Aug. 2024

SemiHow
Know-How for Semiconductor

HPA65D20R
SiC Schottky Diode

Features
- Low reverse current
- Good surge current capability
- Low capacitive charge
- No reverse recovery current
- Halogen free, RoHs compliant

Benefits
- System efficiency improvement over Si diodes
- Higher switching frequency
- Increased power density
- Essentially no switching losses

Applications
- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Motor drives
- UPS

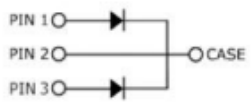
Key Parameters

Parameter	Value	Unit
V_{RRM}	650	V
$I_{F,}(T_C$=160℃)	20	A
$V_{F,}(T_J$=25℃)	1.3	V

Package & Internal Circuit

TO-247-3L





Pin1 - Anode
Pin2 - Cathode
Pin3 - Anode

Maximum Ratings (T_C=25˚C unless otherwise specified)

Symbol	Parameter	Test Condition	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	650	V
V_{RSM}	Non-repetitive Peak Reverse Voltage	T_J=25℃	650	V
I_F	Continuous Forward Current	T_C=25℃	38*/76**	A
		T_C=135℃	19*/38**	
		T_C=160℃	10*/20**	
I_{FRM}	Repetitive Forward Surge Current	T_C=25℃, t_p=10ms, Half Sine Wave	45*	A
		T_C=110℃, t_p=10ms, Half Sine Wave	27*	
I_{FSM}	Non-repetitive Peak Forward Surge Current	T_C=25℃, t_p=10ms, Half Sine Wave	80*	A
		T_C=110℃, t_p=10ms, Half Sine Wave	70*	
$\int i^2 dt$	i^2 t Value	T_C=25℃, t_p=10ms, Half Sine Wave	31.7*	A^2S
		T_C=110℃, t_p=10ms, Half Sine Wave	24.3*	
P_{TOT}	Power Dissipation	T_C=25℃	116*/232**	W
		T_J=110℃	50*/100**	
T_J	Operating Junction Temperature		-55 to 175	℃
T_{stg}	Storage Temperature		-55 to 175	℃

(*Per leg, **Per Device)

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Thermal Characteristics

Symbol	Parameter	Test Condition	Value(Typ.)	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case		1.29/0.65**	℃/W

(*Per leg, **Per Device)

Electrical Characteristics (Tj=25˚C unless otherwise specified)

Static Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{DC}	DC Blocking Voltage	T_J=25℃	650	-	-	V
V_F	Diode Forward Voltage	I_F=20A, T_J=25℃	-	1.3*	1.5*	V
		I_F=20A, T_J=175℃	-	1.5*	-	
I_R	Reverse Current	V_R=650V, T_J=25℃	-	-	50*	μA
		V_R=650V, T_J=175℃	-	-	200*	

AC Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Q_C	Total Capacitive Charge	V_R=400V, T_J=25℃ $Qc = \int_0^{VR} C(V)dV$	-	27*	-	nC
C	Total Capacitance	V_R=0V, T_J=25℃, f=1MHz	-	561*	-	pF
		V_R=200V, T_J=25℃, f=1MHz	-	55*	-	
		V_R=400V, T_J=25℃, f=1MHz	-	43*	-	

(*Per leg, **Per Device)

Typical Characteristics

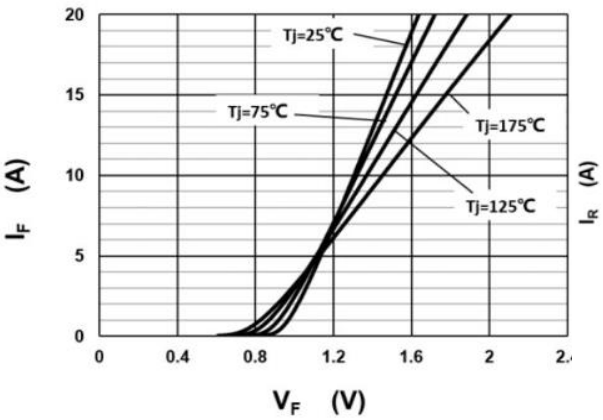


Figure 1. Typical Forward Characteristics

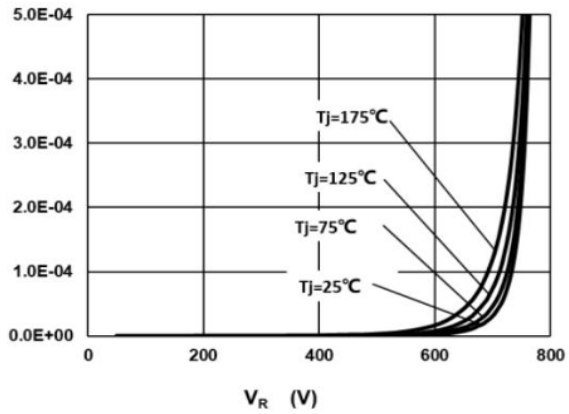


Figure 2. Typical Reverse Current as Function of Reverse voltage

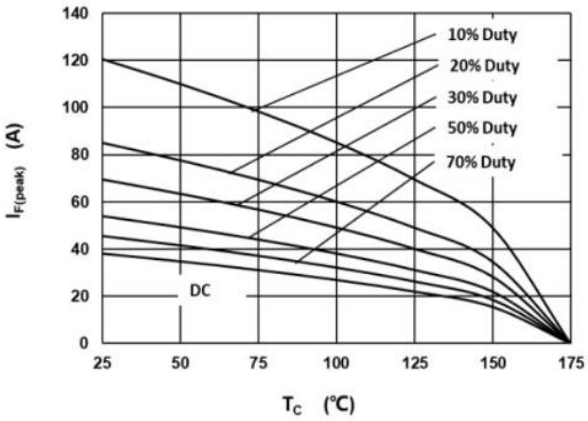


Figure 3. Diode Forward Current as Function of Temperature, Duty=duty cycle

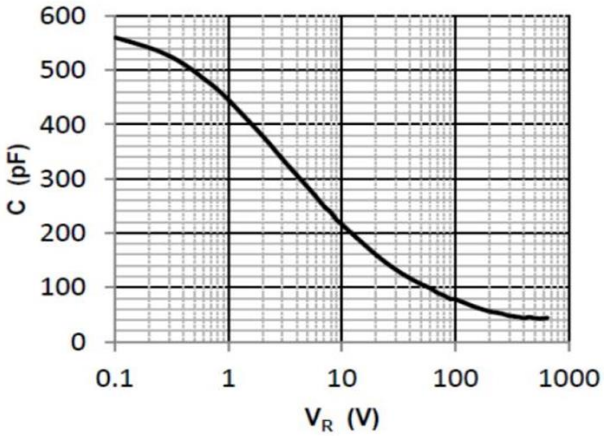


Figure 4. Typical Capacitance as Function of Reverse Voltage, C=f(V_R); T_J=25℃

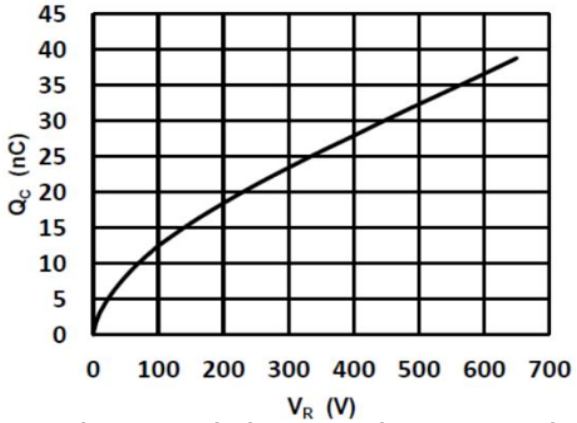


Figure 5. Typical Reverse Charge as Function of Reverse Voltage

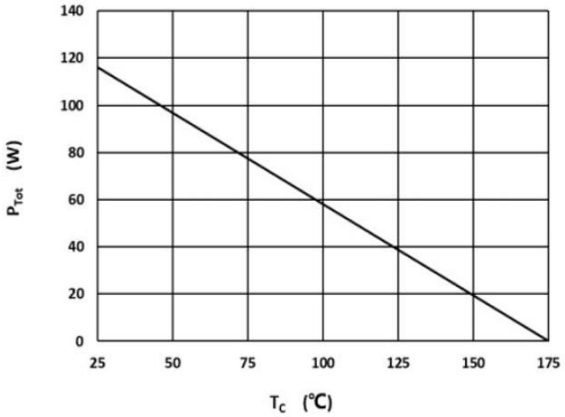


Figure 6. Power Dissipation as Function of Case Temperature

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Typical Characteristics

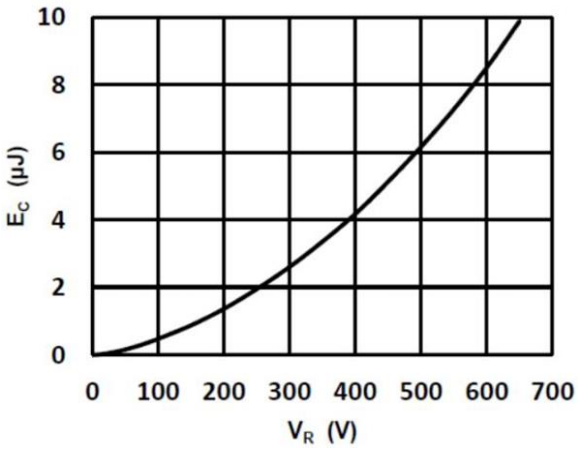


Figure 7. Capacitance Stored Energy

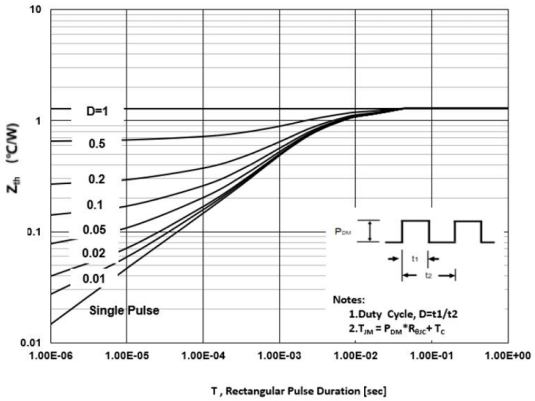
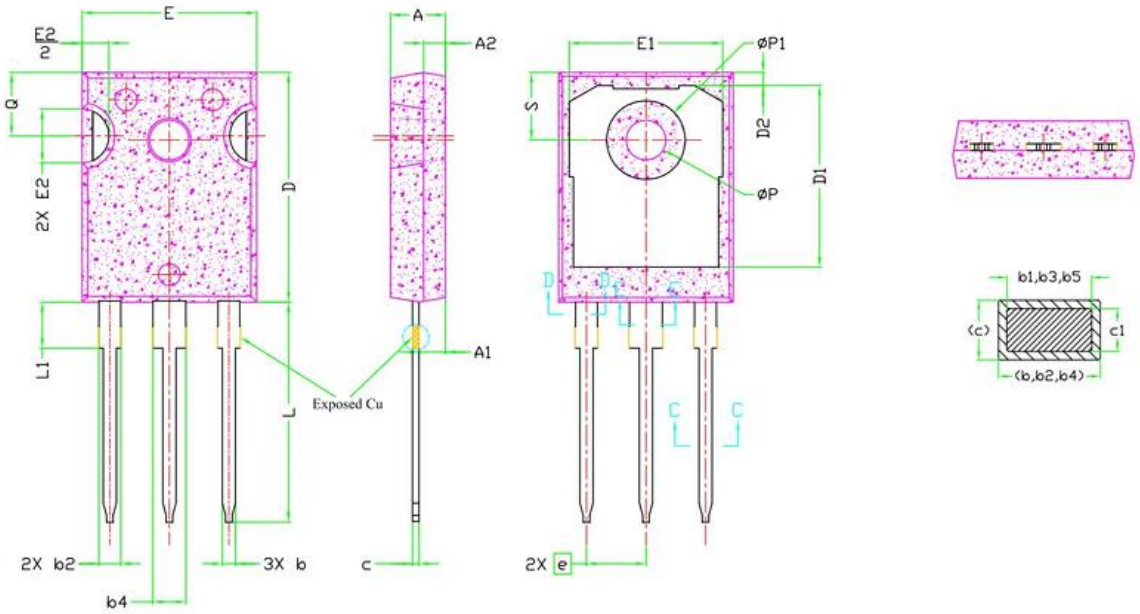


Figure 8. Max. Transient Thermal Impedance

TO-247-3L Package Dimension



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.50	2.00	2.49	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
b4	2.87	3.00	3.22	6, 8
b5	2.87	3.00	3.18	
c	0.55	0.60	0.69	6
c1	0.55	0.60	0.65	
D	20.80	20.95	21.10	4
D1	16.25	16.55	17.65	5
D2	0.51	1.19	1.35	
E	15.75	15.94	16.13	4
E1	13.46	14.02	14.16	5
E2	4.32	4.91	5.49	3
e	5.44BSC			
L	19.81	20.07	20.32	
L1	4.10	4.19	4.40	6
ØP	3.56	3.61	3.65	7
ØP1	7.19REF.			
Q	5.39	5.79	6.20	
S	6.04	6.17	6.30	

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