

FEATURES

- Low reverse recovery charge
- High switching speed
- Low forward voltage drop
- Outstanding thermal cycling capability
- All-FRD configuration
- High tolerance of non-uniform clamping pressure

APPLICATIONS

- High voltage DC transmission
- Flexible AC transmission systems
- High reliability inverters
- Motor controllers

ORDERING INFORMATION

Order As:

DPF2100P45A0052

Note: When ordering, please use the complete part number

KEY PARAMETERS

V_{RRM}		4500V
V_F	(typ)	2.4V
I_F	(max)	2100A
I_{FM}	(max)	4200A

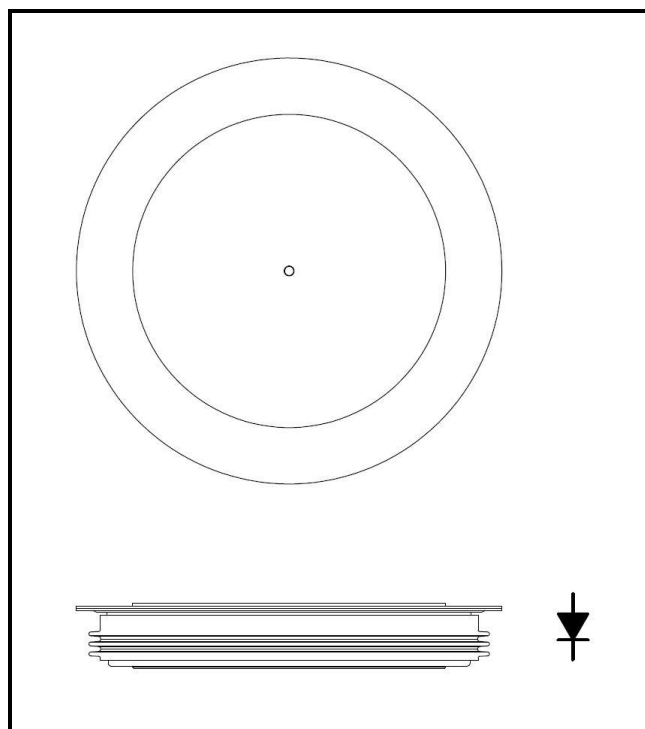
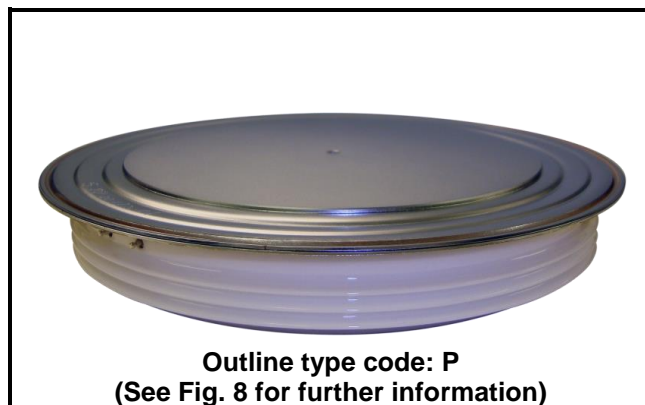


Fig.1 Circuit configuration



Outline type code: P
(See Fig. 8 for further information)

Fig. 2 Package

ABSOLUTE MAXIMUM RATINGS

Stresses above those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture of the package. Appropriate safety precautions should always be followed. Exposure to Absolute Maximum Ratings may affect device reliability.

$T_{\text{case}} = 25^{\circ}\text{C}$ unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
V_{RRM}	Repetitive peak reverse voltage		4500	V
I_{F}	Forward current	$T_{\text{case}} = 105^{\circ}\text{C}$	2100	A
I_{FM}	Max. forward current	1ms, $T_{\text{j}} = 125^{\circ}\text{C}$	4200	A
P_{max}	Max. power dissipation	$T_{\text{case}} = 25^{\circ}\text{C}$, $T_{\text{j}} = 125^{\circ}\text{C}$	22.7	kW
I_{FSM}	Surge (non-repetitive) on-state current	10ms half-sine, $T_{\text{case}}=125^{\circ}\text{C}$, $V_{\text{R}}=0\text{V}$	40.8	kA

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
$R_{\text{th(j-c)}} *$	Thermal resistance – junction to case (cathode side)	DC	-	0.0044	$^{\circ}\text{C/W}$
$R_{\text{th(c-h)}} *$	Thermal resistance – case to heatsink (cathode side)	Clamping force 70kN (with mounting compound)	-	0.0018	$^{\circ}\text{C/W}$
T_{vj}	Virtual junction temperature	-	-	125	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-	-40	125	$^{\circ}\text{C}$
F_{m}	Clamping force	-	65	75	kN

Note:

* Heat transfer occurs primarily through the cathode side of the device.

ELECTRICAL CHARACTERISTICS

$T_{case} = 25^{\circ}\text{C}$ unless stated otherwise.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I_{RM}	Collector cut-off current	$V_R = V_{RRM}$			5	mA
		$V_R = V_{RRM}, T_{case} = 125^{\circ}\text{C}$		30	90	mA
V_F	Diode forward voltage	$I_F = 2100\text{A}, T_j = 25^{\circ}\text{C}$		2.4		V
		$I_F = 2100\text{A}, T_j = 125^{\circ}\text{C}$		2.1		V

ELECTRICAL CHARACTERISTICS

$T_{case} = 25^{\circ}\text{C}$ unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
Q_{rr}	Diode reverse recovery charge	$I_F = 2100\text{A}$ $V_R = 2800\text{V}$ $dI_F/dt = 5000\text{A}/\mu\text{s}$ Tested with IGBT device Dynex DPI2100P45A5200		2500		μC
I_{rr}	Diode reverse recovery current			2300		A
E_{rec}	Diode reverse recovery energy			4300		mJ

$T_{case} = 125^{\circ}\text{C}$ unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
Q_{rr}	Diode reverse recovery charge	$I_F = 2100\text{A}$ $V_R = 2800\text{V}$ $dI_F/dt = 5000\text{A}/\mu\text{s}$ Tested with IGBT device Dynex DPI2100P45A5200		4900		μC
I_{rr}	Diode reverse recovery current			2900		A
E_{rec}	Diode reverse recovery energy			8800		mJ

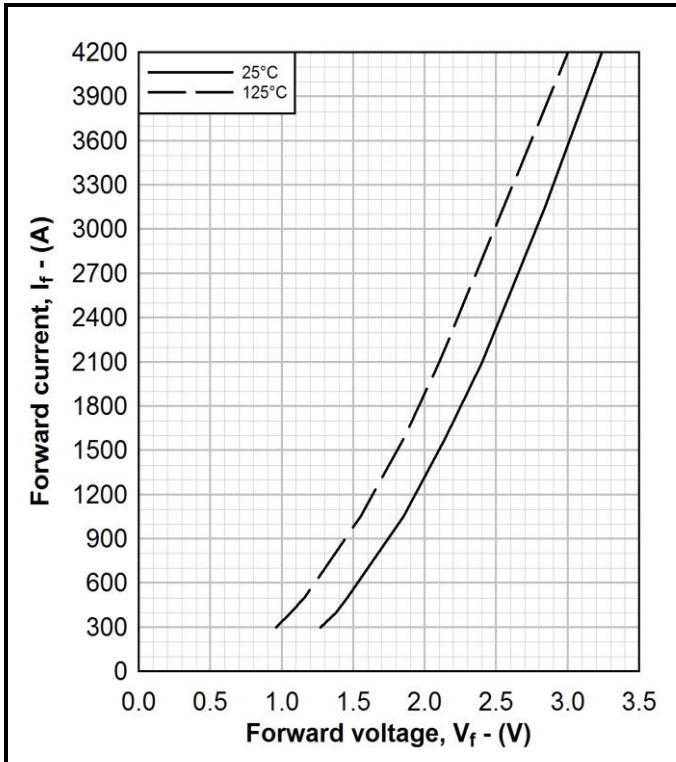


Fig. 3 Diode typical forward characteristics

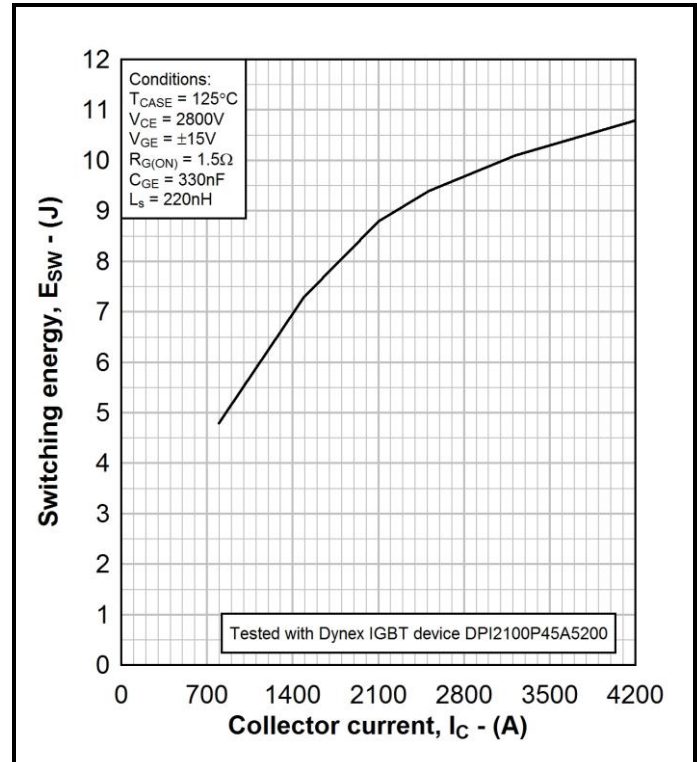


Fig. 4 Typical switching energy vs. collector current

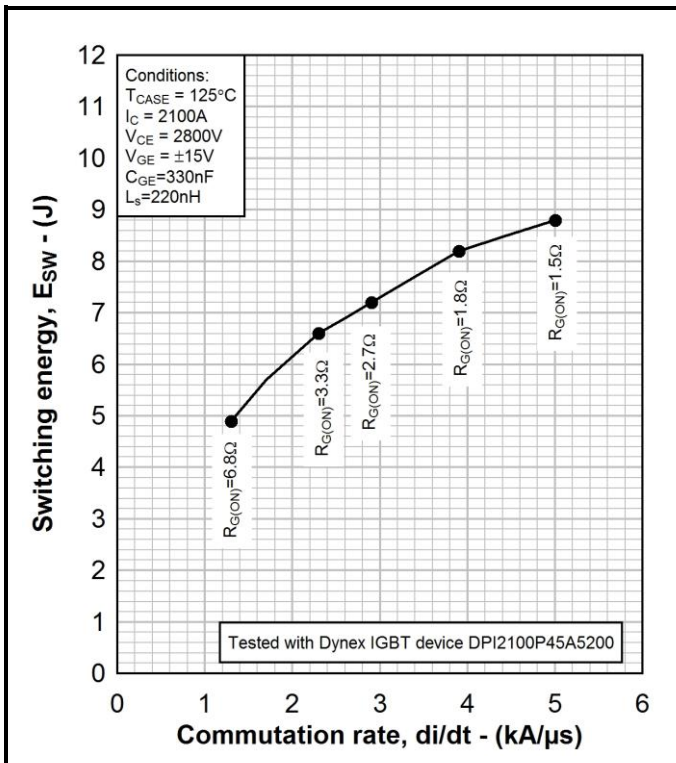


Fig. 5 Typical switching energy vs. gate resistance

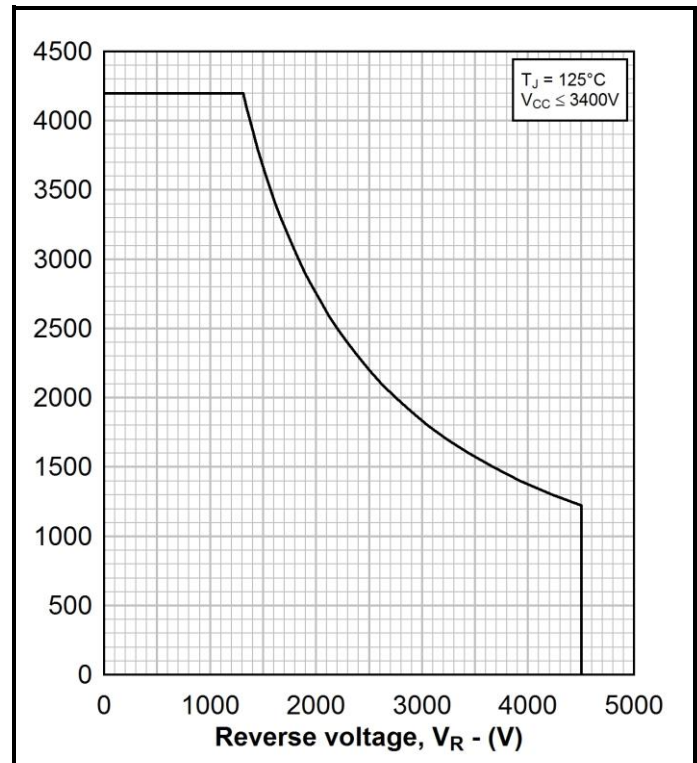


Fig. 6 Diode reverse bias safe operating area

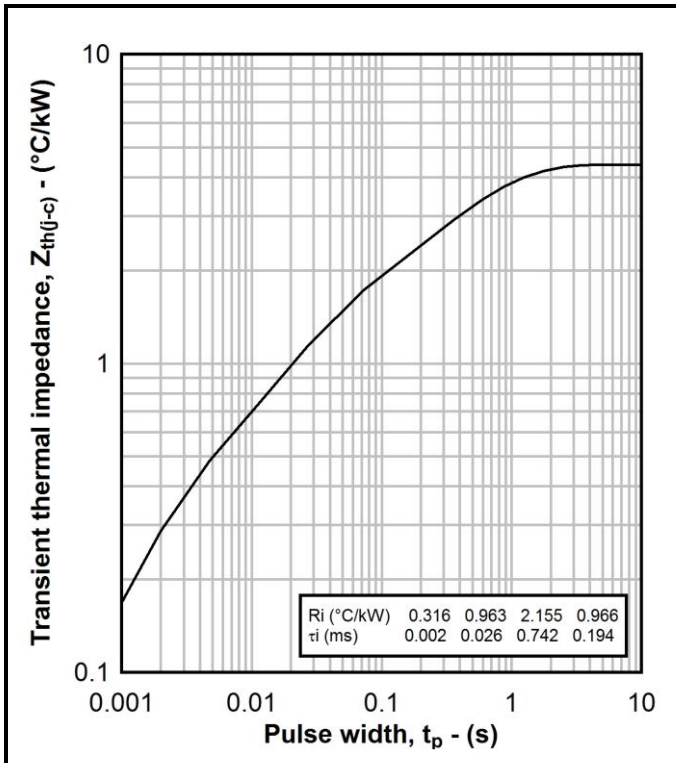


Fig. 7 Transient thermal impedance

PACKAGE DETAILS

For further package information, please visit our website or contact Customer Services.
All dimensions in mm, unless stated otherwise.

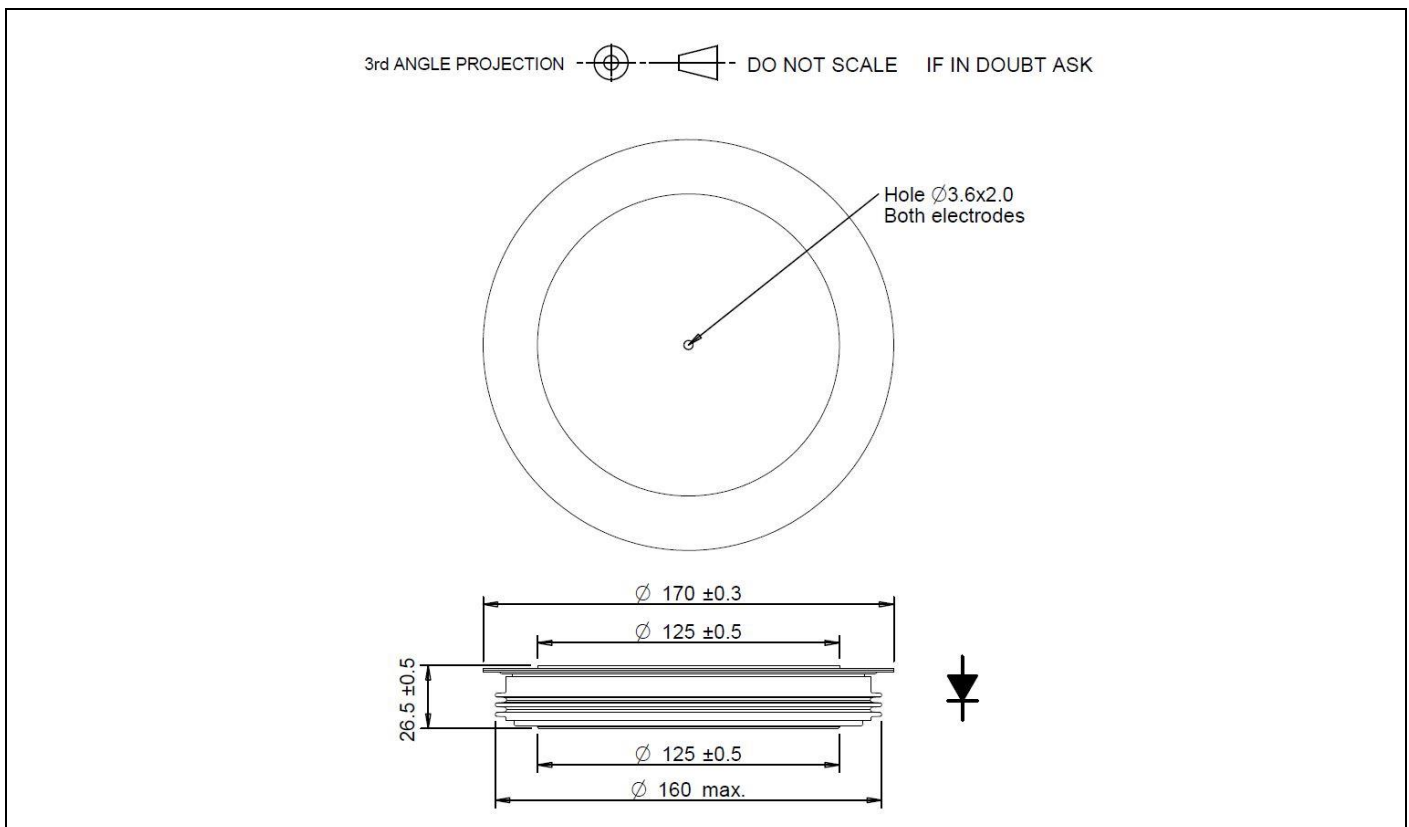


Fig. 7 Package outline

Caution: This device is sensitive to electrostatic discharge. Users should follow ESD handling procedures

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The products are not intended for use in applications where a failure or malfunction may cause loss of life, injury or damage to property. The user must ensure that appropriate safety precautions are taken to prevent or mitigate the consequences of a product failure or malfunction.

The products must not be touched when operating because there is a danger of electrocution or severe burning. Always use protective safety equipment such as appropriate shields for the product and wear safety glasses. Even when disconnected any electric charge remaining in the product must be discharged and allowed to cool before safe handling using protective gloves.

Extended exposure to conditions outside the product ratings may affect reliability leading to premature product failure. Use outside the product ratings is likely to cause permanent damage to the product. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture, a large current to flow or high voltage arcing, resulting in fire or explosion. Appropriate application design and safety precautions should always be followed to protect persons and property.

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HEADQUARTERS OPERATIONS**DYNEX SEMICONDUCTOR LTD**

Doddington Road, Lincoln, Lincolnshire, LN6 3LF,
United Kingdom

Fax: +44(0)1522 500550

Tel: +44(0)1522 500500

Web: <http://www.dynexsemi.com>

CUSTOMER SERVICE**DYNEX SEMICONDUCTOR LTD**

Doddington Road, Lincoln, Lincolnshire, LN6 3LF,
United Kingdom

Fax: +44(0)1522 500020

Tel: +44(0)1522 502753 / 502901

Email: Power_solutions@dynexsemi.com