

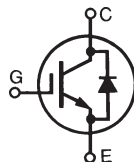
**GenX3™ 1200V  
IGBTs w/ Diode**
**IXGK55N120A3H1  
IXGX55N120A3H1**

$$V_{CES} = 1200V$$

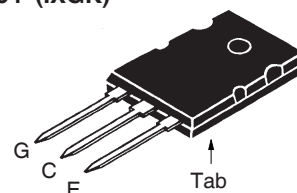
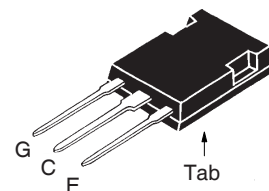
$$I_{C110} = 55A$$

$$V_{CE(sat)} \leq 2.3V$$

Ultra-Low-Vsat PT IGBTs for  
up to 3kHz Switching



| Symbol                        | Test Conditions   | Maximum Ratings                         |            |
|-------------------------------|---|---|------------|
| $V_{CES}$                     | $T_J = 25^\circ C$ to $150^\circ C$   | 1200                                    | V          |
| $V_{CGR}$                     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$                           | 1200                                    | V          |
| $V_{GES}$                     | Continuous  | $\pm 20$                                | V          |
| $V_{GEM}$                     | Transient   | $\pm 30$                                | V          |
| $I_{C25}$                     | $T_C = 25^\circ C$ ( Chip Capability )  | 125                                     | A          |
| $I_{C110}$                    | $T_C = 110^\circ C$   | 55                                      | A          |
| $I_{LRMS}$                    | $T_C = 25^\circ C$ (Lead RMS Limit)   | 120                                     | A          |
| $I_{CM}$                      | $T_C = 25^\circ C$ , 1ms  | 400                                     | A          |
| <b>SSOA</b><br><b>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 3\Omega$<br>Clamped Inductive Load | $I_{CM} = 110$<br>@ $0.8 \cdot V_{CES}$ | A          |
| $P_C$                         | $T_C = 25^\circ C$  | 460                                     | W          |
| $T_J$                         |   | -55 ... +150                            | $^\circ C$ |
| $T_{JM}$                      |   | 150                                     | $^\circ C$ |
| $T_{stg}$                     |   | -55 ... +150                            | $^\circ C$ |
| $T_L$                         | Maximum Lead Temperature for Soldering  | 300                                     | $^\circ C$ |
| $T_{SOLD}$                    | 1.6 mm (0.062 in.) from Case for 10   | 260                                     | $^\circ C$ |
| $M_d$                         | Mounting Torque ( IXGK )  | 1.13/10                                 | Nm/lb.in.  |
| $F_C$                         | Mounting Force ( IXGX )   | 20..120/4.5..27                         | N/lb.      |
| <b>Weight</b>                 | TO-264  | 10                                      | g          |
|                               | PLUS247   | 6                                       | g          |

**TO-264 (IXGK)**

**PLUS247™ (IXGX)**


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

**Features**

- Optimized for Low Conduction Losses
- Anti-Parallel Ultra Fast Diode

**Advantages**

- High Power Density
- Low Gate Drive Requirement

**Applications**

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- Inrush Current Protection Circuits

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                       |
|---------------|---|-----------------------|------|-----------------------|
|               |   | Min.                  | Typ. | Max.                  |
| $V_{GE(th)}$  | $I_C = 1mA$ , $V_{CE} = V_{GE}$                                       | 3.0                   |      | 5.0 V                 |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>Note 1, $T_J = 125^\circ C$     |                       |      | 100 $\mu A$<br>2.0 mA |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                    |                       |      | $\pm 100$ nA          |
| $V_{CE(sat)}$ | $I_C = I_{C110}$ , $V_{GE} = 15V$ , Note 2<br>$T_J = 125^\circ C$     | 1.85<br>1.90          |      | 2.3 V                 |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                          | Characteristic Values |      |                           |
|--------------|--|-----------------------|------|---------------------------|
|              |  | Min.                  | Typ. | Max.                      |
| $g_{fs}$     | $I_C = I_{C110}, V_{CE} = 10\text{V}$ , Note 2   | 30                    | 45   | S                         |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$   |                       | 4340 | pF                        |
| $C_{oes}$    |  |                       | 300  | pF                        |
| $C_{res}$    |  |                       | 115  | pF                        |
| $Q_{g(on)}$  | $I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$                                    |                       | 185  | nC                        |
| $Q_{ge}$     |  |                       | 25   | nC                        |
| $Q_{gc}$     |  |                       | 75   | nC                        |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{V}$  |                       | 23   | ns                        |
| $t_{ri}$     |  |                       | 42   | ns                        |
| $E_{on}$     |  |                       | 5.1  | mJ                        |
| $t_{d(off)}$ | Note 3<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 3\Omega$  |                       | 365  | ns                        |
| $t_{fi}$     |  |                       | 282  | ns                        |
| $E_{off}$    |  |                       | 13.3 | mJ                        |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{V}$ |                       | 24   | ns                        |
| $t_{ri}$     |  |                       | 46   | ns                        |
| $E_{on}$     |  |                       | 9.5  | mJ                        |
| $t_{d(off)}$ | Note 3<br>$V_{CE} = 0.8 \cdot V_{CES}, R_G = 3\Omega$  |                       | 618  | ns                        |
| $t_{fi}$     |  |                       | 635  | ns                        |
| $E_{off}$    |  |                       | 29.0 | mJ                        |
| $R_{thJC}$   |  |                       | 0.27 | $^\circ\text{C}/\text{W}$ |
| $R_{thCK}$   |  | 0.15                  |      | $^\circ\text{C}/\text{W}$ |

### Reverse Diode (FRED)

| Symbol     | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)  | Characteristic Values |      |                           |
|------------|--|-----------------------|------|---------------------------|
|            |  | Min.                  | Typ. | Max.                      |
| $V_F$      | $I_F = 60\text{A}, V_{GE} = 0\text{V}$ , Note 2<br>$T_J = 150^\circ\text{C}$   | 1.85                  | 2.5  | V                         |
| $t_{rr}$   | $I_F = 60\text{A}, V_{GE} = 0\text{V}$ ,<br>$-di_F/dt = 350\text{A}/\mu\text{s}, V_R = 600\text{V}, T_J = 100^\circ\text{C}$ |                       | 200  | ns                        |
| $I_{RM}$   |  |                       | 24.6 | A                         |
| $R_{thJC}$ |  |                       | 0.42 | $^\circ\text{C}/\text{W}$ |

### Notes:

1. Part must be heatsunk for high-temp  $I_{ces}$  measurement.
2. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
3. Switching times & energy losses may increase for higher  $V_{CE}$  (Clamp),  $T_J$  or  $R_G$ .

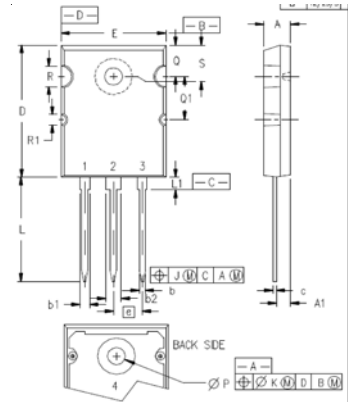
### ADVANCE TECHNICAL INFORMATION

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.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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  
4,850,072 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

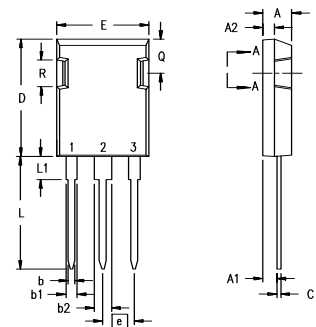
### TO-264 (IXGK) Outline



Terminals: 1 = Gate  
2 = Collector  
3 = Emitter

| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | .185     | .209  | 4.70        | 5.31  |
| A1  | .102     | .118  | 2.59        | 3.00  |
| b   | .037     | .055  | 0.94        | 1.40  |
| b1  | .087     | .102  | 2.21        | 2.59  |
| b2  | .110     | .126  | 2.79        | 3.20  |
| c   | .017     | .029  | 0.43        | 0.74  |
| D   | 1.007    | 1.047 | 25.58       | 26.59 |
| E   | .760     | .799  | 19.30       | 20.29 |
| e   | .215 BSC |       | 5.46 BSC    |       |
| J   | .000     | .010  | 0.00        | 0.25  |
| K   | .000     | .010  | 0.00        | 0.25  |
| L   | .779     | .842  | 19.79       | 21.39 |
| L1  | .087     | .102  | 2.21        | 2.59  |
| ØP  | .122     | .138  | 3.10        | 3.51  |
| Q   | .240     | .256  | 6.10        | 6.50  |
| Q1  | .330     | .346  | 8.38        | 8.79  |
| ØR  | .155     | .187  | 3.94        | 4.75  |
| ØR1 | .085     | .093  | 2.16        | 2.36  |
| S   | .243     | .253  | 6.17        | 6.43  |

### PLUS 247™ (IXGX) Outline



Terminals: 1 = Gate  
2 = Collector  
3 = Emitter

| Dim. | Millimeter |       | Inches   |       |
|------|------------|-------|----------|-------|
|      | Min.       | Max.  | Min.     | Max.  |
| A    | 4.83       | 5.21  | .190     | .205  |
| A1   | 2.29       | 2.54  | .090     | .100  |
| A2   | 1.91       | 2.16  | .075     | .085  |
| b    | 1.14       | 1.40  | .045     | .055  |
| b1   | 1.91       | 2.13  | .075     | .084  |
| b2   | 2.92       | 3.12  | .115     | .123  |
| C    | 0.61       | 0.80  | .024     | .031  |
| D    | 20.80      | 21.34 | .819     | .840  |
| E    | 15.75      | 16.13 | .620     | .635  |
| e    | 5.45 BSC   |       | .215 BSC |       |
| L    | 19.81      | 20.32 | .780     | .800  |
| L1   | 3.81       | 4.32  | .150     | .170  |
| Q    | 5.59       | 6.20  | .220     | 0.244 |
| R    | 4.32       | 4.83  | .170     | .190  |



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