650-V Direct WBG Diode

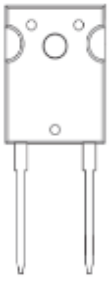
Key Features:
- SiC performance
- Easy paralleling
- High current carrying capability
- Very low junction capacitance
- Highly stable V_F and Q_{RR} at elevated temperatures

Typical Applications:
- Soft switching topologies
- Secondary side rectification

PRODUCT SUMMARY		
V_{BR} (V)	V_F (V)	$I_{F(AV)}$ (A)
650	1.8	20

Pb-free
RoHS COMPLIANT
HALOGEN FREE

TO-247-2L



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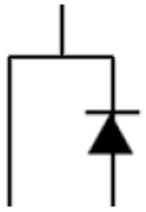
Case



C A

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Cathode-Anode Voltage		V_{BR}	650	V
Diode Forward Current [a]	T_C=25°C	$I_{F(AV)}$	20	A
Single Pulse Forward Current [b]	T_C=25°C	I_{FSM}	90	A
Joule Integral		i^2t	40	$A^2 \cdot s$
Power Dissipation [a]	T_C=25°C	P_D	104	W
Storage Temperature Range		T_{stg}	-55 to 175	°C
Operating Junction Temperature		T_J	-40 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [c]	$R_{\theta JA}$	40	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	1.45	

Notes
a. Package Limited
b. Pulse width limited by maximum junction temperature
c. Surface Mounted on 1” x 1” FR4 Board.

Electrical Characteristics

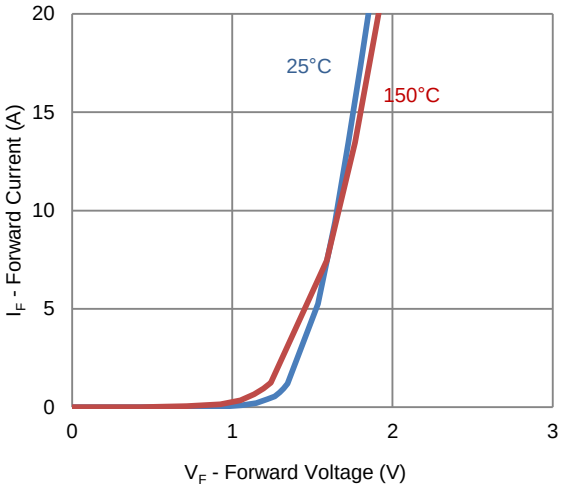
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Forward Voltage [a]	V_F	I_F = 20 A		1.8		V
		I_F = 20 A, T_J = 150°C		1.88		
Repetitive Peak Reverse Voltage	V_{RRM}	T_J = -40°C to 150°C	650			V
Junction Capacitance	C_J	V_R = 200 V, V_{sine} = 0.6 V_{eff}, f = 100 kHz		12		pF
Reverse Leakage Current	I_R	V_R = 650 V			10	uA
		V_R = 650 V, T_J = 150°C			60	uA
Dynamic [b]						
Reverse Recovery Time	T_{rr}	I_F = 20 A, dI/dt = 100 A/us, T_J = 25°C		84		ns
Reverse Recovery Charge	Q_{rr}			213		nC
Peak Recovery Current	I_{RRM}			4.3		A
Reverse Recovery Time	T_{rr}	I_F = 20 A, dI/dt = 100 A/us, T_J = 150°C		82		ns
Reverse Recovery Charge	Q_{rr}			197		nC
Peak Recovery Current	I_{RRM}			3.9		A
Reverse Recovery Time	T_{rr}	I_F = 20 A, dI/dt = 500 A/us, T_J = 25°C		47		ns
Reverse Recovery Charge	Q_{rr}			482		nC
Peak Recovery Current	I_{RRM}			17.9		A
Reverse Recovery Time	T_{rr}	I_F = 20 A, dI/dt = 500 A/us, T_J = 150°C		45		ns
Reverse Recovery Charge	Q_{rr}			435		nC
Peak Recovery Current	I_{RRM}			15.9		A

Notes

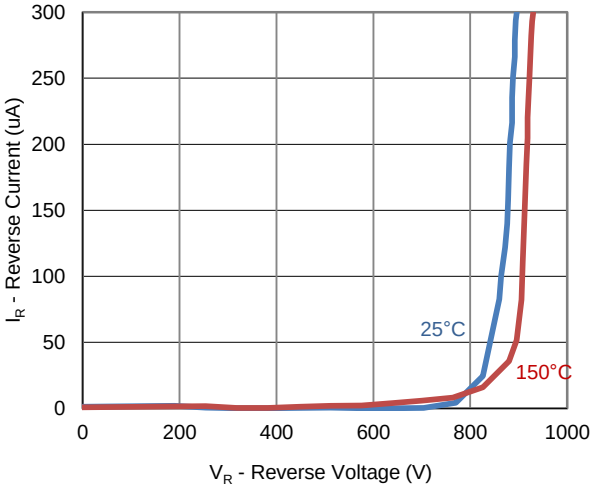
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

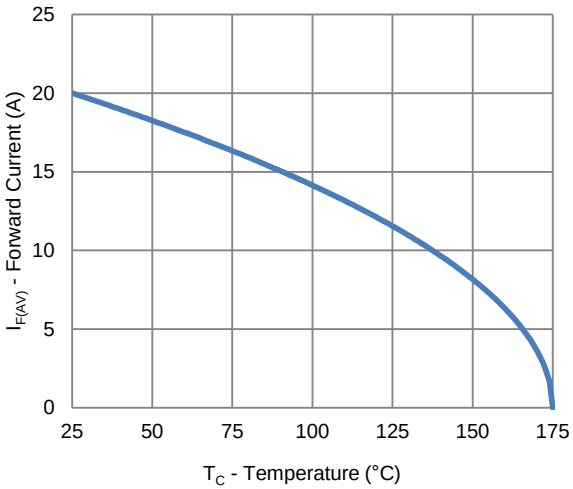
Typical Electrical Characteristics



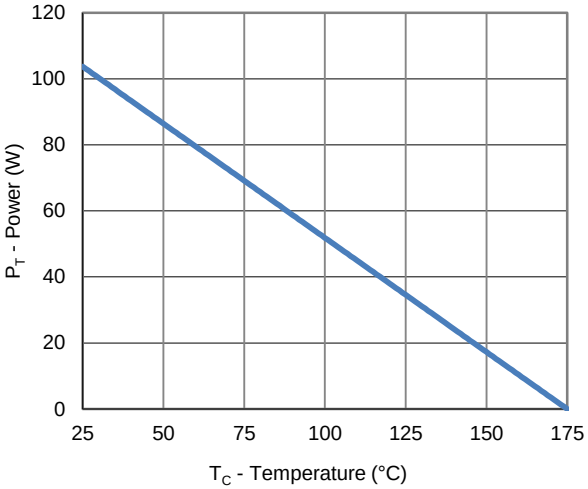
1. Forward Characteristics



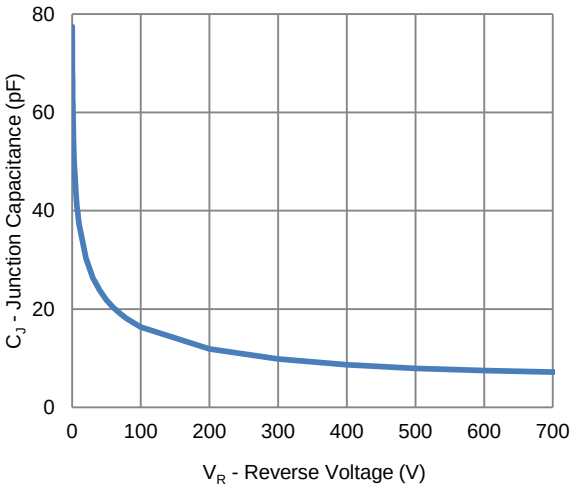
2. Reverse Characteristics



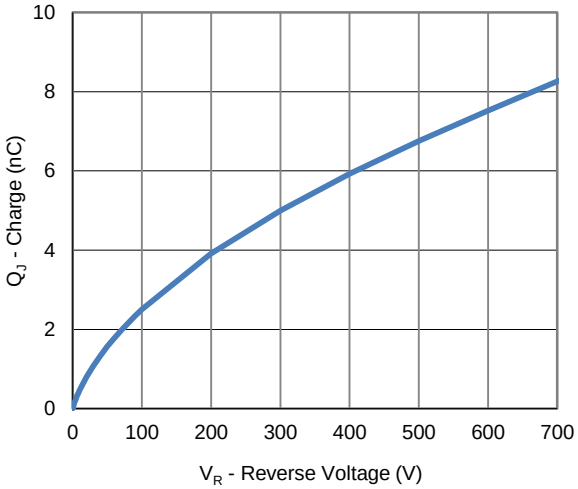
3. Current Derating



4. Power Derating

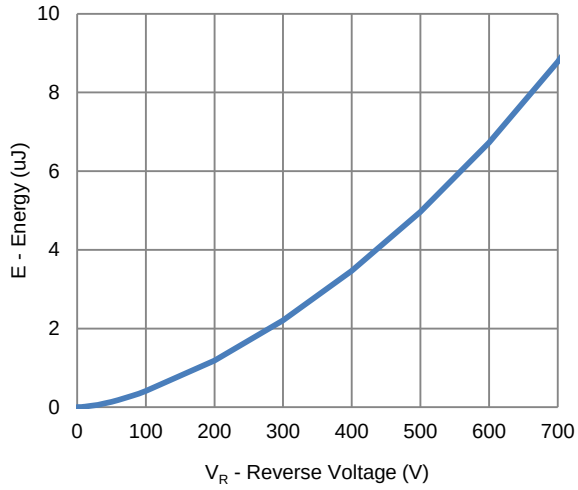


5. Junction Capacitance vs. Reverse Voltage

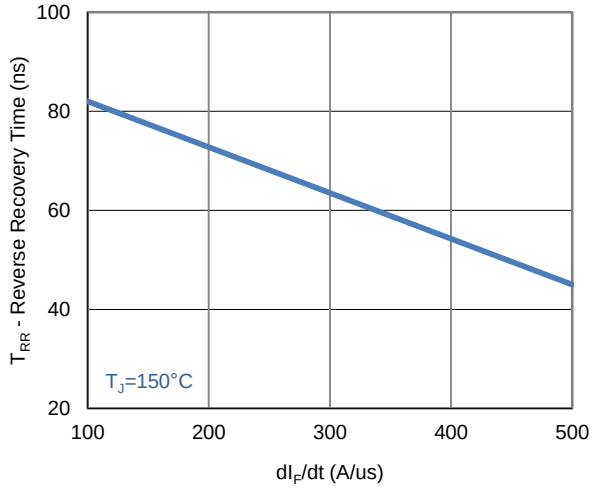


6. Total Capacitance Charge vs. Reverse Voltage

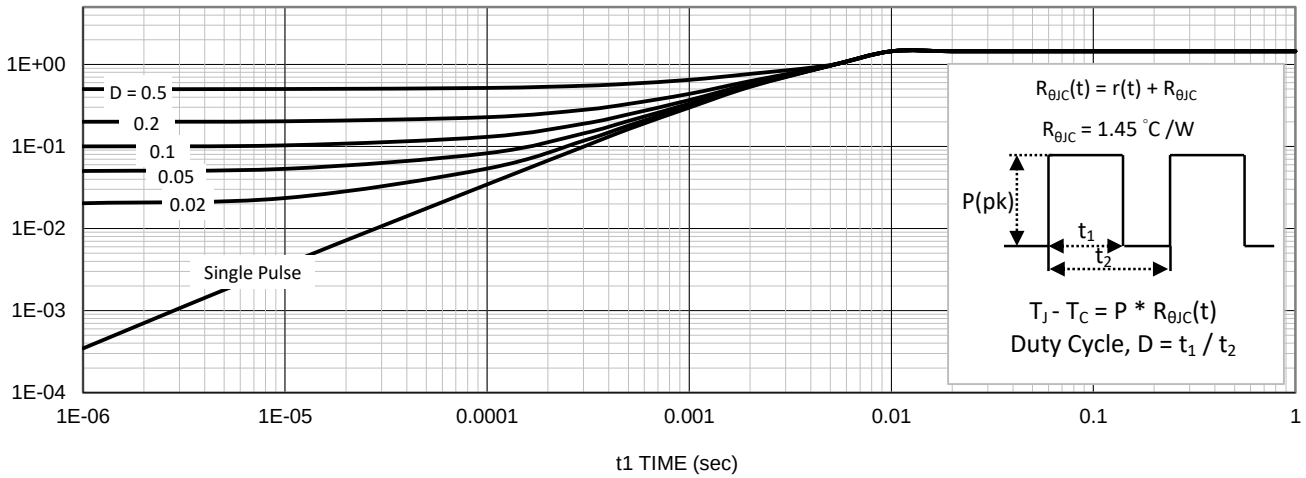
Typical Electrical Characteristics



7. Capacitance Stored Energy vs. Reverse Voltage

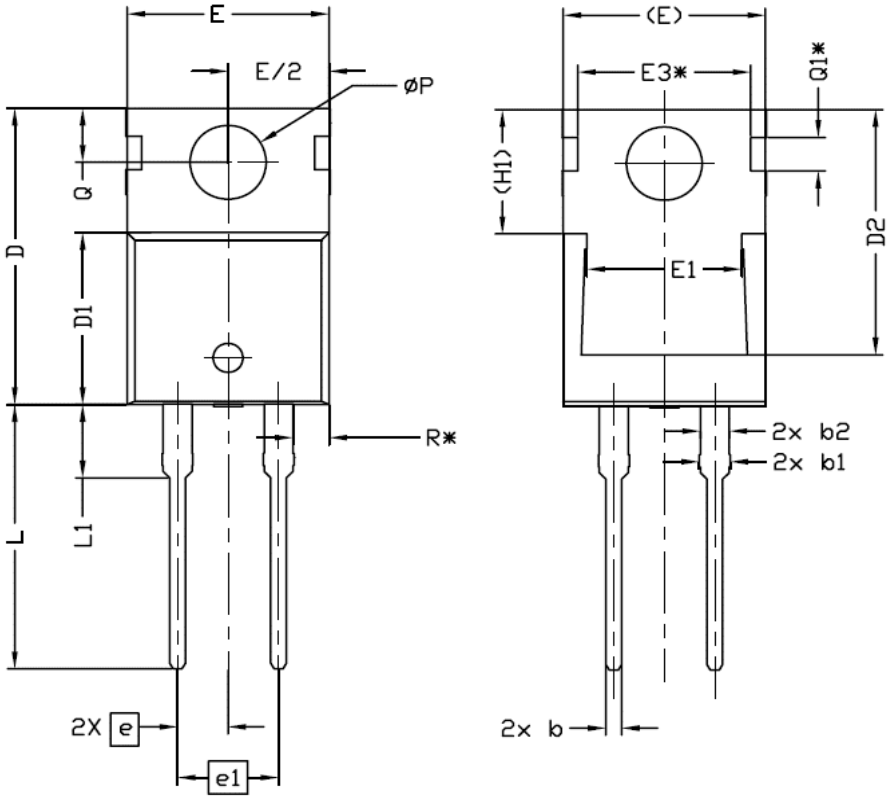


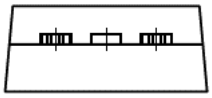
8. Reverse Recovery Time vs. dI_F/dt



9. Thermal Transient Junction to Ambient

Package Information





SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4.24	4.44	4.64
A1	1.15	1.27	1.40
A2	2.30	2.48	2.70
b	0.70	0.80	0.90
b1	1.20	1.55	1.75
b2	1.20	1.45	1.70
c	0.40	0.50	0.60
D	14.70	15.37	16.00
D1	8.82	8.92	9.02
D2	12.43	12.73	12.83
E	9.96	10.16	10.36
E1	6.86	7.77	8.89
E3*	8.70REF.		
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.45	6.60
L	13.47	13.72	13.97
L1	3.60	3.80	4.00
øP	3.75	3.84	3.93
Q	2.60	2.80	3.00
Q1*	1.73REF.		
R*	1.82REF.		