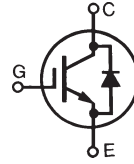
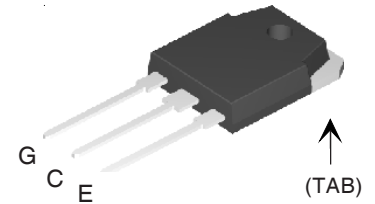


**High Voltage IGBT  
with Diode**
**IXGQ 35N120BD1**

$$\begin{aligned}
 V_{CES} &= 1200 \text{ V} \\
 I_{C25} &= 75 \text{ A} \\
 V_{CE(sat)} &= 3.3 \text{ V} \\
 t_{fi(typ)} &= 160 \text{ ns}
 \end{aligned}$$



Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1200	V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	75	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	35	A
$I_{F110}$	$T_C = 110^\circ\text{C}$	8	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	200	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 10 \Omega$ Clamped inductive load	$I_{CM} = 120$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	400	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10 Nm/lb.in.	
	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
<b>Weight</b>		6	g

**TO-3P (IXGQ)**


G = Gate      C = Collector  
E = Emitter    TAB = Collector

**Features**

- International standard packages
- IGBT and anti-parallel FRED for resonant power supplies
  - Induction heating
  - Rice cookers
- MOS Gate turn-on
  - drive simplicity
- Fast Recovery Expitaxial Diode (FRED)
  - soft recovery with low  $I_{RM}$

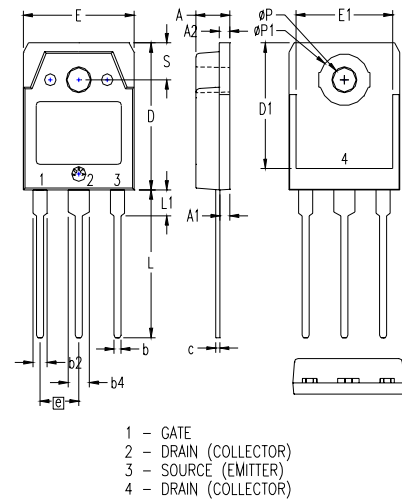
**Advantages**

- Saves space (two devices in one package)
- Easy to mount with 1 screw (isolated mounting screw hole)
- Reduces assembly time and cost

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{GE(th)}$	$I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$	2.5		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$			50 $\mu\text{A}$ 250 $\mu\text{A}$ $T=25^\circ\text{C}$ $T=125^\circ\text{C}$
$I_{GES}$	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = 35 \text{ A}, V_{GE} = 15 \text{ V}$ Note 2	2.7	3.3	V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = 35\text{A}; V_{CE} = 10\text{V}$ , Note 2.	28	38	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		2300	pF
$C_{oes}$		190	pF	
$C_{res}$		80	pF	
$Q_g$	$I_C = 40\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 V_{CES}$		140	nC
$Q_{ge}$		20	nC	
$Q_{gc}$		50	nC	
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b>		40	ns
$t_{ri}$		50	ns	
$E_{on}$	$I_C = 35\text{A}; V_{GE} = 15\text{V}$		0.9	mJ
$t_{d(off)}$	$V_{CE} = 0.8 V_{CES}; R_G = R_{off} = 3\ \Omega$ Note 1.		270	500 ns
$t_{fi}$		160	300 ns	
$E_{off}$			3.8	7.0 mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b>		45	ns
$t_{ri}$		60	ns	
$E_{on}$	$I_C = 35\text{A}; V_{GE} = 15\text{V}$		1.9	mJ
$t_{d(off)}$	Note 1		380	ns
$t_{fi}$		400	ns	
$E_{off}$			8.0	mJ
$R_{thJC}$				0.35 K/W
$R_{thCK}$			0.25	K/W

### TO-3P (IXGQ) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.791	19.80	20.10
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
$\phi P$	.126	.134	3.20	3.40
$\phi P1$	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

All metal area are tin plated.

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = 10\text{A}, V_{GE} = 0\text{V}$			3.3 V
	$I_F = 10\text{A}, V_{GE} = 0\text{V}, T_J = 125^\circ\text{C}$			2.2 V
$I_{RM}$	$I_F = 10\text{A}; -di_F/dt = 100\text{A}/\mu\text{s}, V_R = 100\text{V}$		4.0	A
$t_{rr}$	$V_{GE} = 0\text{V}; T_J = 125^\circ\text{C}$		190	ns
$t_{rr}$	$I_F = 1\text{A}; -di_F/dt = 100\text{A}/\mu\text{s}; V_R = 30\text{V}, V_{GE} = 0\text{V}$		40	ns
$R_{thJC}$				2.5 K/W

- Notes:
- Switching times may increase for  $V_{CE}$  (Clamp)  $> 0.8 \cdot V_{CES}$ , higher  $T_J$  or increased  $R_G$ .
  - Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$ .

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
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	







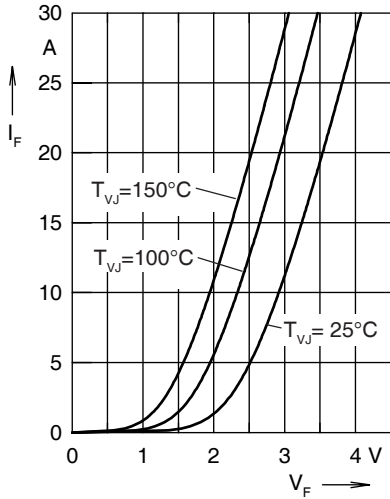


Fig. 18. Forward current  $I_F$  versus  $V_F$

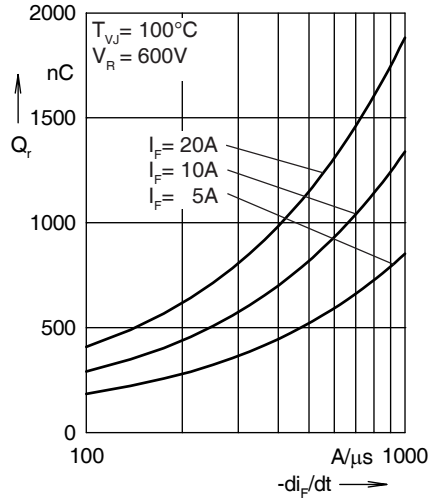


Fig. 19. Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

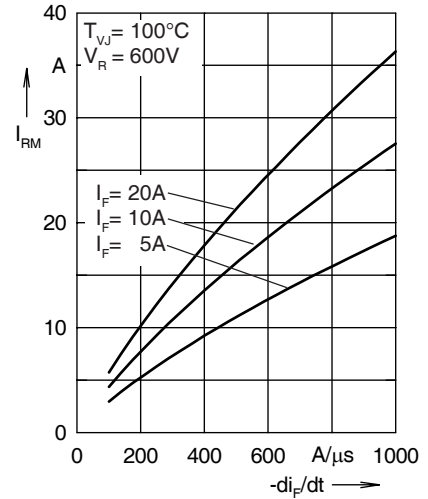


Fig. 20. Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

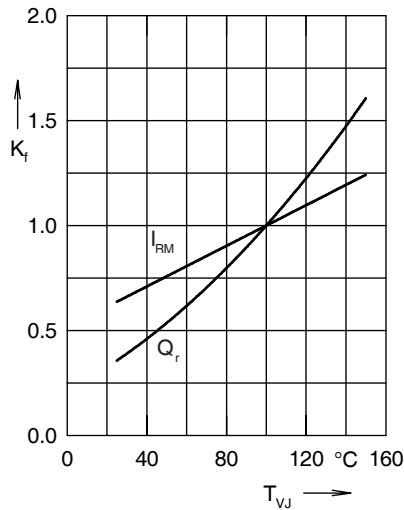


Fig. 21. Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

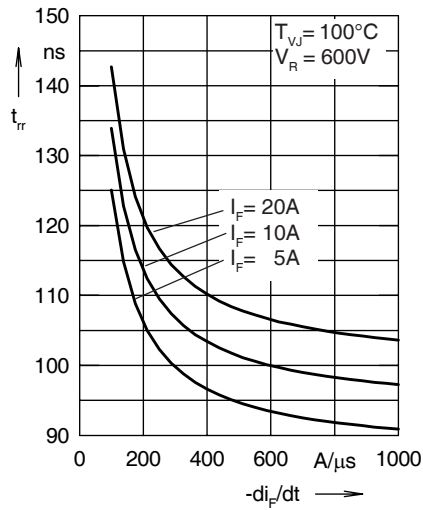


Fig. 22. Recovery time  $t_{tr}$  versus  $-di_F/dt$

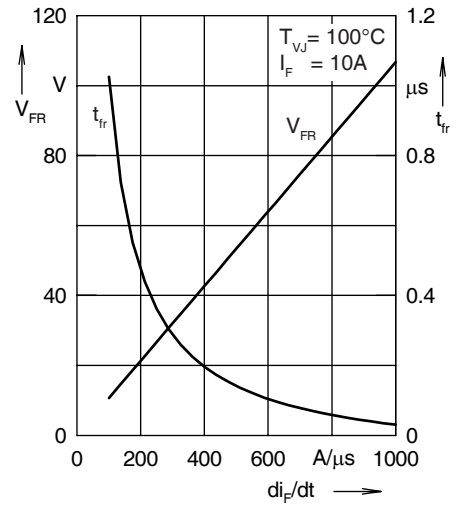


Fig. 23. Peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

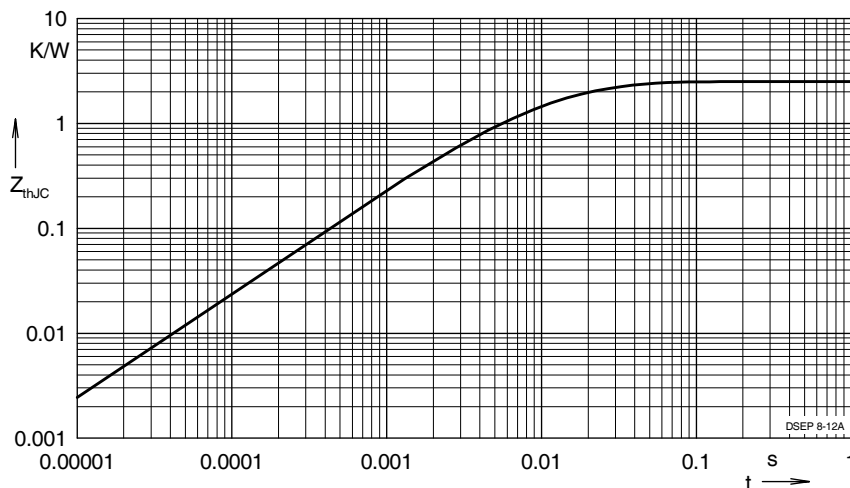


Fig. 24. Transient thermal resistance junction to case

IXYS reserves the right to change limits, test conditions, and dimensions.

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	1.449	0.0052
2	0.558	0.0003
3	0.493	0.017