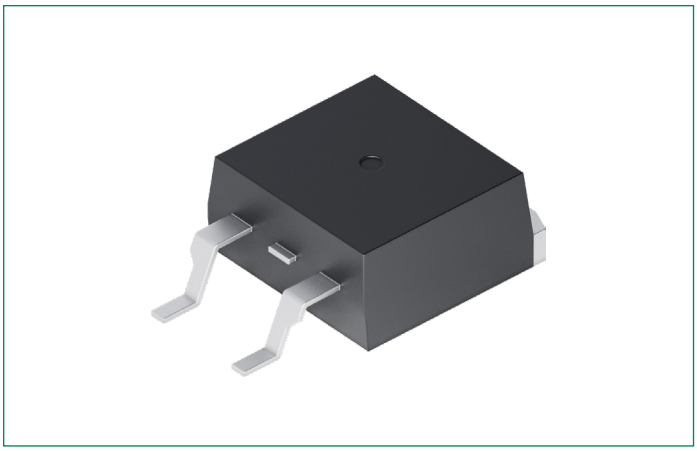
DCK20I1200PC

1200 V, 20 A SiC Schottky Diode

RoHS HF



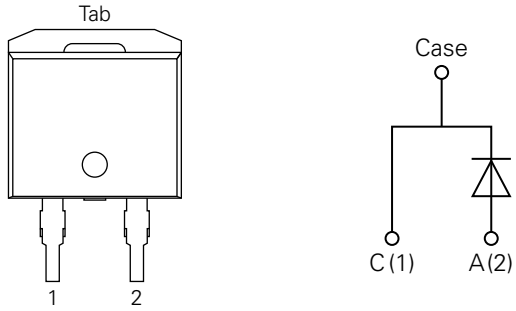
Features

- Maximum virtual junction temperature of 175 °C
- High surge current capacity
- Extremely fast reverse recovery time
- High-frequency operation
- Temperature independent switching behavior
- Positive temperature coefficient on V_F

Applications

- EV charging
- Vienna 3-Phase PFC
- Solar power boost
- Switch mode power supplies

Pinout Diagram TO-263



1: Cathode; **2:** Anode; **Tab:** Case

Product Summary

Characteristic	Value	Unit
V_{RRM}	1200	V
I_F (T_c = 135.4 °C)	20	A
Q_c	94	nC

Revised: XZ 02/03/2025

Maximum Ratings (T_c = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	–		1200	V
V_{DC}	DC blocking voltage	–		1200	V
I_F	Continuous forward current	–	T_c = 25 °C	43	A
			T_c = 135 °C	20.3	
			T_c = 135.4 °C	20	
I_{FSM}	Non-repetitive surge forward current	Sine halfwave @ T_c = 25 °C, t_p = 10 ms		155	A
I_{FRM}	Repetitive peak forward current (Frequency = 0.1 Hz, 100 cycles)	Sine halfwave @ T_c = 25 °C, t_p = 10 ms		125	A
P_{tot}	Total power dissipation	–	T_c = 25 °C	166	W
			T_c = 150 °C	27.7	
I^2t	I^2t	T_c = 25 °C, t_p = 10 ms		120	A^2s
T_{vj}	Virtual junction temperature range	–		–55 to 175	°C
T_{stg}	Storage temperature range	–		–55 to 175	°C

Note: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Thermal Characteristics

Symbol	Characteristic	Value			Unit
		Min.	Typ.	Max.	
$R_{th(j-c)}$	Thermal resistance, junction to case Fig.7	–	0.9	–	K/W

Electrical Characteristics (T_{vj} = 25 °C unless otherwise specified)

Symbol	Characteristic	Conditions		Value			Unit
				Min.	Typ.	Max.	
V_F	Forward voltage Fig.1	I_F = 40A	T_{vj} = 25 °C	–	1.48	1.80	V
			T_{vj} = 175 °C	–	2.20	3.00	
I_R	Reverse current Fig.2	V_R = 1200 V	T_{vj} = 25 °C	–	8	150	µA
			T_{vj} = 175 °C	–	50	800	
C	Total capacitance Fig.3	V_R = 1 V, f = 1 MHz		–	1000	–	pF
		V_R = 400 V, f = 1 MHz		–	89	–	
		V_R = 800 V, f = 1 MHz		–	66	–	
Q_c	Total capacitive charge Fig.4	V_R = 800 V, T_{vj} = 25 °C, $Q_c = \int_0^{VR} C(V)dV$		–	94	–	nC
E_c	Capacitance stored energy Fig.5	V_R = 800 V, T_{vj} = 25 °C, $E_c = \int_0^{VR} C(V) \cdot VdV$		–	27	–	µJ

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Characteristic Curves

Fig. 1. Typical Forward Characteristics

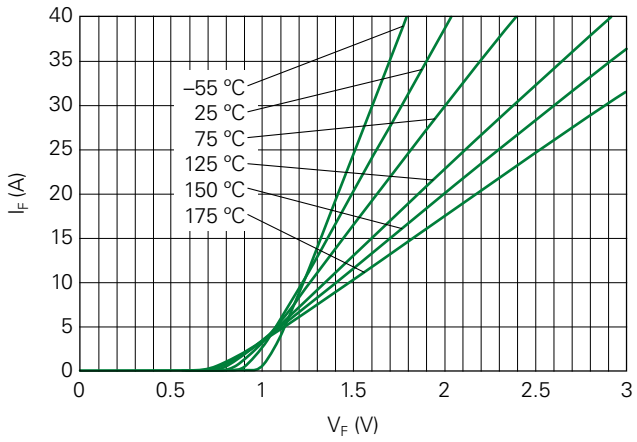


Fig. 2. Typical Reverse Characteristics

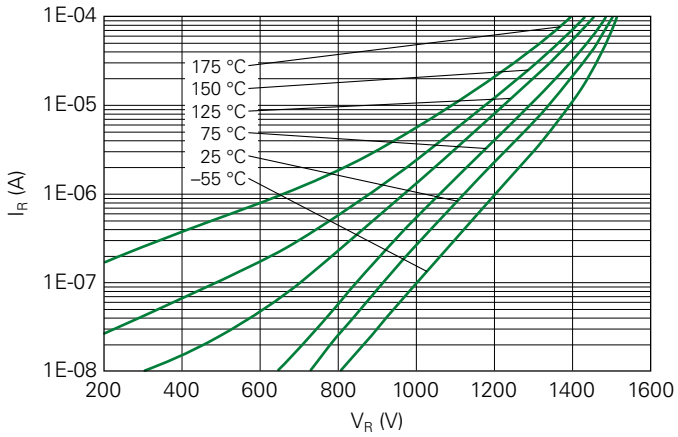


Fig. 3. Capacitance vs. Reverse Voltage

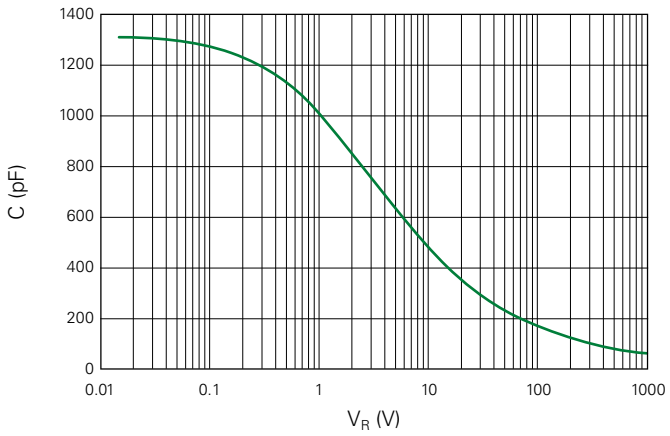


Fig. 4. Total Capacitive Charge vs. Reverse Voltage

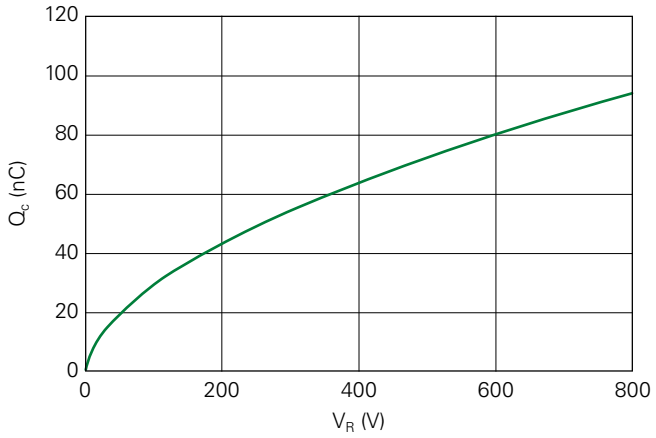


Fig. 5. Capacitance Stored Energy

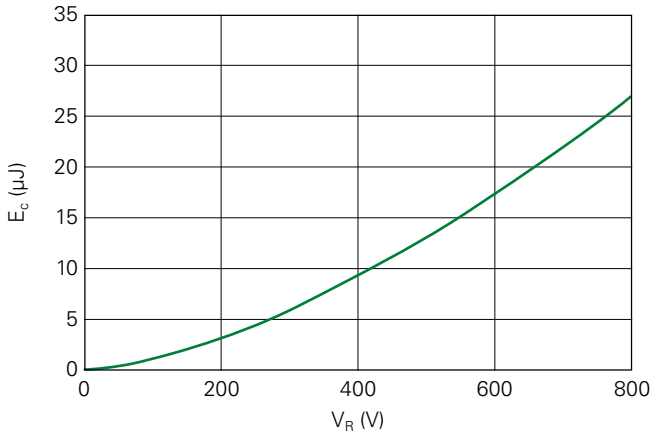


Fig. 6. Power Derating

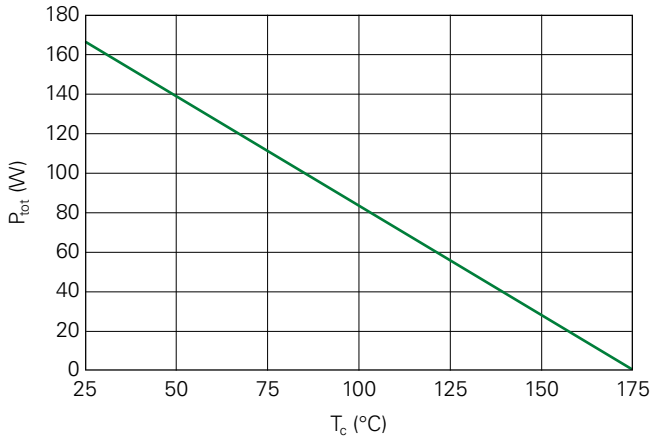


Fig. 7. Transient Thermal Impedance

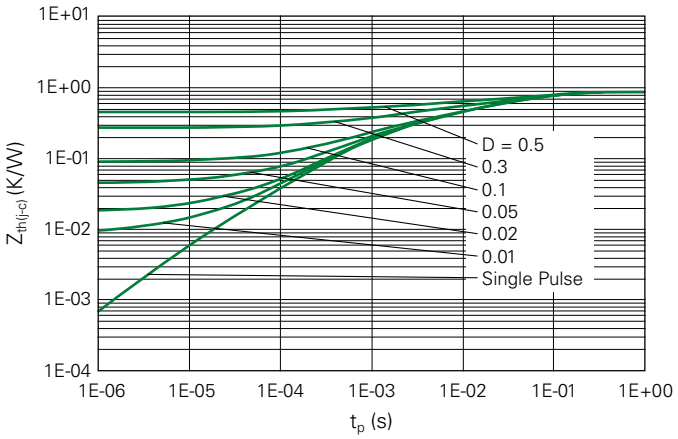
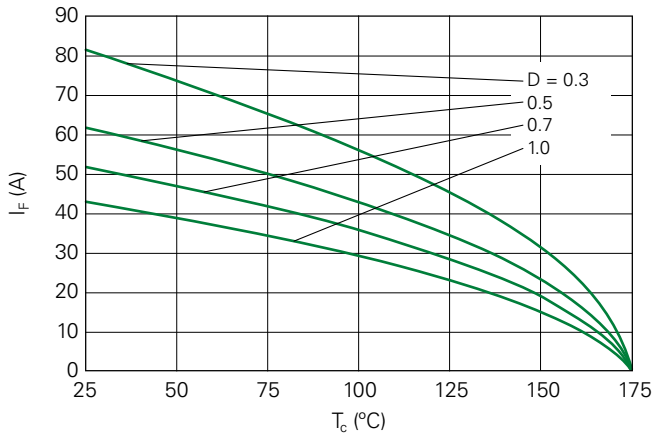
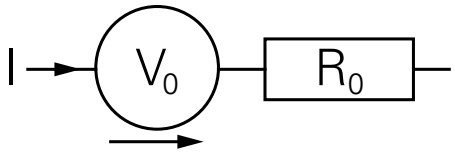


Fig. 8. Forward Current vs. Case Temperature



Diode V_F Model for Simulation



$V_F(T_{vj}) = V_0 + IR_0$

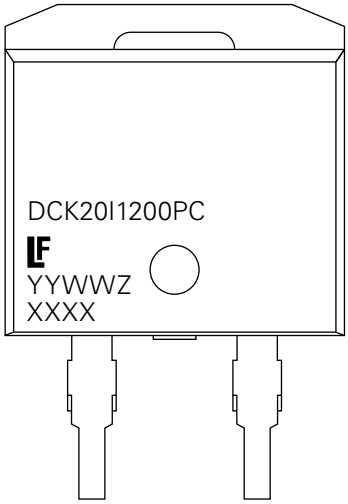
$V_0 = -4 \times 10^{-7} \cdot T_{vj}^2 - 0.0012 \cdot T_{vj} + 0.9763$

$R_0 = 8 \times 10^{-7} \cdot T_{vj}^2 + 0.0001 \cdot T_{vj} + 0.0235$

Notes

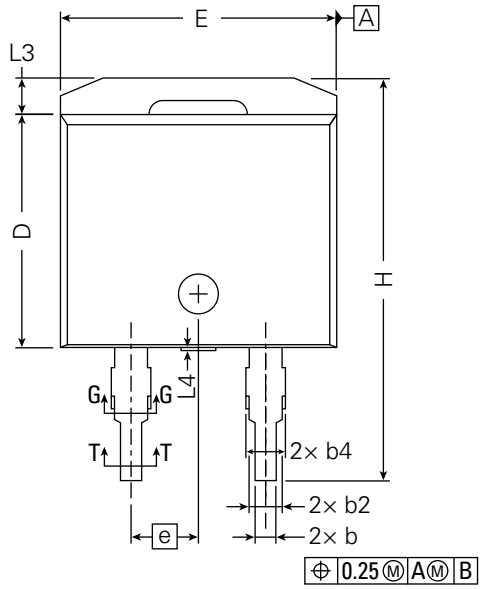
- T_{vj} is the virtual junction temperature in °C
- Range valid from 25 °C to 175 °C
- Model represents performance of a typical chart

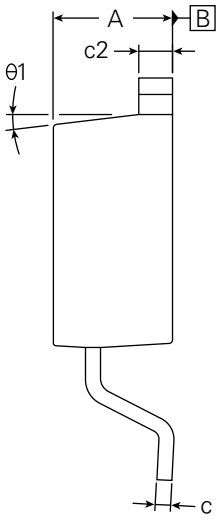
Part Number and Marking

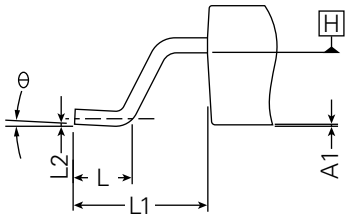


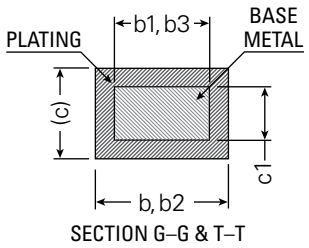
DCK20I1200PC = Part Material Number
YY = Year
WW = Work Week
Z = Assembly Location
XXXX = Lot Traceability

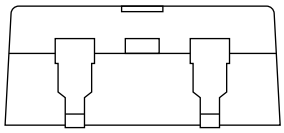
Part Outline Drawing

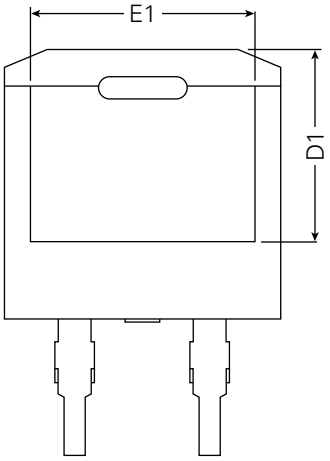












1. Dimensioning & Tolerancing Confirm to ASME Y14.5M-1994.
2. Radius on terminal is optional.
3. Subject to change without notice.

Symbol	Inches			Millimeters		
	Min.	Typical	Max.	Min.	Typical	Max
A	0.172	–	0.180	4.36	–	4.56
A1	0	–	0.001	0.00	–	0.25
b	0.028	–	0.035	0.70	–	0.90
b1	0.020	–	0.035	0.51	–	0.89
b2	0.047	–	0.057	1.20	–	1.46
b3	0.046	–	0.054	1.17	–	1.37
b4	0.047	–	0.062	1.20	–	1.57
c	0.015	–	0.027	0.38	–	0.69
c1	0.015	–	0.021	0.38	–	0.53
c2	0.047	–	0.053	1.19	–	1.34
D	0.339	–	0.354	8.60	–	9.00
D1	0.272	–	0.295	6.90	–	7.50
E	0.400	–	0.415	10.15	–	10.55
E1	0.319	–	0.343	8.10	–	8.70
e	0.100 BSC			2.54 BSC		
H	0.591	–	0.614	15.00	–	15.60
L	0.075	–	0.098	1.90	–	2.50
L1	0.188	–	0.208	4.78	–	5.28
L2	0.010 TYP			0.25 TYP		
L3	0.041	–	0.065	1.05	–	1.65
L4	0	–	0.020	0	–	0.50
θ	0°	–	10°	0°	–	10°
θ1	0°	–	15°	0°	–	15°

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