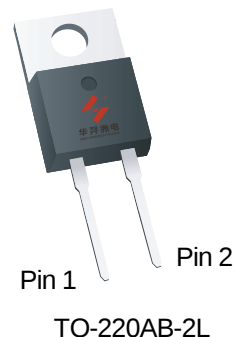


Silicon Carbide Schottky Diode

Feature

- 1200V/7A
- 100% DVDS
- Reliable and Rugged
- Halogen Free and Green Devices Available
(RoHS Compliant)

Pin Description



Applications

- Solar inverters
- Industrial Switched Mode Power Supplies
- Uninterruptible & AUX Power Supplies
- Boost for PFC & DC-DC Stages



SiC Schottky Diode

Ordering and Marking Information

 P2 HYB07120 XYMXXXXXX	Package Code P2: TO-220AB-2L Date Code XYMXXXXXX
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Note: HUAYI halogen free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI halogen free products meet or exceed the halogen free requirements of IPC/JEDEC J-STD-020 for MSL classification at halogen free peak reflow temperature. HUAYI defines "Green" to mean halogen free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

Key Performance and Package Parameters

Type	V _{DC}	I _F	T _{J,MAX}	Qualification
HYB07120P2	1200V	7A	175°C	Industrial

Package Type	Unit	Quantity
TO-220AB-2L	Tube	50

SiC Schottky Diode Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
VRRM	Repetitive peak reverse voltage		1200	V
IF	Continuous Forward Current	Tc=25°C	26.7	A
		Tc=161°C	7	
IFSM	Non-Repetitive Forward Surge Current	tp=10ms,Half sine pulse	45	A
IF,MAX	Non-Repetitive Peak Forward Surge Current	tp=10μs	500	A
Ptot	Power Dissipation	Tc=25°C	94	W
		Tc=110°C	40	W
TJ	Junction Temperature Range		-55 to 175	°C
TSTG	Storage Temperature Range			°C
RθJC	Thermal Resistance, Junction-to-Case		1.6	°C/W
RθJA	Thermal Resistance, Junction-to-Ambient **		62.5	°C/W

Note: * Repetitive rating; pulse width limited by max.junction temperature.

** Surface mounted on 1in2 FR-4 board.

SiC Schottky Diode Characteristics (T_c = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYB07120			Unit
			Min	Typ.	Max	
Static Characteristics						
V _{DC}	DC blocking voltage	I _R =200μA	1200	-	-	V
V _F	Diode forward voltage	I _F =7A, T _C =25°C	-	1.3	2.0	V
		I _F =7A, T _C =175°C	-	1.7	-	V
I _R	Reverse current	V _R =1200V, T _C =25°C	-	2.0	120	μA
		V _R =1200V, T _C =175°C	-	5.0	-	μA
Dynamic Characteristics						
Q _C	Total capacitive charge	V _R =800V	-	53	-	nC
C	Total Capacitance	V _R =0V, f=100kHz	-	755	-	pF
		V _R =400V, f=100kHz	-	50	-	
		V _R =800V, f=100kHz	-	41.6	-	
E _C	Capacitance Stored Energy	V _R =800V	-	27	-	μJ

Note: *Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

SiC Schottky Diode Typical Operating Characteristics

Figure 1: Power Dissipation

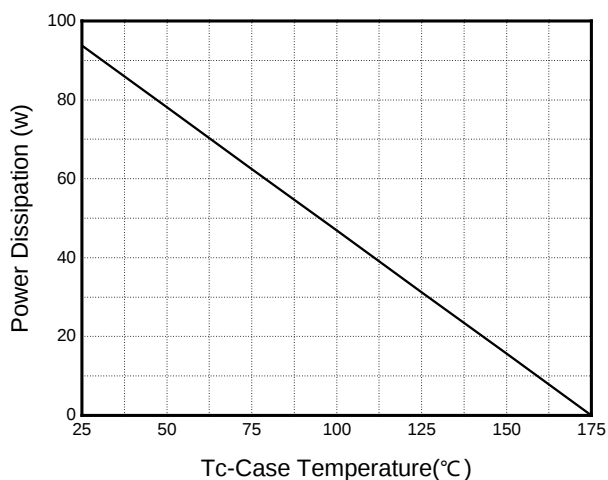
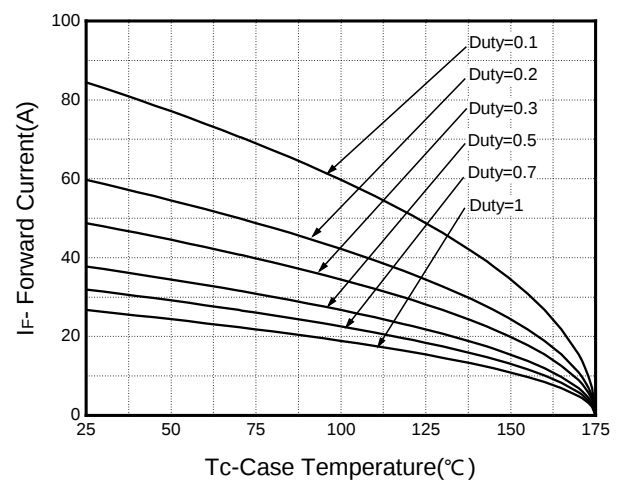


Figure 2: Diode forward Current



SiC Schottky Diode Typical Operating Characteristics

Figure 3: Forward Characteristics

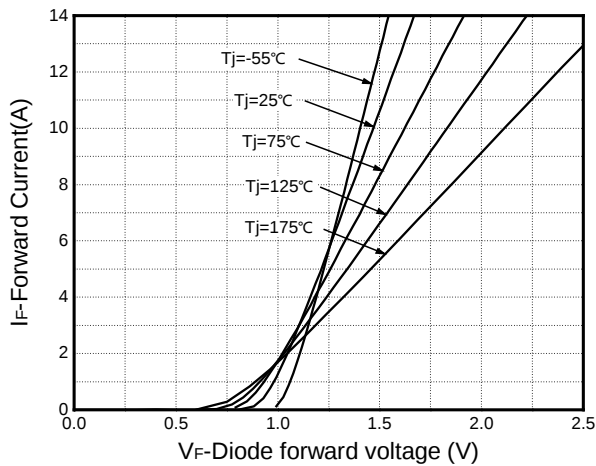


Figure 4: Reverse Characteristics

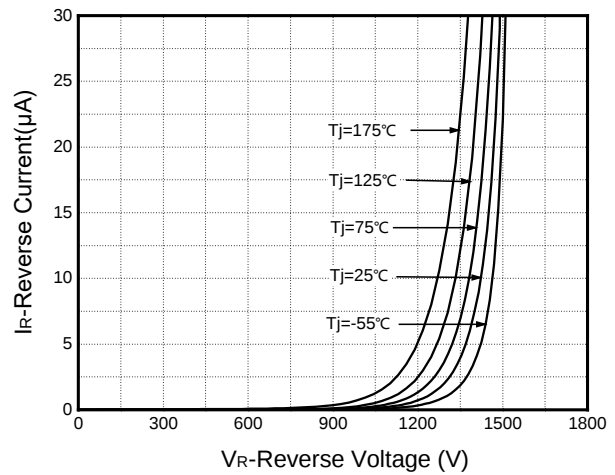


Figure 5: Recovery Charge vs. V_R

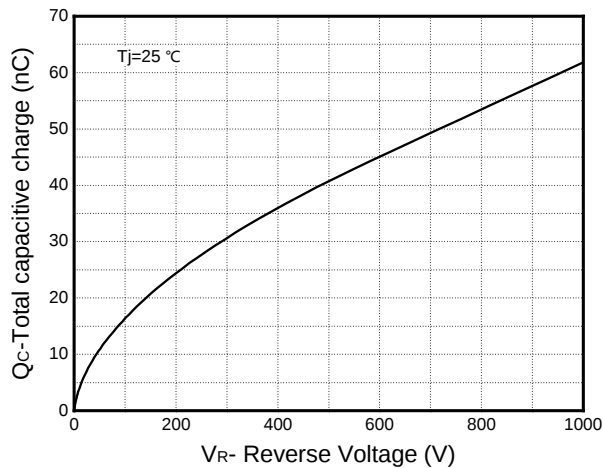


Figure 6: Capacitance vs. V_R

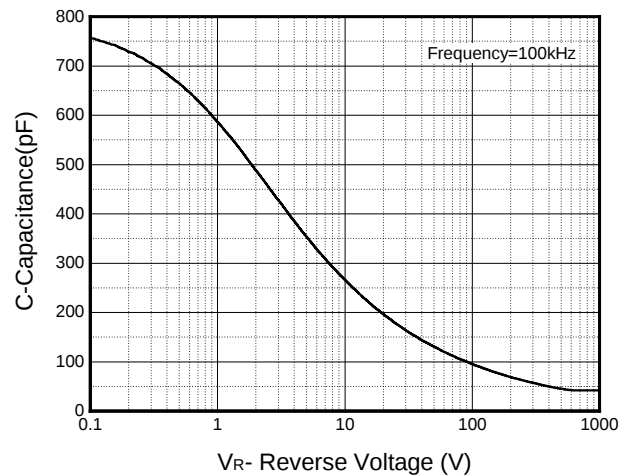


Figure 7: Capacitance Stored Energy

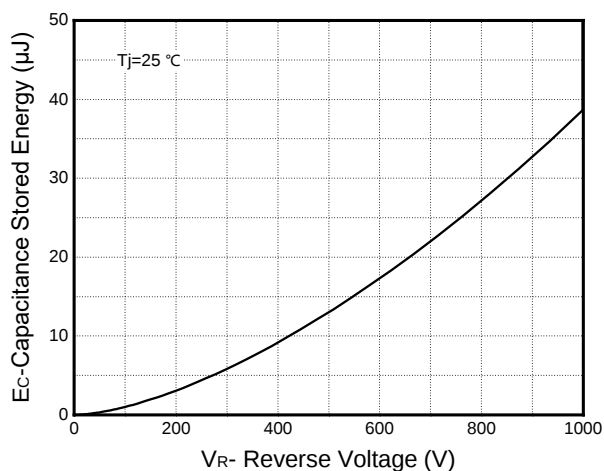
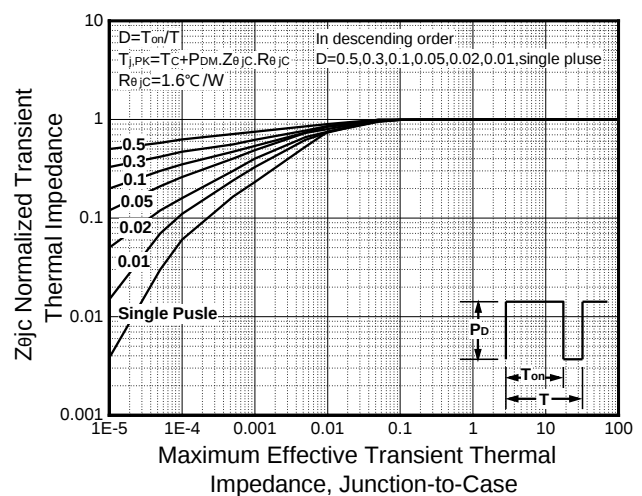


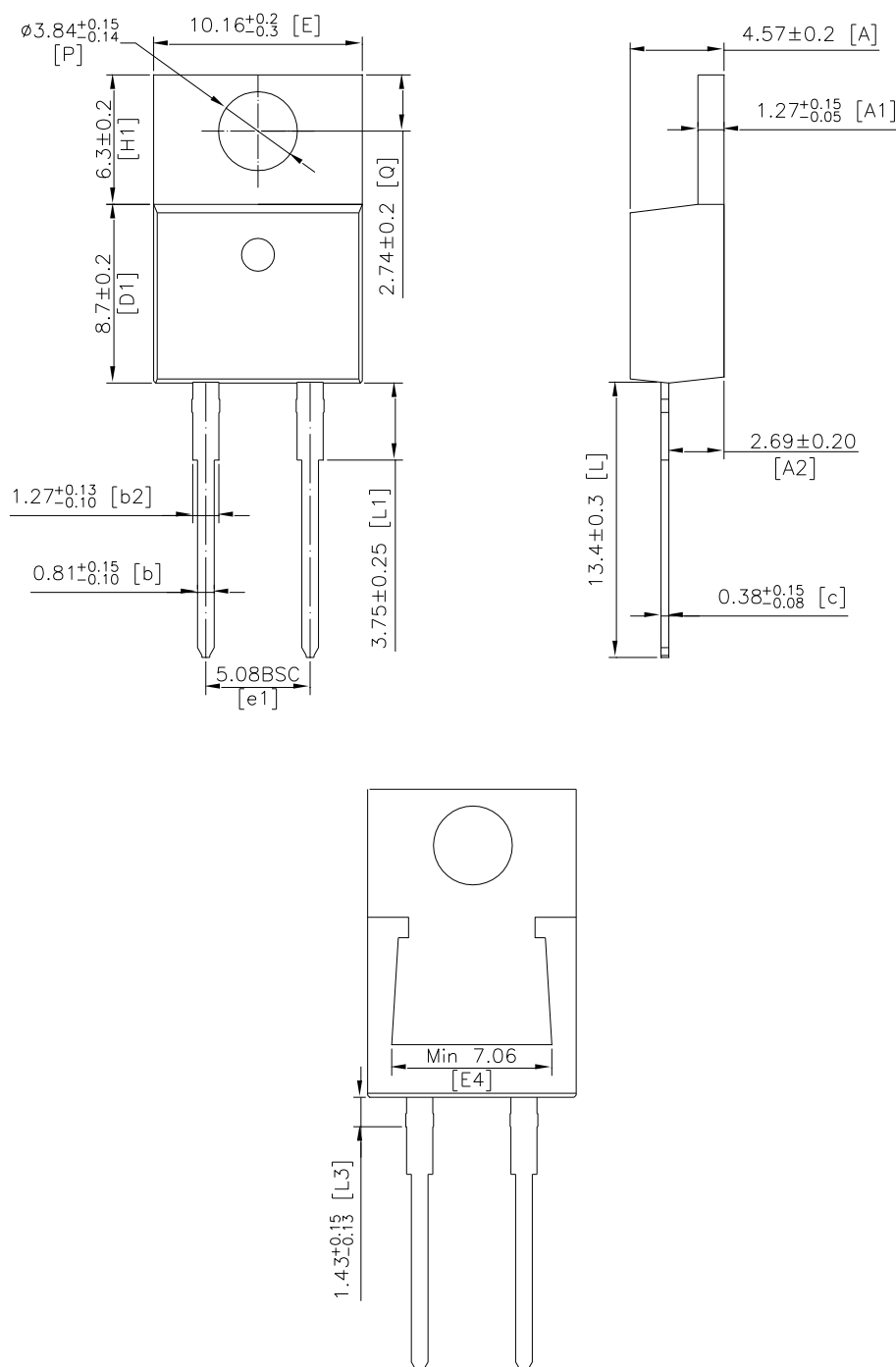
Figure 8: Transient Thermal Impedance



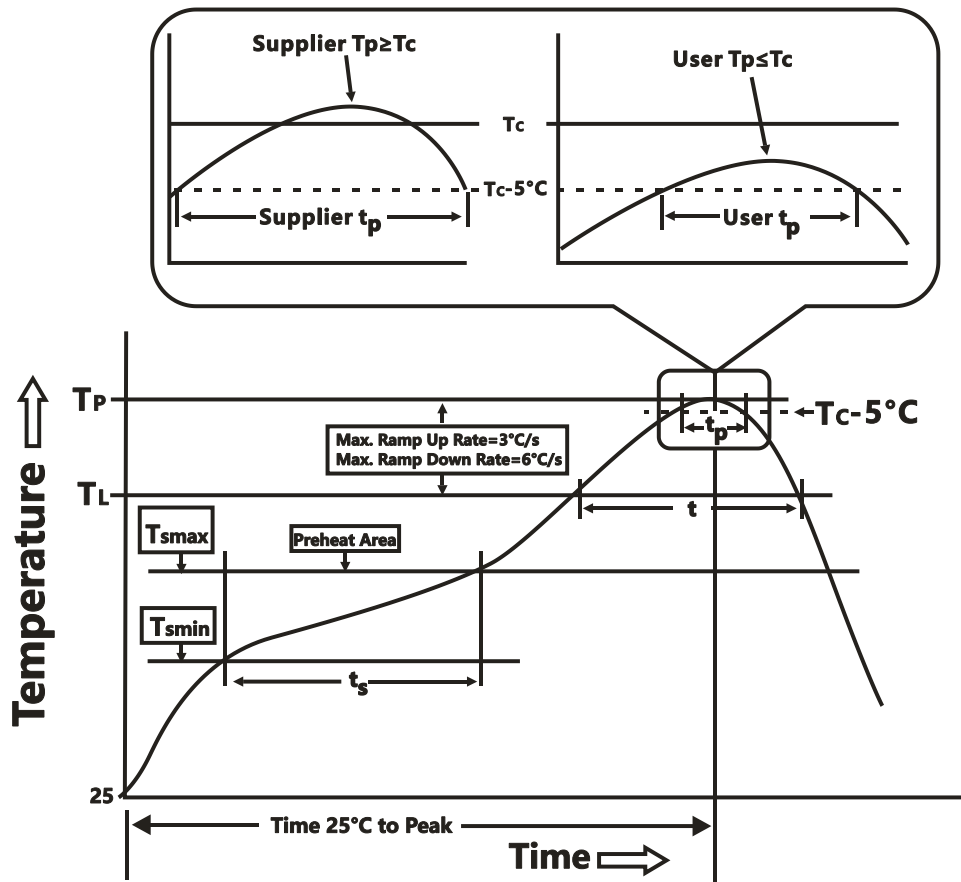
Package Information

TO-220AB-2L

(unit:mm)



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})	100 °C	150 °C
Temperature max (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T_{smax} to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_L)	60-150 seconds	60-150 seconds
Peak package body Temperature (T_P)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_P to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile Temperature (T_P) is defined as a supplier minimum and a user maximum.		
** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		

Table 1.SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2.Pb-free Process – Classification Temperatures (Tc)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ ≥2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	168/500/1000 Hrs, Bias @ 150°C
BHAST	JESD-22, A108	96 Hrs, 85%RH, 230KPA, V _{DC} 80% @ 130°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	250/500/1000 Cycles, -55°C~150°C

Customer Service

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