Preliminary Information

DPI1200P45C2626

Press-Pack IGBT

DS6245-1 July 2018 (LN35904)

FEATURES

- Wide safe operating area
- 10µs short circuit withstand
- Outstanding thermal cycling capability
- Co-pack 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:

DPI1200P45C2626

Note: When ordering, please use the complete part number

KEY PARAMETERS

V_{CES}		4500V
$V_{CE(sat)}$	(typ)	2.6V
I_C	(max)	1200A
$I_{C(PK)}$	(max)	2400A

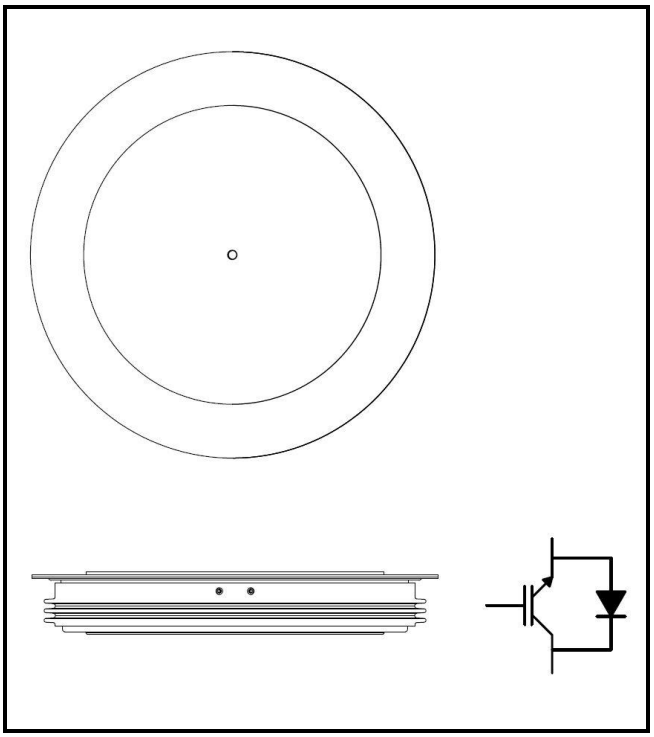

Fig.1 Circuit configuration

Outline type code: P
(See Fig. 11 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_{case} = 25°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
V_{CES}	Collector-emitter voltage	V_{GE} = 0V	4500	V
V_{GES}	Gate-emitter voltage	-	±20	V
I_C	Continuous collector current	T_{case} = 90°C	1200	A
$I_{C(PK)}$	Peak collector current	1ms, T_j = 125°C	2400	A
P_{max}	Max. transistor power dissipation	T_{case} = 25°C, T_j = 125°C	11.4	kW
I_{FSM}	Surge (non-repetitive) on-state current	10ms half-sine, T_{case}=125°C, V_R=0V	20.4	kA

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
$R_{th(j-c)}$ *	Thermal resistance – junction to case IGBT (collector side)	DC	-	0.0088	°C/W
$R_{th(j-c)}$ *	Thermal resistance – junction to case Diode (cathode side)	DC	-	0.0088	°C/W
$R_{th(c-h)}$ *	Thermal resistance – case to heatsink IGBT (collector side)	Clamping force 70kN (with mounting compound)	-	0.0036	°C/W
$R_{th(c-h)}$ *	Thermal resistance – case to heatsink Diode (cathode side)	Clamping force 70kN (with mounting compound)	-	0.0036	°C/W
T_{vj}	Virtual junction temperature	Transistor	-	125	°C
		Diode	-	125	°C
T_{stg}	Storage temperature range	-	-40	125	°C
F_m	Clamping force	-	65	75	kN

Note:
* Device should be cooled from collector/cathode side only.

ELECTRICAL CHARACTERISTICS

T_{case} = 25°C unless stated otherwise.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I_{CES}	Collector cut-off current	V_{GE} = 0V, V_{CE} = V_{CES}			5	mA
		V_{GE} = 0V, V_{CE} = V_{CES}, T_{case} = 125°C		25	75	mA
I_{GES}	Gate leakage current	V_{GE} = ± 20V, V_{CE} = 0V			10	µA
$V_{GE(TH)}$	Gate threshold voltage	I_C = 130mA, V_{GE} = V_{CE}		6.1		V
$V_{CE(sat)}$	Collector-emitter saturation voltage	V_{GE} = 15V, I_C = 1200A, T_j = 25°C		2.6		V
		V_{GE} = 15V, I_C = 1200A, T_j = 125°C		3.0		V
I_F	Diode forward current	DC		1200		A
I_{FM}	Diode maximum forward current	t_p = 1ms		2400		A
V_F	Diode forward voltage	I_F = 1200A, T_j = 25°C		2.3		V
		I_F = 1200A, T_j = 125°C		2.4		V
Q_g	Gate charge	±15V		19		µC
SC_{Data}	Short circuit current, I_{SC}	T_j = 125°C, V_{CC} = 3400V t_p ≤ 10µs, V_{GE} ≤ 15V $V_{CE\ (max)}$ = V_{CES} – L* x dI/dt IEC 60747-9		5000		A

Note:
* L is the circuit inductance

ELECTRICAL CHARACTERISTICS

T_{case} = 125°C unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$t_{d(off)}$	Turn-off delay time	I_C = 1200A V_{GE} = ±15V V_{CE} = 2800V $R_{G(ON)}$ = 2.2Ω $R_{G(OFF)}$ = 10Ω C_{GE} = 150nF L_S ~ 220nH		4800		ns
t_f	Fall time			2900		ns
E_{OFF}	Turn-off energy loss			7000		mJ
$t_{d(on)}$	Turn-on delay time			400		ns
t_r	Rise time			400		ns
E_{ON}	Turn-on energy loss			5600		mJ
Q_{rr}	Diode reverse recovery charge	I_F = 1200A V_{CE} = 2800V dI_F/dt = 3500A/µs		2700		µC
I_{rr}	Diode reverse recovery current			1800		A
E_{rec}	Diode reverse recovery energy			5000		mJ

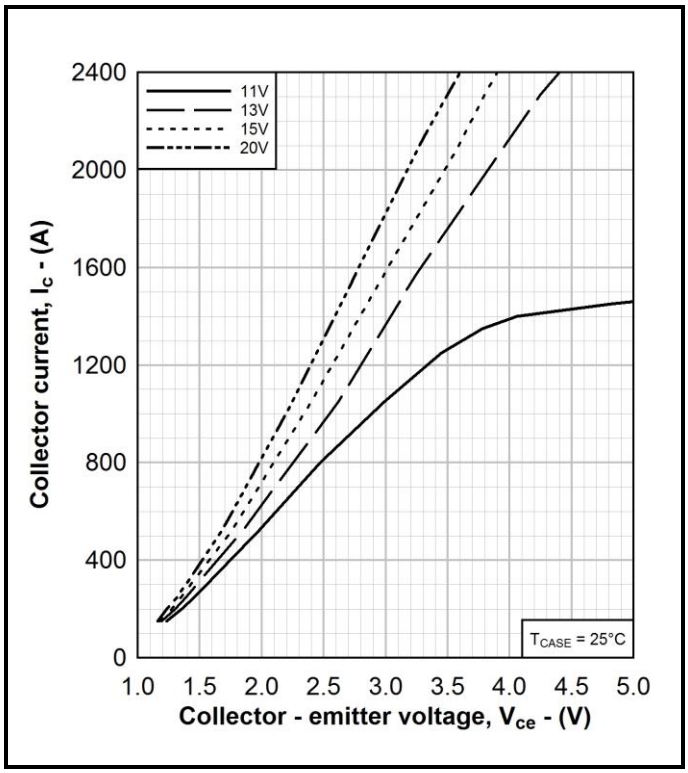

Fig. 3 Typical output characteristics

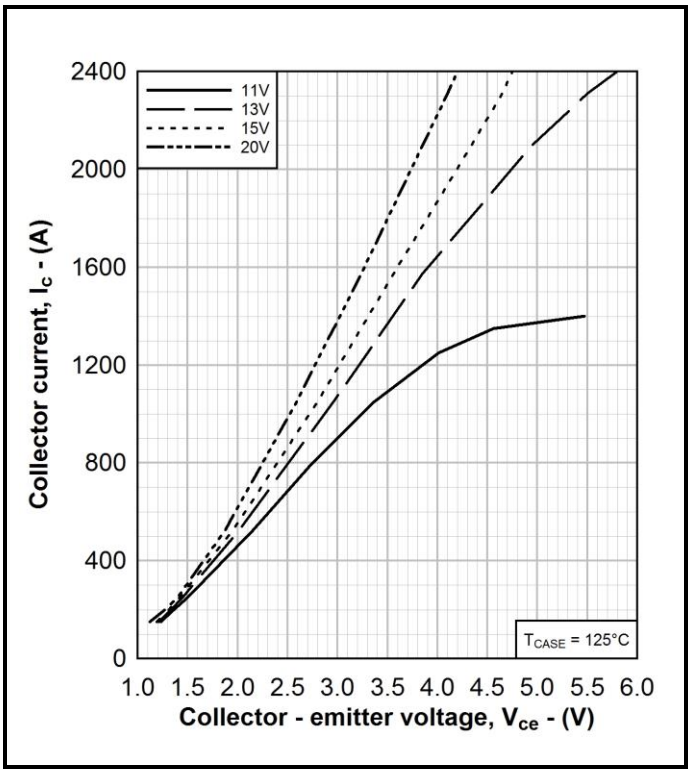

Fig. 4 Typical output characteristics

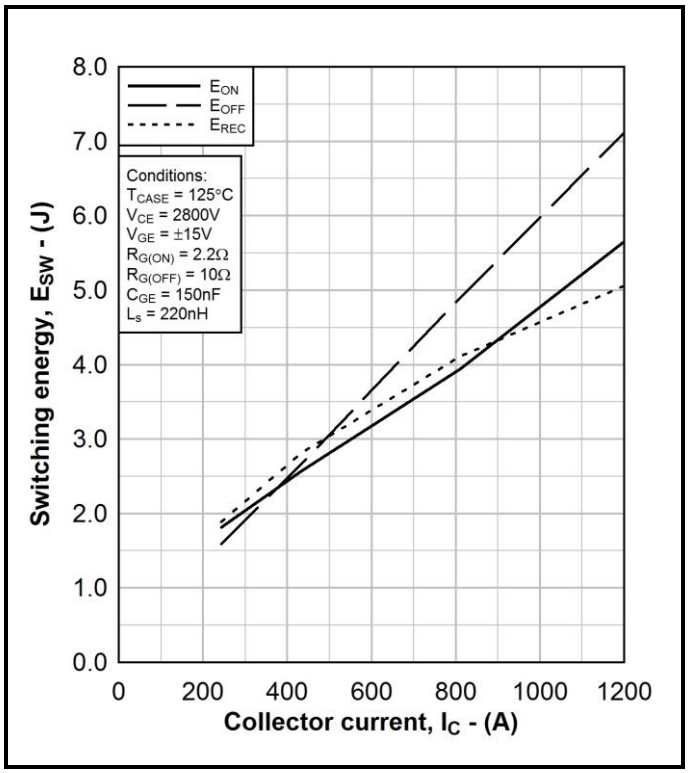

Fig. 5 Typical switching energy vs. collector current

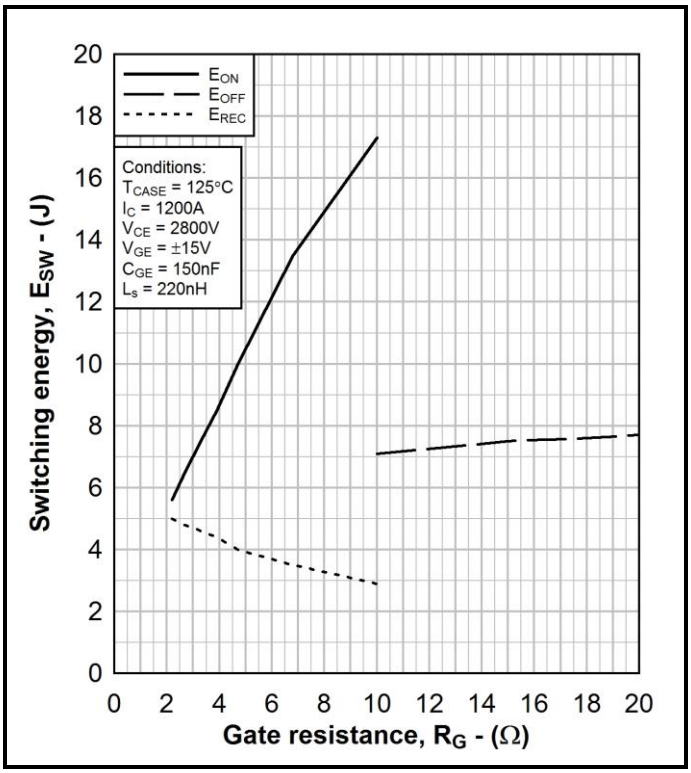

Fig. 6 Typical switching energy vs. gate resistance

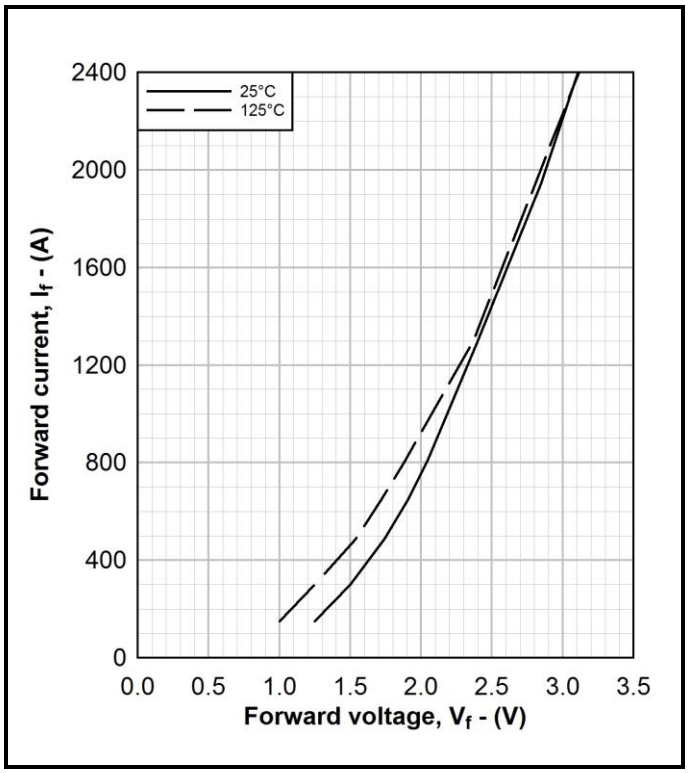

Fig. 7 Diode typical forward characteristics

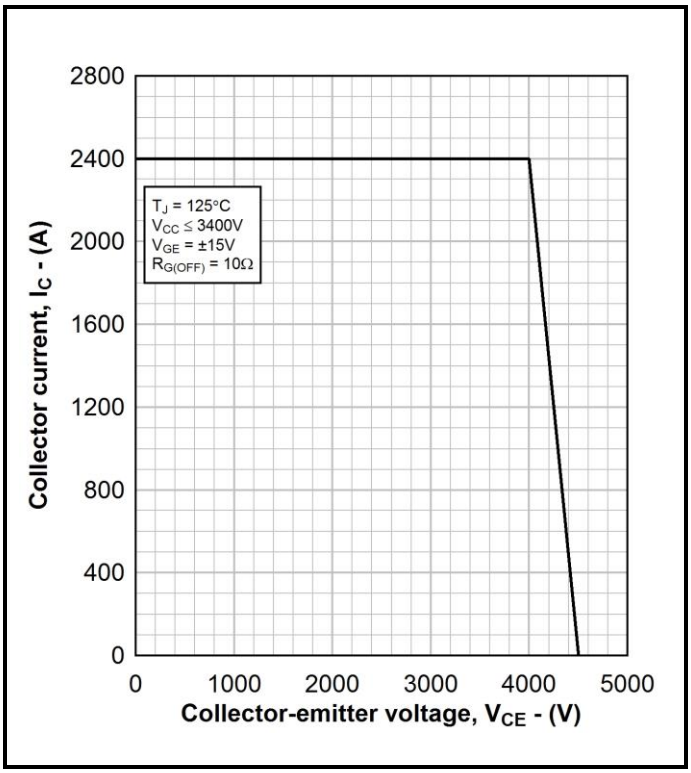

Fig. 8 Reverse bias safe operating area

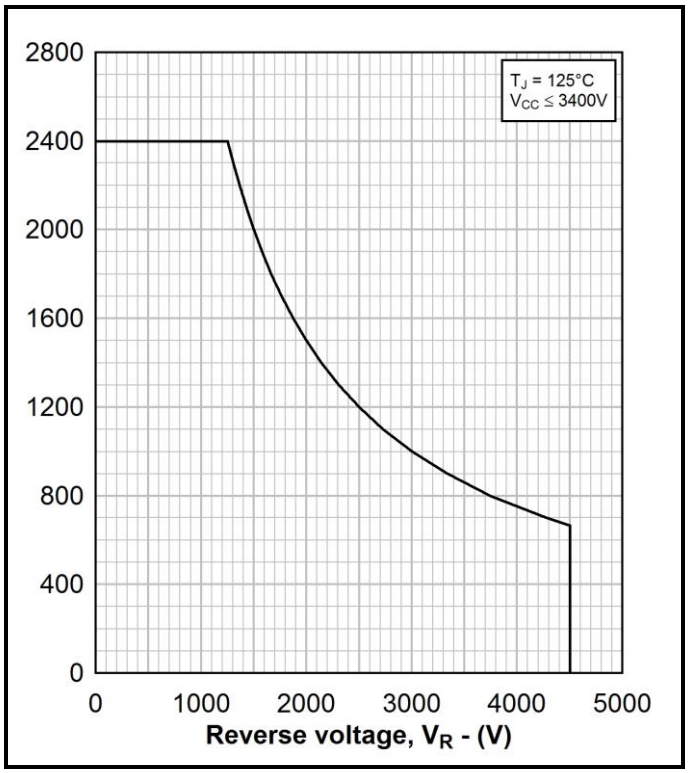

Fig. 9 Diode reverse bias safe operating area

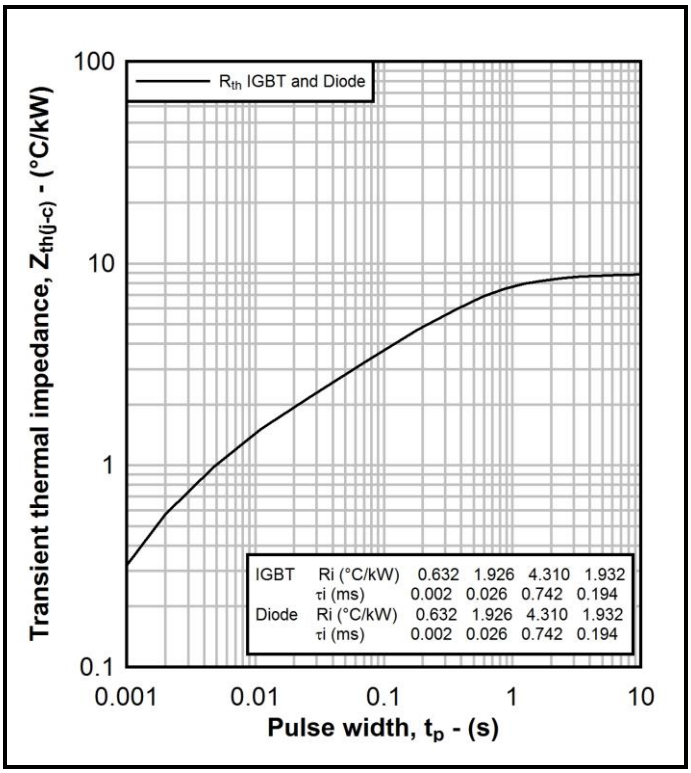

Fig. 10 Transient thermal impedance

PACKAGE DETAILS

For further package information, please visit our website or contact Customer Services.
All dimensions in mm, unless stated otherwise.
DO NOT SCALE.

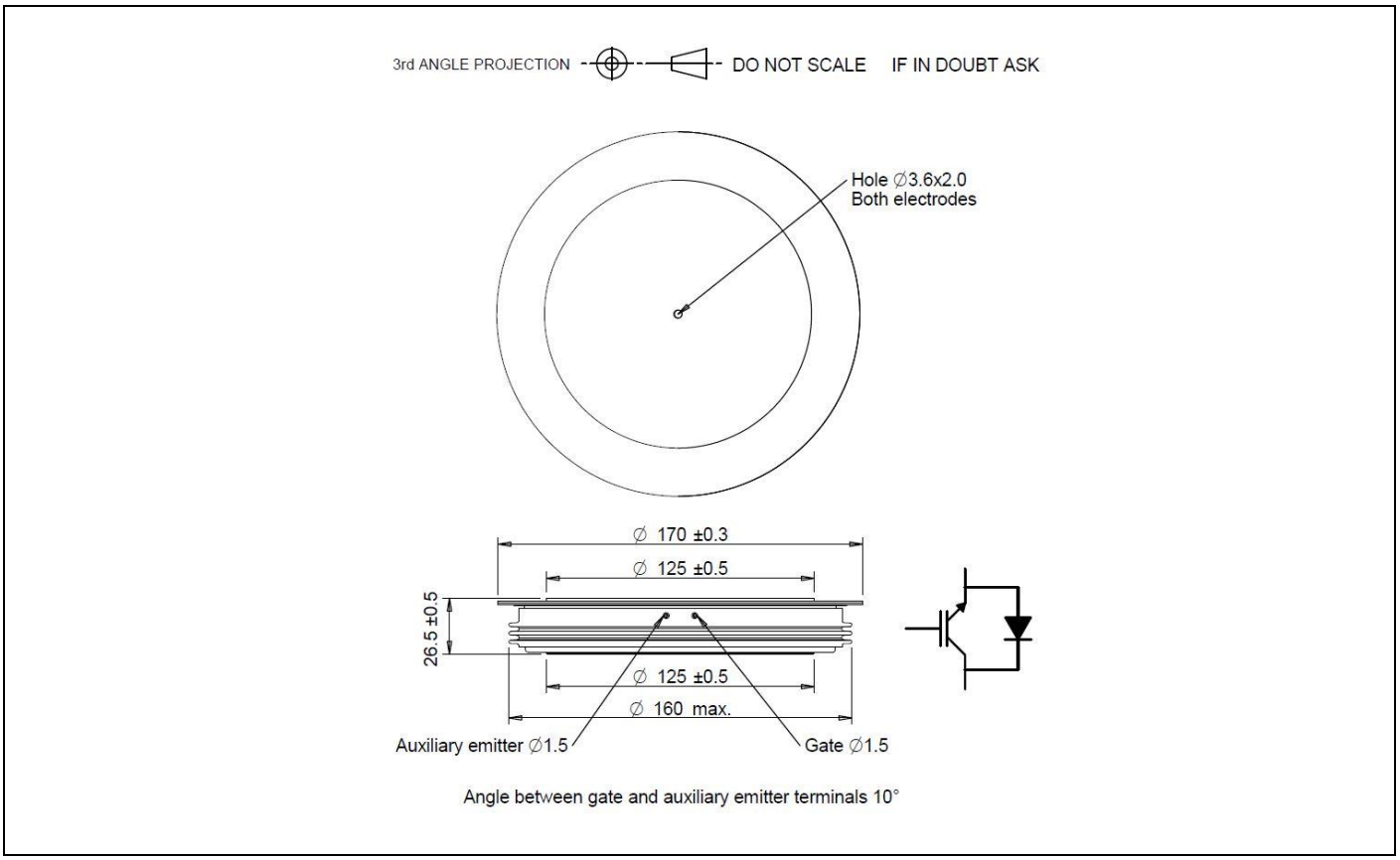

Fig. 11 Package outline

IMPORTANT INFORMATION:

This publication is provided for information only and not for resale.

The products and information in this publication are intended for use by appropriately trained technical personnel.

Due to the diversity of product applications, the information contained herein is provided as a general guide only and does not constitute any guarantee of suitability for use in a specific application. The user must evaluate the suitability of the product and the completeness of the product data for the application. The user is responsible for product selection and ensuring all safety and any warning requirements are met. Should additional product information be needed please contact Customer Service.

Although we have endeavoured to carefully compile the information in this publication it may contain inaccuracies or typographical errors. The information is provided without any warranty or guarantee of any kind.

This publication is an uncontrolled document and is subject to change without notice. When referring to it please ensure that it is the most up to date version and has not been superseded.

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.

Product Status & Product Ordering:
We annotate datasheets in the top right hand corner of the front page, to indicate product status if it is not yet fully approved for production. The annotations are as follows:-

Target Information:	This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.
Preliminary Information:	The product design is complete and final characterisation for volume production is in progress. The datasheet represents the product as it is now understood but details may change.
No Annotation:	The product has been approved for production and unless otherwise notified by Dynex any product ordered will be supplied to the **current version of the data sheet prevailing at the time of our order acknowledgement.**

All products and materials are sold and services provided subject to Dynex's conditions of sale, which are available on request.

Any brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.

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

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