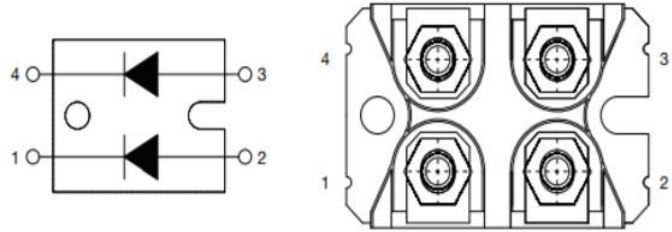


## IVST12080DA1L – 1200V 40A\*2 SiC MODULE

### Features

- Max Junction Temperature 175°C
- High Surge Current Capacity
- Extremely Fast Reverse Recovery Time
- High-Frequency Operation
- Temperature Independent Switching Behavior
- Positive Temperature Coefficient on  $V_F$

### Outline



### Applications

- Induction heating anti-parallel diode
- Inverter Free Wheeling Diodes
- Welding equipment
- Rectifiers in Switch Mode Power Supplies
- UPS Application

Part Number	Package
IVST12080DA1L	SOT 227

### Absolute Maximum Ratings (Per SBD/ $T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
$V_{RRM}$	Reverse voltage (repetitive peak)	1200	V
$V_{DC}$	DC blocking voltage	1200	V
$I_F$	Forward current (continuous) @ $T_c=25^\circ\text{C}$	86	A
	Forward current (continuous) @ $T_c=136^\circ\text{C}$	40	A
$I_{FSM}$	Surge non-repetitive forward current sine halfwave @ $T_c=25^\circ\text{C}$ $t_p=10\text{ms}$	260	A
$I_{FRM}$	Surge repetitive forward current (Freq=0.1Hz, 100cycles) sine halfwave @ $T_{amb}=25^\circ\text{C}$ $t_p=10\text{ms}$	220	A
$P_{tot}$	Total power dissipation @ $T_c=25^\circ\text{C}$	351	W
	Total power dissipation @ $T_c=150^\circ\text{C}$	58	
$\int i^2 dt$	$I^2t$ value @ $T_c=25^\circ\text{C}$ $t_p=10\text{ms}$	392	$\text{A}^2\text{s}$
Tstg	Storage temperature range	-55 to 175	$^\circ\text{C}$
$T_J$	Operating junction temperature range	-55 to 175	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## Electrical Characteristics (Per SBD)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V <sub>F</sub>	Forward Voltage	1.48	1.80	V	I <sub>F</sub> = 40 A T <sub>J</sub> =25°C	Fig. 1
		2.30	3.00		I <sub>F</sub> = 40 A T <sub>J</sub> =175°C	
I <sub>R</sub>	Reverse Current	10	300	μA	V <sub>R</sub> = 1200 V T <sub>J</sub> =25°C	Fig. 2
		60	1000		V <sub>R</sub> = 1200 V T <sub>J</sub> =175°C	
C	Total Capacitance	2240		pF	V <sub>R</sub> = 1 V, T <sub>J</sub> = 25°C, f = 1 MHz	Fig. 3
		215			V <sub>R</sub> = 400 V, T <sub>J</sub> = 25°C, f = 1 MHz	
		170			V <sub>R</sub> = 800 V, T <sub>J</sub> = 25°C, f = 1 MHz	
Q <sub>C</sub>	Total Capacitive Charge	221		nC	V <sub>R</sub> = 800 V, T <sub>J</sub> = 25°C, $Q_C = \int_0^{V_R} C(V) dV$	Fig. 4
E <sub>C</sub>	Capacitance Stored Energy	65.7		μJ	V <sub>R</sub> = 800 V, T <sub>J</sub> = 25°C, $E_C = \int_0^{V_R} C(V) \cdot V dV$	Fig. 5

## Thermal Characteristics (Per SBD)

Symbol	Parameter	Typ.	Unit	Note
R <sub>th(j-c)</sub>	Thermal Resistance from Junction to Case	0.427	°C/W	Fig.7

## Module Characteristics

Symbol	Parameter	Conditions	Value			Unit
			Min.	Typ.	Max.	
V <sub>ISOL</sub>	Isolation test voltage	RMS, f=50/60Hz, t=10sec, I <sub>ISOL</sub> ≤ 1mA	3.0			kV
T <sub>stg</sub>	Storage temperature		-40		150	°C
M	Terminal connection torque	Screw M4	1.1		1.5	N·m
	Mounting torque	Screw M4	1.1		1.5	N·m
G	Weight of module			27		g
	Creepage distance	Terminal to heatsink		10.61		mm
		Terminal to terminal		10.37		mm
	Clearance	Terminal to heatsink		6.7		mm
		Terminal to terminal		4.05		mm

## Typical Performance

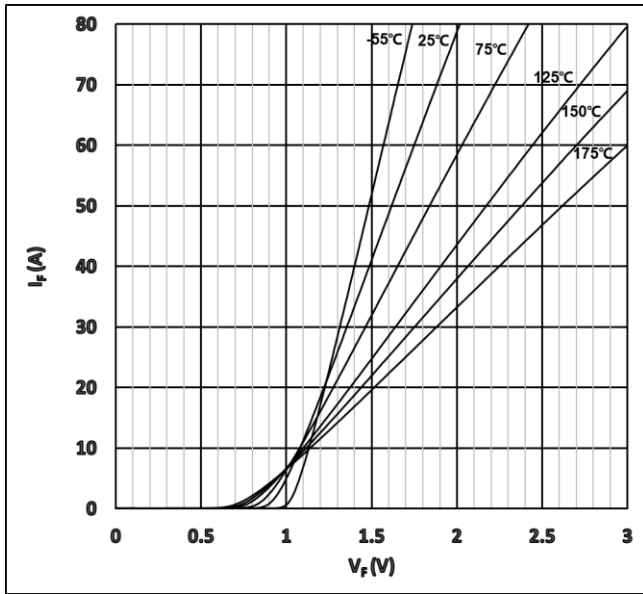


Figure 1. Typical Forward Characteristics

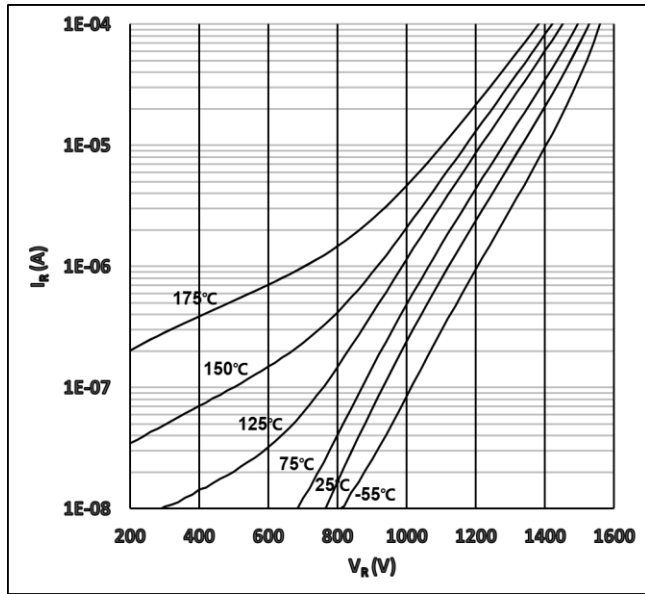


Figure 2. Typical Reverse Characteristics

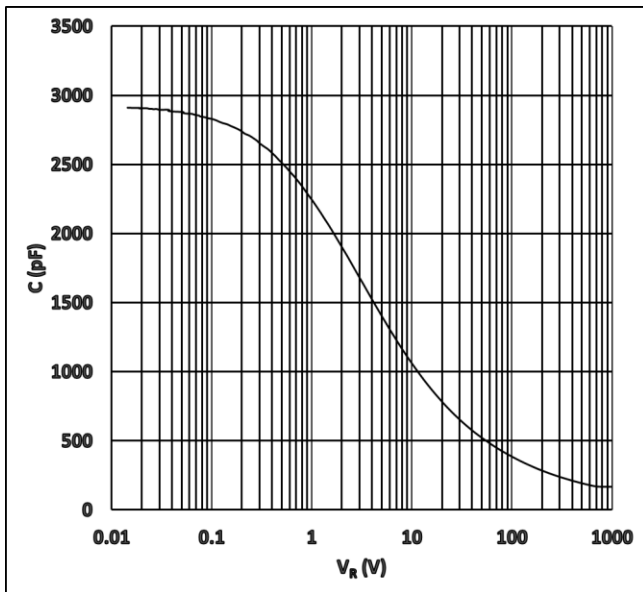


Figure 3. Capacitance vs. Reverse Voltage

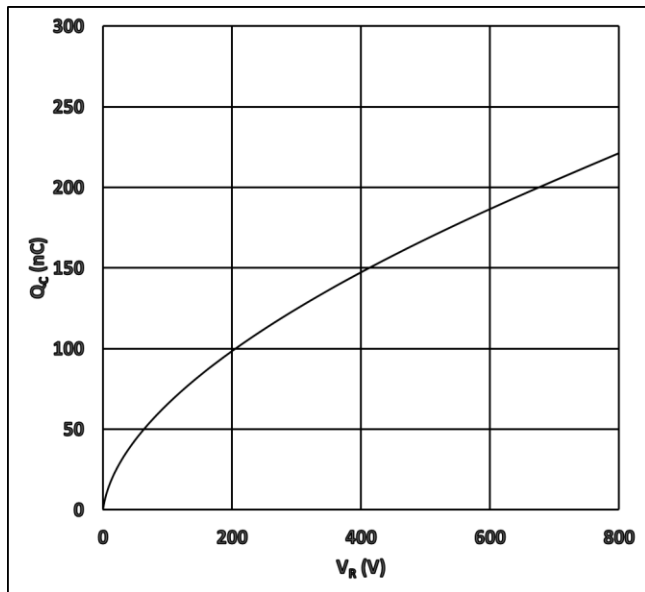


Figure 4. Recovery Charge vs. Reverse Voltage

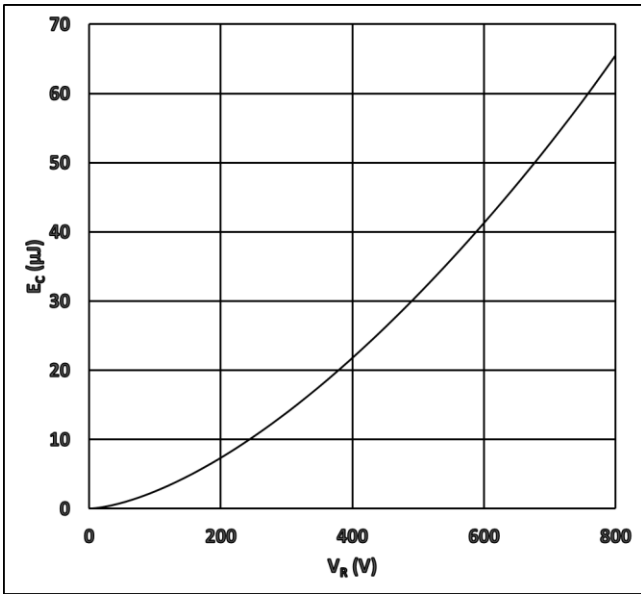


Figure 5. Capacitance Stored Energy

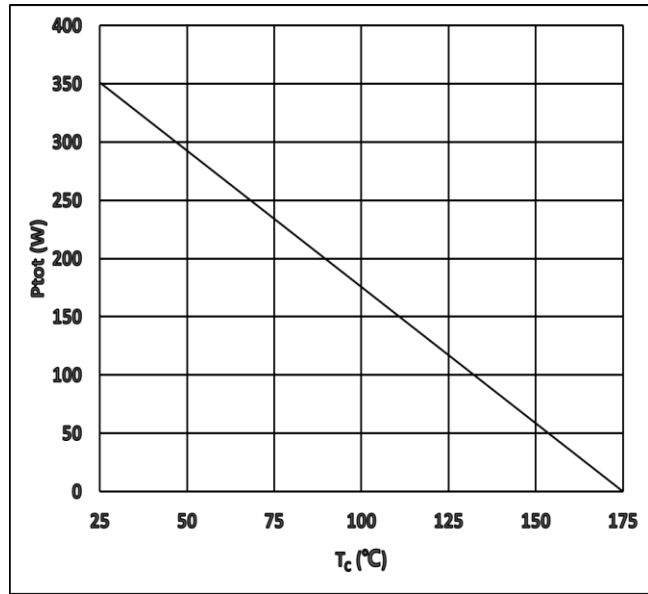


Figure 6. Power Derating

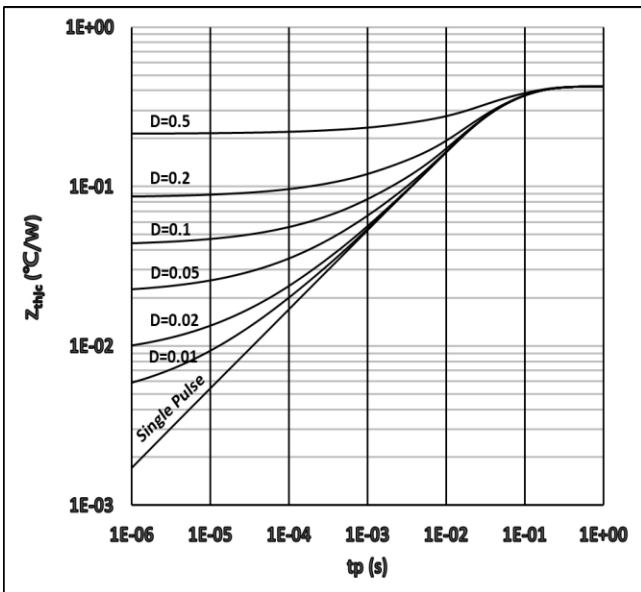


Figure 7. Transient Thermal Impedance

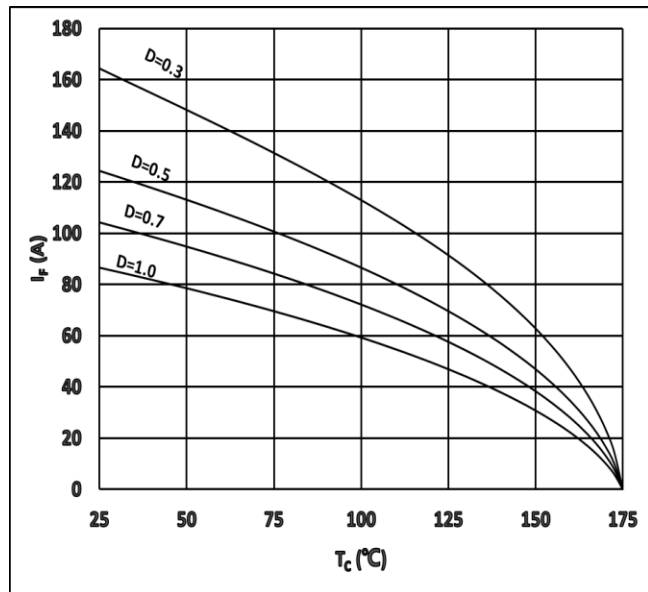
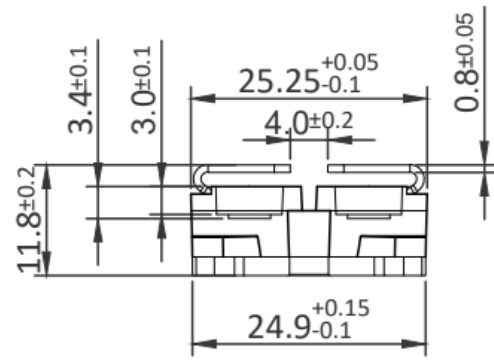
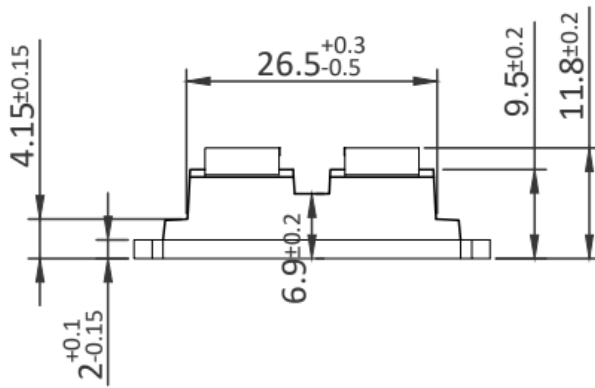
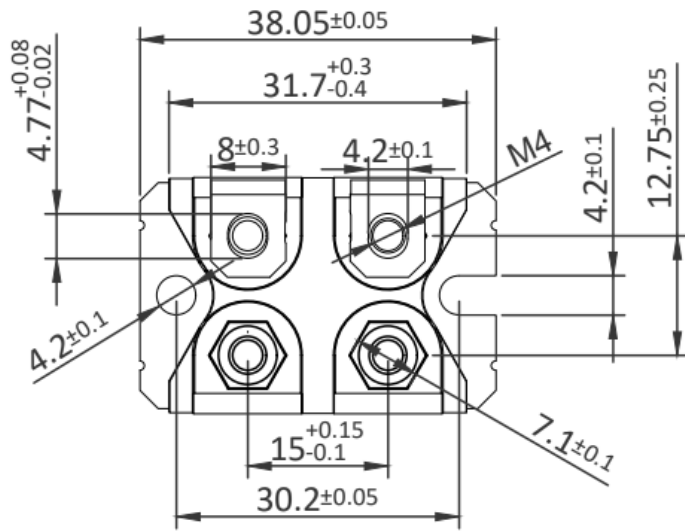


Figure 8. I<sub>F</sub> as a Function of Temp.

# Package Dimensions



## Notes

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