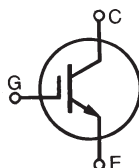


Very High Voltage IGBT

IXEL40N400

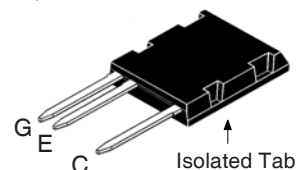
(Electrically Isolated Tab)



$$\begin{aligned} V_{CES} &= 4000V \\ I_{C110} &= 40A \\ V_{CE(sat)} &\leq 3.2V \\ t_{fi(typ)} &= 425ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	4000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	90	A
I_{C110}	$T_C = 110^\circ\text{C}$	40	A
I_{CM}	Pulse Width Limited by T_{JM} , 1ms, $V_{GE} = 25V$	400	A
P_C	$T_C = 25^\circ\text{C}$	380	W
T_J		- 40 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		- 40 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10s	260	$^\circ\text{C}$
V_{ISOL}	$I_{ISOL} < 1\text{mA}$, 50/60 Hz, $t = 1$ minute	4000	V~
F_C	Mounting Force	30..170 / 7..36	Nm/lb-in.
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
- UL Recognized Package
- High Peak Current Capability
- Low Saturation Voltage
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Advantages

- High Power Density
- Easy to Mount

Applications

- Capacitor Discharge
- Pulser Circuits

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 10\text{mA}$, $V_{CE} = V_{GE}$	5.5		7.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 125^\circ\text{C}$		1.5	100 μA mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 500 nA
$V_{CE(sat)}$	$I_C = I_{C110}$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ\text{C}$		2.4 3.0	3.2 V V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = I_{C110}, V_{CE} = 10\text{V}$, Note 1	14	24	S
I_{SC}	$I_C = I_{C110}, V_{CC} = 3400\text{V}$, $V_{CM} < 4000\text{V}$ $V_{GE} = 15\text{V}$, $t_{SC} \leq 10\mu\text{s}$		200	A
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		6040	pF
C_{oes}			278	pF
C_{res}			120	pF
R_{Gint}			5.2	Ω
$Q_{g(on)}$	$I_C = I_{C110}, V_{GE} = 15\text{V}$, $V_{CE} = 1000\text{V}$		275	nC
Q_{ge}			63	nC
Q_{gc}			134	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 2800\text{V}$, $R_G = 33\Omega$ Note 3		160	ns
t_{ri}			100	ns
E_{on}			55	mJ
$t_{d(off)}$			630	ns
t_{fi}			425	ns
E_{off}			165	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 2800\text{V}$, $R_G = 33\Omega$ Note 3		155	ns
t_{ri}			105	ns
E_{on}			85	mJ
$t_{d(off)}$			715	ns
t_{fi}			455	ns
E_{off}			205	mJ
R_{thJC}	(Pressure Mount)			0.26 $^\circ\text{C/W}$
R_{thCK}		0.15		$^\circ\text{C/W}$

ISOPLUS i5-Pak™ HV Outline				
Pin 1 = Gate Pin 2 = Emitter Pin 3 = Collector Tab 4 = Isolated				
SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	0.190	0.205	4.83	5.21
A1	0.102	0.118	2.59	3.00
A2	0.046	0.055	1.17	1.40
b	0.045	0.055	1.14	1.40
b1	0.063	0.072	1.60	1.83
b2	0.058	0.068	1.47	1.73
c	0.020	0.029	0.51	0.74
D	1.020	1.040	25.91	26.42
E	0.770	0.799	19.56	20.29
e	0.150 BSC		3.81 BSC	
e1	0.450 BSC		11.43 BSC	
L	0.780	0.820	19.81	20.83
L1	0.080	0.102	2.03	2.59
Q	0.210	0.235	5.33	5.97
Q1	0.490	0.513	12.45	13.03
R	0.150	0.180	3.81	4.57
R1	0.100	0.130	2.54	3.30
S	0.668	0.690	16.97	17.53
T	0.801	0.821	20.34	20.85
U	0.065	0.080	1.65	2.03

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Part must be heatsunk for high-temp I_{CES} measurement.
3. Switching times & energy losses may increase for higher V_{CE} (Clamp), T_J or R_G .

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	

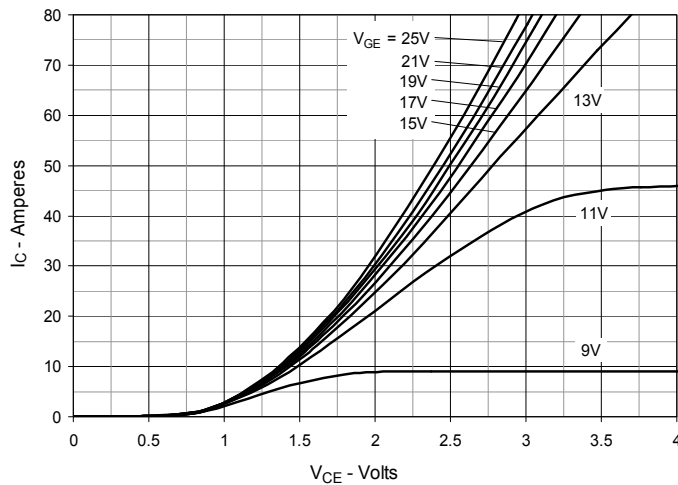
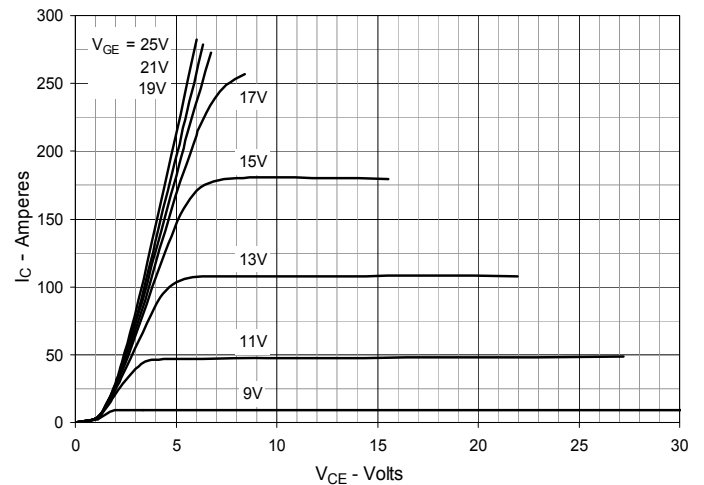
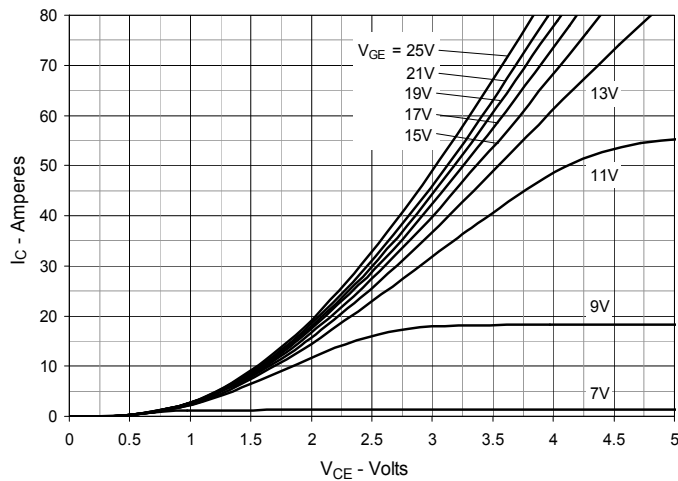
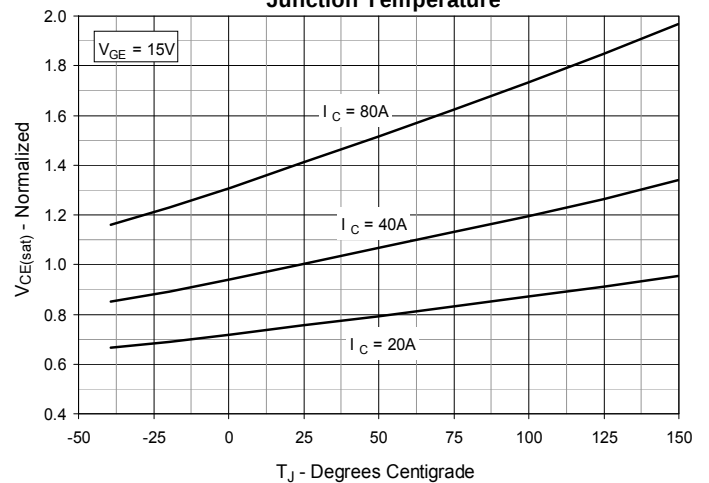
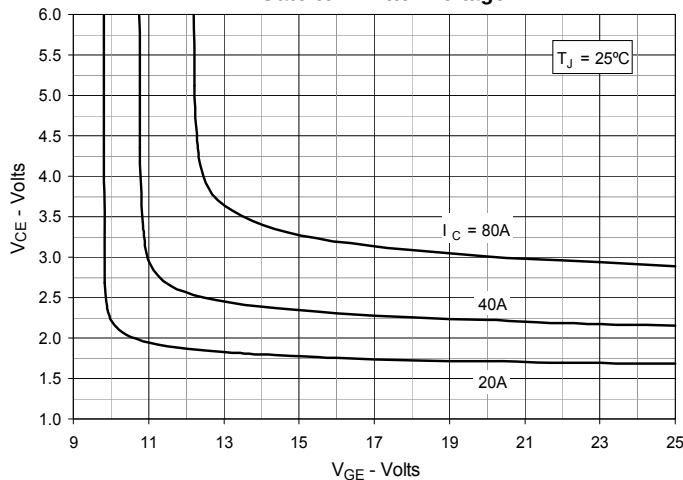
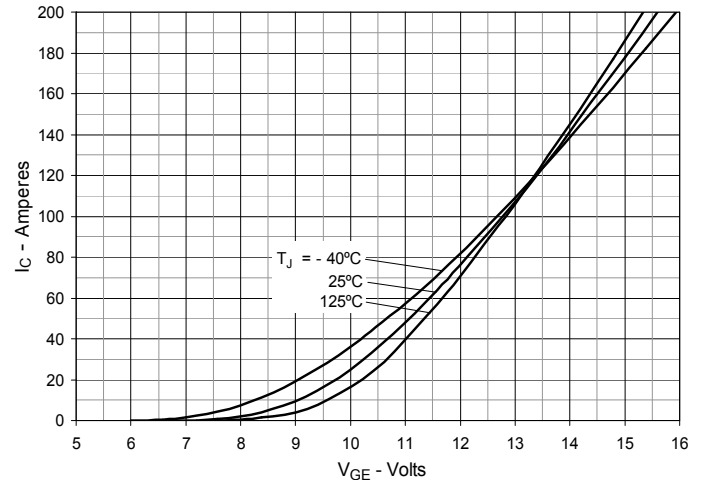
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

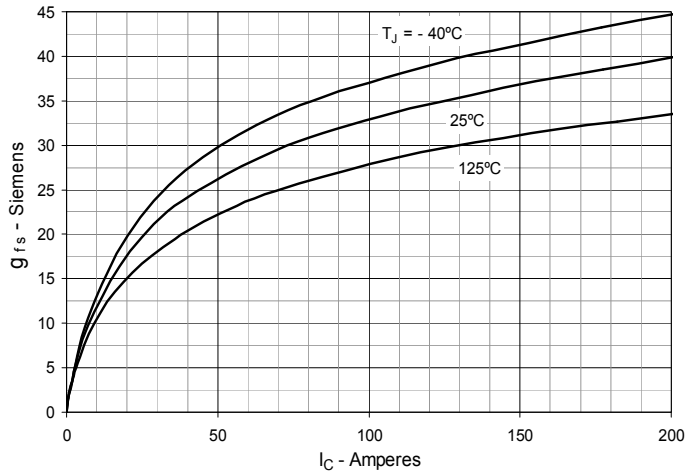


Fig. 8. Gate Charge

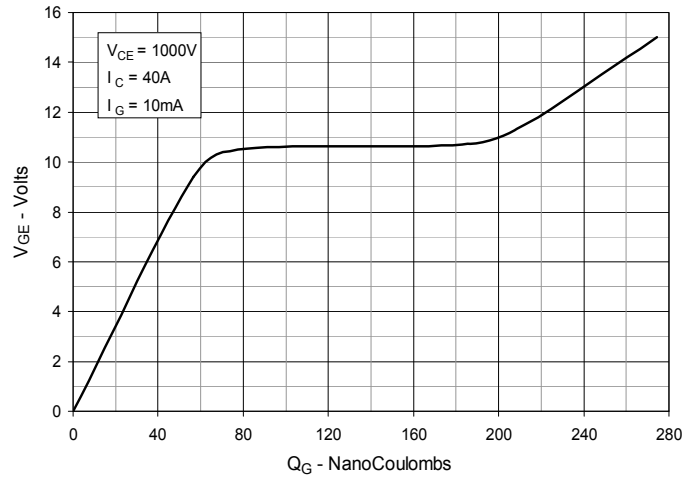


Fig. 9. Capacitance

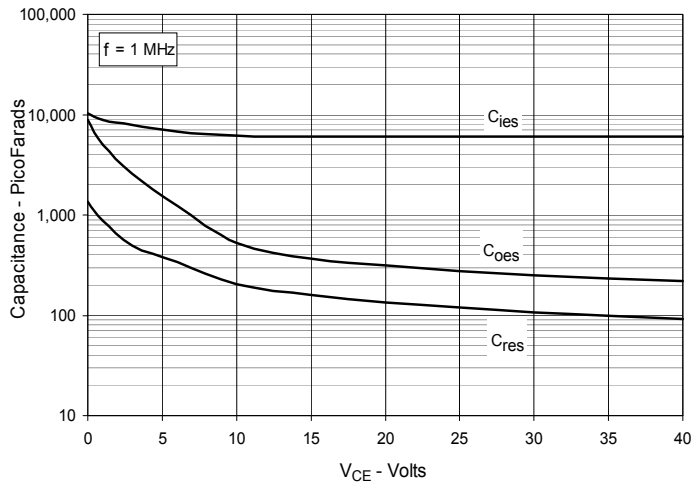


Fig. 10. Reverse-Bias Safe Operating Area

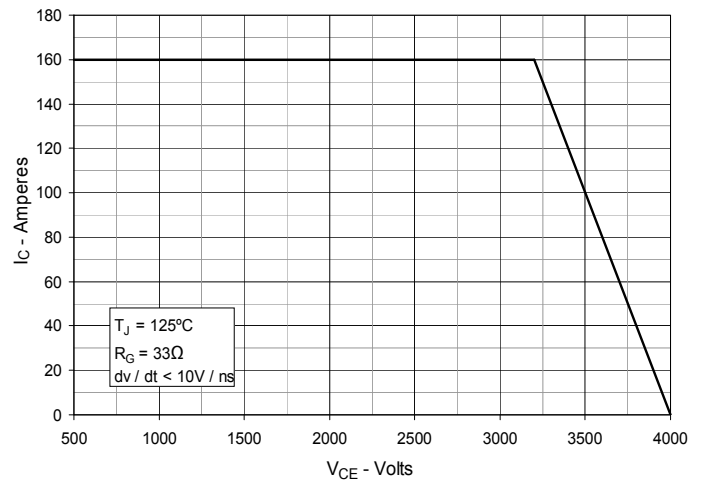


Fig. 11. Maximum Transient Thermal Impedance

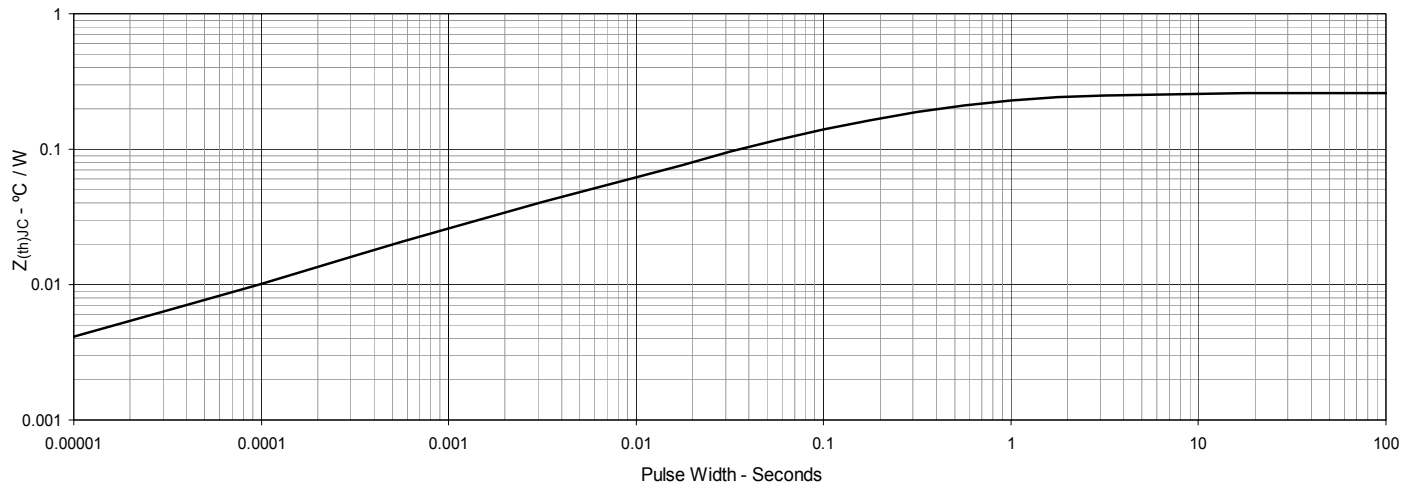


Fig. 12. Typ. Swicthng Characteristics vs. Collector Current

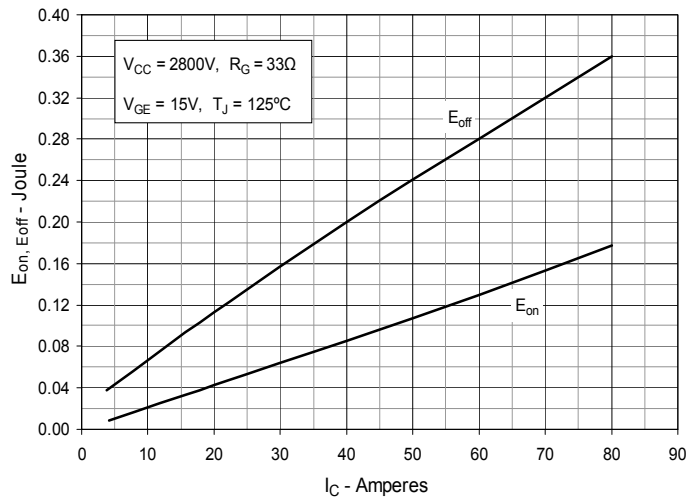


Fig. 13. Typ. Swicthng Characteristics vs. Gate Resistor

