

Silicon Carbide Schottky Diode

**Feature**

- z 1200V/10A
- z 100% DVDS
- z Reliable and Rugged
- z Halogen Free and Green Devices Available  
(RoHS Compliant)

**Pin Description**



Pin 1                  Pin 2  
TO-220AB-2L


**Applications**

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



SiC Schottky Diode

**Ordering and Marking Information**

 <p>P2 <b>HYB10120</b> XYMXXXXXX</p>	<p>Package Code P2: TO-220AB-2L</p> <p>Date Code XYMXXXXXX</p>
---	--

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 <sub>DC</sub>	I <sub>F</sub>	T <sub>J,MAX</sub>	Qualification
HYB10120P2	1200V	10A	175°C	Industrial

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

## SiC Schottky Diode Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T <sub>c</sub> =25°C Unless Otherwise Noted)				
V <sub>RRM</sub>	Repetitive peak reverse voltage		1200	V
I <sub>F</sub>	Continuous Forward Current	T <sub>c</sub> =25°C	25.6	A
		T <sub>c</sub> =161°C	10	
I <sub>FSM</sub>	Non-Repetitive Forward Surge Current	tp=10ms,Half sine pulse	64	A
I <sub>F,MAX</sub>	Non-Repetitive Peak Forward Surge Current	tp=10 s	500	A
P <sub>tot</sub>	Power Dissipation	T <sub>c</sub> =25°C	120	W
		T <sub>c</sub> =110°C	53	W
T <sub>J</sub>	Junction Temperature Range		-55 to 175	°C
T <sub>STG</sub>	Storage Temperature Range			°C
R <sub>JC</sub>	Thermal Resistance, Junction-to-Case		1.23	°C/W
R <sub>JA</sub>	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<sub>c</sub> =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYB10120			Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
V <sub>DC</sub>	DC blocking voltage	I <sub>R</sub> =200 A	1200	-	-	V
V <sub>F</sub>	Diode forward voltage	I <sub>F</sub> =10A, T <sub>c</sub> =25°C	-	1.65	2.0	V
		I <sub>F</sub> =10A, T <sub>c</sub> =175°C	-	2.6	-	V
I <sub>R</sub>	Reverse current	V <sub>R</sub> =1200V, T <sub>c</sub> =25°C	-	2.0	60	A
		V <sub>R</sub> =1200V, T <sub>c</sub> =175°C	-	3.5	-	A
<b>Dynamic Characteristics</b>						
Q <sub>c</sub>	Total capacitive charge	V <sub>R</sub> =800V	-	38	-	nC
C	Total Capacitance	V <sub>R</sub> =0V, f=100kHz	-	528	-	pF
		V <sub>R</sub> =400V, f=100kHz	-	35.8	-	
		V <sub>R</sub> =800V, f=100kHz	-	29.6	-	
E <sub>c</sub>	Capacitance Stored Energy	V <sub>R</sub> =800V	-	19	-	J

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

### SiC Schottky Diode Typical Operating Characteristics

Figure 3: Forward C haracteristics

Figure 4: Reverse Characteristics

Figure 5: Recovery Charge vs.  $V_R$

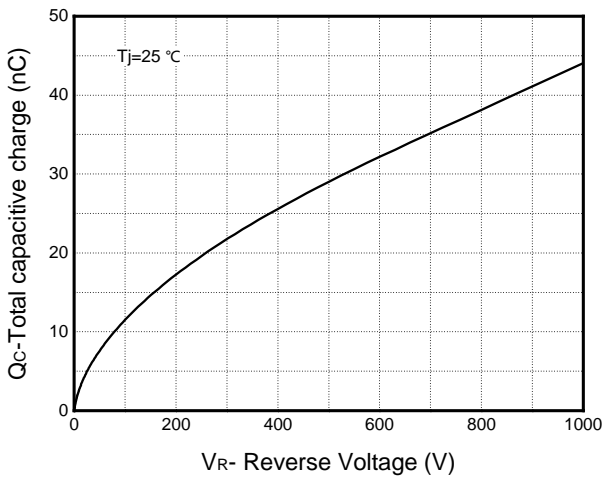


Figure 6: Capacitance vs.  $V_R$

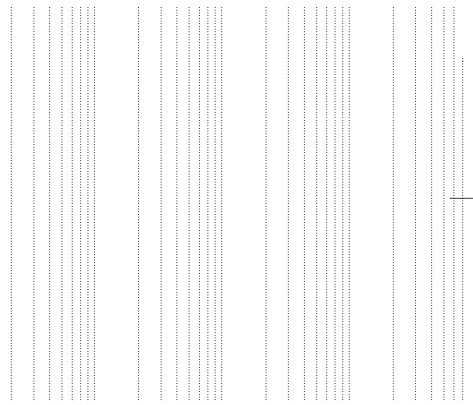


Figure 7: Capacitance Stored Energy

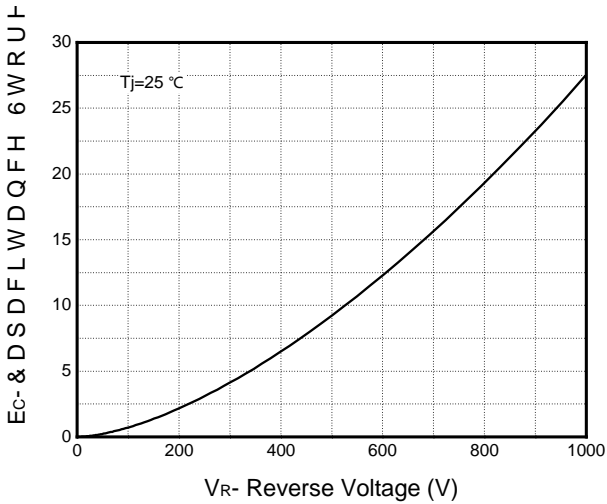
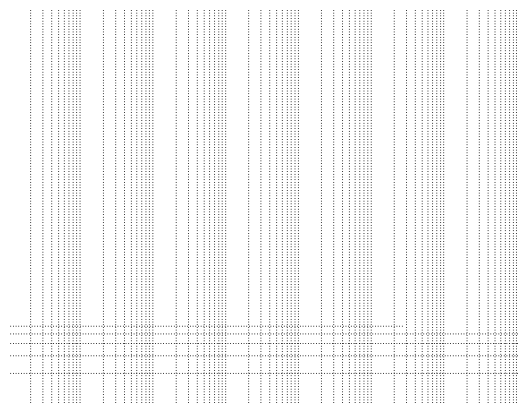


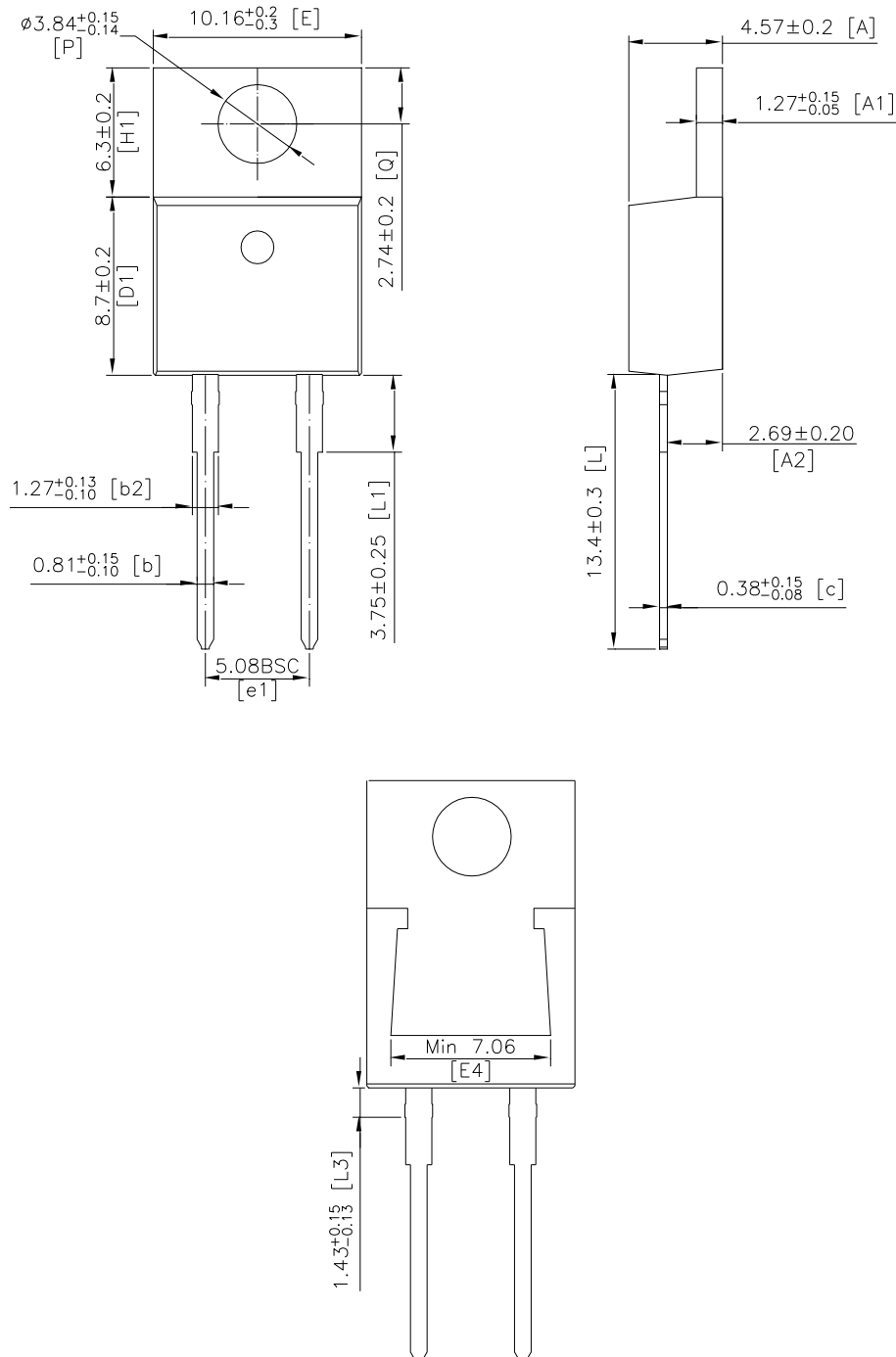
Figure 8: Transient Thermal Impedance



## 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  $T_P$  1.62 18.j1

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

Package Thickness	Volume mm <sup>3</sup>	Volume mm <sup>3</sup>
	<350	≥350
<2.5 mm	235 ℃	220 ℃
• P P	220 ℃	220 ℃

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

Package Thickness	Volume mm <sup>3</sup>	Volume mm <sup>3</sup>	Volume mm <sup>3</sup>
	<350	350-2000	≥2000
<1.6 mm	260 ℃	260 ℃	260 ℃
1.6 mm ±2.5 mm	260 ℃	250 ℃	245 ℃
≥2.5 mm	250 ℃	245 ℃	245 ℃

## Reliability Test Program

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

## Customer Service

Worldwide Sales and Service: [sales@hymexa.com](mailto:sales@hymexa.com)

Technical Support: [Technology@hymexa.com](mailto:Technology@hymexa.com)

Huayi Microelectronics Co., Ltd.

No.8928, Shangji Road, Economic and Technological Development Zone, Xi'an, China

TEL: (86-029) 86685706

FAX: (86-029) 86685705

E-mail: [sales@hymexa.com](mailto:sales@hymexa.com)

Web net: <http://www.hymexa.com/>