



650V / 2x20A

# ACC040H06DD

SiC Schottky Barrier Diode

ACTRON TECHNOLOGY CORP.

## Features

- Shorter recovery time
- High speed switching
- High surge current capability
- Enabling higher frequency and increased power density
- System efficiency improvement
- System cost and size savings due to the reduced cooling requirements

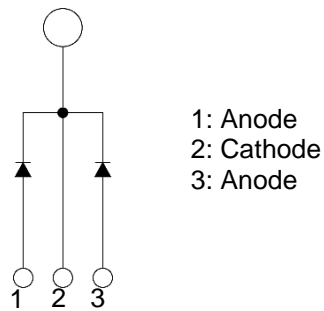
## Outline (TO247-3L)



## Applications

- Power Factor Correction in SMPS
- Solar inverter
- Uninterruptible Power Supply
- EV Charging Stations
- Data Center

## Circuit Diagram



## Mechanical Characteristics

- TO247-3L package
- Halogen Free
- Pb free lead plating ; RoHS compliant
- Packaging: Tube

## Marking Diagram

Laser Mark



LL : Assembly Lot code  
WW : Week  
YY : Year



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### Parameter and Specification

#### Absolute Maximum Rating<sup>(1)</sup>

Parameter	Symbol	Condition	Value	Unit
Repetitive peak reverse voltage	$V_{RM}$	$T_c=25^{\circ}C$	650	V
Continue forward current	$I_F$	$T_c=135^{\circ}C$	$2 \times 20^{*1}$	A
Surge non-repetitive forward current , sine half-wave	$I_{FSM}$	$T_c=25^{\circ}C, t_p=10ms, \text{Sine half wave}$	$153^{*2}/306^{*3}$	A
		$T_c=110^{\circ}C, t_p=10ms, \text{Sine half wave}$	$122^{*2}/244^{*3}$	
Surge repetitive forward current	$I_{FRM}$	$T_c=25^{\circ}C, t_p=10ms, \text{Sine half wave}$	$72^{*2}/144^{*3}$	A
$I^2t$ value	$\int I^2t$	$T_c=25^{\circ}C, t_p=10ms, \text{Sine half wave}$	$117^{*2}/468^{*3}$	$A^2s$
Total power dissipation	$P_D$	$T_c=25^{\circ}C$	$170^{*2}/340^{*3}$	W
		$T_c=110^{\circ}C$	$73^{*2}/146^{*3}$	
Junction temperature	$T_j$		175	$^{\circ}C$
Storage temperature	$T_{STG}$		-55 ~ 175	$^{\circ}C$

Note :

- (1) \*1 Dual dice
- (2) \*2 per Leg
- (3) \*3 per Device
- (4) Exceeding these ratings may damage the device.

#### Thermal Characteristics

Parameter	Symbol	Condition		Typ.	Unit
Thermal resistance	$\theta_{jc}$	Junction - Case	Per Leg	0.62	$^{\circ}C / W$
			Per Device	0.31	



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## Electrical Characteristics

Characteristic	Symbol	Condition	MIN	TYP	MAX	Unit
DC reverse voltage	$V_{DC}$	$T_j = 25^{\circ}C, I_R = 100\mu A$	650	-	-	V
Forward voltage	$V_F$	$T_j = 25^{\circ}C, I_F = 20A$	-	1.35	1.5	V
		$T_j = 150^{\circ}C, I_F = 20A$	-	1.6	-	
		$T_j = 175^{\circ}C, I_F = 20A$	-	1.7	-	
Reverse current	$I_R$	$T_j = 25^{\circ}C, V_R = 650V$	-	4	100	uA
		$T_j = 150^{\circ}C, V_R = 650V$	-	16	-	
		$T_j = 175^{\circ}C, V_R = 650V$	-	30	-	
Total capacity charge	$Q_C$	$T_j = 25^{\circ}C, V_R = 400V,$ $di/dt = 350A/us$	-	57	-	nC
Total capacitance	$C_{TOT}$	$T_j = 25^{\circ}C, V_R = 1V,$ $F = 1MHz$	-	940	-	pF
		$T_j = 25^{\circ}C, V_R = 400V,$ $F = 1MHz$	-	96	-	
		$T_j = 25^{\circ}C, V_R = 650V,$ $F = 1MHz$	-	95	-	
Capacitance Stored Energy	$E_C$	$V_R = 400V$	-	9.5	-	$\mu J$



## Electrical Characteristic Curves

### V<sub>F</sub> – I<sub>F</sub> Characteristics (Per Leg)

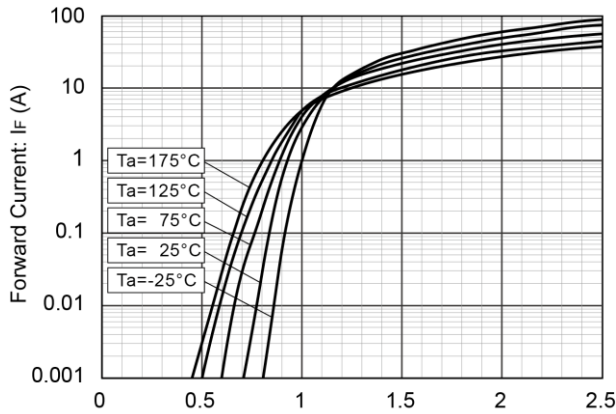


Figure1. Forward Voltage: V<sub>F</sub> (V)

### V<sub>F</sub> – I<sub>F</sub> Characteristics (Per Leg)

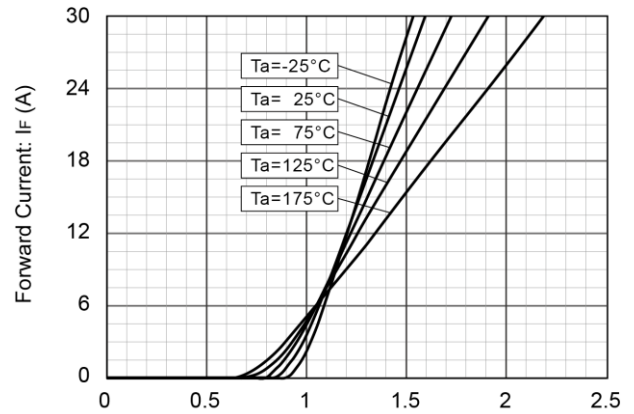


Figure2. Forward Voltage: V<sub>F</sub> (V)

### V<sub>R</sub> – I<sub>R</sub> Characteristics (Per Leg)

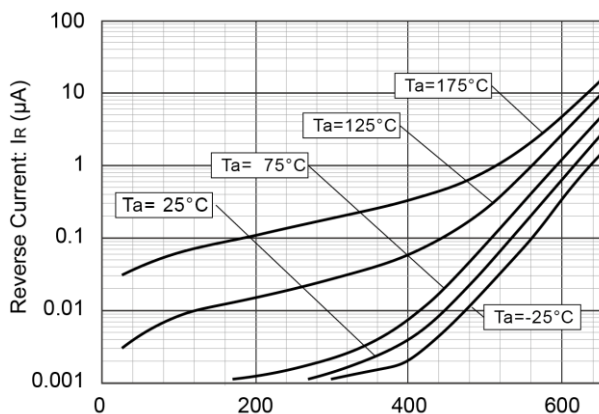


Figure3. Reverse Voltage: V<sub>R</sub> (V)

### V<sub>R</sub> – C<sub>t</sub> Characteristics (Per Leg)

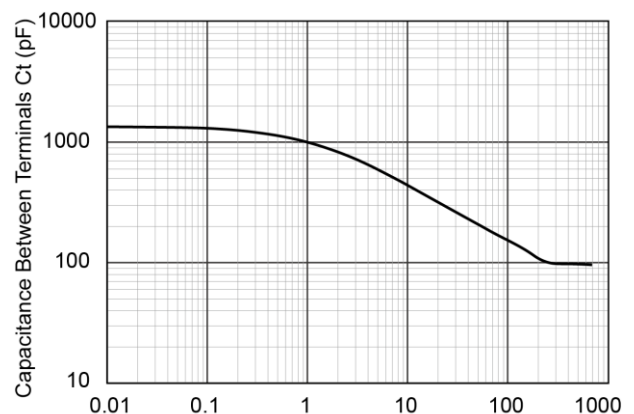


Figure4. Reverse Voltage: V<sub>R</sub>(V) Ta = 25 °C f = 1MHz

### Maximum I<sub>P</sub> – T<sub>C</sub> Characteristics (Per Leg)

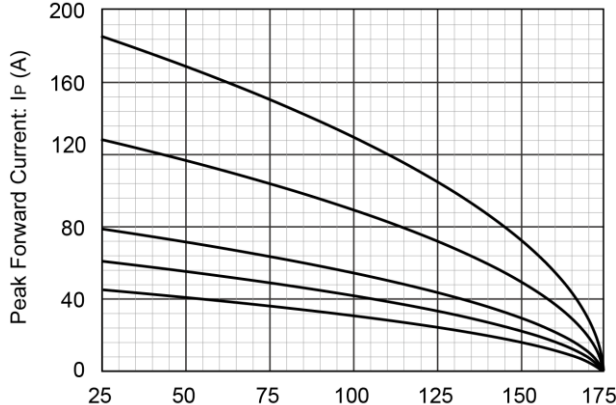


Figure5. Case Temperature: T<sub>C</sub> (°C)

### Power Dissipation (Per Leg)

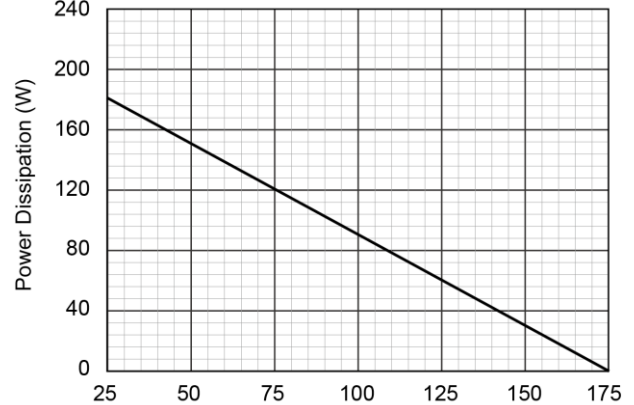


Figure6. Case Temperature: T<sub>C</sub> (°C)



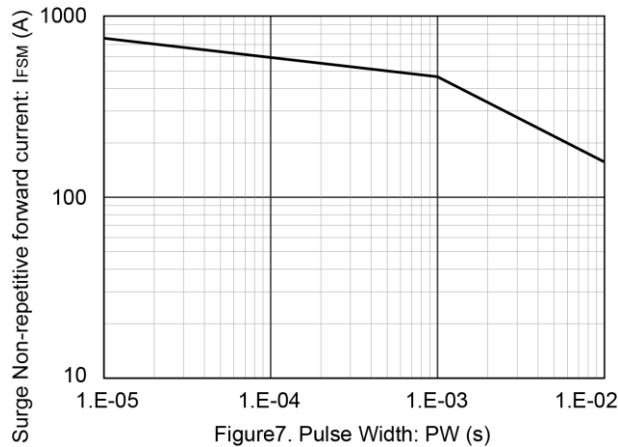
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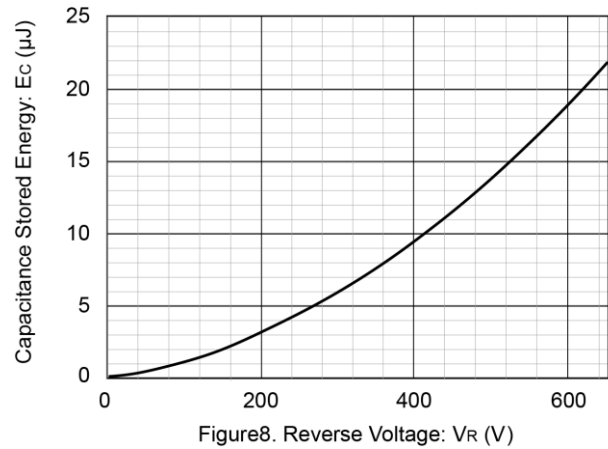
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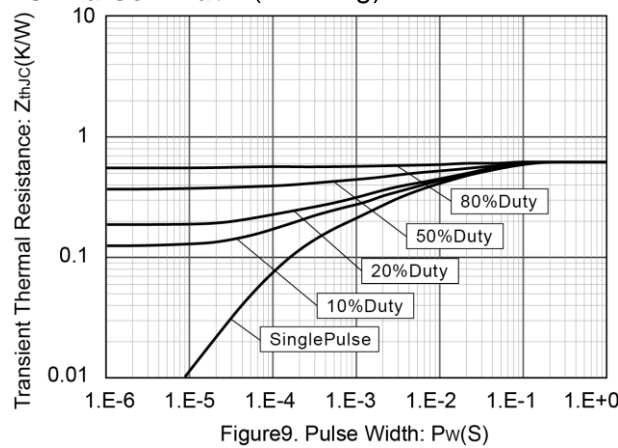
## I<sub>FSM</sub> – PW Characteristics (Per Leg)



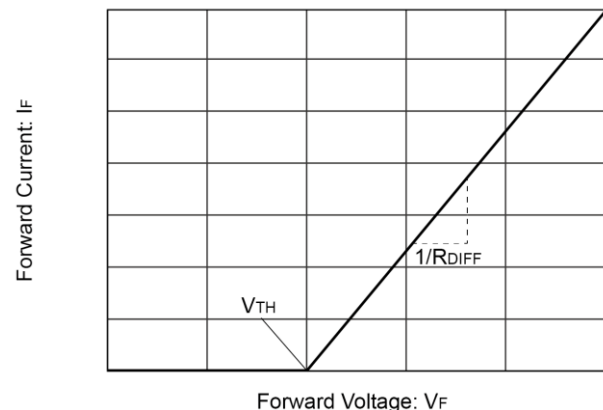
## E<sub>C</sub> – V<sub>R</sub> Characteristics (Per Leg)



## Typical Transient Thermal Resistance vs. Pulse Width (Per Leg)



## Simplified Forward Characteristic (Per Leg)



$$V_F = V_{TH} + R_{DIFF} \times I_F$$

Threshold Voltage (V<sub>TH</sub>):

$$V_{TH}(T_j) = -0.0011 \times T_j + 0.962 \text{ [V]}$$

Differential Resistance (R<sub>DIFF</sub>):

$$R_{DIFF}(T_j) = A \times T_j^2 + B \times T_j + C \text{ [}\Omega\text{]}$$

$$A = 4.0 \times 10^{-7}$$

$$B = 9.0 \times 10^{-5}$$

$$C = 1.92 \times 10^{-2}$$



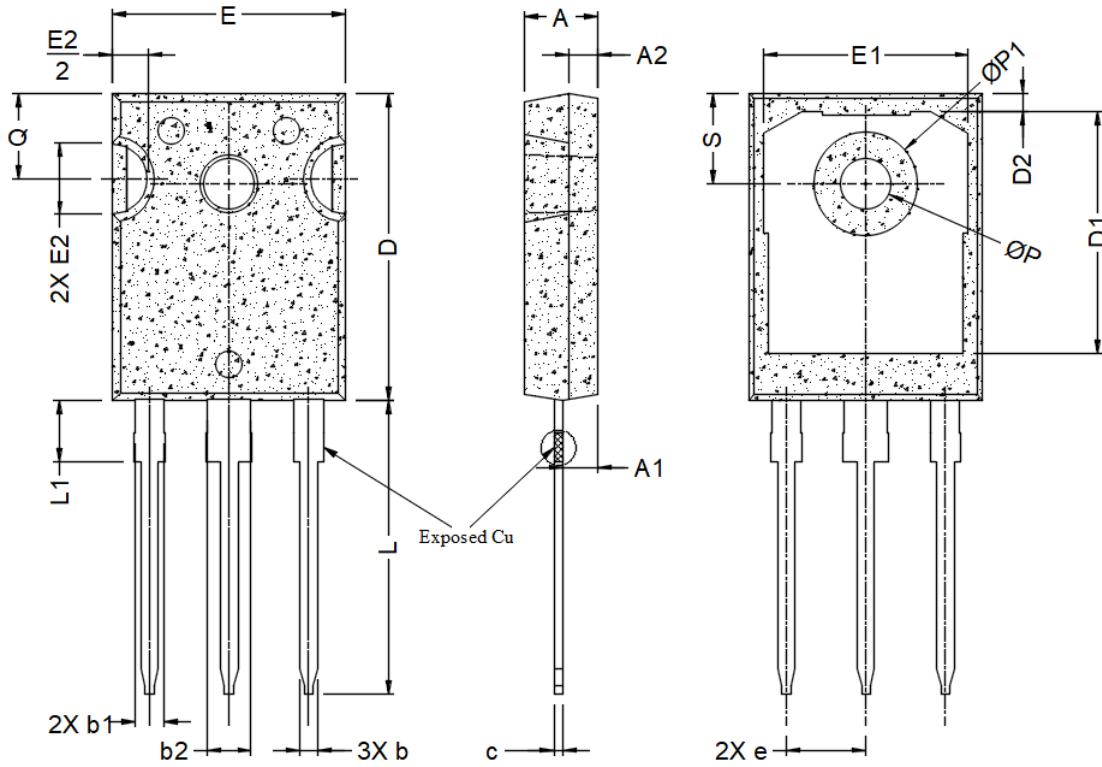
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**Package Outline**



Unit : mm

SYMBOL	DIMENSIONS		
	MIN.	NCM.	MAX.
A	4.83	5.02	5.21
A1	2.29	2.41	2.55
A2	1.50	2.00	2.49
b	1.12	1.20	1.33
b1	1.91	2.00	2.39
b2	2.87	3.00	3.22
c	0.55	0.60	0.69
D	20.80	20.95	21.10
D1	16.25	16.55	17.65
D2	0.51	1.19	1.35
E	15.75	15.94	16.13
E1	13.46	14.02	14.16
E2	4.32	4.91	5.49
e	5.44BSC		
L	19.81	20.07	20.32
L1	4.10	4.19	4.40
ØP	3.56	3.61	3.65
ØP1	7.19REF.		
Q	5.39	5.79	6.20
S	6.04	6.17	6.30