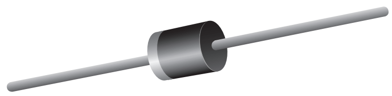
High Current Axial Plastic Rectifier



P600

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	6.0 A
V_{RRM}	50 V, 100 V, 200 V, 400 V, 600 V, 800 V
I_{FSM}	400 A
I_R	5.0 μA
V_F	0.9 V, 0.95 V
T_J max.	150 °C
Package	P600
Diode variations	Single die

FEATURES

- Low forward voltage drop
- Low leakage current, I_R less than 0.1 μA
- High forward current capability
- High forward surge capability
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS
COMPLIANT

TYPICAL APPLICATIONS

For use in general purpose rectification of power supplies, inverters, converters, and freewheeling diodes application.

Note

- These devices are not AEC-Q101 qualified.

MECHANICAL DATA

Case: P600, void-free molded epoxy body
Molding compound meets UL 94 V-0 flammability rating
Base P/N-E3 - RoHS-compliant, commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
E3 suffix meets JESD 201 class 1A whisker test

Polarity: Color band denotes cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

PARAMETER		SYMBOL	GI750	GI751	GI752	GI754	GI756	GI758	UNIT
Maximum repetitive peak reverse voltage		V_{RRM}	50	100	200	400	600	800	V
Maximum RMS voltage		V_{RMS}	35	70	140	280	420	560	V
Maximum DC blocking voltage		V_{DC}	50	100	200	400	600	800	V
Maximum non-repetitive peak reverse voltage		V_{RSM}	60	120	240	480	720	1200	V
Maximum average forward rectified current at	T_A =60 °C, PCB mounting (fig. 1)	$I_{F(AV)}$	6.0						A
	T_L = 60 °C,0.125" (3.18 mm) lead length (fig. 2)		22						
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load		I_{FSM}	400						A
Operating junction and storage temperature range		T_J, T_{STG}	- 50 to + 150						°C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

PARAMETER	TEST CONDITIONS		SYMBOL	GI750	GI751	GI752	GI754	GI756	GI758	UNIT
Maximum instantaneous forward voltage at	6.0 A		V_F	0.90					0.95	V
	100 A			1.25					1.30	
Maximum DC reverse current at rated DC blocking voltage		T_A = 25 °C	I_R	5.0						μA
		T_A = 100 °C		1.0						mA
Typical reverse recovery time	I_F = 0.5 A, I_R = 1.0 A, I_{rr} = 0.25 A		t_{rr}	2.5						μs
Typical junction capacitance	4.0 V, 1 MHz		C_J	150						pF

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)								
PARAMETER	**SYMBOL**	**GI750**	**GI751**	**GI752**	**GI754**	**GI756**	**GI758**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	20						°C/W
	$R_{\theta JL}$ (1)	4.0						

Note

(1) Thermal resistance from junction to ambient and from junction to lead at 0.375" (9.5 mm) lead length, PCB mounted with 1.1" x 1.1" (30 mm x 30 mm) copper pads

ORDERING INFORMATION (Example)				
PREFERRED P/N	**UNIT WEIGHT (g)**	**PREFERRED PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
GI756-E3/54	2.1	54	800	13" diameter paper tape and reel
GI756-E3/73	2.1	73	300	Ammo pack packaging

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

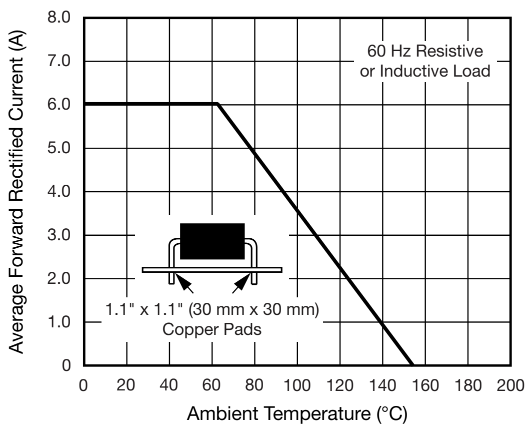


Fig. 1 - Maximum Forward Current Derating Curve

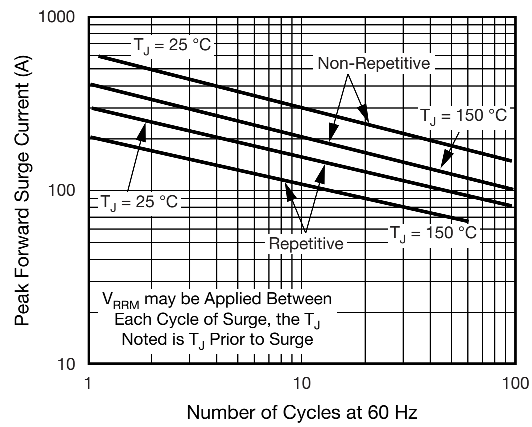


Fig. 3 - Maximum Peak Forward Surge Current

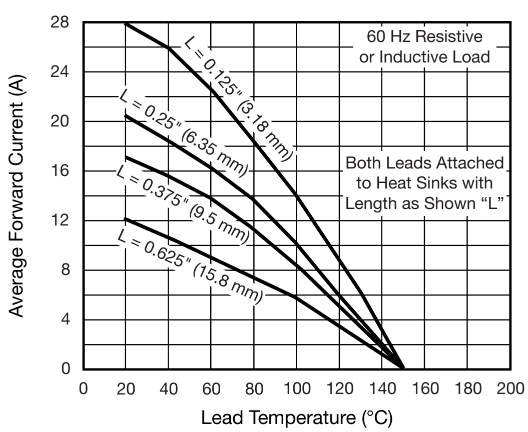


Fig. 2 - Maximum Forward Current Derating Curve

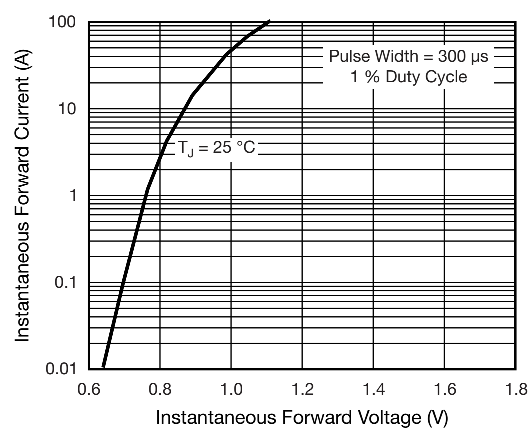


Fig. 4 - Typical Instantaneous Forward Characteristics

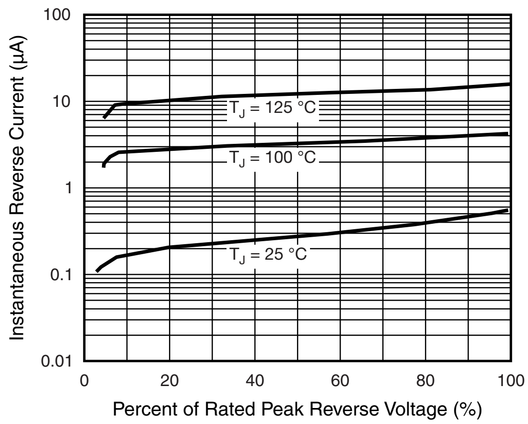


Fig. 5 - Typical Reverse Characteristics

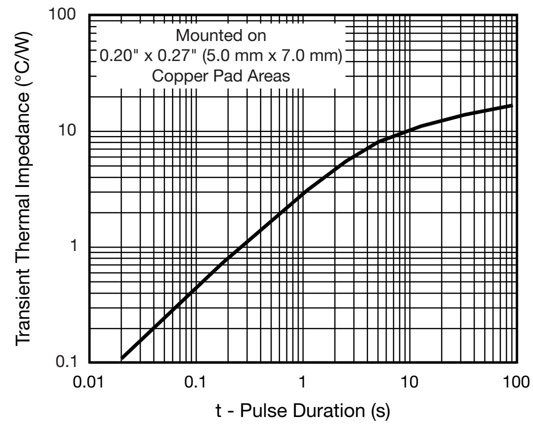
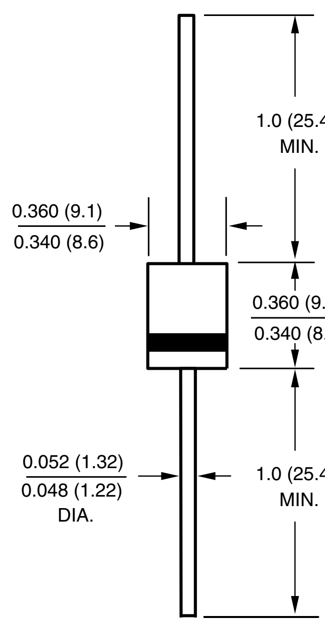


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

P600



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Standard Recovery Diodes (Hockey PUK Version), 800 A

DO-200AA

PRODUCT SUMMARY	
$I_{F(AV)}$	800 A
Package	DO-200AA
Circuit configuration	Single Diode

FEATURES

- Wide current range
- High voltage ratings up to 2400 V
- High surge current capabilities
- Diffused junction
- Hockey PUK version
- Case style DO-200AA
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS
COMPLIANT

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	**TEST CONDITIONS**	**VALUES**	**UNITS**
$I_{F(AV)}$		800	A
	T_{hs}	55	°C
$I_{F(RMS)}$		1435	A
	T_{hs}	25	°C
I_{FSM}	50 Hz	8250	A
	60 Hz	8640	
I^2t	50 Hz	340	kA^2s
	60 Hz	311	
V_{RRM}	Range	400 to 2400	V
T_J		- 40 to 190	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	**VOLTAGE CODE**	**V_{RRM}, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V**	**V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V**	**I_{RRM} MAXIMUM AT T_J = 150 °C mA**
VS-SD400C..C	04	400	500	15
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
	24	2400	2500	

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled			800 (425)	A
					55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled			1435	A
Maximum peak, one-cycle forward, non-repetitive surge current	I_{FSM}	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	8250	
		t = 8.3 ms			8640	
		t = 10 ms	50 % V_{RRM} reapplied		6940	
		t = 8.3 ms			7265	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		340	kA^2s
		t = 8.3 ms			311	
		t = 10 ms	50 % V_{RRM} reapplied		241	
		t = 8.3 ms			220	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			3400	$kA^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.80	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.83	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.55	mΩ
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.53	
Maximum forward voltage drop	V_{FM}	I_{pk} = 1930 A, $T_J = T_J$ maximum, t_p = 10 ms sinusoidal wave			1.86	V

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	T_J		- 40 to 190	°C
Maximum storage temperature range	T_{Stg}		- 55 to 200	
Maximum thermal resistance, junction to heatsink	R_{thJ-hs}	DC operation single side cooled	0.163	K/W
		DC operation double side cooled	0.073	
Mounting force, ± 10 %			4900 (500)	N (kg)
Approximate weight			70	g
Case style		See dimensions - link on page 5	DO-200AA	

ΔR_{thJ-hs} CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.017	0.018	0.011	0.012	$T_J = T_J$ maximum	K/W
120°	0.020	0.020	0.020	0.020		
90°	0.025	0.025	0.027	0.027		
60°	0.037	0.036	0.038	0.038		
30°	0.064	0.062	0.065	0.062		

Note

- The table above shows the increment of thermal resistance R_{thJ-hs} when devices operate at different conduction angles than DC

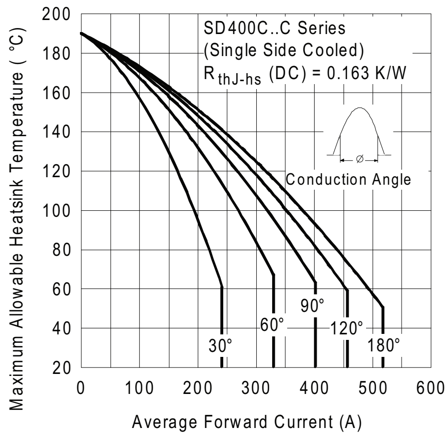


Fig. 1 - Current Ratings Characteristics

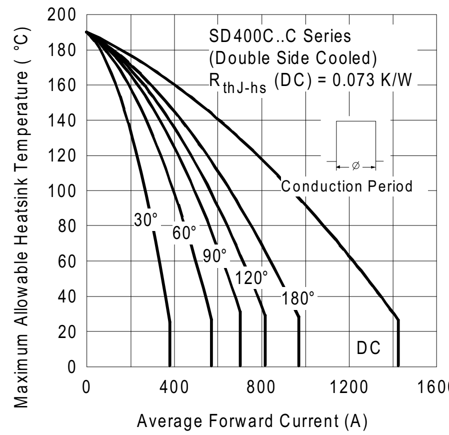


Fig. 4 - Current Ratings Characteristics

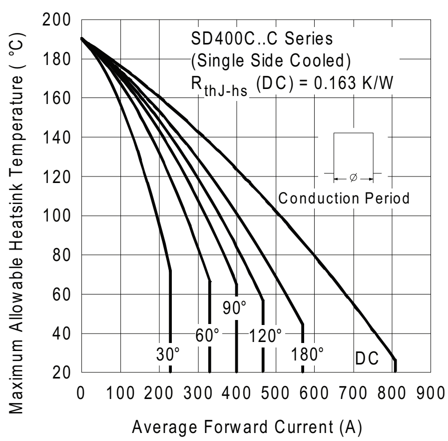


Fig. 2 - Current Ratings Characteristics

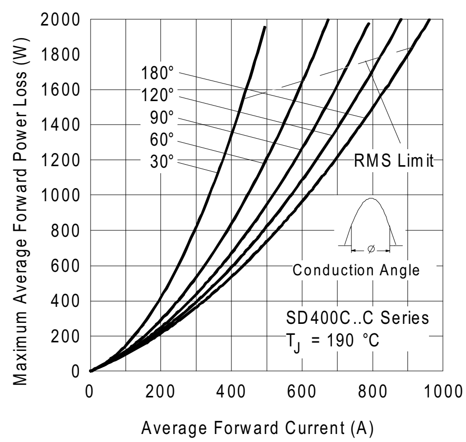


Fig. 5 - Forward Power Loss Characteristics

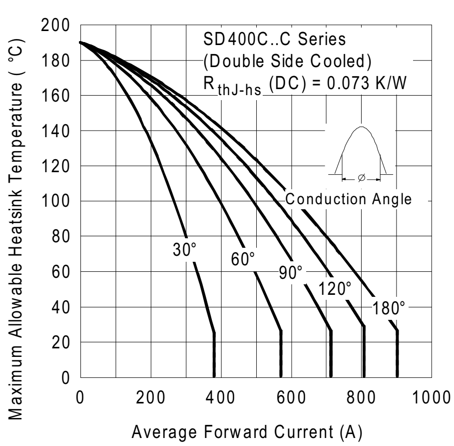


Fig. 3 - Current Ratings Characteristics

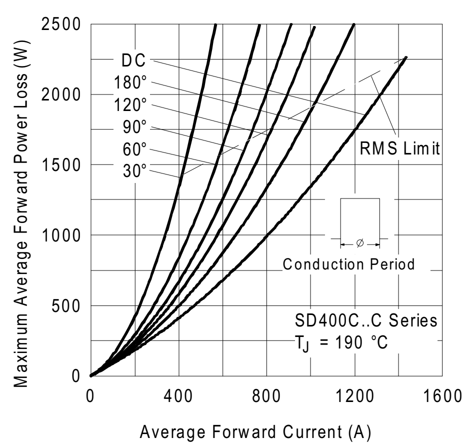


Fig. 6 - Forward Power Loss Characteristics

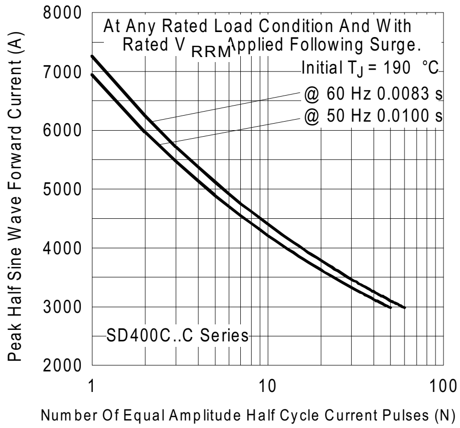


Fig. 7 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

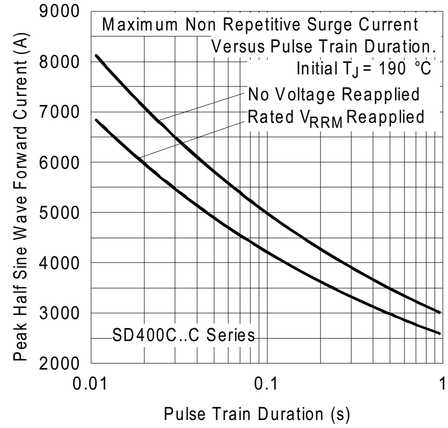


Fig. 8 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

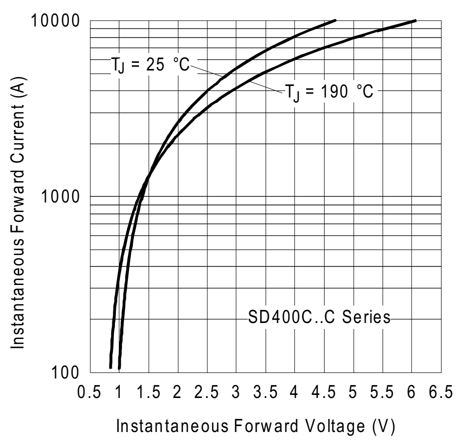


Fig. 9 - Forward Voltage Drop Characteristics

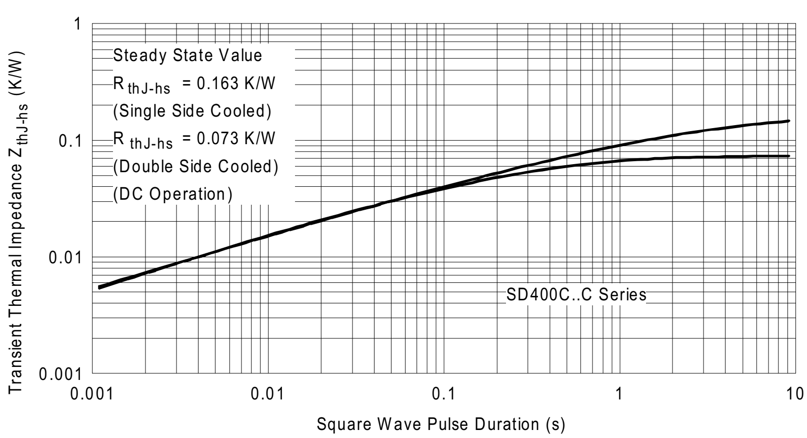


Fig. 10 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

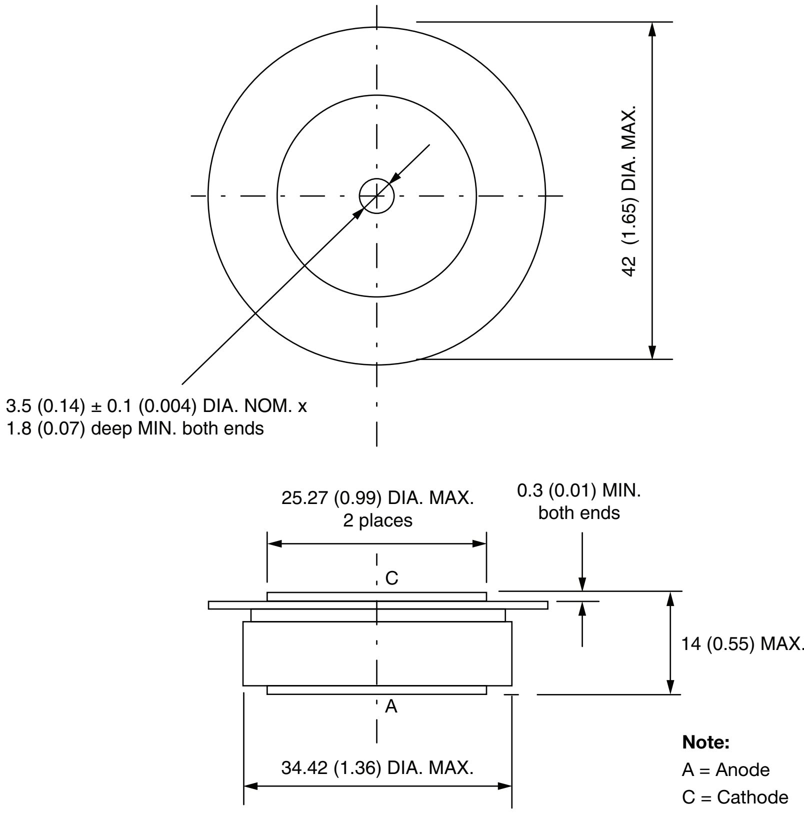
Device code	VS-	SD	40	0	C	24	C
	1	2	3	4	5	6	7

1	-	Vishay Semiconductors product
2	-	Diode
3	-	Essential part number
4	-	0 = Standard recovery
5	-	C = Ceramic PUK
6	-	Voltage code x 100 = V_{RRM} (see Voltage Ratings table)
7	-	C = PUK case DO-200AA

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95248

DO-200AA

DIMENSIONS in millimeters (inches)



Note:
A = Anode
C = Cathode

Quote between upper and lower pole pieces has to be considered after application of mounting force (see Thermal and Mechanical Specifications)

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Physical Explanation

GENERAL TERMINOLOGY

Semiconductor diodes are used as rectifiers, switches, varactors and voltage stabilizers (see Zener data book).

Semiconductor diodes are two-terminal solid-state devices having asymmetrical voltage-current characteristics. Unless otherwise stated, this means a device has single pn-junction corresponding to the characteristics shown in figure 1.

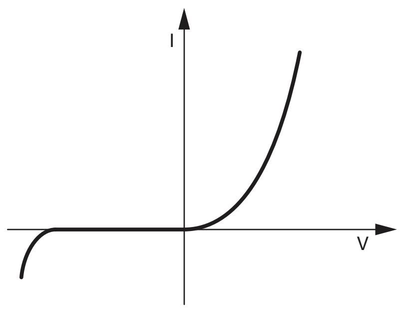


Fig. 1

An application of the voltage current curve is given by

$$I = I_S\left(\exp \frac{V}{V_T} - 1\right)$$

where

I_S = saturation current

$V_T = \frac{k \times T}{q}$ = temperature potential

If the diode is forward-biased (anode positive with respect to cathode), its forward current ($I = I_F$) increases rapidly with increasing voltage. That is, its resistance becomes very low.

If the diode is reverse-biased (anode negative with respect to cathode), its reverse current ($-I = I_R$) is extremely low. This is only valid until the breakdown voltage V_{BR} has been reached. When the reverse voltage is slightly higher than the breakdown voltage, a sharp rise in reverse current results.

Bulk resistance

Resistance of the bulk material between junction and the diode terminals.

Parallel resistance, r_P

Diode resistance resulting from HF rectification which acts as a damping resistance to the pre-tuned demodulation circuit.

Differential resistance

See forward resistance, differential

Diode capacitance, C_D

Total capacitance between the diode terminals due to case, junction and parasitic capacitances.

Breakdown voltage, V_{BR}

Reverse voltage at which a small increase in voltage results in a sharp rise of reverse current. It is given in the technical data sheet for a specified current.

Forward voltage, V_F

The voltage across the diode terminals which results from the flow of current in the forward direction.

Forward current, I_F

The current flowing through the diode in the direction of lower resistance.

Forward resistance, r_F

The quotient of DC forward voltage across the diode and the corresponding DC forward current.

Forward resistance, differential r_f

The differential resistance measured between the terminals of a diode under specified conditions of measurement, i.e., for small-signal AC voltages or currents at a point of forward direction V-I characteristic.

Case capacitance, C_{case}

Capacitance of a case without a semiconductor crystal.

Integration time, t_{av}

With certain limitations, absolute maximum ratings given in technical data sheets may be exceeded for a short time. The mean value of current or voltage is decisive over a specified time interval termed integration time. These mean values over time interval, t_{av}, should not exceed the absolute maximum ratings.

Average rectified output current, I_{FAV}

The average value of the forward current when using the diode as a rectifier. The maximum allowable average rectified output current depends on the peak value of the applied reverse voltage during the time interval at which no current is flowing. In the absolute maximum ratings, one or both of the following are given:

- The maximum permissible average rectified output current for zero diode voltage (reverse).
- The maximum permissible average rectified output current for the maximum value of V_{RRM} during the time interval at which no current is flowing.

Note

- I_{FAV} decreases with an increasing value of the reverse voltage during the interval of no current flow.

Physical Explanation

Rectification efficiency, η_r

The ratio of the DC load voltage to the peak input voltage of an RF rectifier.

Series resistance, r_s

The total value of resistance representing the bulk, contact and lead resistance of a diode given in the equivalent circuit diagram of variable capacitance diodes.

Junction capacitance, C_J

Capacitance due to a pn junction of a diode which decreases with increasing reverse voltage.

Reverse voltage, V_R

The voltage drop which results from the flow of reverse current (through the semiconductor diode).

Reverse current, I_R (leakage current)

The current which flows when reverse bias is applied to a semiconductor junction.

Reverse resistance, R_R

The quotient of the DC reverse voltage across a diode and the corresponding DC reverse current.

Reverse resistance, differential, r_r

The differential resistance measured between the terminals of a diode under specified condition of measurement i.e., for small-signal (AC) voltage or currents at a point of reverse-voltage direction V-I characteristic.

Peak forward current, I_{FRM}

The maximum forward current with sine-wave operation, $f \geq 25$ Hz, or pulse operation, $f \geq 25$ Hz, having a duty cycle $t_p/T \leq 0.5$.

Peak reverse voltage, V_{RRM}

The maximum reverse voltage having an operating frequency $f \geq 25$ Hz for sine-wave as well as pulse operation.

Peak surge forward current, I_{FSM}

The maximum permissible surge current in a forward direction having a specified waveform with a short specified time interval (i.e., 10 ms) unless otherwise specified. It is not an operating value. During frequent repetitions, there is a possibility of change in the device's characteristic.

Peak surge reverse voltage, V_{RSM}

The maximum permissible surge voltage applied in a reverse direction. It is not an operating value. During frequent repetitions, there is a possibility of change in the device's characteristic.

Power dissipation, P_V

An electrical power converted into heat. Unless otherwise specified, this value is given in the data sheets under absolute maximum ratings, with T_A = 25 °C at a specified distance from the case (both ends).

Switching on Characteristic

Forward recovery time, t_{fr}

The time required for the voltage to reach a specified value (normally 110 % of the steady state forward voltage drop), after instantaneous switching from zero or a specified reverse voltage to a specified forward biased condition (forward current).

This recovery time is especially noticeable when higher currents are to be switched within a short time. The reason is that the forward resistance during the turn-on time could be higher than the DC current (inductive behavior). This can result in the destruction of a diode because of high instantaneous power loss if constant current control is used.

Turn on transient peak voltage, V_{fp}

The voltage peak (overshoot) after instantaneous switching from zero or a specified reverse voltage to a specified forward biased condition (forward current). The forward recovery is very important especially when higher forward currents must be switched on within a very short time (switching on losses).

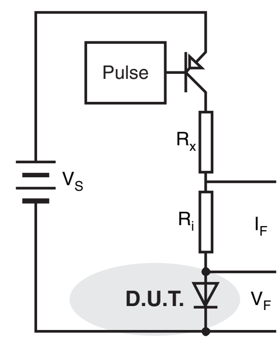


Fig. 2

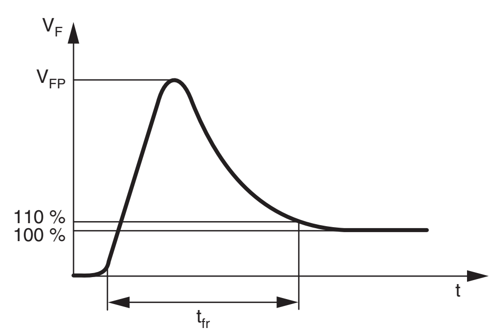


Fig. 3

Switching off Characteristic, Inductive Load

Reverse recovery time, t_{rr}

The time required for the current to reach a specified reverse current, i_R (normally 0.25 % of I_{RM}), after switching from a specified forward current I_F to a specified reverse biased condition (reverse voltage V_{Batt}) with a specified slope dI_F/dt.

Physical Explanation

Peak reverse recovery current, I_{RM}

The peak reverse current after switching from a specified forward current I_F to a specified reverse biased condition (reverse voltage V_R) with a specified switching slope dI_F/dt.

The reverse recovery is very important especially when switching from higher currents to high reverse voltage within a very short time (switching off losses).

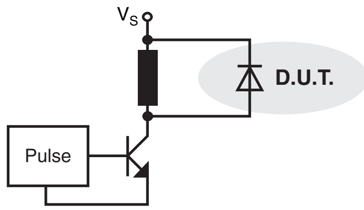


Fig. 4

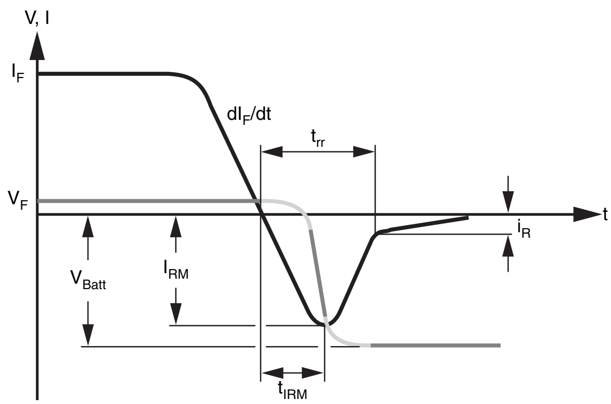


Fig. 5

Reverse avalanche energy, E_R

The reverse avalanche energy when using the rectifier as a freewheeling diode with an indicutive load. When the inductance is switched off, the current through the inductance will keep on flowing through the D.U.T. until the stored energy,

$$E_R = \frac{1}{2} \times L \times I^2$$

is dissipated within the rectifier. Under this condition the diode is in a reverse avalanche mode with a reverse current at the beginning which is equal to the current that was flowing through the inductance just before it was switched off.

The reverse energy capability depends on the reverse current and the junction temperature prior to the avalanche mode.

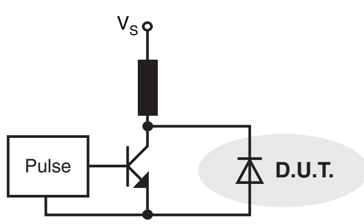


Fig. 6

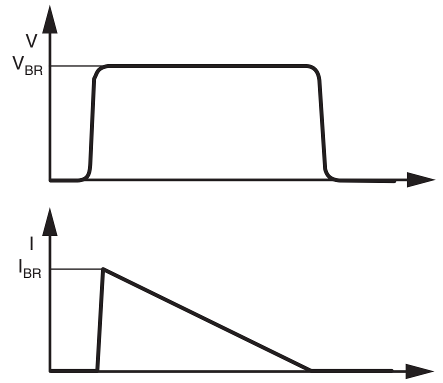


Fig. 7

Switching off Characteristic, Instantaneous Switching

Reverse recovery time, t_{rr}

The time required for the current to reach a specified reverse current, i_R (normally 0.25 A), after instantaneous switching from a specified forward current I_F (normally 0.5 A) to a specified reverse current I_R (normally 1.0 A).

Reverse recovery charge, Q_{rr}

The charged stored within the diode when instantaneous switched from a specified forward current I_F (normally 0.5 A) to a specified reverse current I_R (normally 1.0 A).

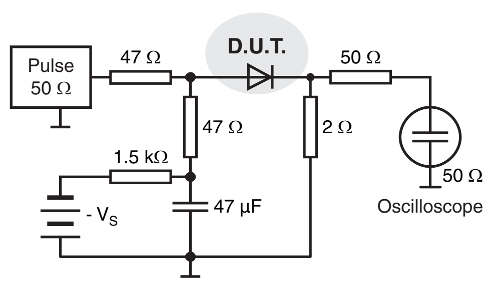


Fig. 8

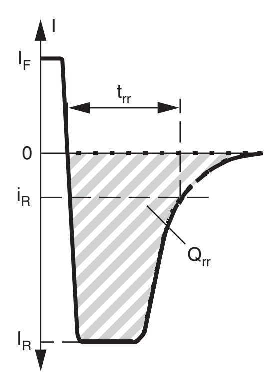


Fig. 9

C3D08065I

Silicon Carbide Schottky Diode

Z-REC® RECTIFIER

V_{RRM}	=	650 V
I_F (T_C=130˚C)	=	8 A
Q_c	=	21 nC

Features

- 650-Volt Schottky Rectifier
- Ceramic Package Provides 2.5kV Isolation
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Positive Temperature Coefficient on V_F

Benefits

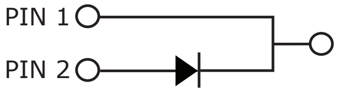
- Electrically Isolated Package
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- HVAC
- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter Stages
- AC/DC converters

Package

TO-220 Isolated



Part Number	Package	Marking
C3D08065I	Isolated TO-220-2	C3D08065I

Maximum Ratings (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
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	16.5 8 7.5	A	T_C=25˚C T_C=130˚C T_C=135˚C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	29 19	A	T_C=25˚C, t_P=10 ms, Half Sine Wave T_C=110˚C, t_P=10 ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	69 55	A	T_C=25˚C, t_P=10 ms, Half Sine Wave T_C=110˚C, t_P=10 ms, Half Sine Wave	
$I_{F,Max}$	Non-Repetitive Peak Forward Surge Current	650 530	A	T_C=25˚C, t_P = 10 µs, Pulse T_C=110˚C, t_P = 10 µs, Pulse	
P_{tot}	Power Dissipation	53.6 23.2	W	T_C=25˚C T_C=110˚C	Fig. 4
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.1	1.8 2.4	V	I_F = 8 A T_J=25°C I_F = 8 A T_J=175°C	Fig. 1
I_R	Reverse Current	10 12	51 204	µA	V_R = 650 V T_J=25°C V_R = 650 V T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	20		nC	V_R = 400 V, I_F = 8A di/dt = 500 A/μs T_J = 25°C	Fig. 5
C	Total Capacitance	395 37 32		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 200 V, T_J = 25˚C, f = 1 MHz V_R = 400 V, T_J = 25˚C, f = 1 MHz	Fig. 6
E_C	Capacitance Stored Energy	3.0		μJ	V_R = 400 V	Fig. 7

Note:This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Package Thermal Resistance from Junction to Case	2.8	°C/W	Fig. 8

Typical Performance

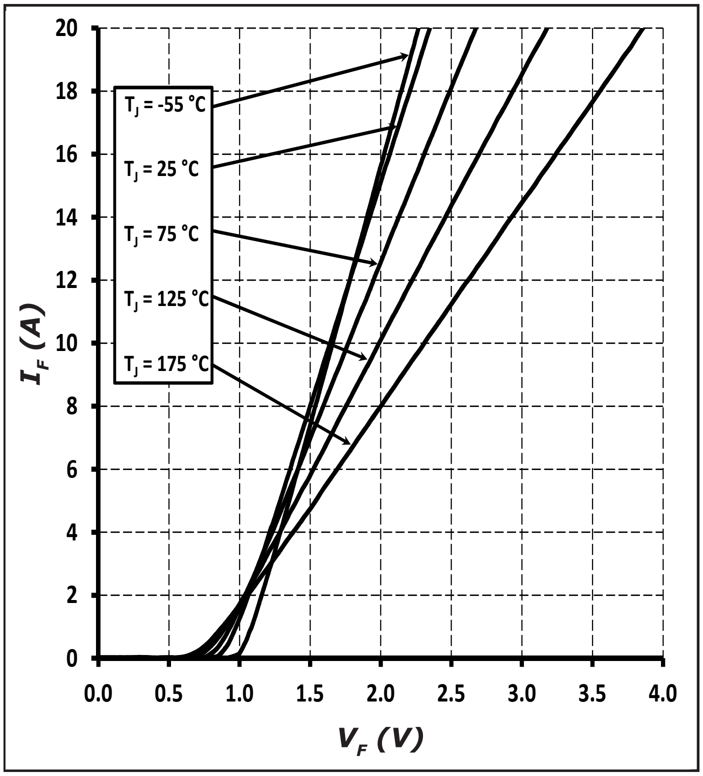


Figure 1. Forward Characteristics

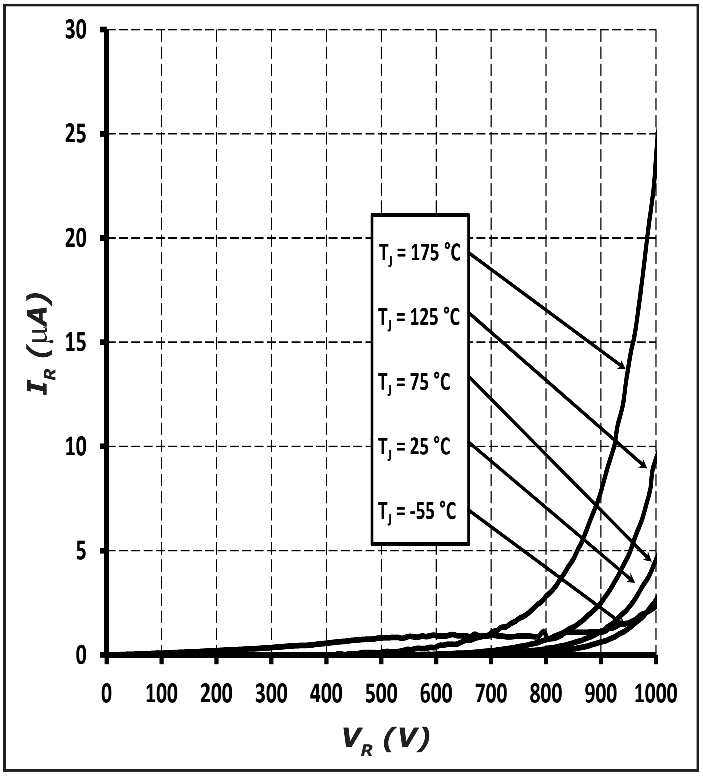


Figure 2. Reverse Characteristics

Typical Performance

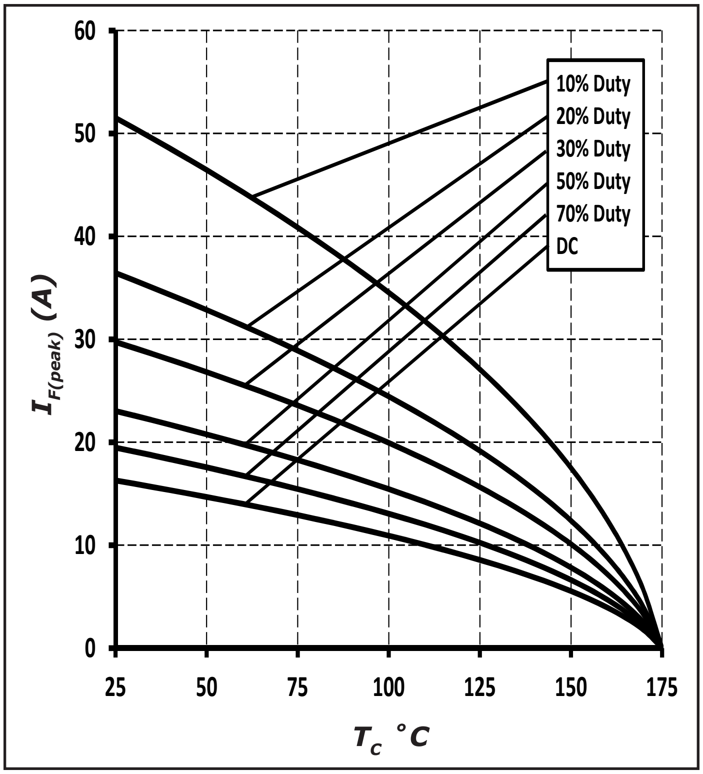


Figure 3. Current Derating

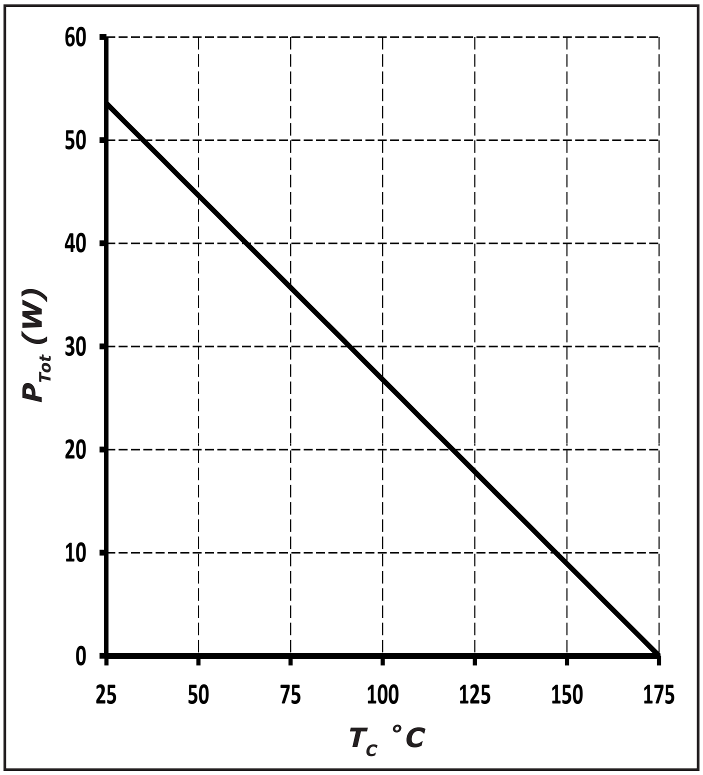


Figure 4. Power Derating

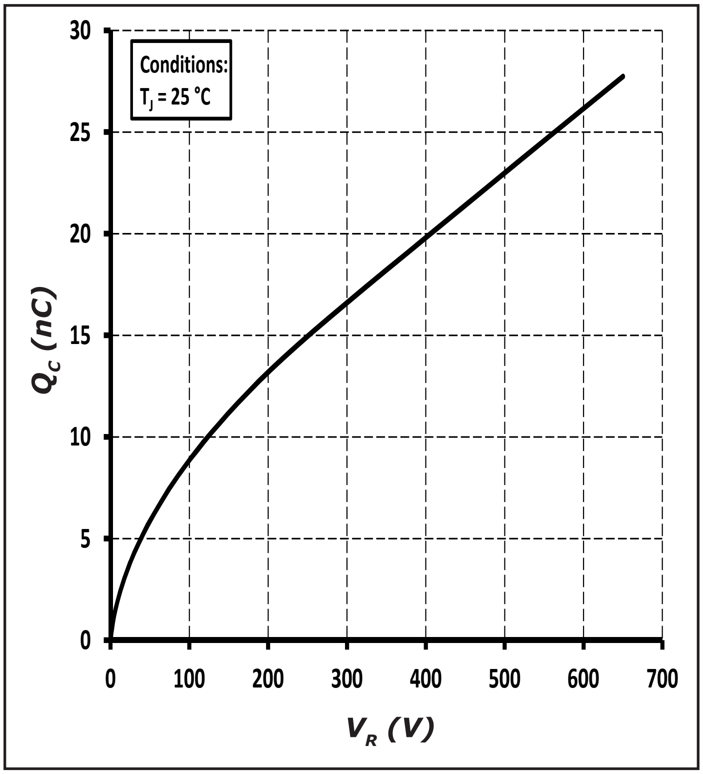


Figure 5. Total Capacitance Charge vs. Reverse Voltage

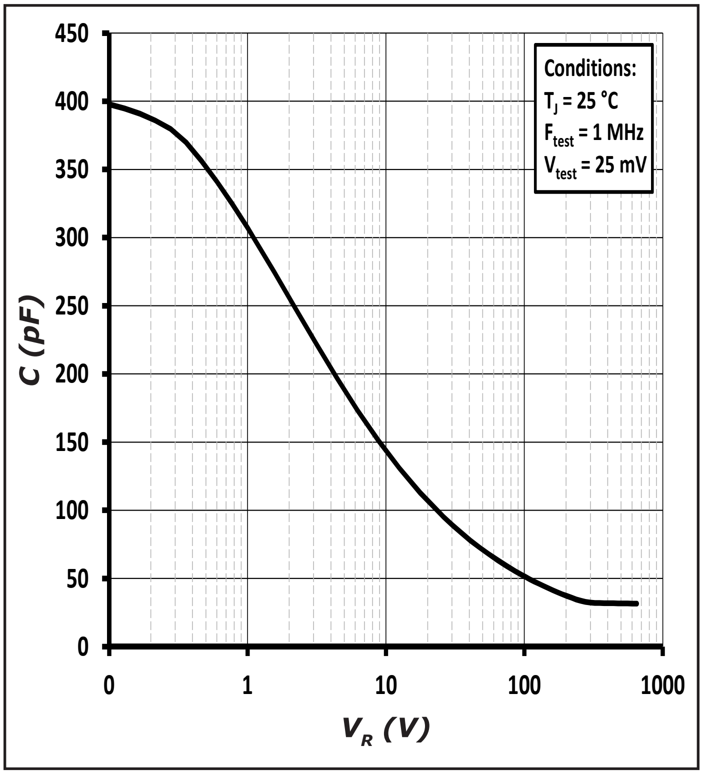


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

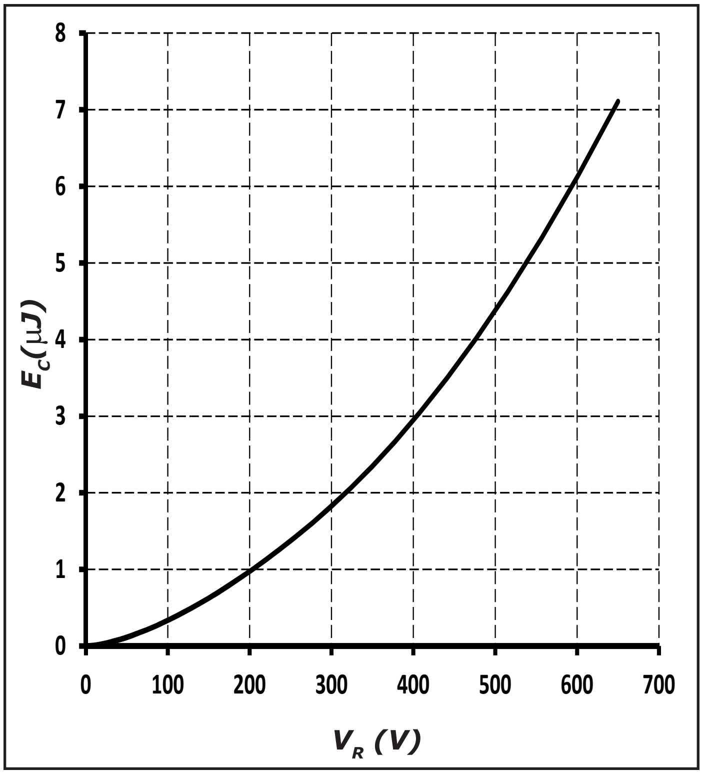


Figure 7. Capacitance Stored Energy

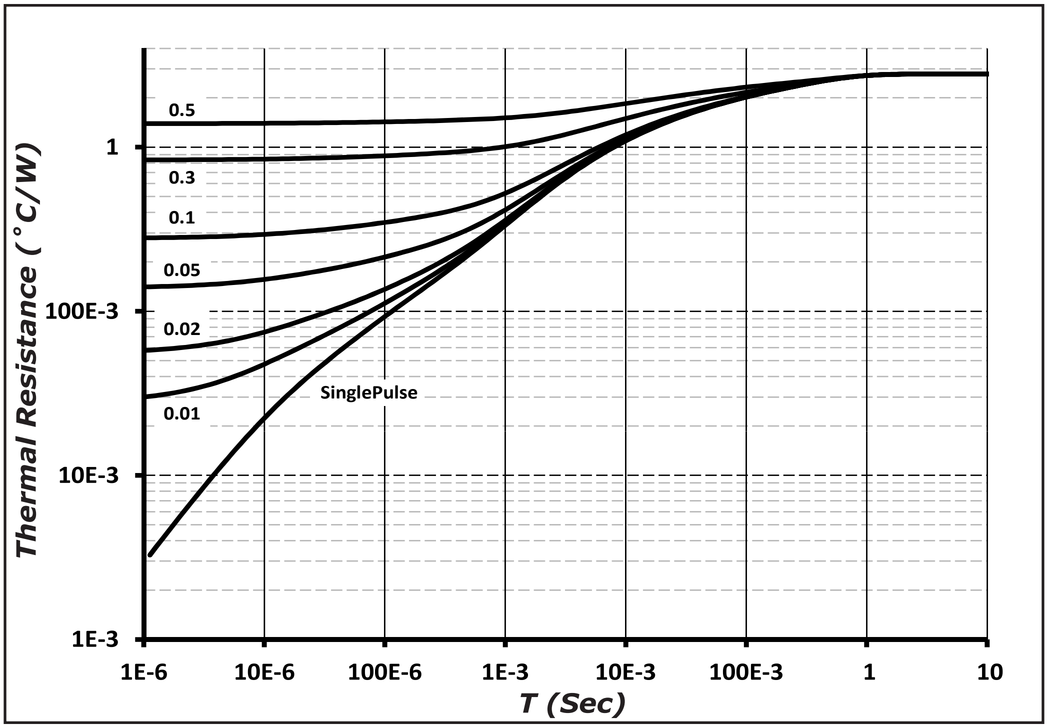
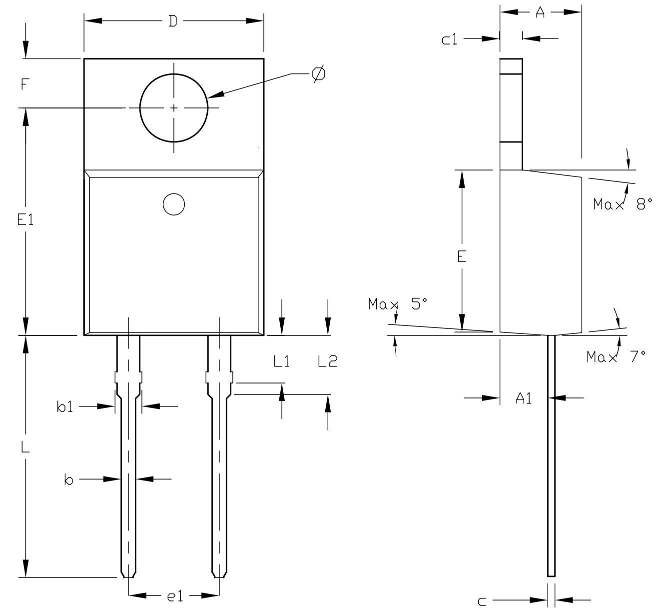


Figure 9. Transient Thermal Impedance

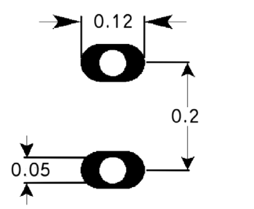
Package Dimensions

Package TO-220-2



Symbol	Dimension in Millimeters		Dimension in Inches	
	Min	Max	Min	Max
A	4.420	4.720	0.174	0.186
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.360	0.460	0.014	0.018
c1	1.170	1.370	0.046	0.054
D	9.960	10.250	0.392	0.404
E	8.990	9.290	0.354	0.366
E1	12.550	12.850	0.494	0.506
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
L	13.080	13.480	0.515	0.531
L1	2.470	2.870	0.097	0.113
L2	3.200	3.600	0.126	0.142
Ø	3.790	3.890	0.149	0.153
θ1	Max 8°			
θ2	Max 7°			
θ3	Max 5°			
T	Max 0.0205		Max 0.52	

Recommended Solder Pad Layout



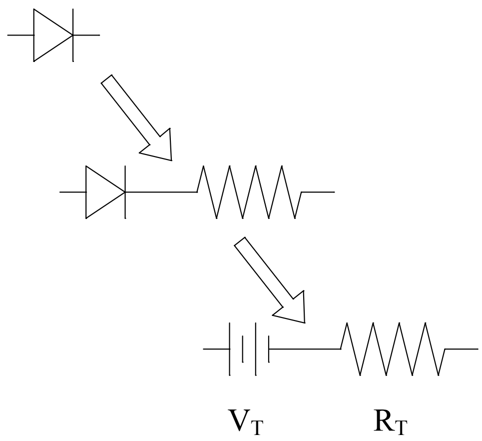
all units are in inches

TO-220-2

Part Number	Package	Marking
C3D08065I	Isolated TO-220-2	C3D08065I

Note: Recommended soldering profiles can be found in the applications note here:
http://www.wolfspeed.com/power_app_notes/soldering

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_T = 0.95 + (T_J * -1.2*10^{-3})$$
$$R_T = 0.054 + (T_J * 5.5*10^{-4})$$

Note: T_j = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

Notes

- **RoHS Compliance**
  The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Wolfspeed representative or from the Product Ecology section of our website at http://www.wolfspeed.com/power/tools-and-support/product-ecology.

- **REACh Compliance**
  REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future,please contact a Cree representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

- This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control systems.

Related Links

- Cree SiC Schottky diode portfolio: http://www.wolfspeed.com/Power/Products#SiCSchottkyDiodes
- Schottky diode Spice models: http://www.wolfspeed.com/power/tools-and-support/DIODE-model-request2
- SiC MOSFET and diode reference designs: http://go.pardot.com/l/101562/2015-07-31/349i

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
Fax: +1.919.313.5451
www.cree.com/power