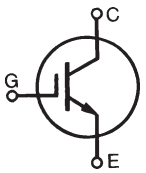
Very High Voltage IGBT

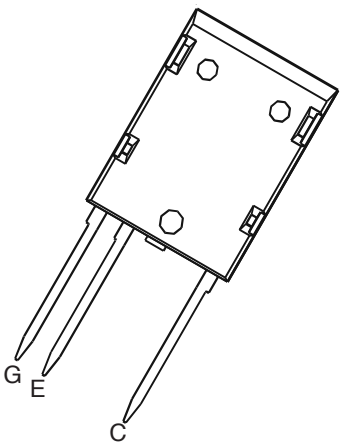
IXEL40N400

V_{CES} = 4000 V
I_{C90} = 40 A
$V_{CE(sat)}$ = 4.0 V
$t_{fi(typ)}$ = 450 ns



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 125°C	4000	V
V_{GES}	Continuous	±20	V
I_{C90}	T_C = 90°C	40	A
I_{CM}	Limited by T_J	170	A
P_C	T_C = 25°C	380	W
T_J		-40 ... +125	°C
T_{JM}		125	°C
T_{stg}		-40 ... +125	°C
Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Maximum Tab temperature for soldering SMD devices for 10 s		260	°C
F_C	Mounting Force	30..170 / 7..36	N/lb
V_{ISOL}	I_{ISOL} < 1 mA, 50/60 Hz, t = 1 minute	2500	V~
Weight		10	g

ISOPLUS i5 (HV)



Features

- High current handling capability
- MOS Gate turn-on
  - drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification

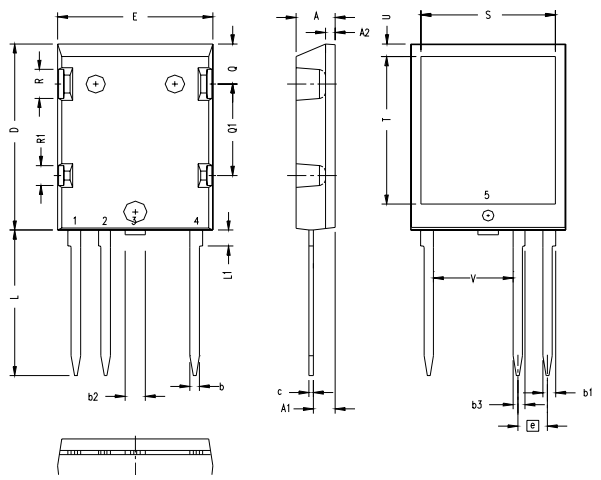
Applications

- Capacitor discharge
- Pulser circuits

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{GE(th)}$	I_C = 10 mA, V_{CE} = V_{GE}		6.0		7.5	V
I_{CES}	V_{CE} = 4000 V V_{GE} = 0 V	 T_J = 125°C		 1.5	100	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±500	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V	 T_J = 125°C		3.0 3.9	4.0	V V

Symbol	Test Conditions	Characteristic Values (T_J = 25°C unless otherwise specified) min.	typ.	max.
g_{fs}	$I_C = I_{C90}$, V_{CE} = 10 V,		21	S
I_{SC}	V_{CC} = 3400V, V_{CM} < 4000V, V_{GE} = 15V T_J = 125°C, t_{SC} <= 10 µs		175	A
C_{ies}			7450	pF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		280	pF
C_{res}			70	pF
Q_{ge}	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		310	nC
R_{Gint}			5	Ω
$t_{d(on)}$	**Inductive load**		170	ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = ±15 V		100	ns
E_{on}	V_{CE} = 2800 V, R_G 33 Ω		54	mJ
$t_{d(off)}$			660	ns
t_{fi}			450	ns
E_{off}			170	mJ
$t_{d(on)}$	**Inductive load,** T_J = 125°C		165	ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = ±15 V		105	ns
E_{on}	V_{CE} = 2800 V, R_G 33 Ω		72	mJ
$t_{d(off)}$			750	ns
t_{fi}			480	ns
E_{off}			22	mJ
R_{thJC}				0.33 K/W
R_{thCK}	(Pressure mount)		0.15	K/W

ISOPLUS i5 HV Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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	.100	.110	2.54	2.79
b3	.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	
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
V	.398	.406	10.11	10.31

Pin 1 = Gate Pin 4 = Collector
Pin 2 = Emitter TAB(5) = Electrically Isolated. Note V_{ISOL} = 2500 V~.
Metal surface finish: Tin plated except trim areas

Fig. 1. Output Characteristics @ 25 ºC

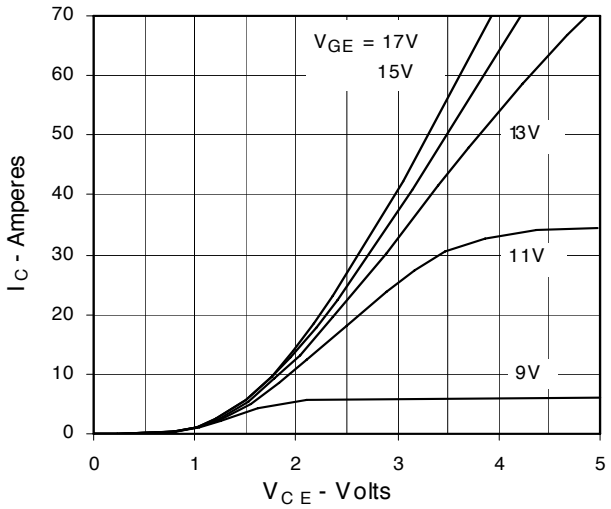


Fig. 2. Extended Output Characteristics @ 25 ºC

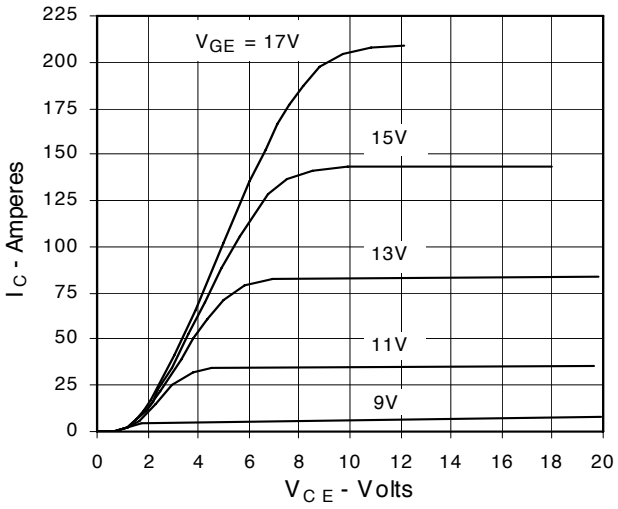


Fig. 3. Output Characteristics @ 125 ºC

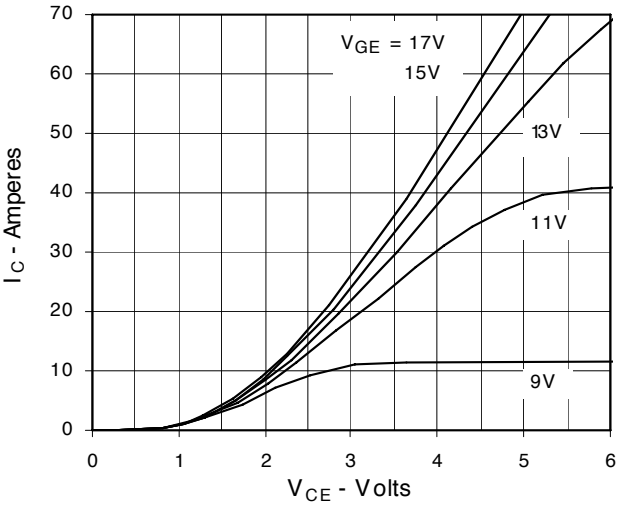


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

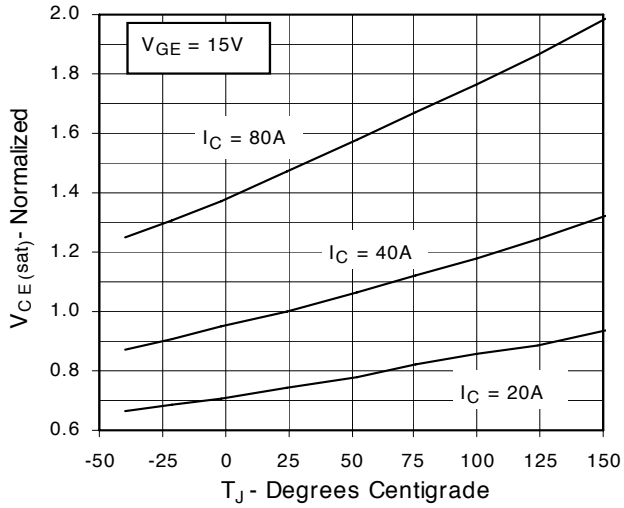


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

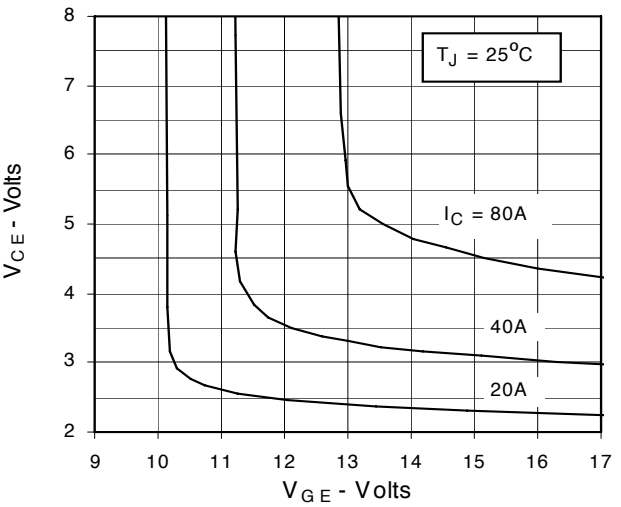


Fig. 6. Input Admittance

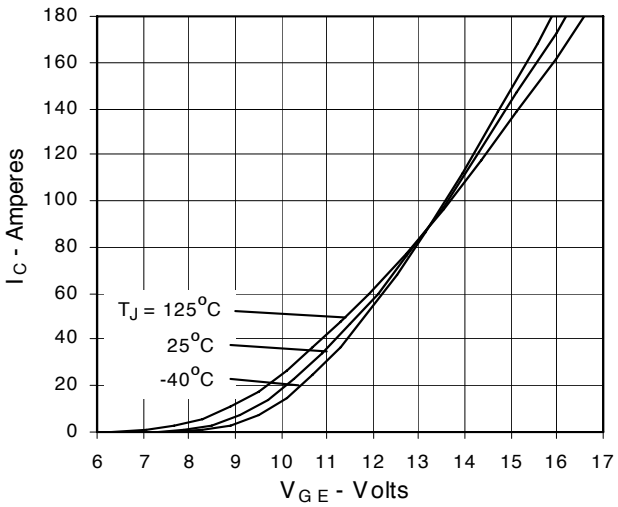


Fig. 7. Transconductance

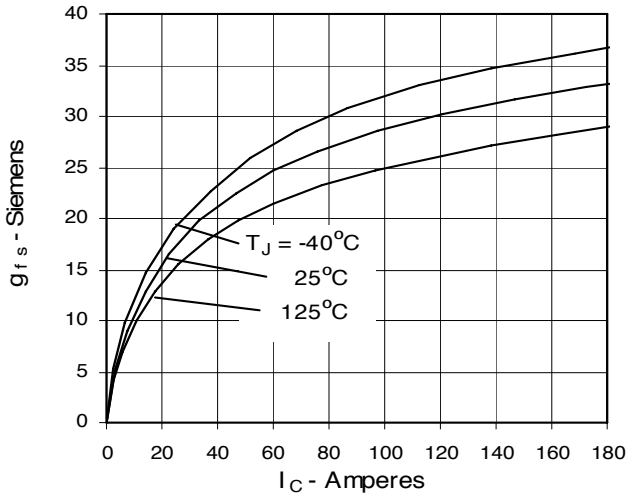


Fig. 8. Turn-on & Turn-off Energies vs. Collector Current

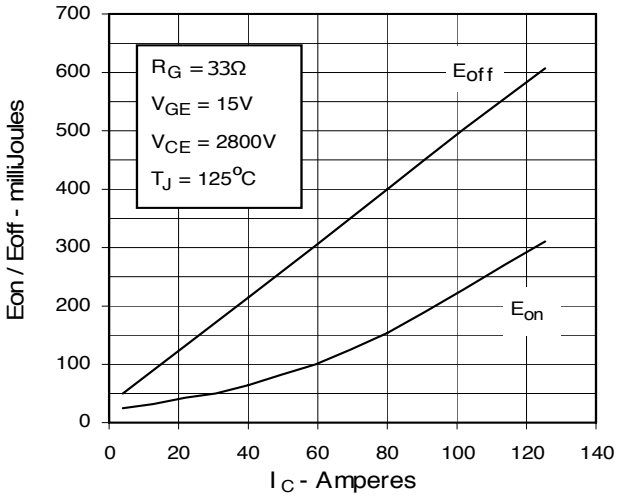


Fig. 9. Turn-on & Turn-off Energies vs. Gate Resistance

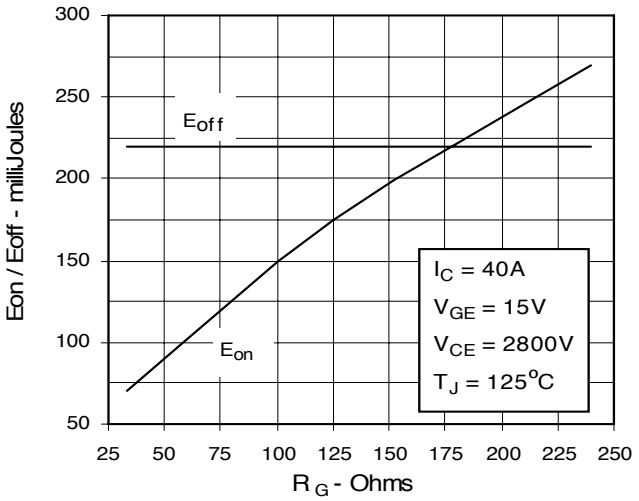


Fig. 10. Gate Charge

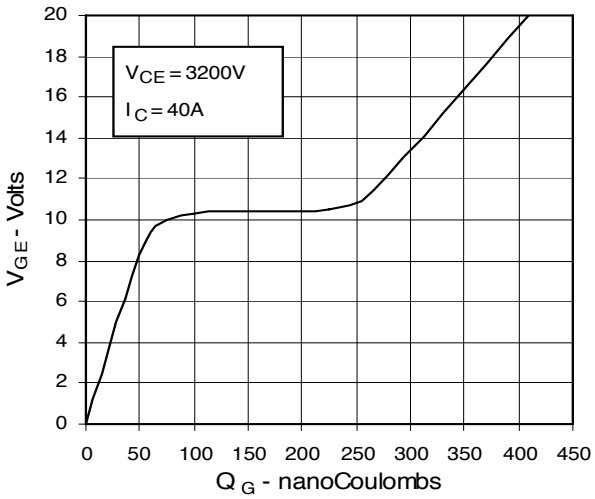


Fig. 11. Capacitance

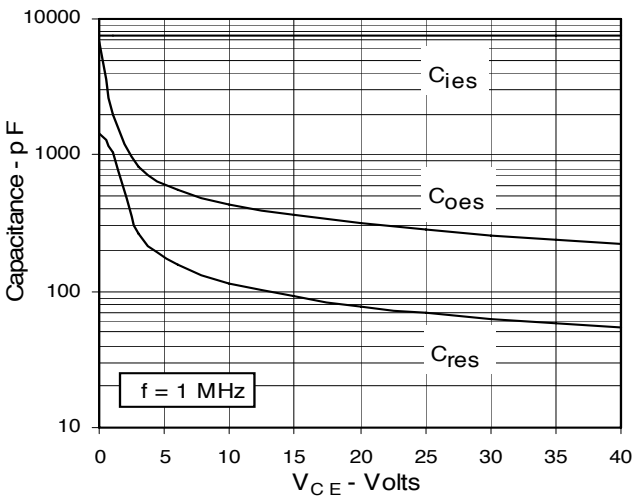
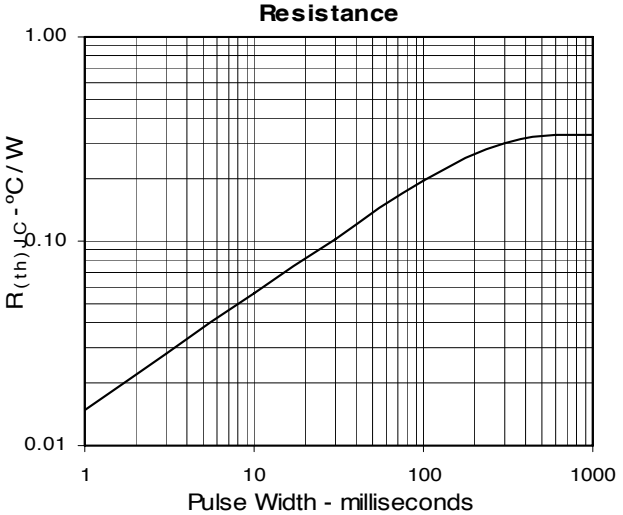


Fig. 12. Maximum Transient Thermal Resistance



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