IXYSPOWER
Efficiency Through Technology

PRODUCT BRIEF

1700V and 2500V XPT™ IGBTs

For high-voltage, high-speed power conversion applications

May 2017

DESCRIPTION

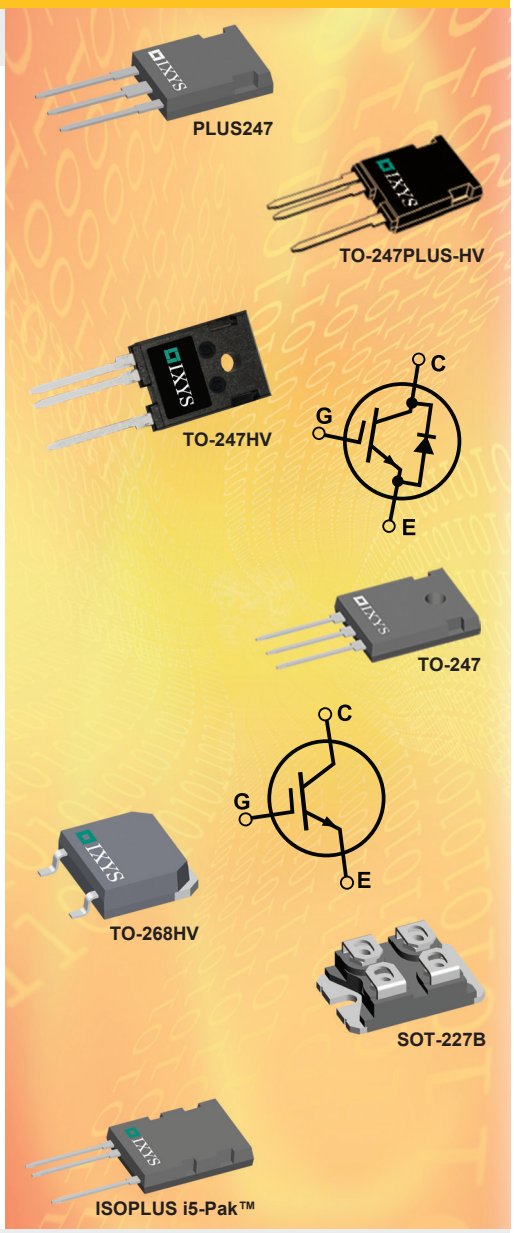
IXYS Corporation (NASDAQ: IXYS), a manufacturer of power semiconductors and integrated circuits for energy efficiency, power management, and motor control applications, has released 1700V and 2500V XPT™ (eXtreme-light Punch Through) IGBTs. With current ratings ranging from 29A to 178A, they are well-suited for high-voltage, high-speed power conversion applications. Devices co-packed with anti-parallel fast diodes are also available.

Designed using the proprietary thin-wafer XPT™ technology and the state-of-the-art IGBT process, these new devices display such qualities as reduced thermal resistance, low tail current, low energy loss, and high-speed switching capability. Also, thanks to the positive temperature coefficient of their on-state voltage, the new high-voltage IGBTs can be used in parallel, which provides cost-effective solutions compared to series-connected, lower-voltage device ones. This consequently results in reduction in the associated gate drive circuitry, simplicity in design, and improvement in the reliability of the overall system.

The optional co-packed fast recovery diodes have low reverse recovery time and are optimized to produce smooth switching waveforms and significantly lower electromagnetic interference (EMI).

There are a number of high-voltage, high-speed power switching applications that can benefit from utilizing these discrete IGBTs. Among them are pulser circuits, laser and X-ray generators, high-voltage power supplies, high-voltage test equipment, capacitor discharge circuits, and AC switches.

The new XPT™ IGBTs are available in the following international standard size packages: SOT-227, TO-247, PLUS247, ISOPLUS i5-Pak™, TO-247HV, TO-247PLUS-HV and TO-268HV. The latter three have increased creepage distances between leads, making them robust against higher voltages. Some example part numbers include IXYH24N170C, IXYN30N170CV1, IXYH30N170C, and IXYH25N250CHV, with collector current ratings of 58A, 88A, 108A, and 95A, respectively.



FEATURES

- Thin wafer XPT™ technology
- Low on-state voltages $V_{CE(sat)}$
- Co-packed fast recovery diodes
- Positive temperature coefficient of $V_{CE(sat)}$
- International standard size high-voltage packages

ADVANTAGES

- Higher efficiency
- Elimination of multiple series-connected devices
- Increased reliability of power systems

APPLICATIONS

- Pulser circuits
- Laser and X-ray generators
- High-voltage power supplies
- High-voltage test equipment
- Capacitor discharge circuits
- AC switches

Available Parts

Part Number	V_{CES} (V)	I_{C25} T_C=25°C (A)	I_{C110} T_C=110°C (A)	$V_{CE(sat)}$ max T_J=25°C (V)	t_{fi} typ T_J=150°C (ns)	E_{off} typ T_J=150°C (mJ)	R_{thJC} max IGBT (°C/W)	Configuration	Package Style
IXYH10N170C	1700	36	10	3.8	94	0.9	0.53	Single	TO-247
IXYH10N170CV1		36	10	3.8	94	0.9	0.53	Copacked	TO-247
IXYH16N170C		40	16	3.8	140	1.95	0.48	Single	TO-247
IXYH16N170CV1		40	16	3.8	140	1.95	0.48	Copacked	TO-247
IXYH24N170C		58	24	4	140	2.66	0.3	Single	TO-247
IXYH24N170CV1		58	24	4	140	2.66	0.3	Copacked	TO-247
IXYN30N170CV1		88	30	3.7	178	4.5	0.22	Copacked	SOT-227
IXYH30N170C		108	30	3.7	178	4.5	0.16	Single	TO-247
IXYX30N170CV1		108	30	3.7	178	4.5	0.16	Copacked	PLUS247™
IXYN50N170CV1		120	50	3.7	160	8.2	0.17	Copacked	SOT-227
IXYX50N170C		178	50	3.7	160	8.2	0.1	Single	PLUS247™
IXYH8N250C	2500	29	8	4	128	1.2	0.53	Single	TO-247
IXYH8N250CV1HV		29	8	4	128	1.2	0.53	Copacked	TO-247HV
IXYH12N250C		28	12	4.5	138	1.95	0.48	Single	TO-247
IXYH12N250CV1HV		28	12	4.5	138	1.95	0.48	Copacked	TO-247HV
IXYH16N250C		35	16	4	236	4.4	0.3	Single	TO-247
IXYH16N250CV1HV		35	16	4	236	4.4	0.3	Copacked	TO-247HV
IXYL40N250CV1		70	38	4	250	11.5	0.26	Copacked	ISOPLUS i5-Pak™
IXYX40N250CHV		70	40	4	250	11.5	0.1	Single	TO-247PLUS-HV
IXYH25N250CHV		95	25	4	350	10.5	0.16	Single	TO-247HV
IXYT25N250CHV		95	25	4	350	10.5	0.16	Single	TO-268HV
IXYX25N250CV1		95	25	4	350	10.5	0.16	Copacked	PLUS247™
IXYX25N250CV1HV		95	25	4	350	10.5	0.16	Copacked	TO-247PLUS-HV

Application Examples

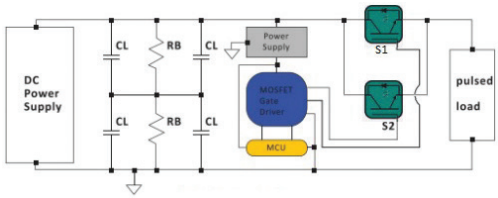


Figure 1: Pulse circuit

Figure 1 illustrates a generic pulse circuit in which two 1700V XPT™ IGBTs **IXYH24N170CV1** (S1, S2) are used in parallel to control the power delivered to the pulsed load. The DC power supply charges the capacitor bank, and the stored energy is switched to the load.

Figure 2 and Figure 3 demonstrate two possible configurations of AC switches. The 2500V XPT™ IGBT **IXYX25N250CV1HV** in the high-voltage TO-247PLUS-HV package can be utilized to realize the switches. Both circuits can control the current precisely and also provide an overcurrent protection function. Figure 2 is a cost effective option.

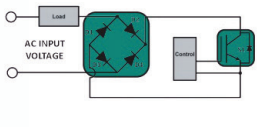


Figure 2: AC switch

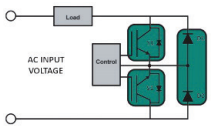


Figure 3: Bi-directional AC Switch

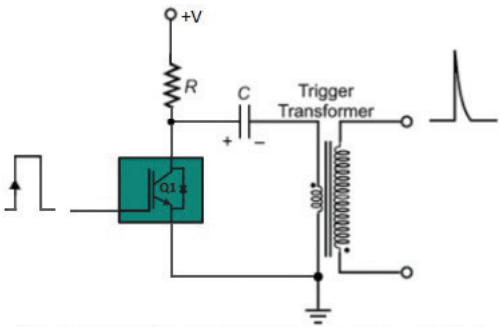


Figure 4: High-voltage trigger circuit for laser generation

Figure 4 is an example of a high-voltage trigger circuit used in flash-lamp pumped solid-state laser generation. When the 2500V XPT™ IGBT **IXYL40N250CV1** (Q1) is off, the capacitor C is charged through the resistor R and the transformer primary. When the capacitor is fully charged, Q is turned ON and quickly discharges C, which generates a pulse across the primary side; it is then stepped up across the secondary winding, producing a desired high-voltage pulse.

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