

SiC Diode

V_R	650 V
I_F	20 A
Q_C	54 nC

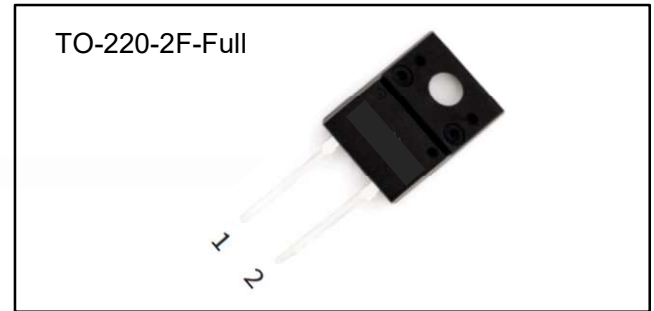
Features

- Low Forward Voltage Drop
- High-Speed Switching
- Positive Temperature Coefficient on V_F
- Temperature-Independent Switching Behavior

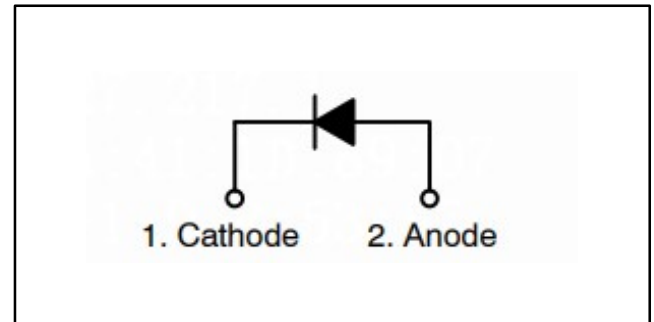
Applications

- Power Factor Correction
- Sever Mode Power Supplies
- Uninterruptible Power Supply

● **Outline**



● **Inner Circuit**



Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Value		Unit	Note
			Min	Typ		
V_{RRM}	Repetitive Peak Reverse Voltage		-	650	V	
V_{DC}	DC Blocking Voltage	$I_R=1\text{mA}$, $T_J=25^\circ\text{C}$	650	921	V	Fig.3
I_F	Continuous Forward Current	$T_J=25^\circ\text{C}$	-	24	A	Fig.4
		$T_J=70^\circ\text{C}$	-	20	A	
		$T_J=125^\circ\text{C}$	-	14	A	
I_{FRM}	Repetitive Peak Forward Surge Current	$T_J=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave (After test: $V_F \geq 0.5\text{V}@I_F=1\text{mA}$; $V_R \geq 500\text{V}@I_R=1\text{mA}$; $I_R \leq 5\text{mA}@V_R=650\text{V}$)	128	160	A	
		$T_J=125^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave (After test: $V_F \geq 0.5\text{V}@I_F=1\text{mA}$; $V_R \geq 500\text{V}@I_R=1\text{mA}$; $I_R \leq 5\text{mA}@V_R=650\text{V}$)	112	140	A	
I_{FSM}	Non-repetitive Peak Forward Surge Current	$T_J=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave (After test: $V_F \geq 0.5\text{V}@I_F=1\text{mA}$; $V_R \geq 500\text{V}@I_R=1\text{mA}$; $I_R \leq 5\text{mA}@V_R=650\text{V}$)	135	169	A	Fig.10
		$T_J=125^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave (After test: $V_F \geq 0.5\text{V}@I_F=1\text{mA}$; $V_R \geq 500\text{V}@I_R=1\text{mA}$; $I_R \leq 5\text{mA}@V_R=650\text{V}$)	126	157	A	
P_{tot}	Power Dissipation	$T_J=25^\circ\text{C}$	-	65	W	Fig.5
		$T_J=125^\circ\text{C}$	-	22	W	
T_{stg}	Storage Temperature		-	-55 to 175	$^\circ\text{C}$	

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Electrical Characteristics

Symbol	Parameter	Conditions	Value			Unit	Note
			Min	Typ	Max		
V_F	Forward Voltage	$I_F=20A, T_J=25^{\circ}C$	-	1.35	1.5	V	Fig.1
		$I_F=20A, T_J=125^{\circ}C$	-	1.58	-	V	
		$I_F=20A, T_J=175^{\circ}C$	-	1.77	-	V	
I_R	Reverse Current	$V_R=650V, T_J=25^{\circ}C$	-	0.33	5	μA	Fig.2
		$V_R=650V, T_J=125^{\circ}C$	-	1.52	-	μA	
		$V_R=650V, T_J=175^{\circ}C$	-	8.30	-	μA	
Q_c	Total Capacitive Charge	$V_R=400V, T_J=25^{\circ}C$	-	54	-	nC	Fig.7
C	Total Capacitance	$f=1\text{ MHz}, V_R=0V, T_J=25^{\circ}C$	-	1026	-	pF	Fig.6
		$f=1\text{ MHz}, V_R=200V, T_J=25^{\circ}C$	-	103	-	pF	
		$f=1\text{ MHz}, V_R=400V, T_J=25^{\circ}C$	-	97	-	pF	
E_c	Capacitance Stored Energy	$V_R=400V$	-	8.6	-	μJ	Fig.8

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Note
$R_{th(j-c)}$	Thermal Resistance , Junction to Case	-	2.3	-	$^{\circ}C/W$	Fig.9

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Electrical Characteristic Curves

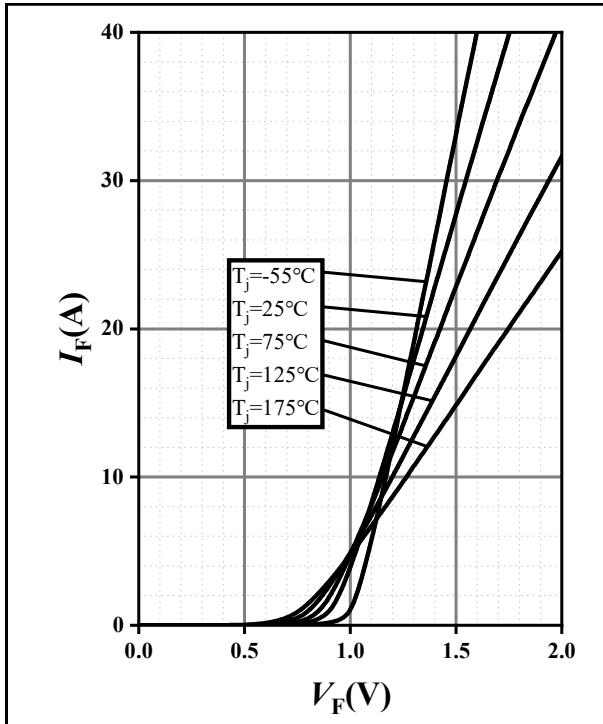


Fig.1 Forward Characteristics

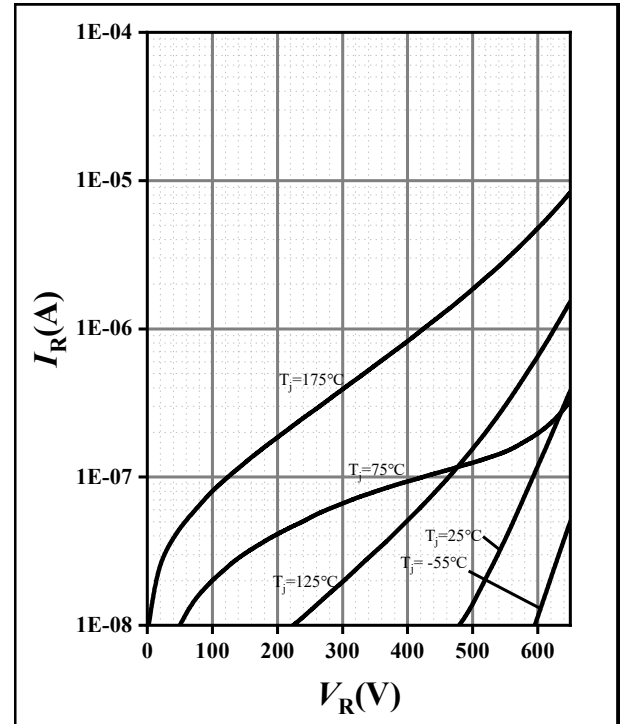


Fig.2 Reverse Characteristics

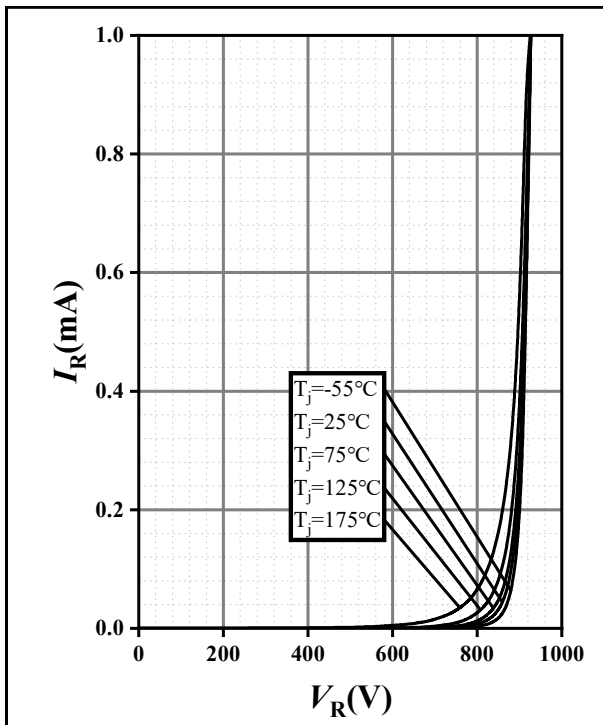


Fig.3 Reverse Characteristics

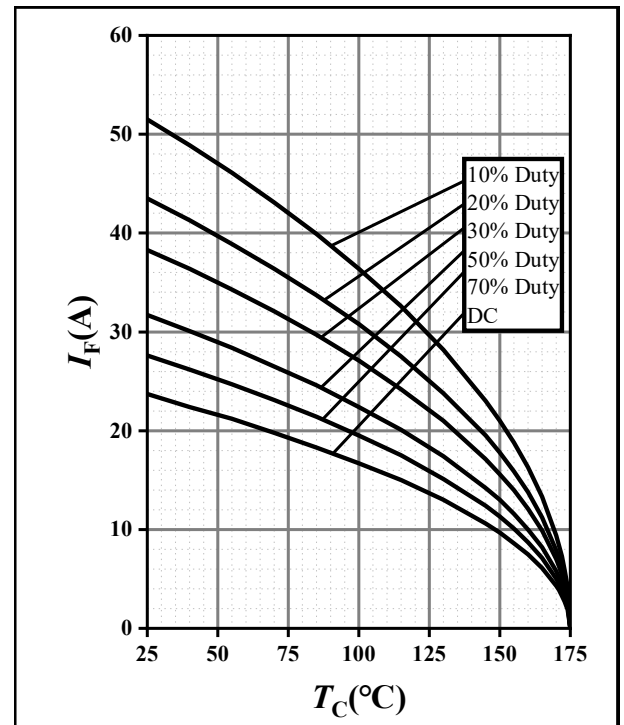


Fig.4 Peak Forward Current Derating

Electrical Characteristic Curves

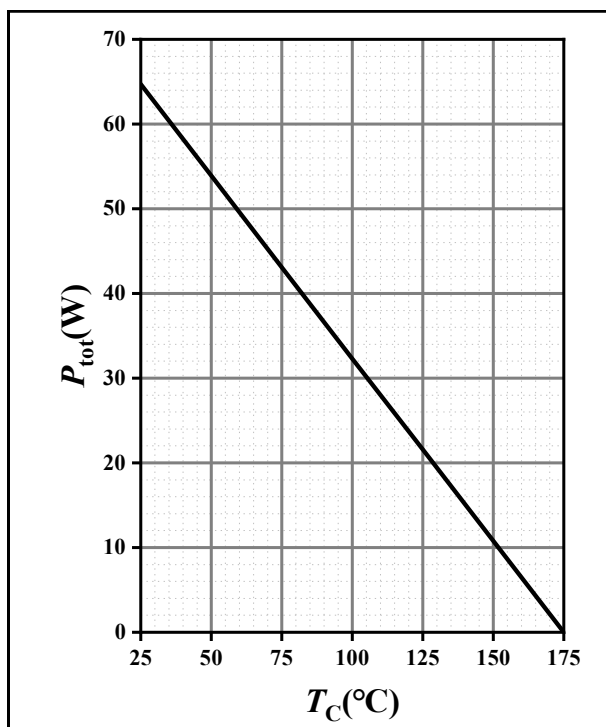


Fig.5 Power Dissipation

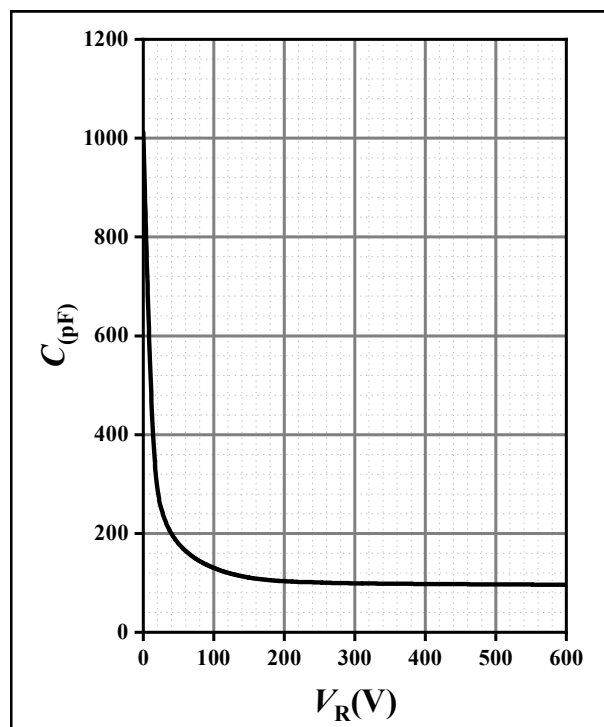


Fig.6 Capacitance vs. Reverse Voltage

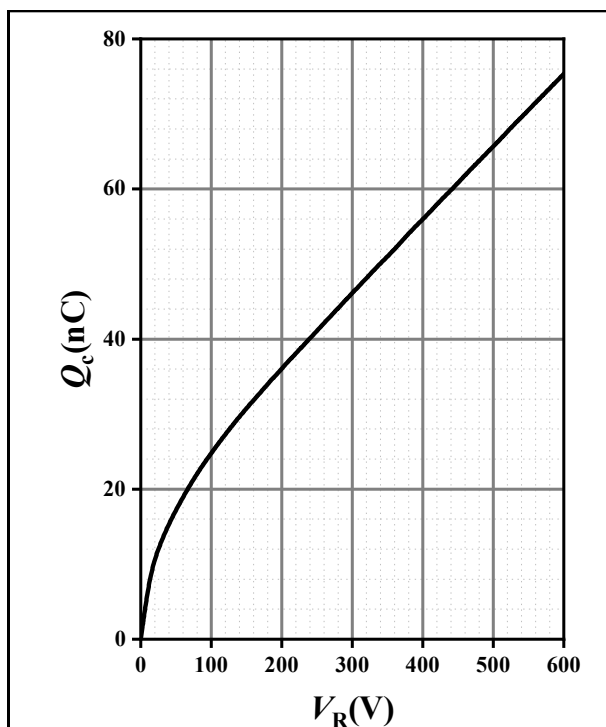


Fig.7 Capacitance Charge vs. Reverse Voltage

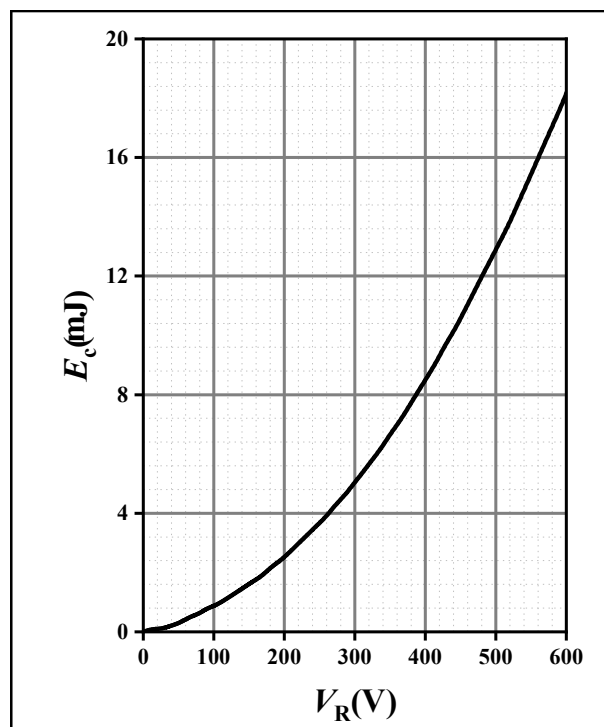


Fig.8 Capacitance Stored Energy vs. Reverse Voltage

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Electrical Characteristic Curves

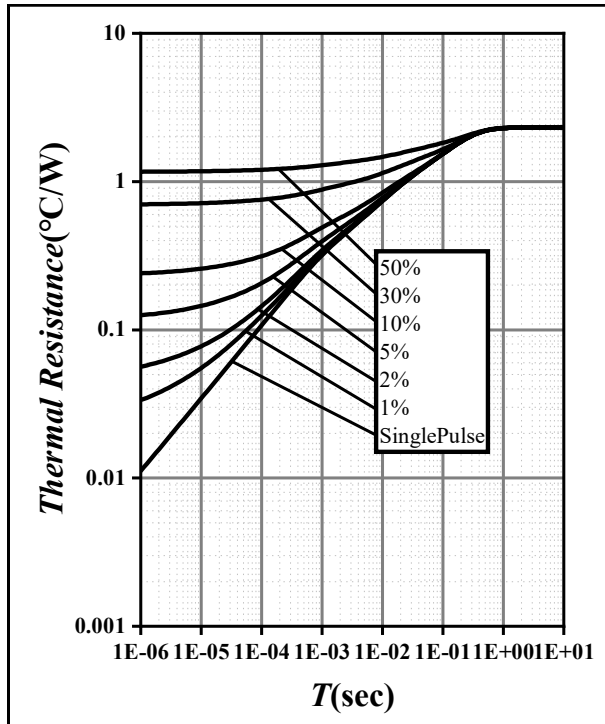


Fig.9 Transient Thermal Impedance

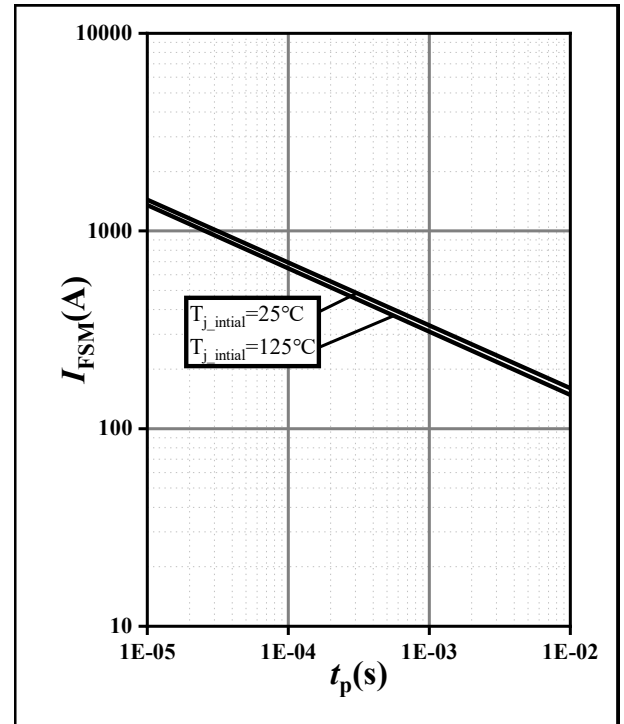
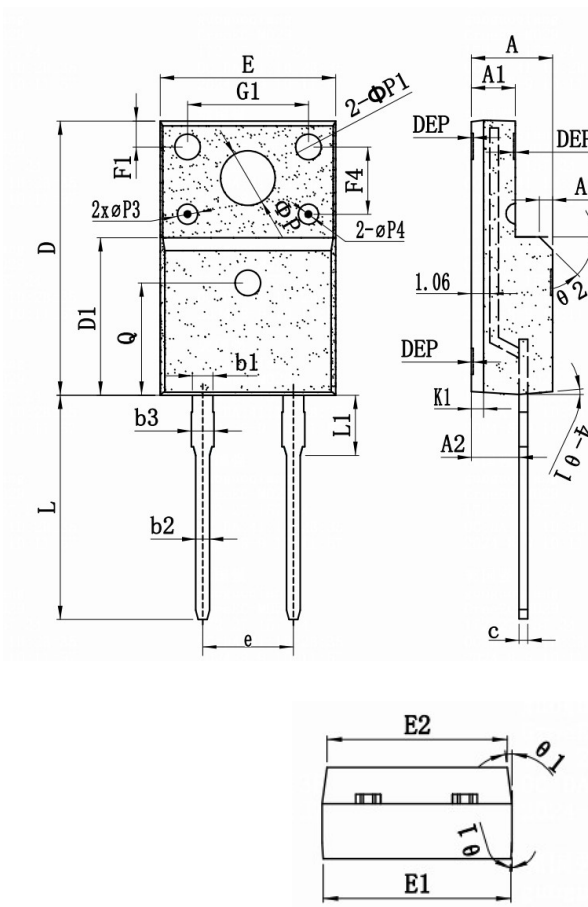


Fig.10 Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

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Package Outline



SYMBOL	mm		
	MIN	NOM	MAX
*A	4.50	4.70	4.90
*A1	2.34	2.54	2.74
*A2	2.66	2.76	2.86
A3	1.0REF		
b1	1.18	1.20	1.24
*b2	0.75	0.80	0.85
*b3	1.22	1.30	1.38
*C	0.45	0.50	0.55
*D	15.67	15.87	16.07
D1	9.04	9.12	9.20
*e	5.03	5.08	5.13
*E	10.00	10.16	10.30
E1	9.94	10.06	10.20
E2	9.40	9.50	9.60
F1	1.40	1.50	1.60
F2	13.80	13.90	14.00
*F3	3.20	3.30	3.40
F4	3.70	3.90	4.10
G1	6.90	7.00	7.10
K1	0.65	0.70	0.75
*L	12.78	12.98	13.18
*L1	3.40	3.50	3.60
Q	6.50REF		
*ΦP	3.08	3.18	3.28
ΦP1	1.45	1.55	1.65
ΦP2	3.30	3.40	3.50
ΦP3	0.95	1.15	1.35
ΦP4	0.25	0.30	0.35
θ1	3°	5°	7°
θ2	42°	45°	48°
*DEP	0.05	0.10	0.15