IXYS

Preliminary Technical Information

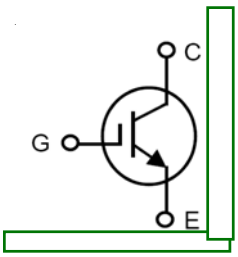
High Voltage XPT™ IGBT

IXYX40N450HV

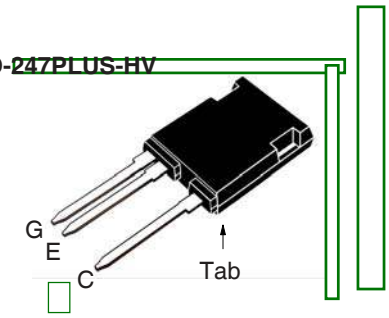
V_{CES} = 4500V

I_{C110} = 40A

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



TO-247PLUS-HV



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	4500	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	4500	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	95	A
I_{C110}	T_C = 110°C	40	A
I_{CM}	T_C = 25°C, 1ms	350	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 120 3600	A V
P_C	T_C = 25°C	660	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force	20..120/4.5..27	N/lb
Weight		6	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	4500			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	μA
	T_J = 125°C			1.25	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±200	nA
$V_{CE(sat)}$	I_C = 40A, V_{GE} = 15V, Note 1		3.2	3.9	V
	T_J = 125°C		4.0		V

Features

- High Voltage Package
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

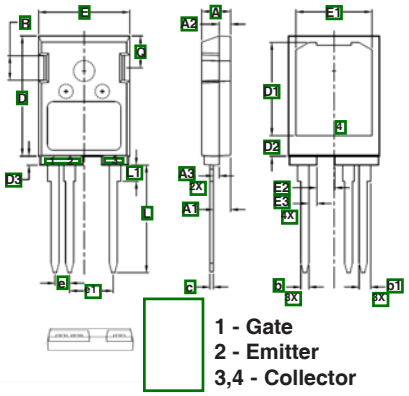
Applications

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

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 40A, V_{CE} = 10V, Note 1	18	30	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3550	pF
C_{oes}			146	pF
C_{res}			67	pF
Q_g	I_C = 40A, V_{GE} = 15V, V_{CE} = 1000V		170	nC
Q_{ge}			19	nC
Q_{gc}			70	nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C**		36	ns
t_r	I_C = 40A, V_{GE} = 15V		330	ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 2Ω		110	ns
t_f			1120	ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C**		46	ns
t_r	I_C = 40A, V_{GE} = 15V		740	ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 2Ω		118	ns
t_f			1010	ns
R_{thJC}				0.19 °C/W
R_{thCS}			0.15	°C/W

Note: 1. Pulse test, t < 300μs, duty cycle, d < 2%.

TO-247PLUS-HV Outline



1 - Gate
2 - Emitter
3,4 - Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100 BSC		2.54 BSC	
e1	.300 BSC		7.62 BSC	
L	.732	.748	18.60	19.00
L1	.106	.118	2.70	3.00
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30

PRELIMINARY 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.

Fig. 1. Output Characteristics @ T_J = 25ºC

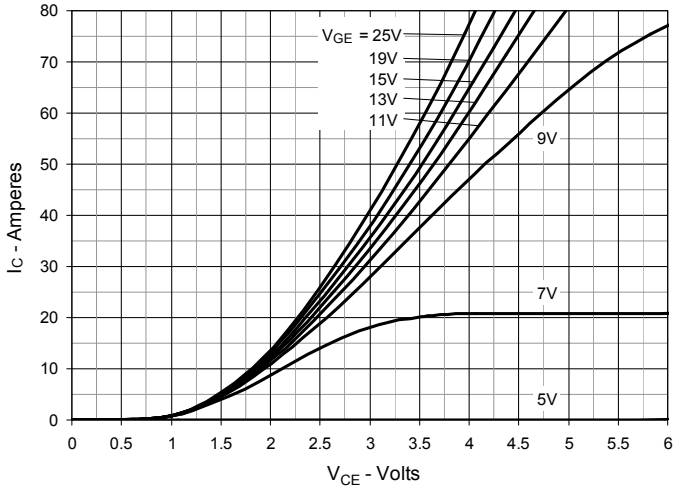


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

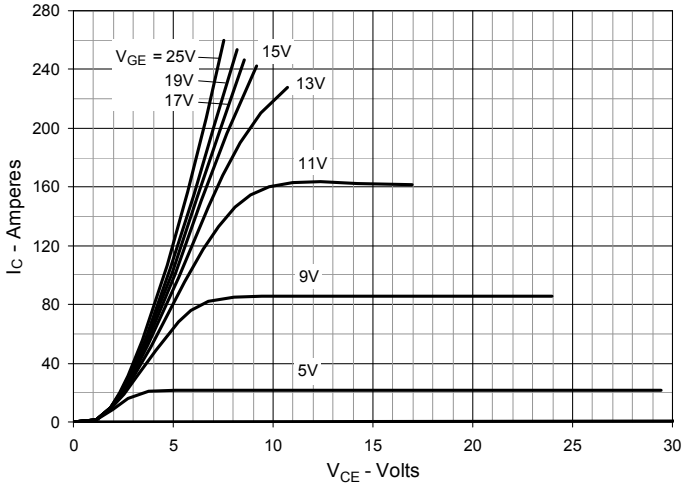


Fig. 3. Output Characteristics @ T_J = 125ºC

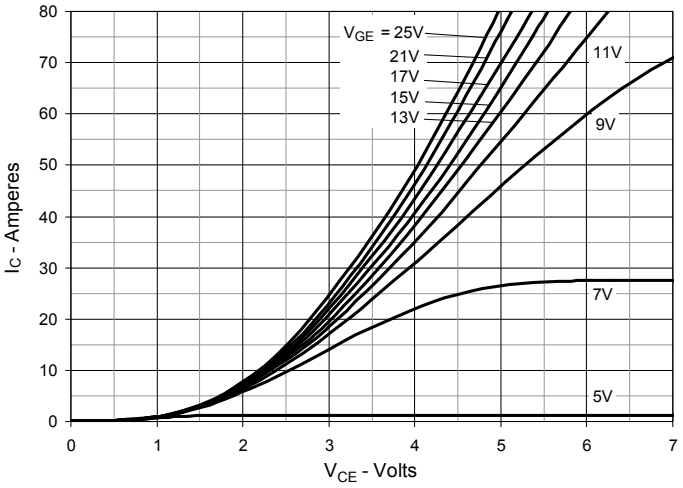


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

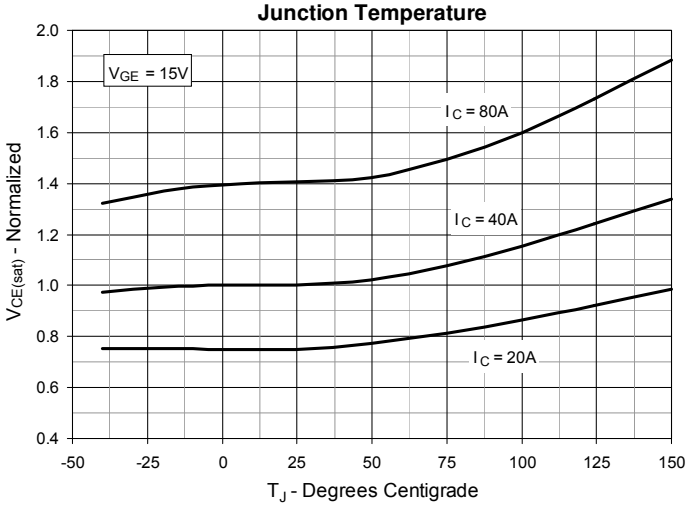


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

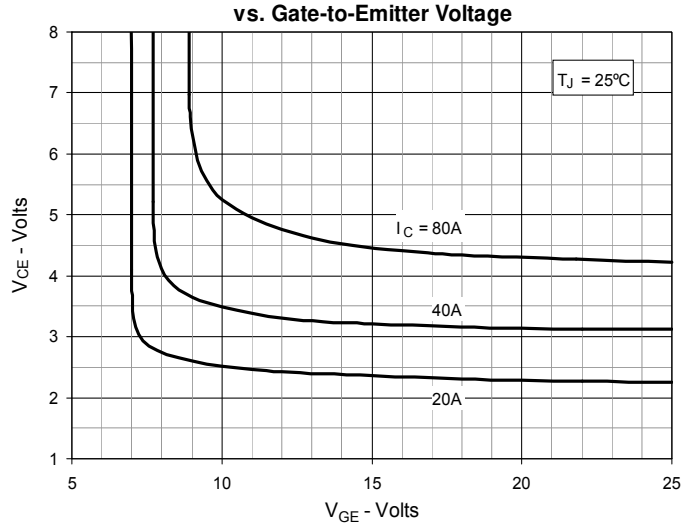


Fig. 6. Input Admittance

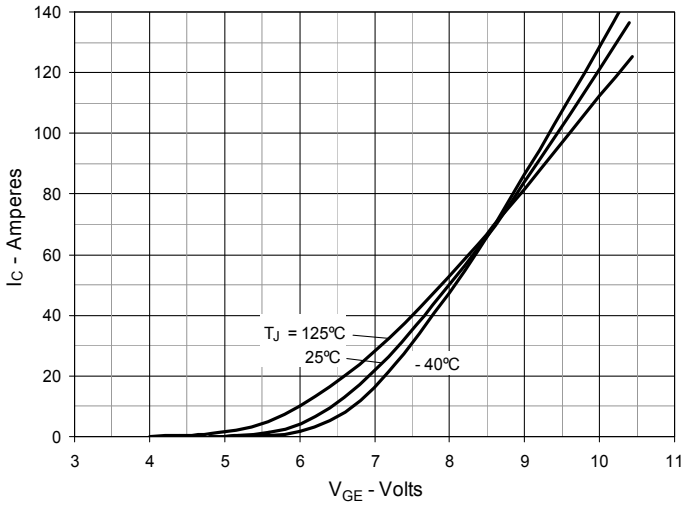


Fig. 7. Transconductance

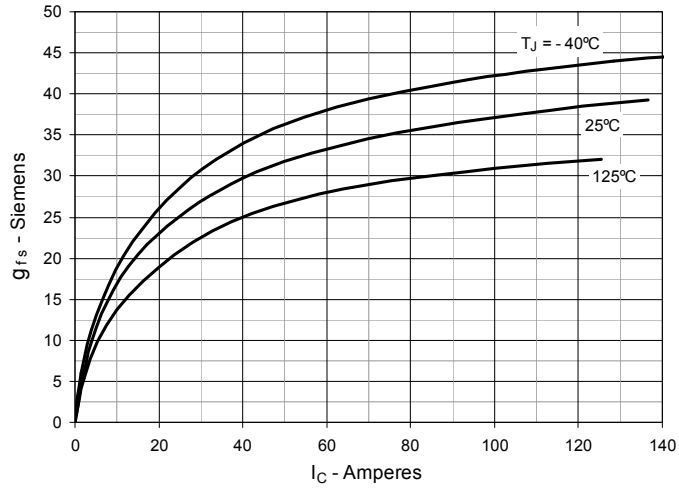


Fig. 8. Gate Charge

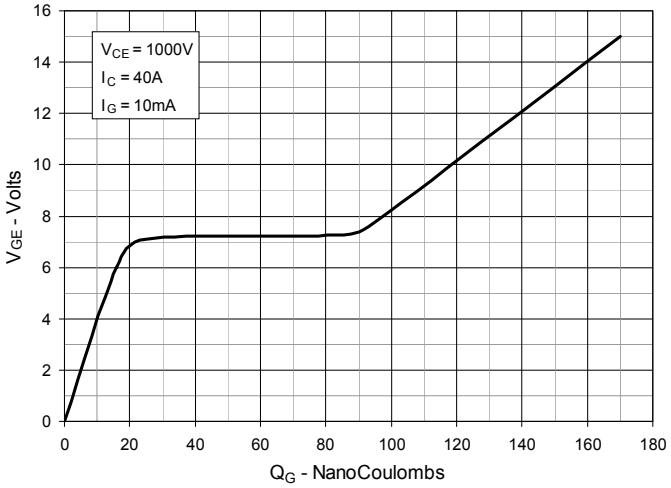


Fig. 9. Capacitance

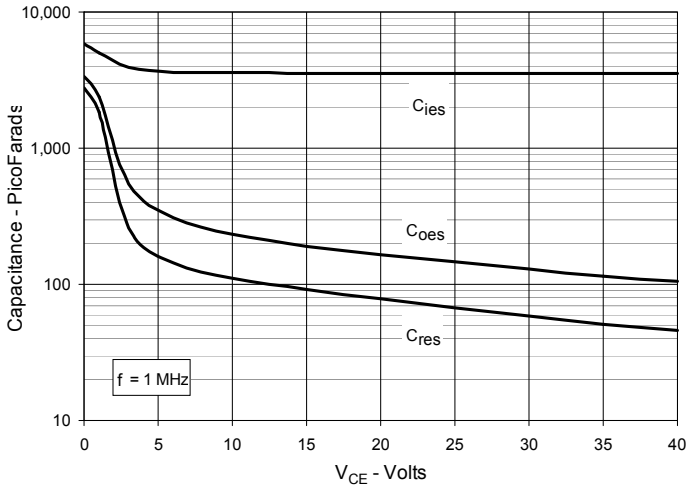


Fig. 10. Reverse-Bias Safe Operating Area

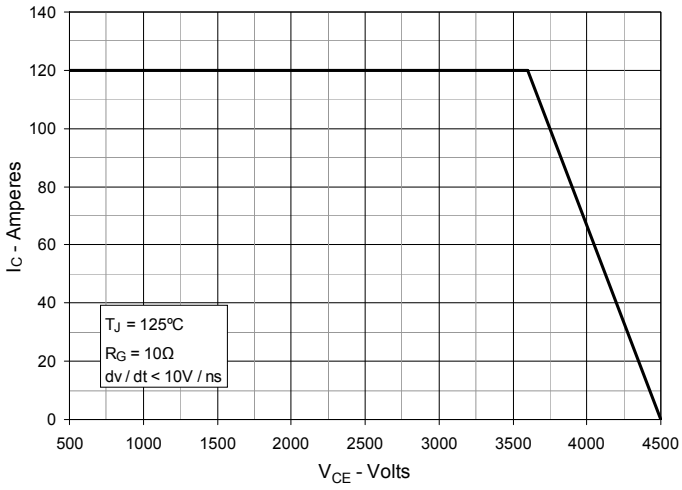
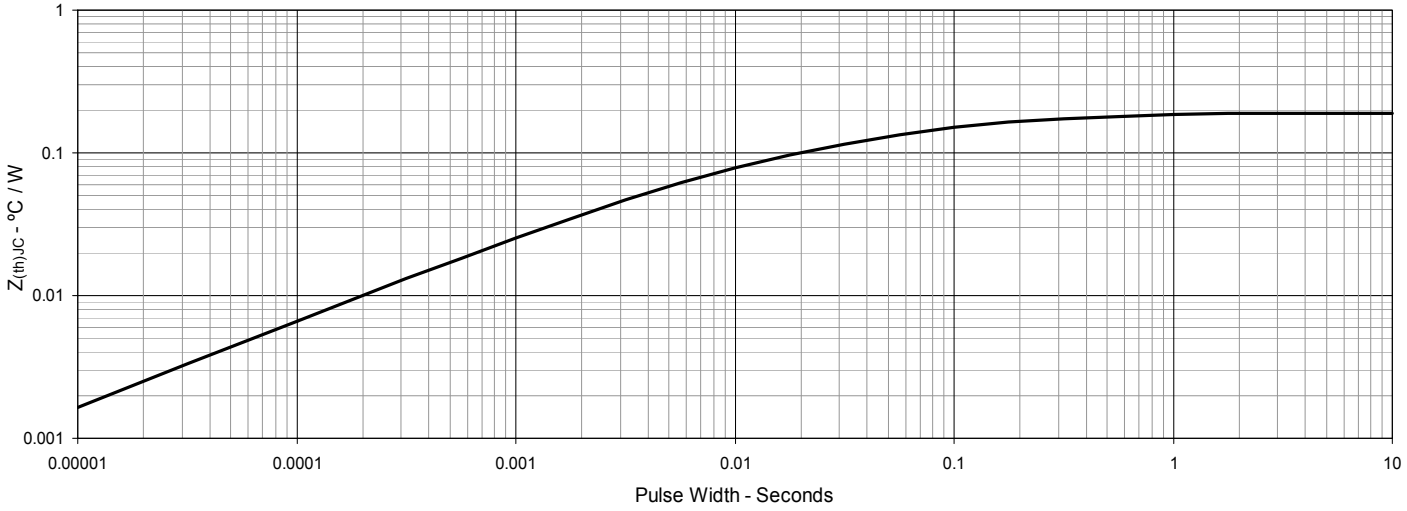


Fig. 11. Maximum Transient Thermal Impedance



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