

High Voltage XPT™ IGBT

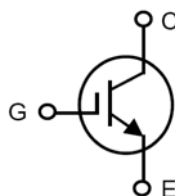
IXYF40N450

$$V_{CES} = 4500V$$

$$I_{C110} = 32A$$

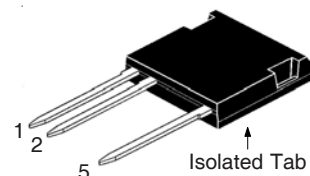
$$V_{CE(sat)} \leq 3.9V$$

(Electrically Isolated Tab)



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_C = 25^\circ C$ to $150^\circ C$	4500	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	4500	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	60	A
I_{C110}	$T_C = 110^\circ C$	32	A
I_{CM}	$T_C = 25^\circ C$, 1ms	350	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$	$I_{CM} = 120$	A
	Clamped Inductive Load	3600	V
P_C	$T_C = 25^\circ C$	290	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
T_{SOLD}	Plastic Body for 10 seconds	260	$^\circ C$
F_C	Mounting Force	20..120 / 4.5..27	Nm/lb.in.
V_{ISOL}	50/60Hz, 1 Minute	4000	V~
Weight		5	g

ISOPLUS i4-Pak™



1 = Gate
2 = Emitter

5 = Collector

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

Symbol	Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	4500		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 100^\circ C$		100	25 μA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 40A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		3.2	3.9 V
			4.0	V

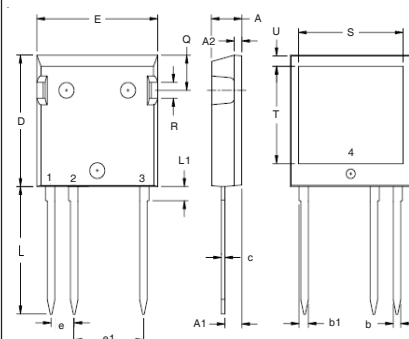
Symbol Test Conditions

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

Characteristic Values

		Min.	Typ.	Max.
g_{fs}	$I_C = 40\text{A}, V_{CE} = 10\text{V}$, Note 1	18	30	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3550	pF
C_{oes}			146	pF
C_{res}			67	pF
Q_g	$I_C = 40\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		170	nC
Q_{ge}			19	nC
Q_{gc}			70	nC
$t_{d(on)}$	Resistive Switching Times, $T_J = 25^\circ\text{C}$ $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 2\Omega$		36	ns
t_r			330	ns
$t_{d(off)}$			110	ns
t_f			1120	ns
$t_{d(on)}$	Resistive Switching Times, $T_J = 125^\circ\text{C}$ $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 2\Omega$		46	ns
t_r			740	ns
$t_{d(off)}$			118	ns
t_f			1010	ns
R_{thJC}				0.43°C/W
R_{thCS}			0.15	$^\circ\text{C/W}$

ISOPLUS i4-Pak™ (HV) Outline



Pin 1 = Gate
Pin 2 = Emitter
Pin 3 = Collector
Tab 4 = Isolated

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Notes:

1. Pulse test, $t < 300\mu\text{s}$, duty cycle, $d < 2\%$.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

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
	4,860,072	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	

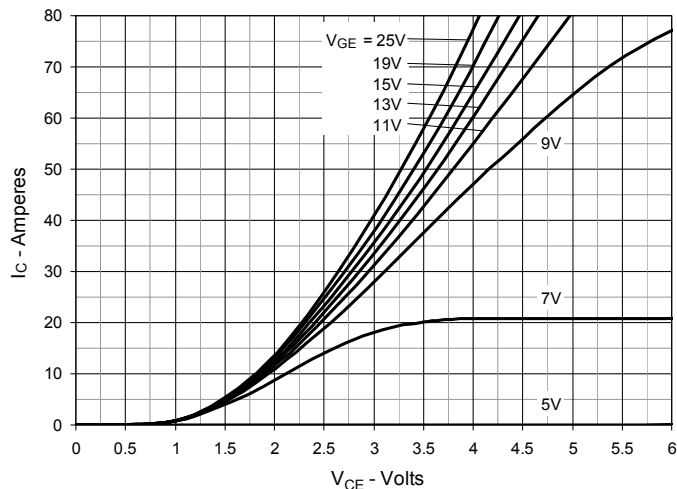
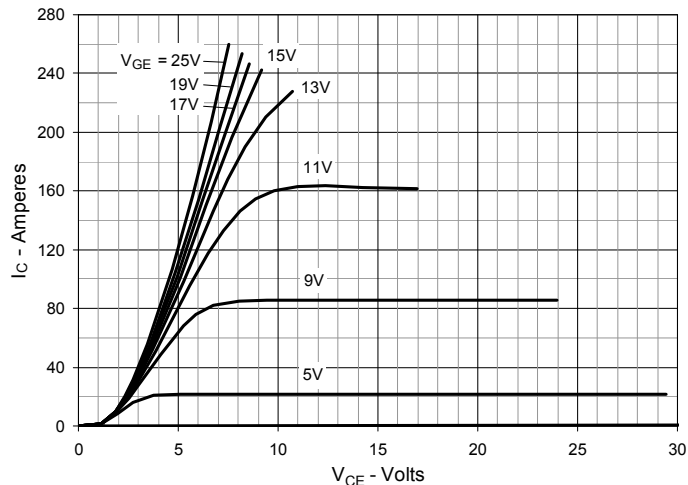
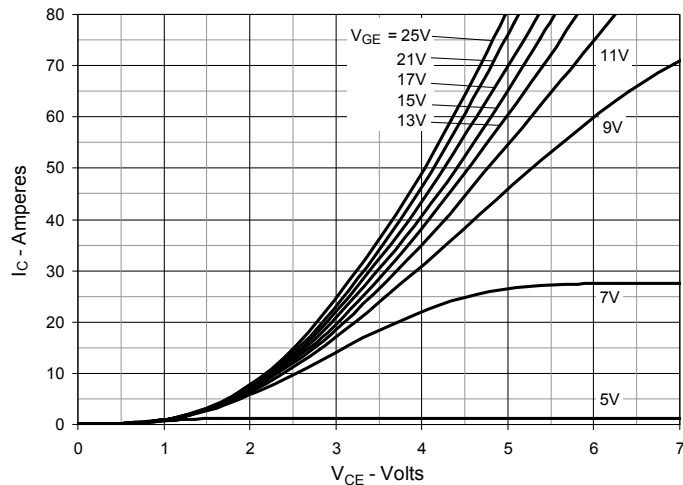
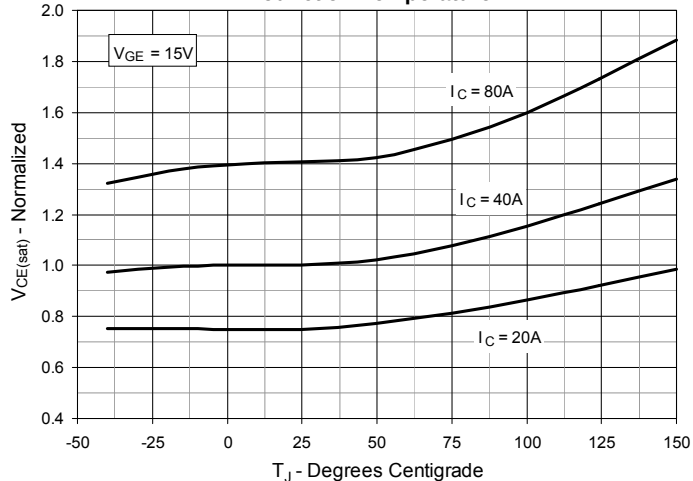
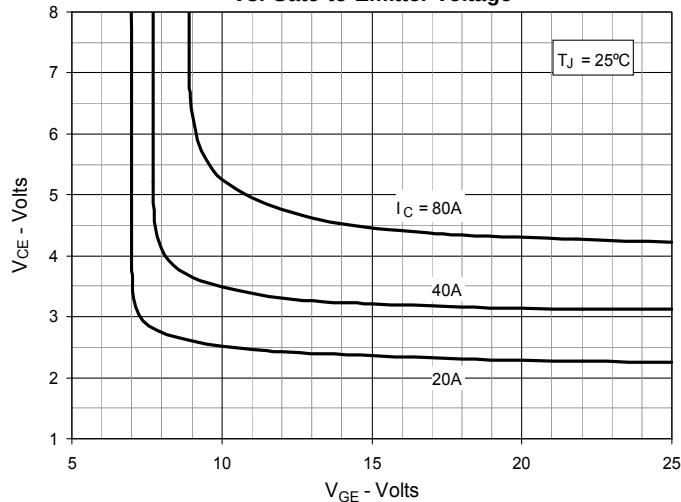
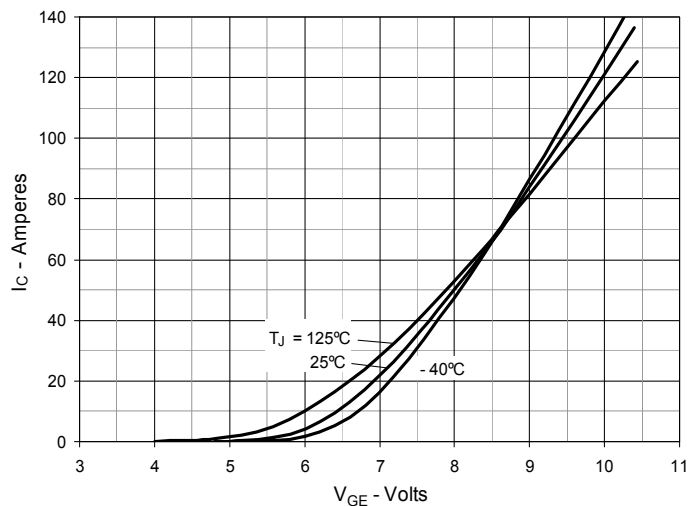
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

Fig. 6. Input Admittance


Fig. 7. Transconductance

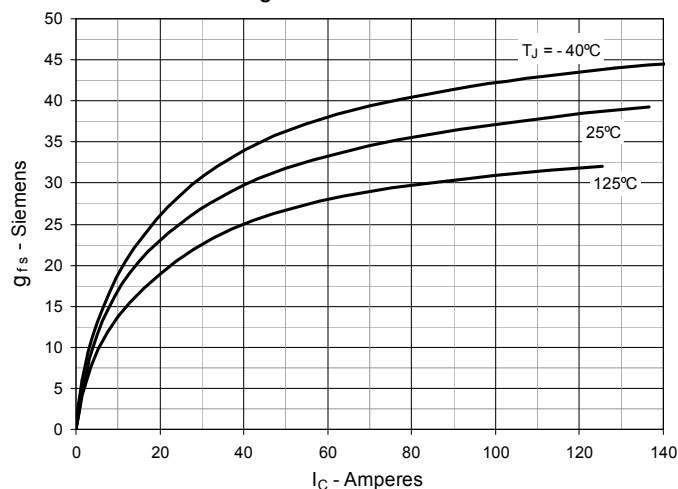


Fig. 8. Gate Charge

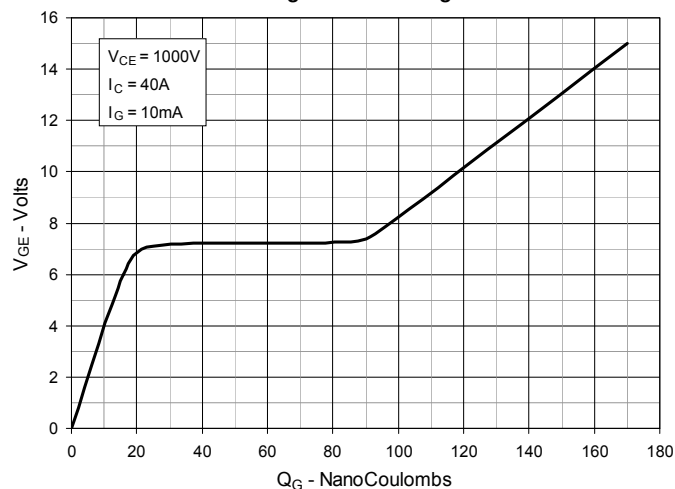


Fig. 9. Capacitance

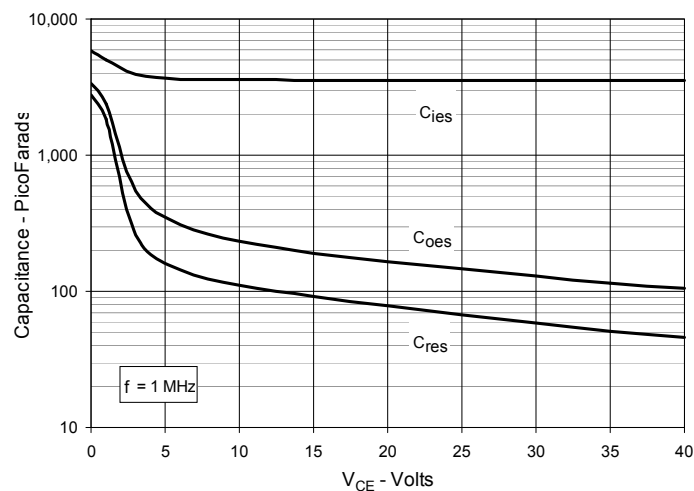


Fig. 10. Reverse-Bias Safe Operating Area

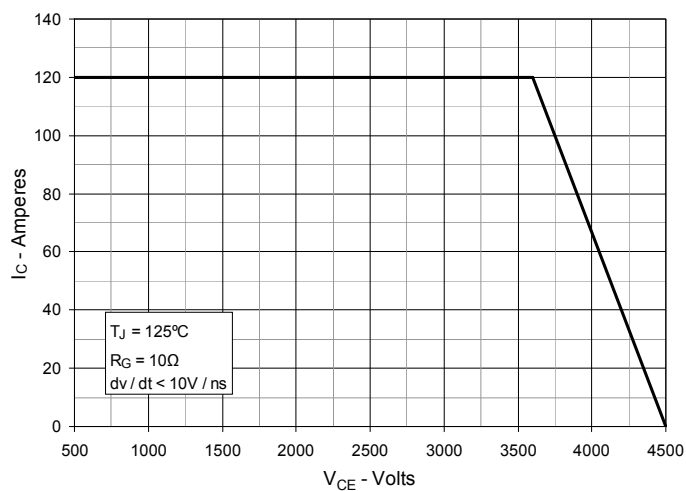
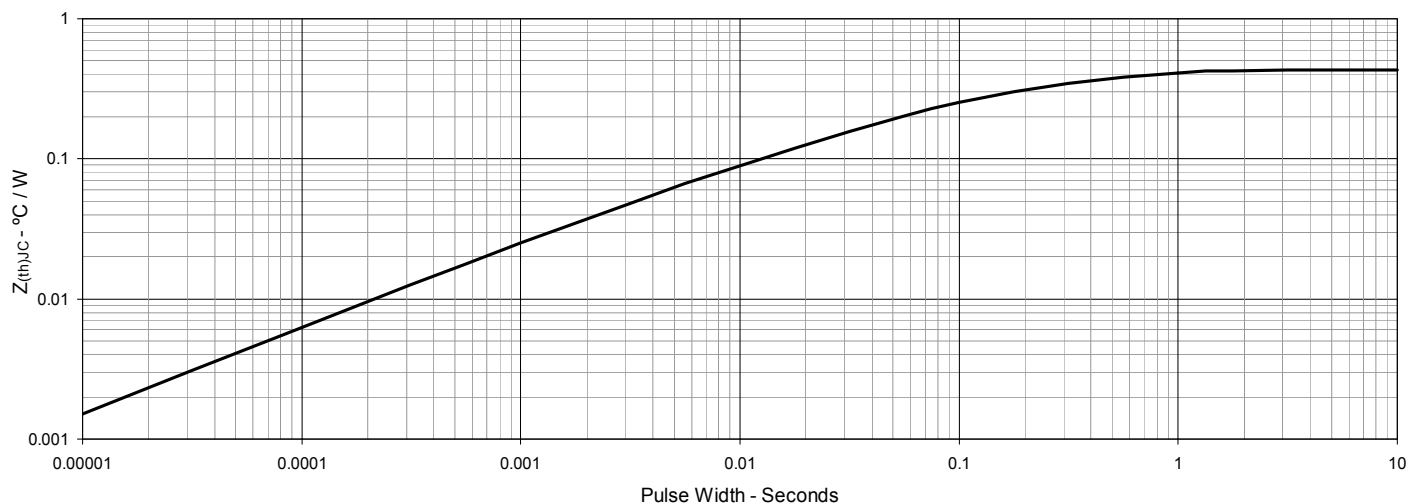


Fig. 11. Maximum Transient Thermal Impedance



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