

## High Voltage XPT™ IGBT

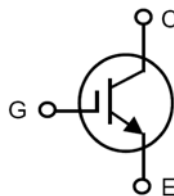
**IXYF40N450**

$$V_{CES} = 4500V$$

$$I_{C110} = 32A$$

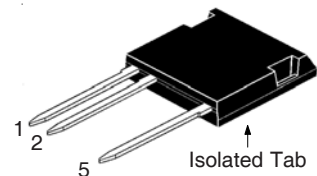
$$V_{CE(sat)} \leq 3.9V$$

(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	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	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
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 10\Omega$	$I_{CM} = 120$	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~
<b>Weight</b>		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**

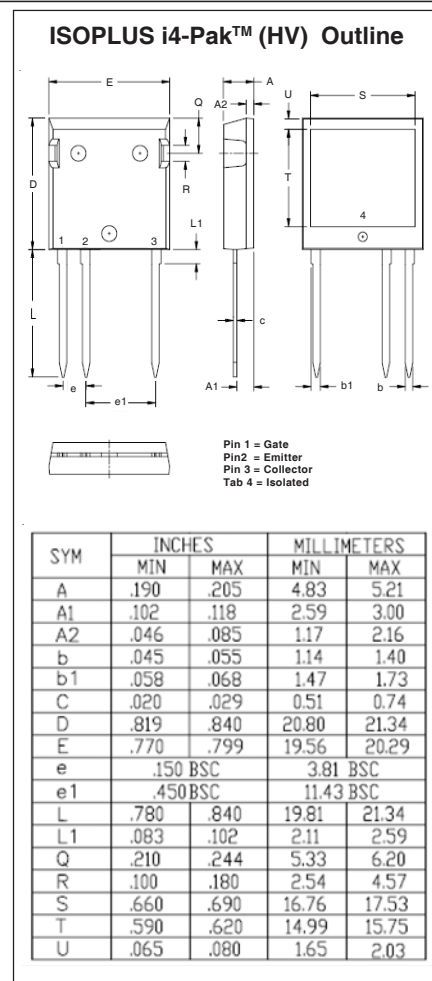
- Low Gate Drive Requirement
- High Power Density

**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 $\mu A$ $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 200$ 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.
$g_{fs}$	$I_C = 40\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	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
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 2\Omega$		36	ns
$t_r$			330	ns
$t_{d(off)}$			110	ns
$t_f$			1120	ns
$t_{d(on)}$			<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 2\Omega$	
$t_r$	740	ns		
$t_{d(off)}$	118	ns		
$t_f$	1010	ns		
$R_{thJC}$	0.15			
$R_{thCS}$			$^\circ\text{C/W}$	



**Notes:**

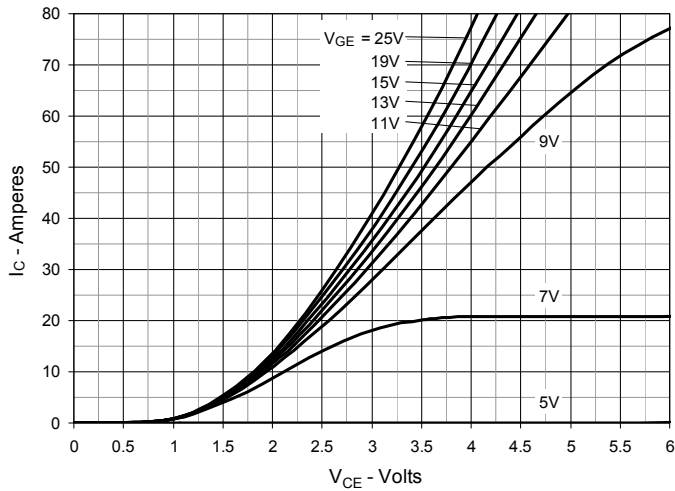
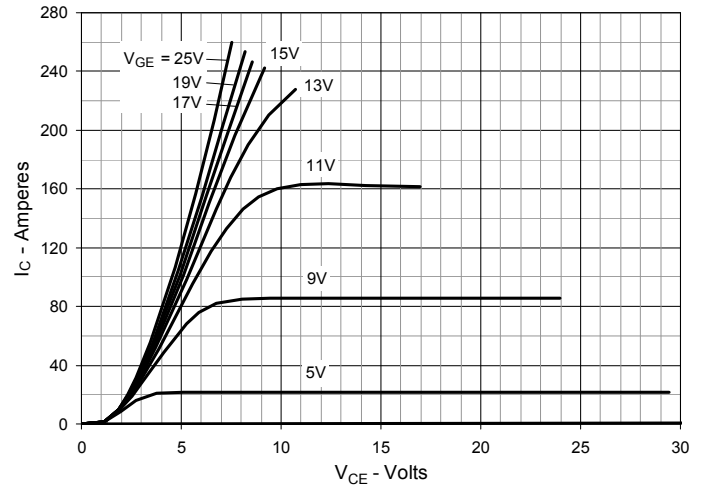
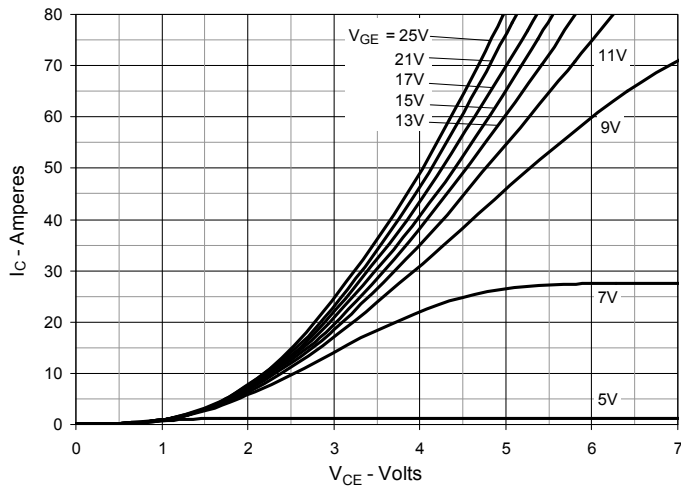
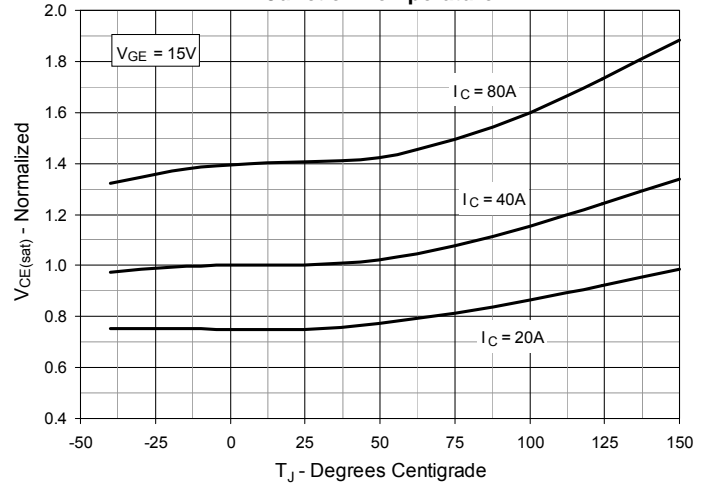
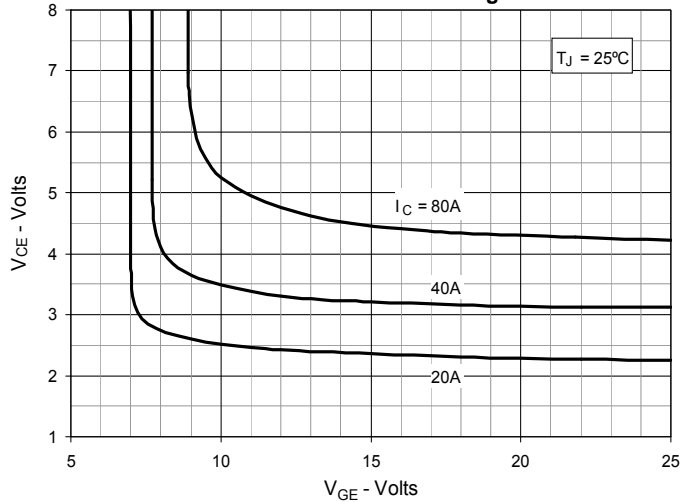
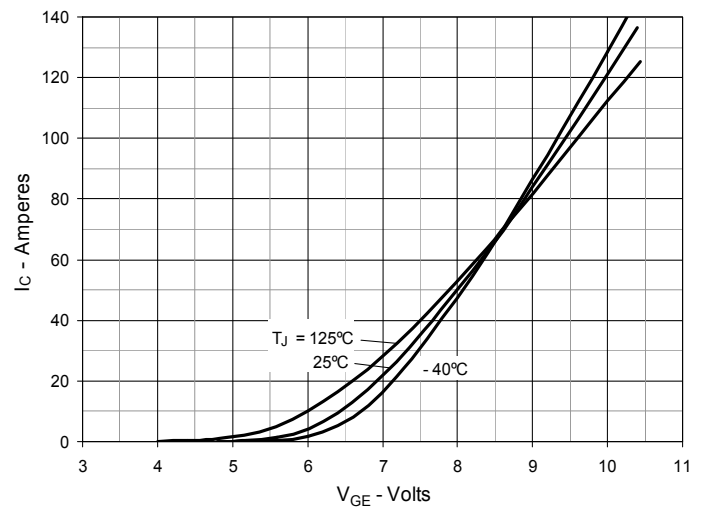
1. Pulse test,  $t < 300\mu\text{s}$ , duty cycle,  $d < 2\%$ .
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

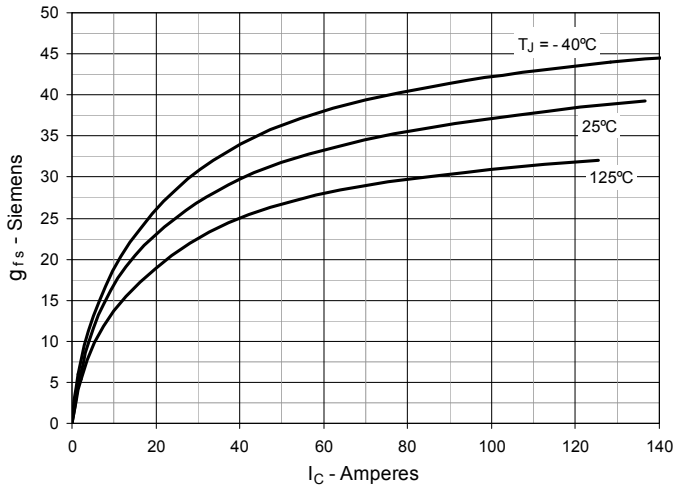
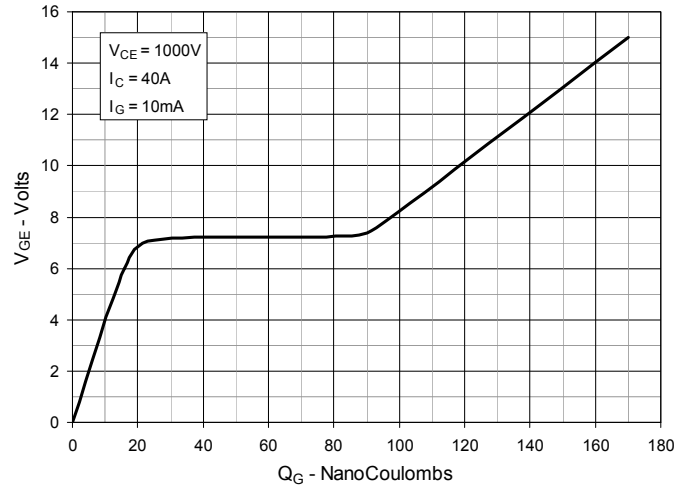
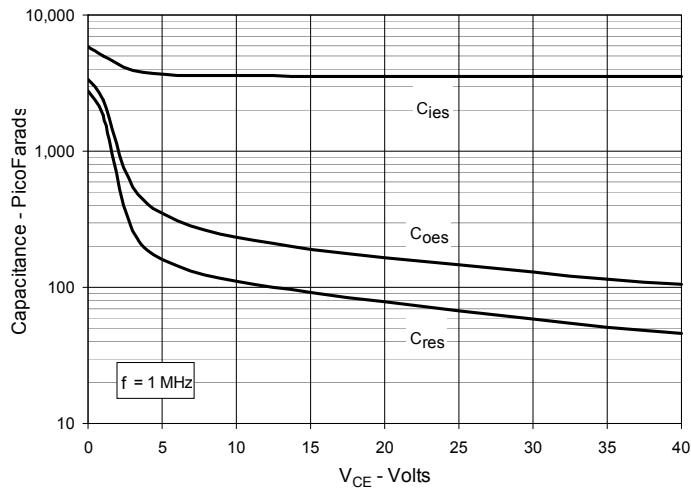
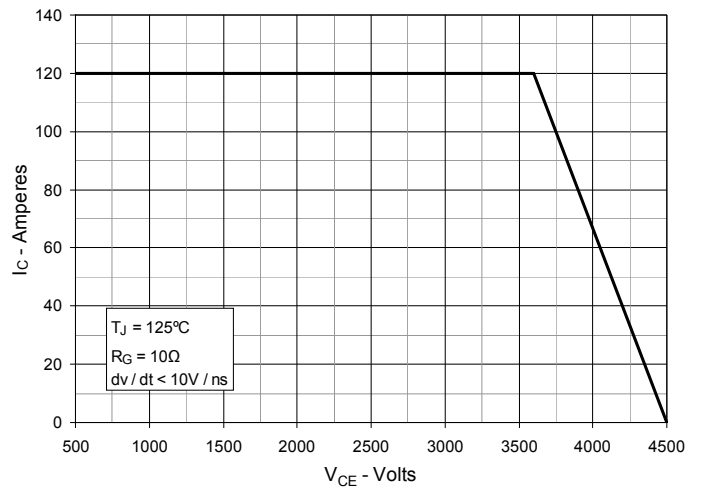
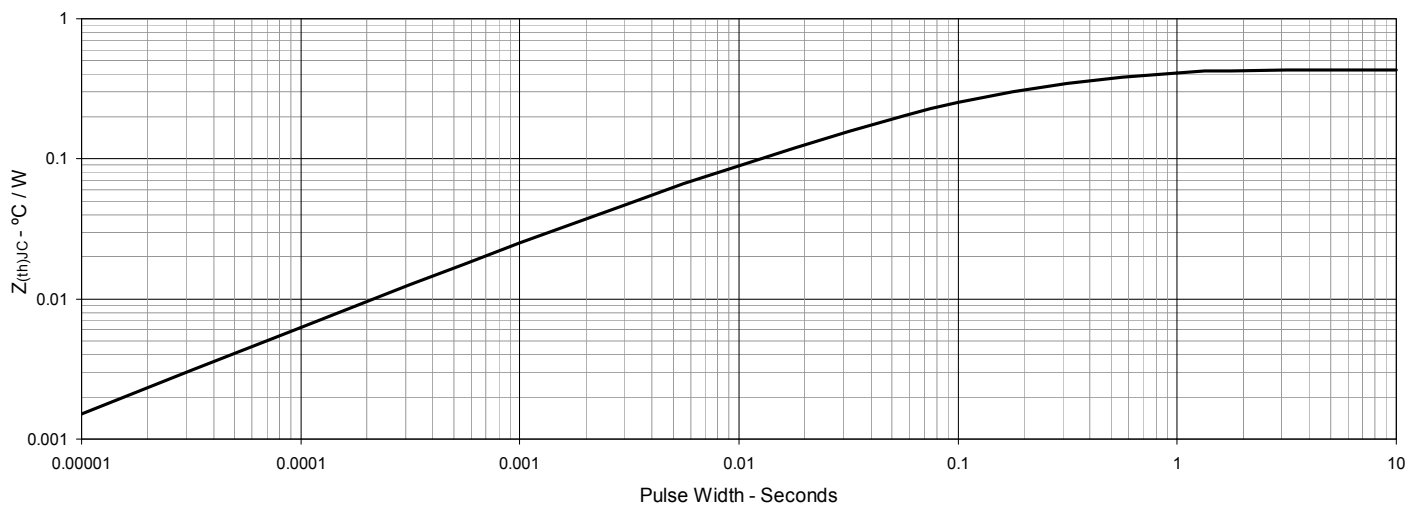
**ADVANCE TECHNICAL INFORMATION**

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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