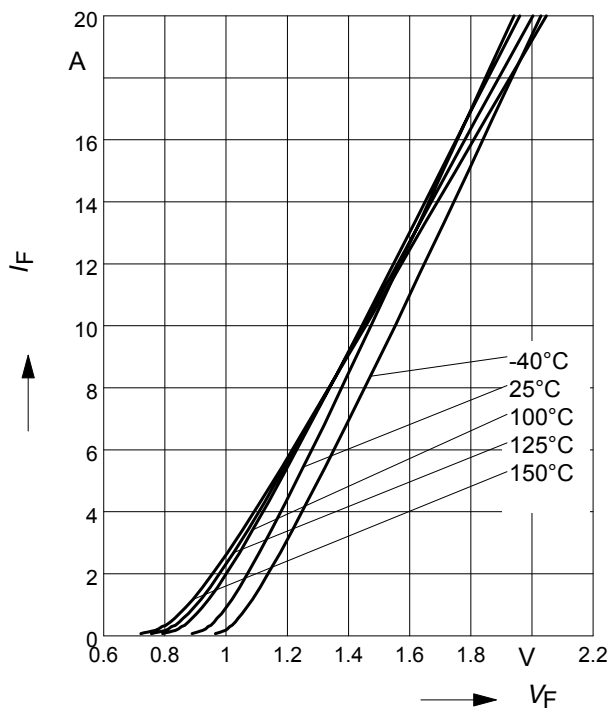
parameter: $T_j \leq 175^\circ\text{C}$



3 Typ. forward characteristic (per leg)

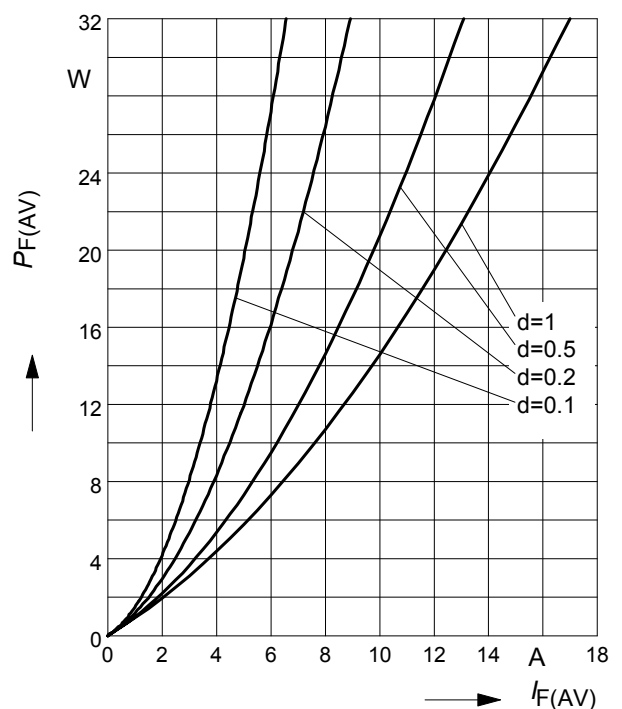
$I_F = f(V_F)$

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

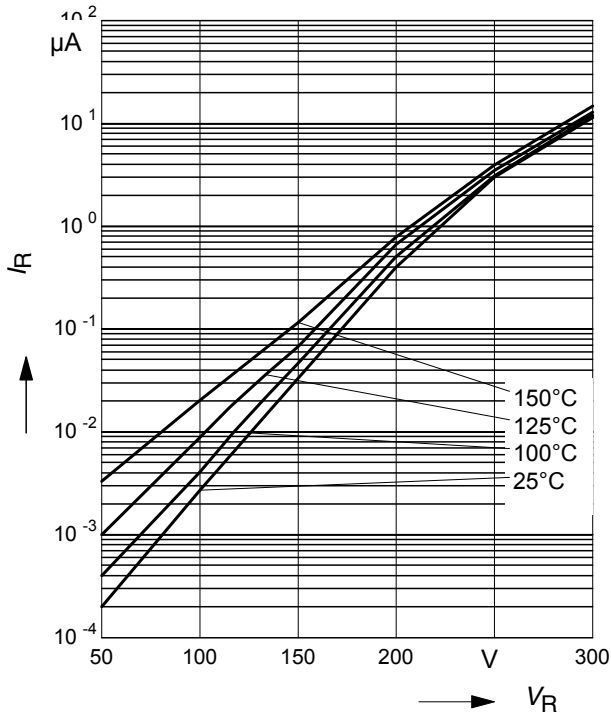


4 Typ. forward power dissipation vs. average forward current (per leg)

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



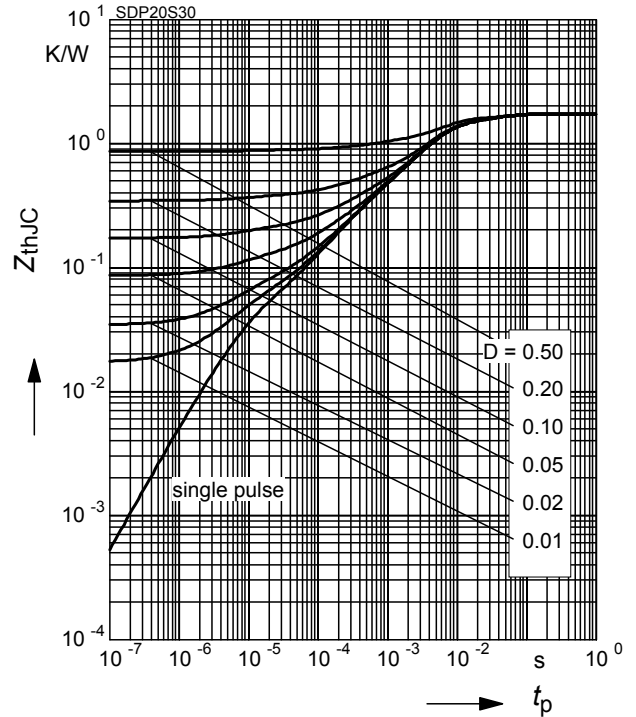
5 Typ. reverse current vs. reverse voltage
(per leg) $I_R = f(V_R)$



6 Transient thermal impedance (per leg)

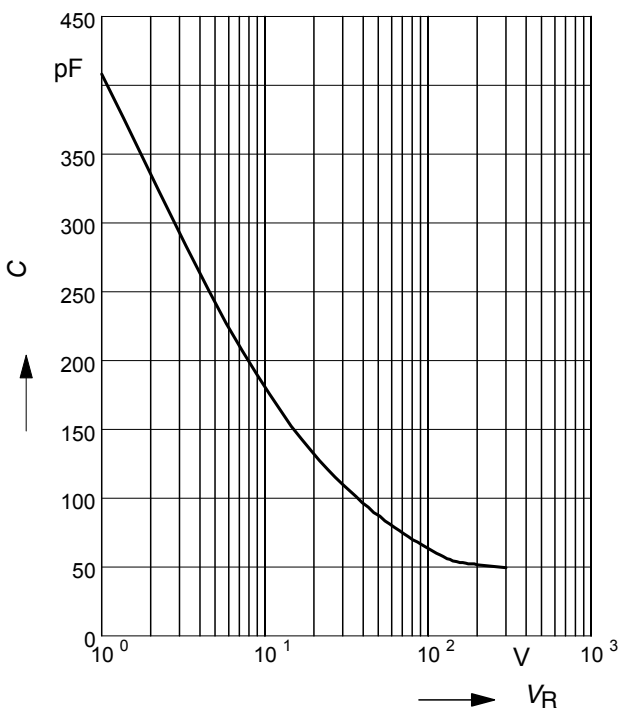
$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$



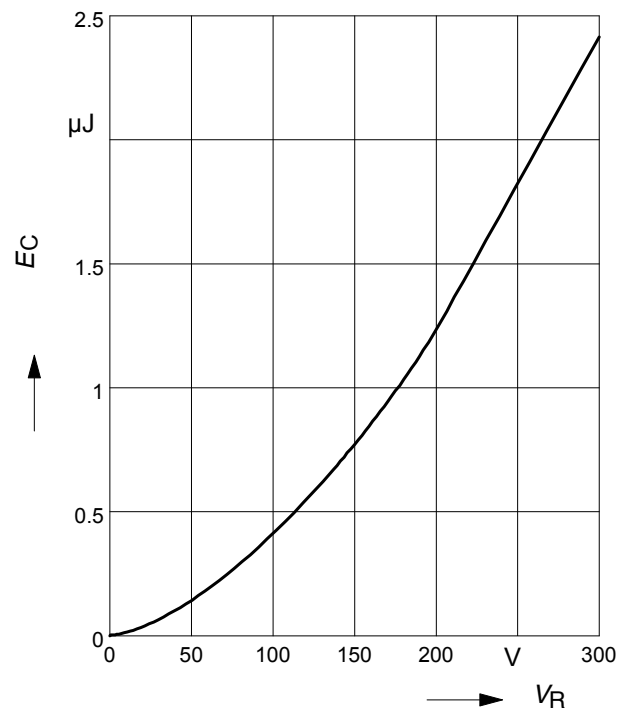
7 Typ. capacitance vs. reverse voltage
(per leg) $C = f(V_R)$

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



8 Typ. C stored energy (per leg)

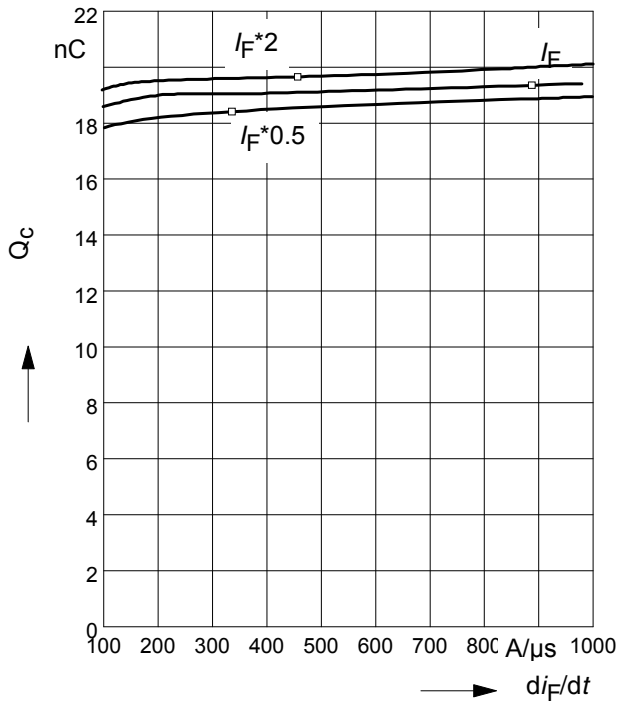
$E_C = f(V_R)$

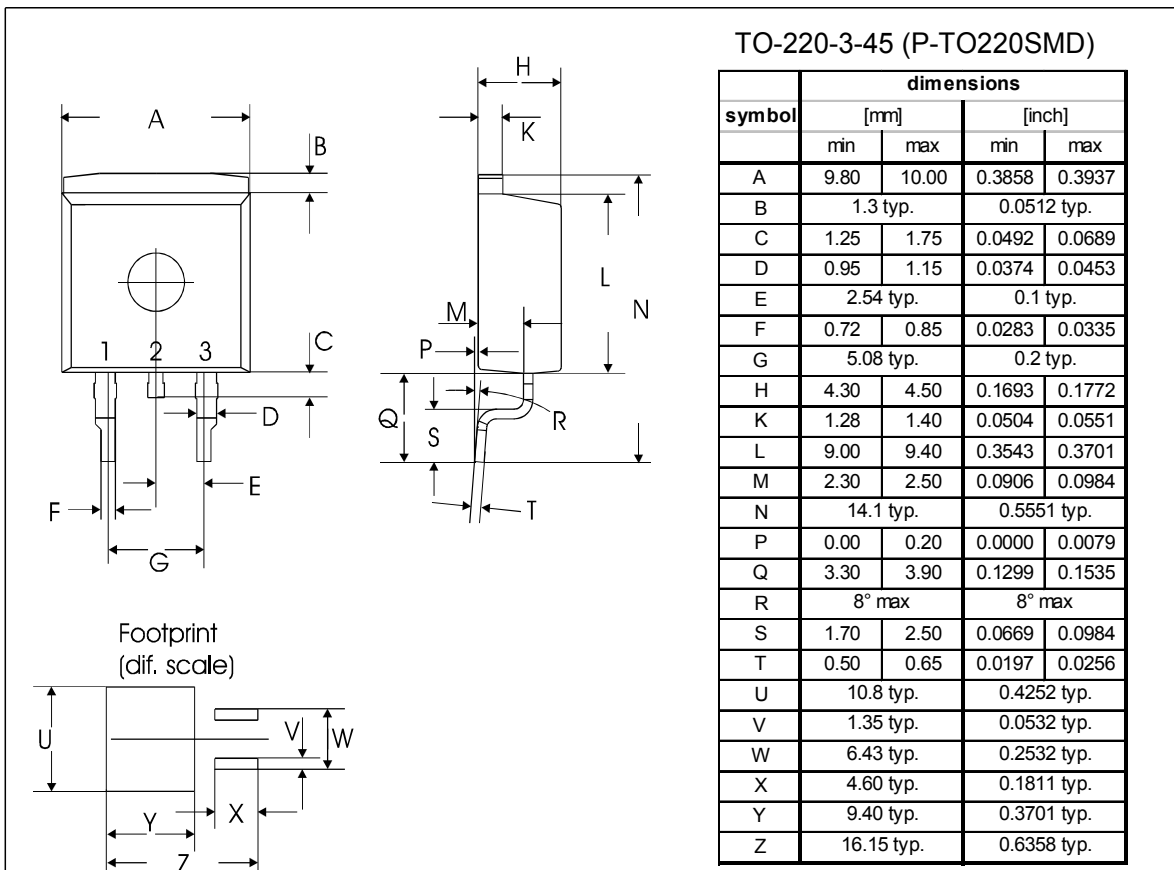
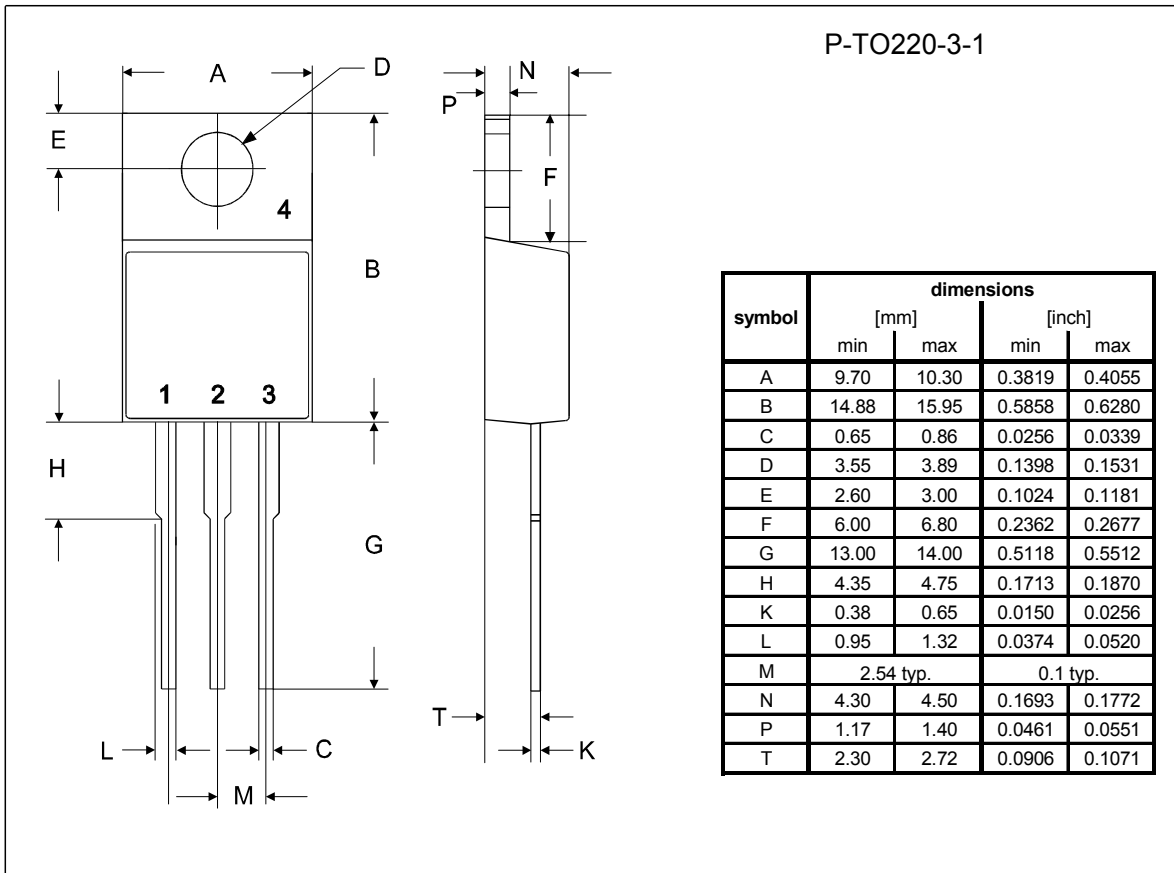


9 Typ. capacitive charge vs. current slope

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

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





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