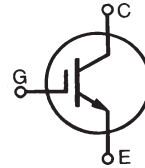


**1200V XPT™ IGBT  
GenX3™**
**IXYK120N120B3  
IXYX120N120B3**

 High-Speed IGBT  
for 10-30 kHz Switching


$$V_{CES} = 1200V$$

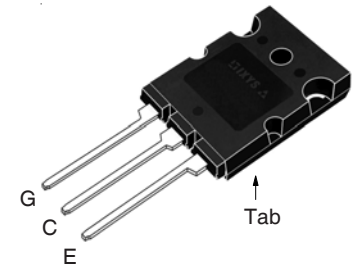
$$I_{C110} = 120A$$

$$V_{CE(sat)} \leq 2.2V$$

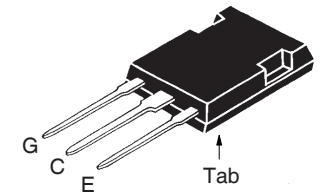
$$t_{fi(typ)} = 260ns$$

| Symbol                  | Test Conditions   | Maximum Ratings                         |            |
|-------------------------|---|---|------------|
| $V_{CES}$               | $T_J = 25^\circ C$ to $175^\circ C$   | 1200                                    | V          |
| $V_{CGR}$               | $T_J = 25^\circ C$ to $175^\circ C$ , $R_{GE} = 1M\Omega$                           | 1200                                    | V          |
| $V_{GES}$               | Continuous  | $\pm 20$                                | V          |
| $V_{GEM}$               | Transient   | $\pm 30$                                | V          |
| $I_{C25}$               | $T_C = 25^\circ C$ (Chip Capability)  | 320                                     | A          |
| $I_{LRMS}$              | Terminal Current Limit  | 160                                     | A          |
| $I_{C110}$              | $T_C = 110^\circ C$   | 120                                     | A          |
| $I_{CM}$                | $T_C = 25^\circ C$ , 1ms  | 800                                     | A          |
| $I_A$                   | $T_C = 25^\circ C$  | 60                                      | A          |
| $E_{AS}$                | $T_C = 25^\circ C$  | 2                                       | J          |
| <b>SSOA<br/>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 150^\circ C$ , $R_G = 1\Omega$<br>Clamped Inductive Load | $I_{CM} = 240$<br>$V_{CE} \leq V_{CES}$ | A          |
| $P_C$                   | $T_C = 25^\circ C$  | 1500                                    | W          |
| $T_J$                   |   | -55 ... +175                            | $^\circ C$ |
| $T_{JM}$                |   | 175                                     | $^\circ C$ |
| $T_{stg}$               |   | -55 ... +175                            | $^\circ C$ |
| $T_L$                   | Maximum Lead Temperature for Soldering  | 300                                     | $^\circ C$ |
| $T_{SOLD}$              | 1.6 mm (0.062in.) from Case for 10s   | 260                                     | $^\circ C$ |
| $M_d$                   | Mounting Torque (TO-264)  | 1.13/10                                 | Nm/lb.in   |
| $F_c$                   | Mounting Force (PLUS247)  | 20..120 / 4.5..27                       | N/lb       |
| <b>Weight</b>           | TO-264P   | 10                                      | g          |
|                         | PLUS247   | 6                                       | g          |

TO-264P (IXYK)



PLUS247 (IXYX)



G = Gate                      E = Emitter  
C = Collector                Tab = Collector

**Features**

- Square RBSOA
- International Standard Packages
- Positive Thermal Coefficient of  $V_{ce(sat)}$
- Avalanche Rated
- High Current Handling Capability

**Advantages**

- High Power Density
- Low Gate Drive Requirement

**Applications**

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |            |                      |
|---------------|---|-----------------------|------------|----------------------|
|               |   | Min.                  | Typ.       | Max.                 |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                      | 1200                  |            | V                    |
| $V_{GE(th)}$  | $I_C = 1mA$ , $V_{CE} = V_{GE}$                                       | 3.0                   |            | V                    |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 150^\circ C$             |                       |            | 25 $\mu A$<br>1.5 mA |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                    |                       |            | $\pm 200$ nA         |
| $V_{CE(sat)}$ | $I_C = 100A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 150^\circ C$         |                       | 1.8<br>2.4 | V<br>V               |

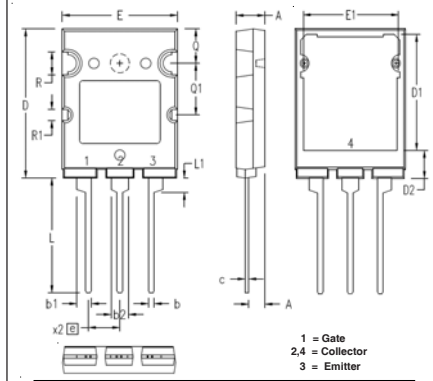
**Symbol Test Conditions**

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

**Characteristic Values**

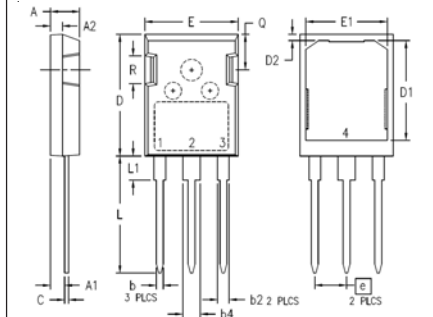
|              |  | Min. | Typ. | Max.                    |    |
|--------------|--|------|------|-------------------------|----|
| $g_{fs}$     | $I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$   | 40   | 70   |                         | S  |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$   |      | 9800 |                         | pF |
| $C_{oes}$    |  |      | 567  |                         | pF |
| $C_{res}$    |  |      | 215  |                         | pF |
| $Q_{g(on)}$  | $I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$  |      | 400  |                         | nC |
| $Q_{ge}$     |  |      | 70   |                         | nC |
| $Q_{gc}$     |  |      | 190  |                         | nC |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 100\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$<br>Note 2  |      | 30   |                         | ns |
| $t_{ri}$     |  |      | 54   |                         | ns |
| $E_{on}$     |  |      | 9.7  |                         | mJ |
| $t_{d(off)}$ |  |      | 340  |                         | ns |
| $t_{fi}$     |  |      | 260  |                         | ns |
| $E_{off}$    |  |      | 21.5 |                         | mJ |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 150^\circ\text{C}</math></b><br>$I_C = 100\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$<br>Note 2 |      | 29   |                         | ns |
| $t_{ri}$     |  |      | 55   |                         | ns |
| $E_{on}$     |  |      | 14.7 |                         | mJ |
| $t_{d(off)}$ |  |      | 420  |                         | ns |
| $t_{fi}$     |  |      | 406  |                         | ns |
| $E_{off}$    |  |      | 27.9 |                         | mJ |
| $R_{thJC}$   |  |      |      | 0.10 $^\circ\text{C/W}$ |    |
| $R_{thCS}$   |  | 0.15 |      | $^\circ\text{C/W}$      |    |

**TO-264P Outline**



| SYM       | INCHES   |       | MILLIMETERS |       |
|-----------|----------|-------|-------------|-------|
|           | MIN      | MAX   | MIN         | MAX   |
| A         | .185     | .209  | 4.70        | 5.30  |
| A1        | .102     | .118  | 2.60        | 3.00  |
| b         | .035     | .049  | 0.90        | 1.25  |
| b1        | .091     | .106  | 2.30        | 2.70  |
| b2        | .110     | .126  | 2.80        | 3.20  |
| c         | .020     | .033  | 0.50        | 0.85  |
| D         | 1.012    | 1.035 | 25.70       | 26.30 |
| D1        | .783     | .799  | 19.90       | 20.30 |
| D2        | .185     | .205  | 4.70        | 5.20  |
| E         | .776     | .799  | 19.70       | 20.30 |
| E1        | .661     | .677  | 16.80       | 17.20 |
| e         | .215 BSC |       | 5.46 BSC    |       |
| L         | .768     | .807  | 19.50       | 20.50 |
| L1        | .091     | .106  | 2.30        | 2.70  |
| Q         | .228     | .244  | 5.80        | 6.20  |
| Q1        | .346     | .362  | 8.80        | 9.20  |
| $\phi R$  | .150     | .165  | 3.80        | 4.20  |
| $\phi R1$ | .071     | .087  | 1.80        | 2.20  |

**PLUS247™ Outline**



Terminals: 1 - Gate  
2,4 - Collector  
3 - Emitter

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .055 | 1.14        | 1.40  |
| b1  | .075     | .087 | 1.91        | 2.20  |
| b4  | .115     | .126 | 2.92        | 3.20  |
| C   | .024     | .031 | 0.61        | 0.80  |
| D   | .819     | .840 | 20.80       | 21.34 |
| D1  | .650     | .690 | 16.51       | 17.53 |
| D2  | .035     | .050 | 0.89        | 1.27  |
| E   | .620     | .635 | 15.75       | 16.13 |
| E1  | .520     | .560 | 13.08       | 14.22 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .810 | 19.81       | 20.57 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |

**Notes:**

1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
2. Switching times & energy losses may increase for higher  $V_{CE}$  (clamp),  $T_J$  or  $R_G$ .

**ADVANCE TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 | 6,683,344    | 6,727,585    | 7,005,734 B2 | 7,157,338B2 |
|  | 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405 B2 | 6,759,692    | 7,063,975 B2 |             |
|  | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505    | 6,710,463    | 6,771,478 B2 | 7,071,537    |             |