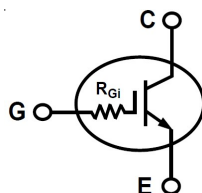


High Voltage XPT™ IGBT

IXYL60N450

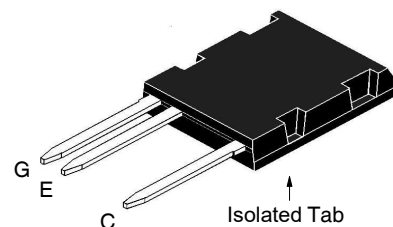
$$\begin{aligned} V_{CES} &= 4500V \\ I_{C110} &= 38A \\ V_{CE(sat)} &\leq 3.30V \end{aligned}$$

(Electrically Isolated Tab)



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	4500	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GE} = 1M\Omega$	4500	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	90	A
I_{C110}	$T_C = 110^\circ\text{C}$	38	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	680	A
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 125^\circ\text{C}, R_G = 4.7\Omega$	$I_{CM} = 120$	A
	Clamped Inductive Load	1500	V
P_C	$T_C = 25^\circ\text{C}$	417	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	Plastic Body for 10s	260	$^\circ\text{C}$
F_C	Mounting Force	40..120 / 9..27	N/lb
V_{ISOL}	50/60 Hz, RM, $t = 1\text{min}$	4000	V~
Weight		8	g

ISOPLUS i5-Pak™



G = Gate
C = Collector
E = Emitter

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 ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0V$	4500		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = 4000V, V_{GE} = 0V$ Note 1, $T_J = 90^\circ\text{C}$		75	25 μA μA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 300 nA
$V_{CE(sat)}$	$I_C = 60A, V_{GE} = 15V$, Note 1 $T_J = 125^\circ\text{C}$		2.64 3.46	V V

Symbol Test Conditions $(T_J = 25^\circ\text{C}$ Unless Otherwise Specified)**Characteristic Values****Min.** **Typ.** **Max.**

g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	32	54	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		7530	pF
C_{oes}			270	pF
C_{res}			115	pF
R_{Gi}	Integrated Gate Input Resistance		5.0	Ω
$Q_{g(on)}$	$I_C = 60\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		366	nC
Q_{ge}			48	nC
Q_{gc}			138	nC
$t_{d(on)}$	Resistive Switching Times, $T_J = 25^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 4.7\Omega$		55	ns
t_r			450	ns
$t_{d(off)}$			450	ns
t_f			1360	ns
$t_{d(on)}$	Resistive Switching Times, $T_J = 125^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 4.7\Omega$		60	ns
t_r			664	ns
$t_{d(off)}$			510	ns
t_f			1070	ns
R_{thJC}				0.30 $^\circ\text{C/W}$
R_{thCS}			0.15	$^\circ\text{C/W}$

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.

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IXYS MOSFETs and IGBTs are covered 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
 by one or more of the following U.S. patents: 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
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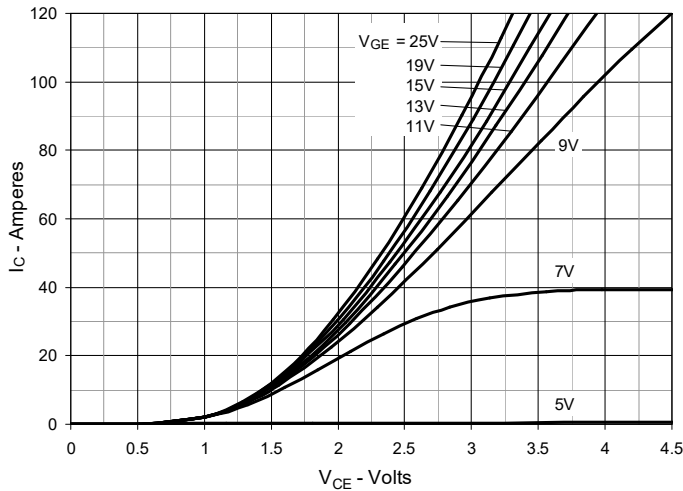
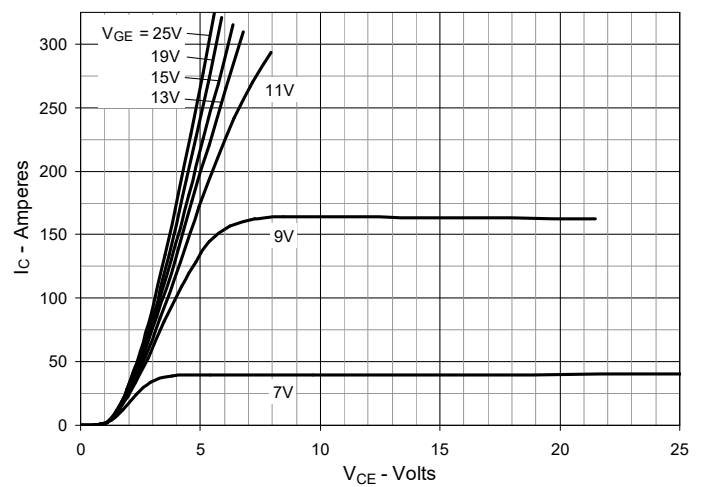
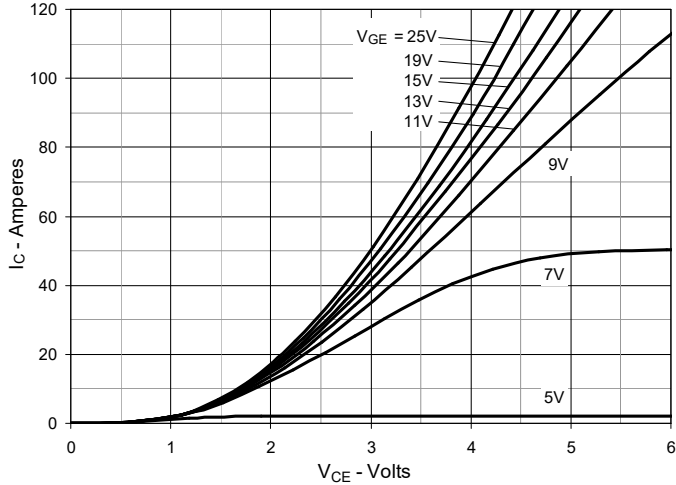
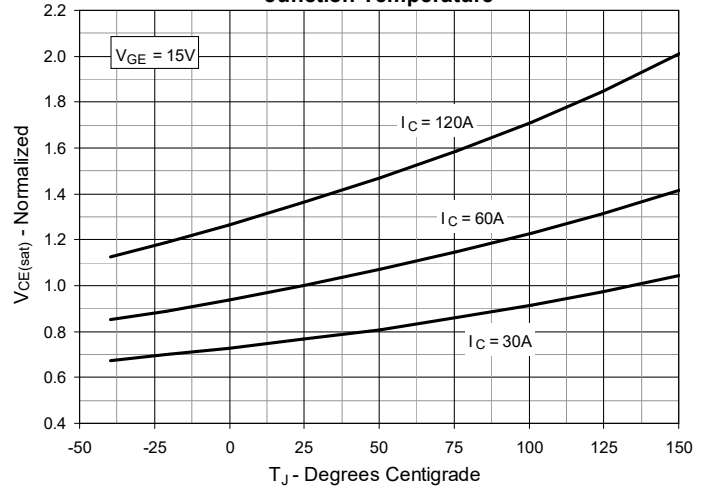
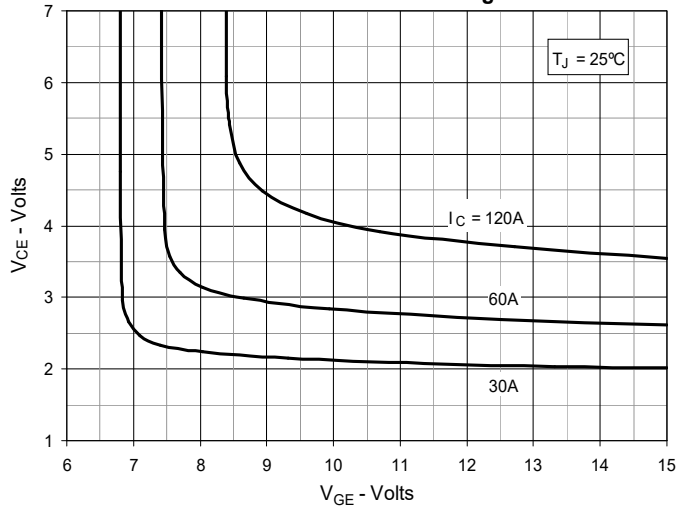
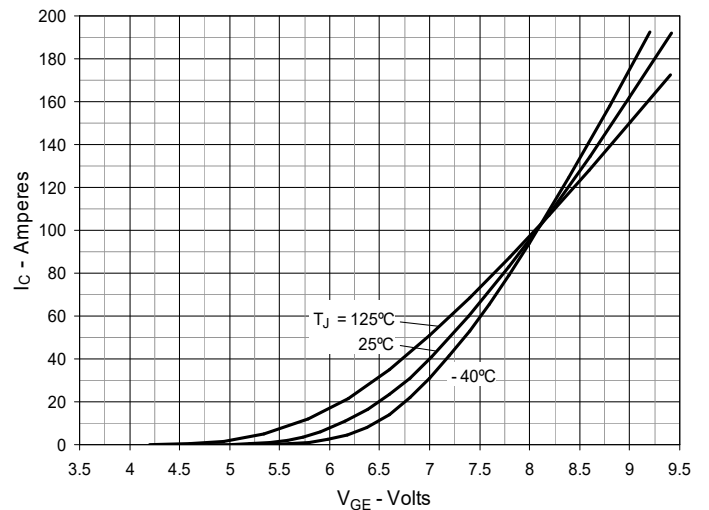
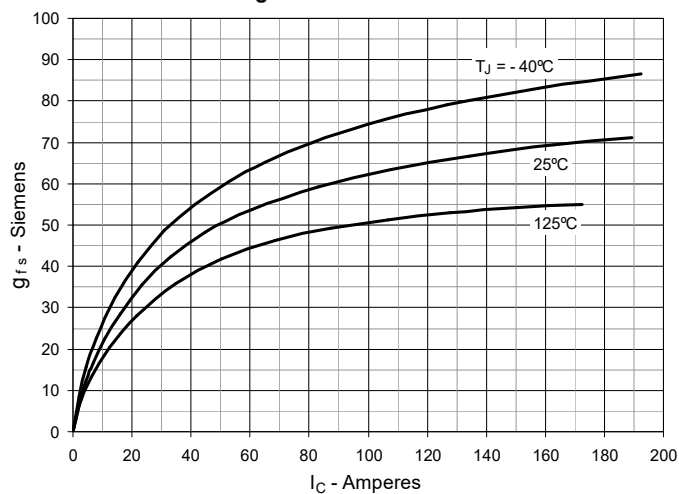
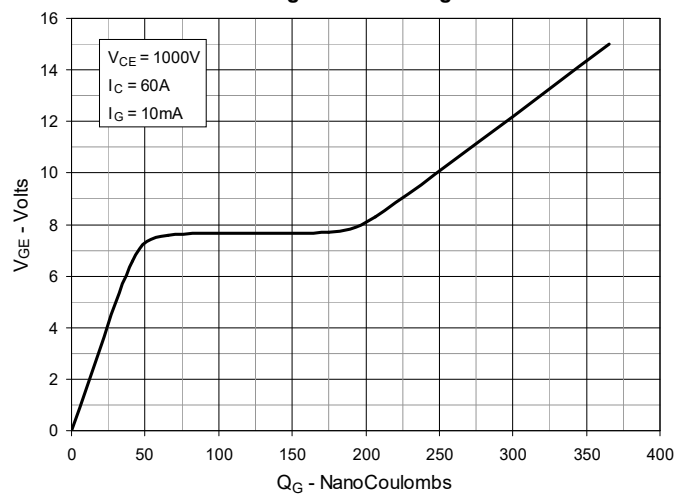
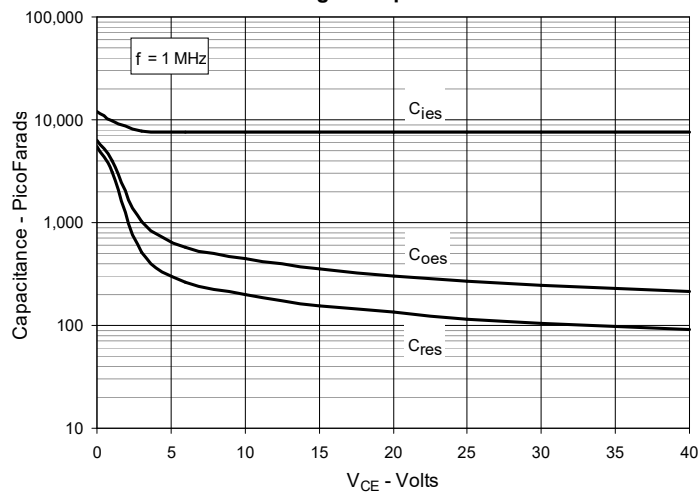
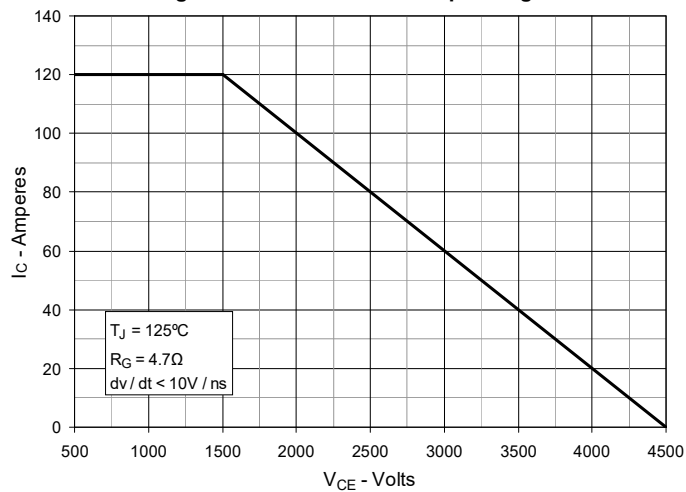
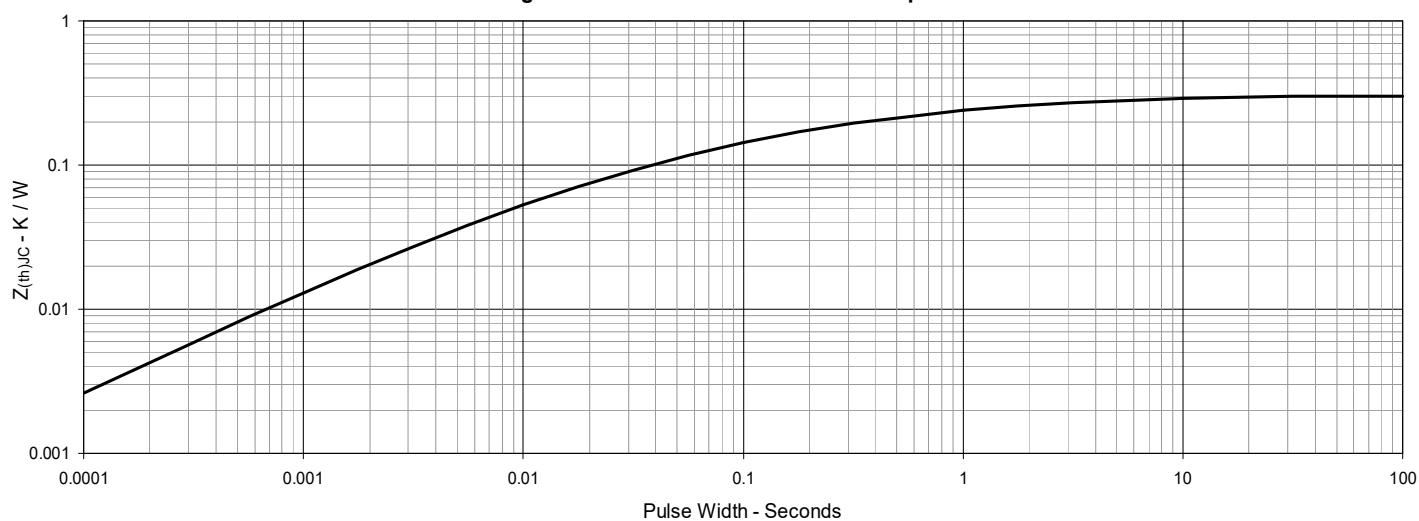
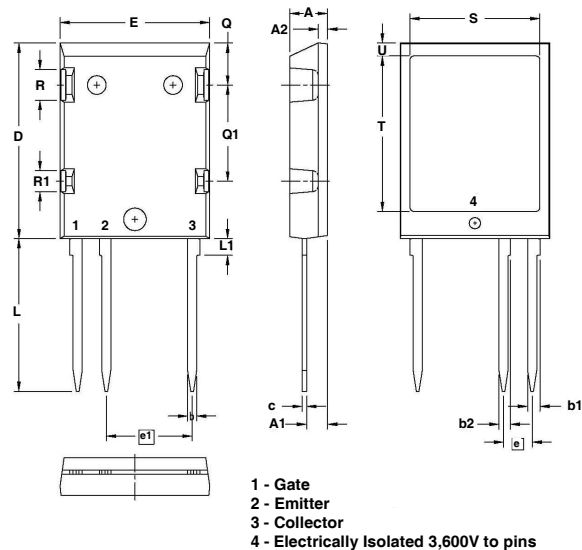
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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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ISOPLUS i5-Pak™ (IXYL) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.055	1.17	1.40
b	.045	.055	1.14	1.40
b1	.063	.072	1.60	1.83
b2	.058	.068	1.47	1.73
c	.020	.029	0.51	0.74
D	1.020	1.040	25.91	26.42
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.820	19.81	20.83
L1	.080	.102	2.03	2.59
Q	.210	.235	5.33	5.97
Q1	.490	.513	12.45	13.03
R	.150	.180	3.81	4.57
R1	.100	.130	2.54	3.30
S	.668	.690	16.97	17.53
T	.801	.821	20.34	20.85
U	.065	.080	1.65	2.03



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