

# PD040065E2H / PD040065E2H\_G

## 650V Silicon Carbide Diode

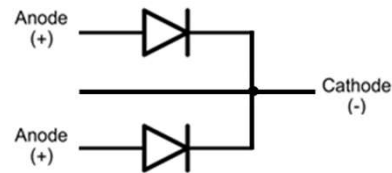
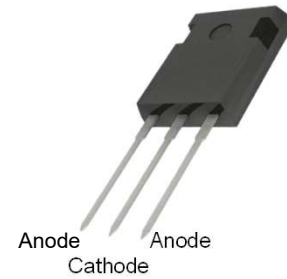
### Features

- 650-Volt Schottky Rectifier
- Shorter recovery time
- High-speed switching possible
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on VF
- RoHS Compliant

### Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- HID Lighting

### Package Outline



### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$V_{RRM}$	Repetitive Peak Reverse Voltage	650	V
$V_{RSM}$	Surge Peak Reverse Voltage	650	V
$V_{DC}$	DC Blocking Voltage	650	V
$I_F$	Continuous Forward Current $T_C = 25^\circ\text{C}$ $T_C = 140^\circ\text{C}$	47 / 94 20 / 40	A
$I_{FRM}$	Repetitive Peak Forward Current $T_C = 110^\circ\text{C}$	106 / 210	A
$I_{FSM}$	Non-Repetitive Forward Surge Current $T_C = 25^\circ\text{C}$ $T_C = 110^\circ\text{C}$	100 / 200 80 / 160	A
$P_D$	Power Dissipation $T_C = 25^\circ\text{C}$	176 / 352	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

\* Per Leg / Per Device

### Electrical Characteristics (Per Leg)

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_F$	Forward Voltage	$I_F = 20\text{A}, T_C = 25^\circ\text{C}$ $I_F = 20\text{A}, T_C = 175^\circ\text{C}$	--	1.5 2.0	1.8 2.4	V
$I_R$	Reverse Current	$V_R = 650\text{V}, T_C = 25^\circ\text{C}$ $V_R = 650\text{V}, T_C = 175^\circ\text{C}$	--	30 60	70 700	$\mu\text{A}$
$Q_C$	Total Capacitive Charge	$V_R = 400\text{V}$	--	45	--	nC
C	Total Capacitance	$V_R = 1\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$ $V_R = 520\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$	--	850 113	--	pF

### Thermal Characteristics

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	0.85 / 0.43	1.05 / 0.53	$^\circ\text{C}/\text{W}$

\* Per Leg / Per Device

### Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
PD040065E2H	PD040065E2H	TO-247_3L	-	-	30
PD040065E2H_G	PD040065E2H_G	TO-247_3L	-	-	30

\* PD040065E2H\_G : RoHS Compliant

### Typical Characteristics (Per Leg)

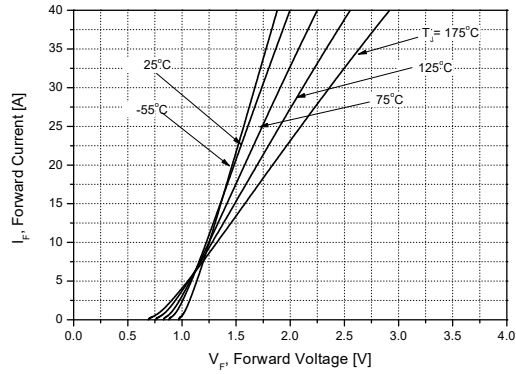


Figure 1. Forward Characteristics

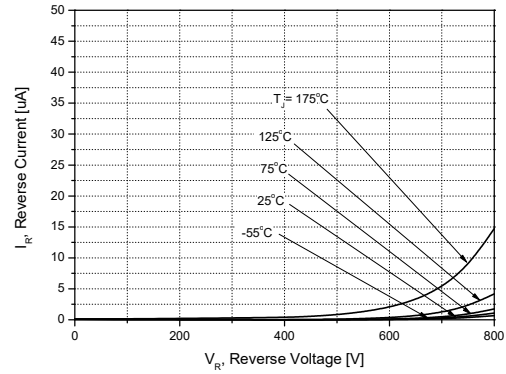


Figure 2. Reverse Characteristics

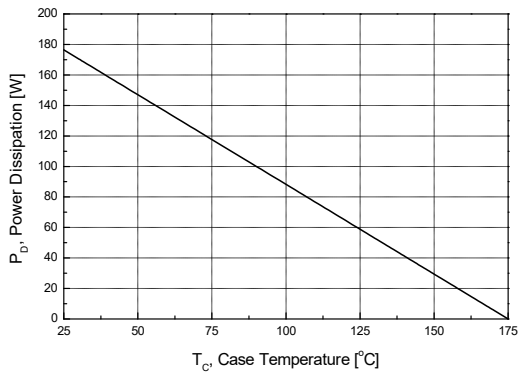


Figure 3. Power Dissipation

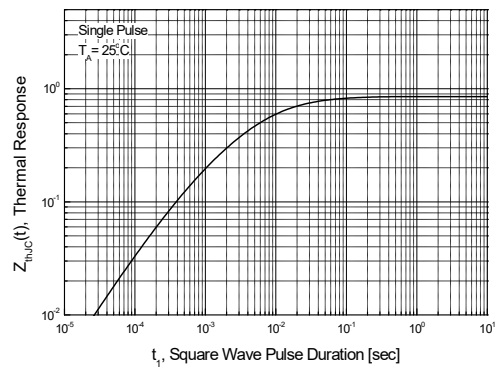


Figure 4. Transient Thermal Resistance

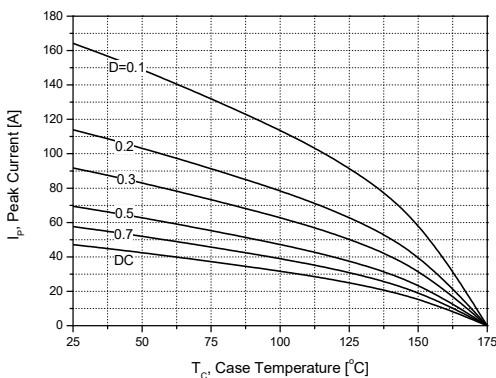


Figure 5. Peak Forward Current Derating

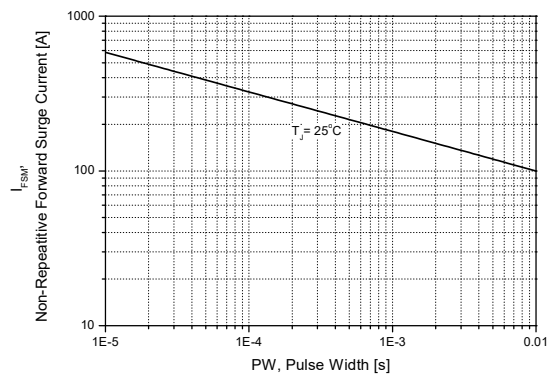
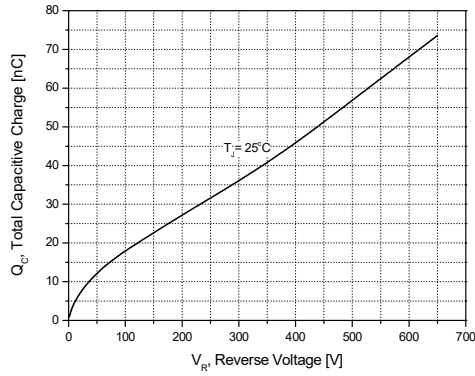
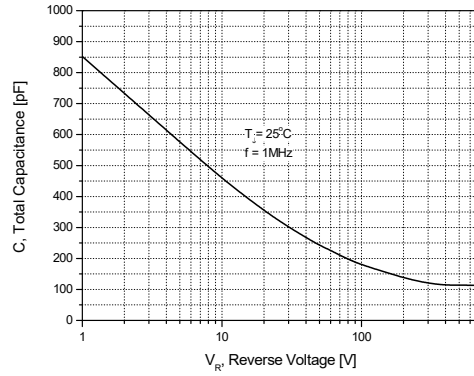


Figure 6. Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

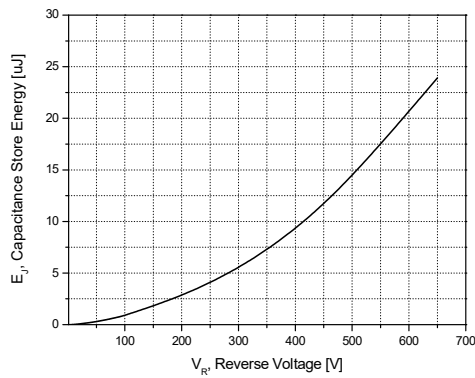
### Typical Characteristics (Per Leg)



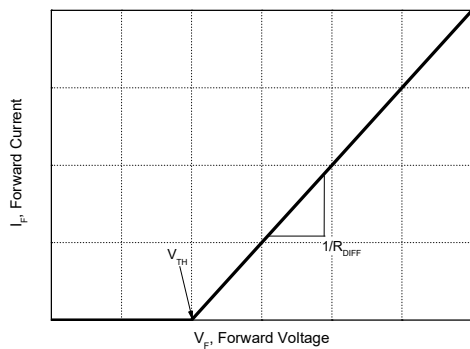
**Figure 7. Total Capacitive Charge**



**Figure 8. Total Capacitance**



**Figure 9. Capacitance Store Energy**



**Figure 10. Equivalent Forward Current Curve**

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

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

$$V_{TH}(T_j) = -0.001 \times (T_j) + 0.950 \text{ [V]}$$

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

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

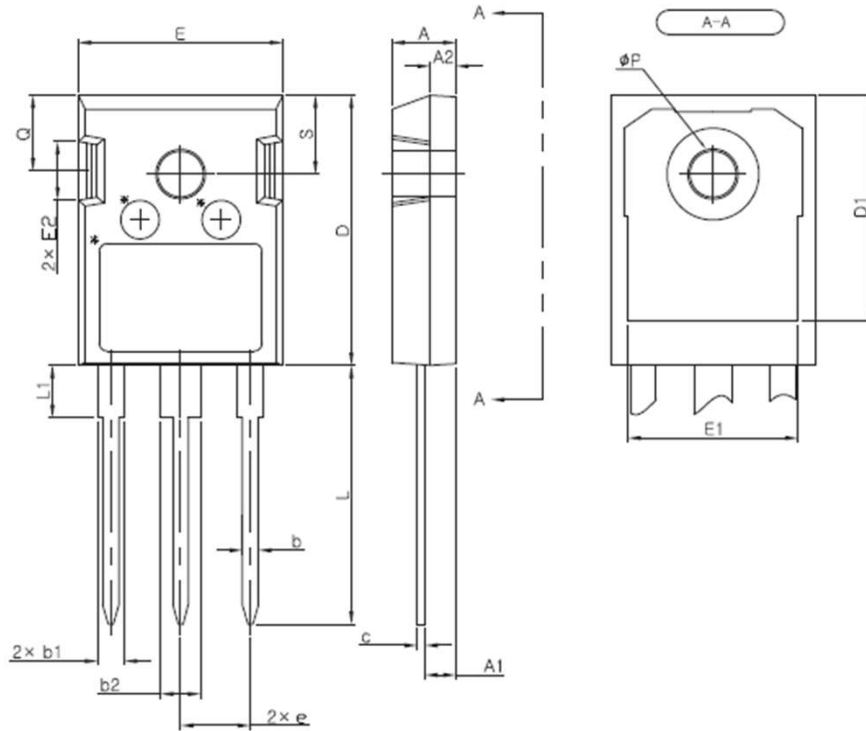
$$A = 6.82 \times 10^{-7}$$

$$B = 8.19 \times 10^{-5}$$

$$C = 2.46 \times 10^{-2}$$

[T<sub>j</sub> [°C]; -55 °C ≤ T<sub>j</sub> ≤ 175 °C; IF ≤ 20 A]

Package Information

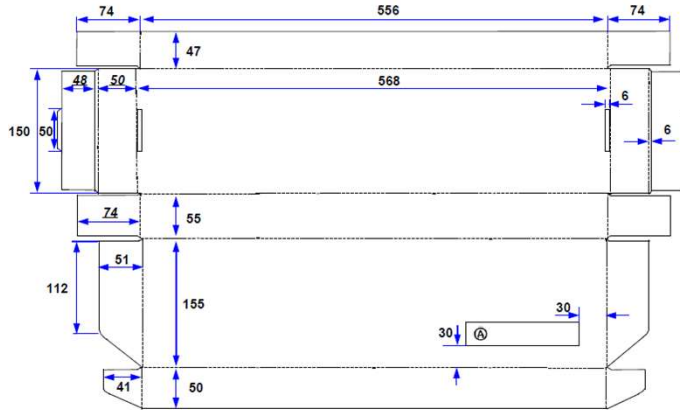



SYMBOL	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.29	2.41	2.54
A2	1.90	2.00	2.10
b	1.10	1.20	1.30
b1	1.91	2.10	2.20
b2	2.92	3.10	3.20
c	0.50	0.60	0.70
D	20.80	21.07	21.34
D1	17.43	17.63	17.83
E	15.75	15.94	16.13
E1	13.06	13.26	13.46
E2	4.32	4.58	4.83
e	5.45 BSC		
L	19.81	20.19	20.57
L1	3.81	4.07	4.32
phi P	3.55	3.60	3.65
Q	5.59	5.90	6.20
S	6.15 BSC		

**NOTE**  
 1. THESE DIMENSION DO NOT INCLUDE MOLD PROTRUSION

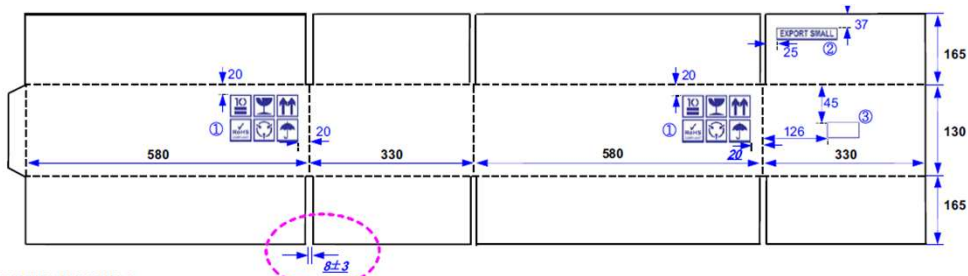
## Packing Information

### Inner Box



PART ID PDXXXXXXEX_G	PKG Type XX-XXXX-XX
LOT No. XXXXXXXXXXXXXX	QTY X,XXX ea
	
DATE : XXXX.XX.XX	

### Outer Box



[ BOX PRINTING MARKING ]

①



MARKING SIZE (Each Symbol 30\*30)  
COLOR (DARK BLUE)

② **EXPORT SMALL**  
MARKING SIZE (112\*20)  
COLOR (DARK BLUE)

③   
LABEL MARKING SIZE (75\*35)  
COLOR (DARK BLUE)

- [ NOTE ]
- MATERIAL : KLB175\*K180\*KLB175\*K180\*KLB175  
(SUK175\*K200\*K200\*K200\*SUK175)
  - NAIL QTY : 3 PCS
  - PRINTING TOLERANCE : MARKING SIZE(±3)  
MARKING POSITION(±5)

PART ID : PDXXXXXXEX_G	
LOT NO : XXXXXXXXXXXXX	
QTY : XX,XXXX ea	
	
DATE : XXXX.XX.XX	

## Notes

- A. Specifications mentioned in this publication are subject to change without notice.
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