650-V Direct WBG Diode

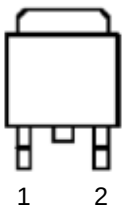
Key Features:
- SiC performance
- Easy paralleling
- High current carrying capability
- Very low junction capacitance
- Highly stable V_F and Q_{RR} at elevated temperatures

Typical Applications:
- Soft switching topologies
- Secondary side rectification

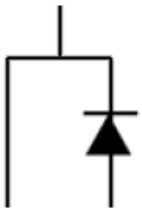
PRODUCT SUMMARY		
V_{BR} (V)	V_F (V)	$I_{F(AV)}$ (A)
650	1.8	10

Pb-free
RoHS COMPLIANT
HALOGEN FREE

TO-263



Case



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	$I_{F(AV)}$	10	A
Single Pulse Forward Current [b]	T_C=25°C	I_{FSM}	50	A
Joule Integral		i^2t	12	$A^2 \cdot s$
Power Dissipation [a]	T_C=25°C	P_D	37	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	$R_{\theta JC}$	3.7	

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

Electrical Characteristics

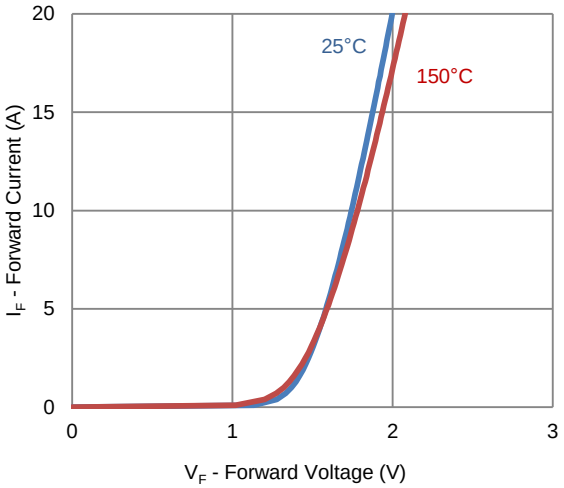
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Forward Voltage [a]	V_F	I_F = 10 A		1.8		V
		I_F = 10 A, T_J = 150°C		1.84		
Repetitive Peak Reverse Voltage	V_{RRM}	T_J = -40°C to 150°C	650			V
Junction Capacitance	C_J	V_R = 200 V, V_{sine} = 0.6 V_{eff}, f = 100 kHz		6.3		pF
Reverse Leakage Current	I_R	V_R = 650 V			2	uA
		V_R = 650 V, T_J = 150°C			10	uA
Dynamic [b]						
Reverse Recovery Time	T_{rr}	I_F = 10 A, dI/dt = 100 A/us, V_R = 400V, T_J = 25°C		76		ns
Reverse Recovery Charge	Q_{rr}			149		nC
Peak Recovery Current	I_{RRM}			3.3		A
Reverse Recovery Time	T_{rr}	I_F = 10 A, dI/dt = 100 A/us, V_R = 400V, T_J = 150°C		71		ns
Reverse Recovery Charge	Q_{rr}			121		nC
Peak Recovery Current	I_{RRM}			2.8		A
Reverse Recovery Time	T_{rr}	I_F = 10 A, dI/dt = 500 A/us, V_R = 400V, T_J = 25°C		30		ns
Reverse Recovery Charge	Q_{rr}			204		nC
Peak Recovery Current	I_{RRM}			11.2		A
Reverse Recovery Time	T_{rr}	I_F = 10 A, dI/dt = 500 A/us, V_R = 400V, T_J = 150°C		30		ns
Reverse Recovery Charge	Q_{rr}			183		nC
Peak Recovery Current	I_{RRM}			9.9		A

Notes

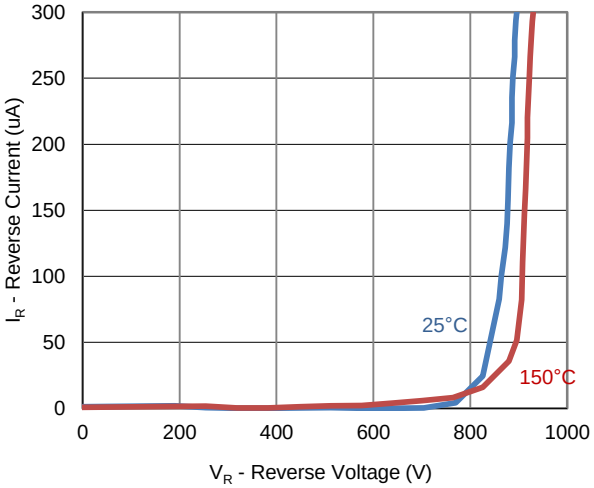
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

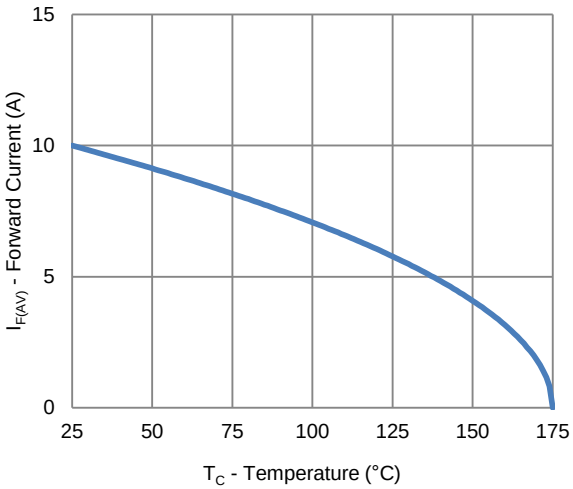
Typical Electrical Characteristics



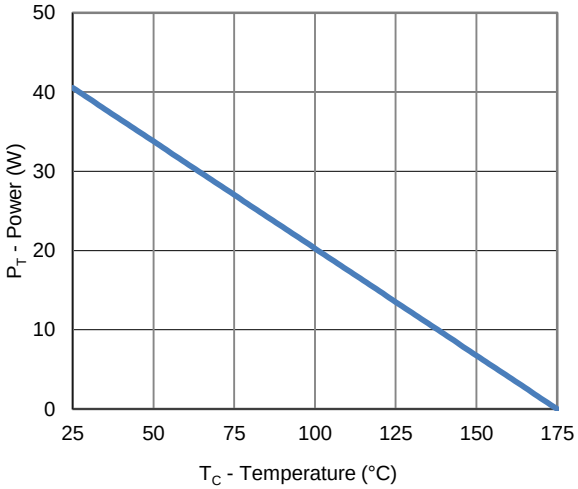
1. Forward Characteristics



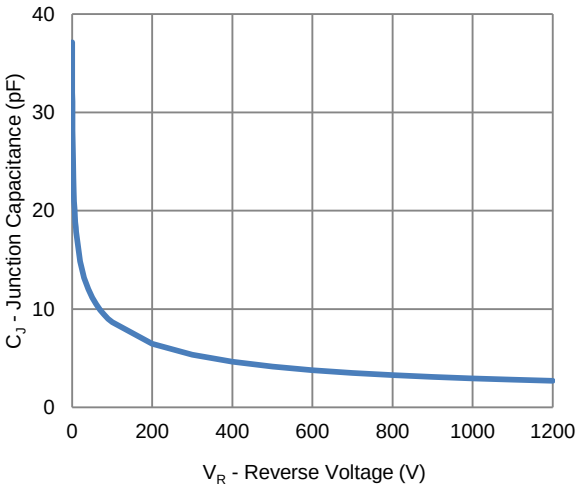
2. Reverse Characteristics



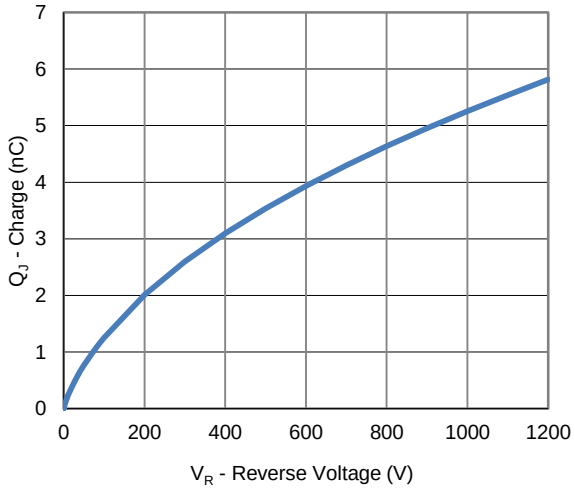
3. Current Derating



4. Power Derating

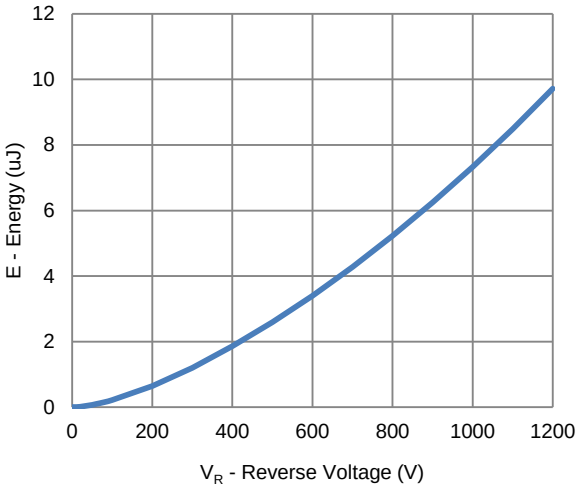


5. Junction Capacitance vs. Reverse Voltage

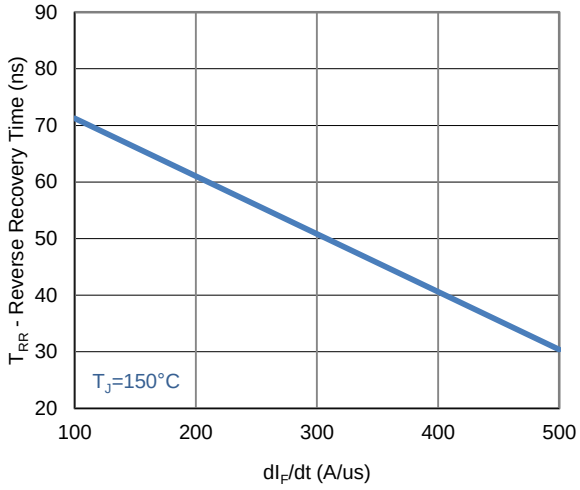


6. Total Capacitance Charge vs. Reverse Voltage

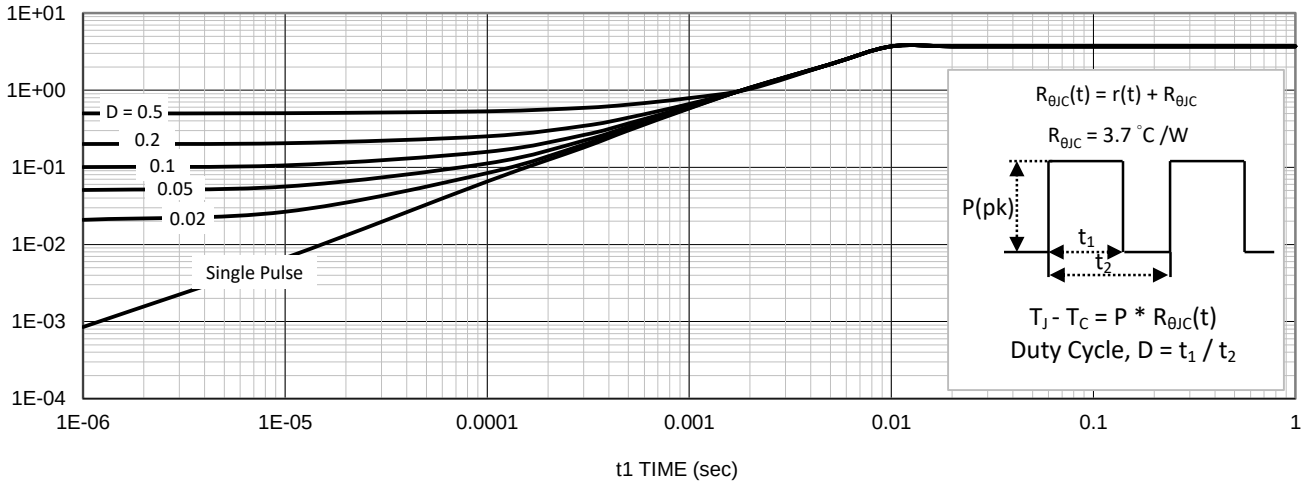
Typical Electrical Characteristics



7. Capacitance Stored Energy vs. Reverse Voltage

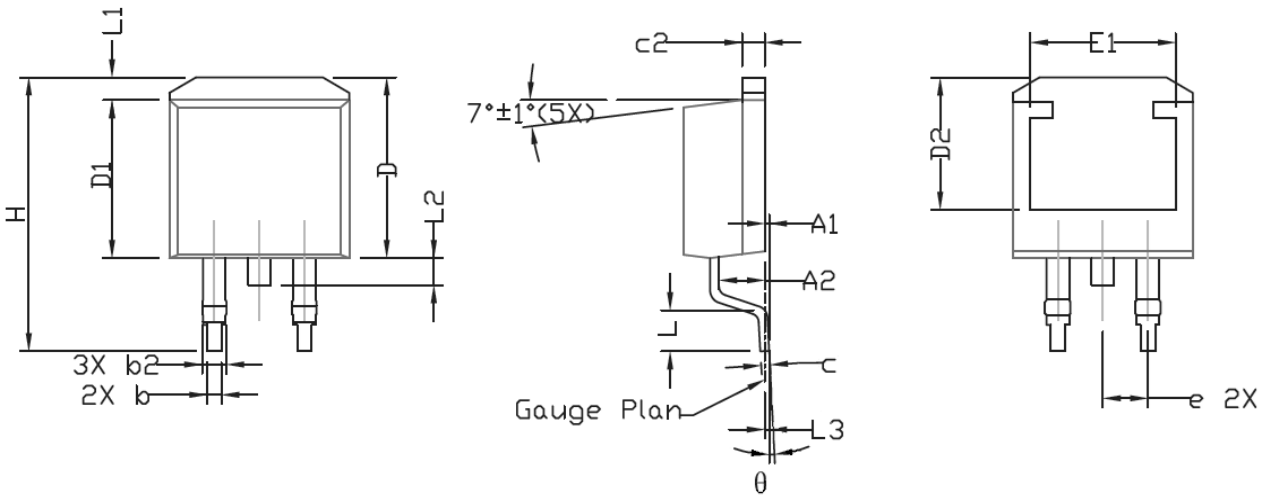


8. Reverse Recovery Time vs. dI_F/dt



9. Thermal Transient Junction to Ambient

Package Information



SYMBOL	DIMENSIONAL REQMTS			INCHES REQMTS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.57	4.72	0.169	0.180	0.186
A1	0	---	0.25	0	---	0.010
A2	2.47	2.57	2.67	0.097	0.101	0.105
b	0.69	0.813	0.94	0.027	0.032	0.037
b2	1.17	1.27	1.45	0.046	0.050	0.057
c	0.48	0.50	0.60	0.019	0.020	0.024
c2	1.17	1.27	1.37	0.046	0.050	0.054
D	9.80	10.05	10.30	0.386	0.396	0.406
D1	8.64	8.78	9.65	0.340	0.346	0.380
D2	7.12	7.37	7.62	0.280	0.290	0.300
E	9.70	10.15	10.54	0.382	0.400	0.415
E1	8.00	8.20	8.40	0.315	0.323	0.331
e	2.54 BSC			0.100 BSC		
H	14.99	15.24	15.49	0.590	0.600	0.610
L	1.78	2.29	2.79	0.070	0.090	0.110
L1	1.02	1.27	1.52	0.040	0.050	0.060
L2	---	---	1.75	---	---	0.069
L3	---	0.254	---	---	0.010	---
θ	0°	---	8°	0°	---	8°