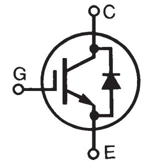
IXYS

Advance Technical Information

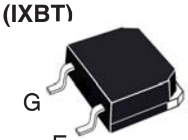
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBT22N300HV
IXBH22N300HV

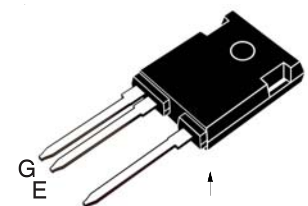
V_{CES} = 3000V
I_{C110} = 22A
$V_{CE(sat)}$ ≤ 2.7V



TO-268HV (IXBT)



TO-247HV (IXBH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	60	A
I_{C110}	T_C = 110°C	22	A
I_{CM}	T_C = 25°C, 1ms	190	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 15Ω Clamped Inductive Load	I_{CM} = 180 V_{CES} ≤ 1500	A V
T_{SC} **(SCSOA)**	V_{GE} = 15V, T_J = 125°C, R_G = 52Ω, V_{CE} = 1500V, Non-Repetitive	10	µs
P_C	T_C = 25°C	290	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}	Plastic Body for 10s	260	°C
M_d	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
Weight	TO-268HV TO-247HV	4 6	g g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	3000			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			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 22A, V_{GE} = 15V, Note 1		2.2	2.7	V
	T_J = 125°C		2.7		V

Features

- High Voltage Packages
- 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

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IXBT22N300HV
IXBH22N300HV

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fS}	I_C = 22A, V_{CE} = 10V, Note 1	13	22		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2200		pF
C_{oes}			85		pF
C_{res}			30		pF
$Q_{g(on)}$	I_C = 22A, V_{GE} = 15V, V_{CE} = 1500V		110		nC
Q_{ge}			13		nC
Q_{gc}			45		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C** I_C = 22A, V_{GE} = 15V, V_{CE} = 960V, R_G = 15Ω		46		ns
t_r			360		ns
$t_{d(off)}$			205		ns
t_f			1820		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C** I_C = 22A, V_{GE} = 15V, V_{CE} = 960V, R_G = 15Ω		43		ns
t_r			700		ns
$t_{d(off)}$			220		ns
t_f			1650		ns
R_{thJC}				0.43	°C/W
R_{thCS}	TO-247HV		0.21		°C/W

Reverse Diode

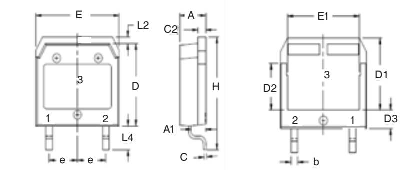
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max	
V_F	I_F = 22A, V_{GE} = 0V, Note 1			2.7	V
t_{rr}	I_F = 11A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs, V_R = 100V, V_{GE} = 0V		1.4		μs
I_{RM}			30		A
Q_{RM}			21		μC

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

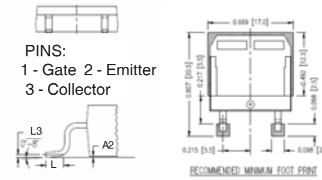
ADVANCE TECHNICAL INFORMATION

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.

TO-268HV Outline

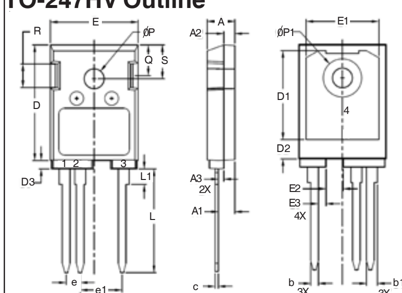


PINS:
1 - Gate 2 - Emitter
3 - Collector



SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

TO-247HV Outline



PINS:
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
øP	.138	.142	3.50	3.60
øP1	.272	.280	6.90	7.10
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30
S	.240	.248	6.10	6.30

IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

Fig. 1. Output Characteristics @ T_J = 25ºC

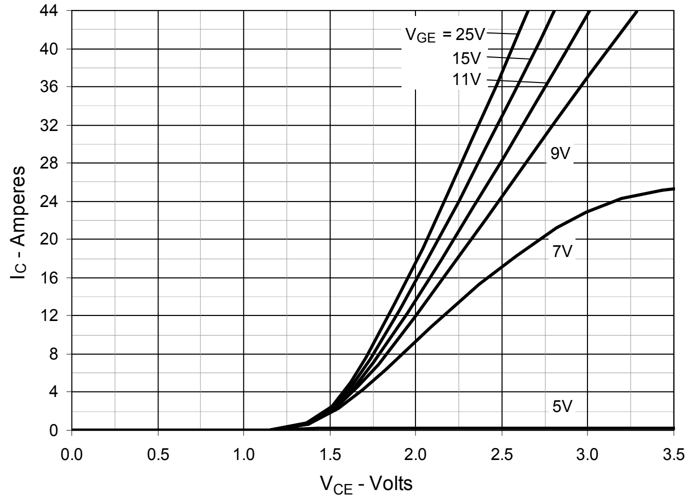


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

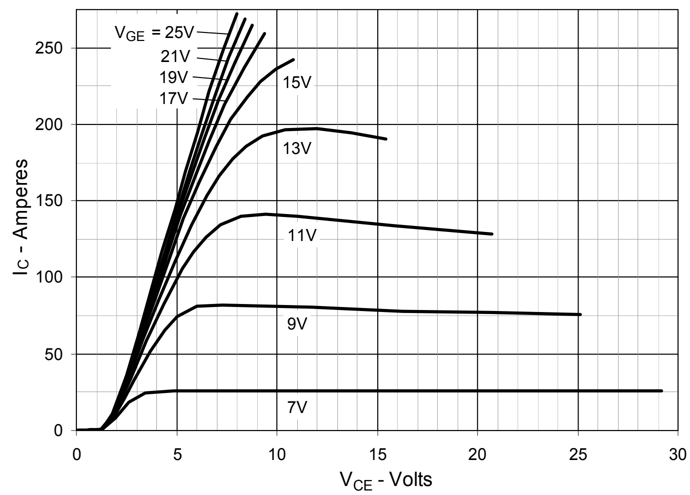


Fig. 3. Output Characteristics @ T_J = 125ºC

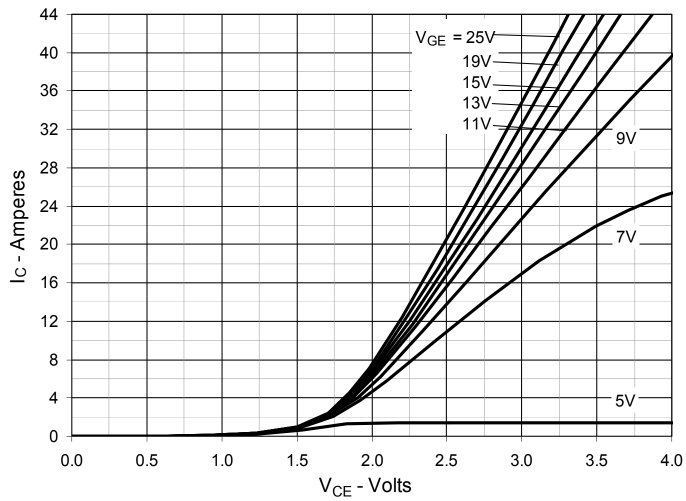


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

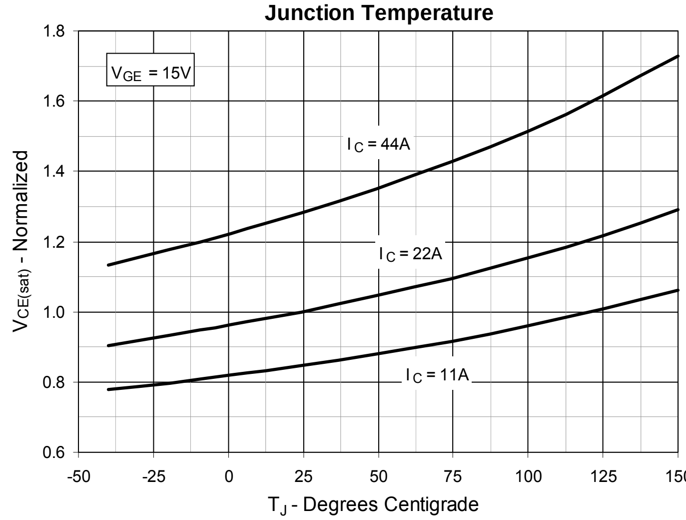


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

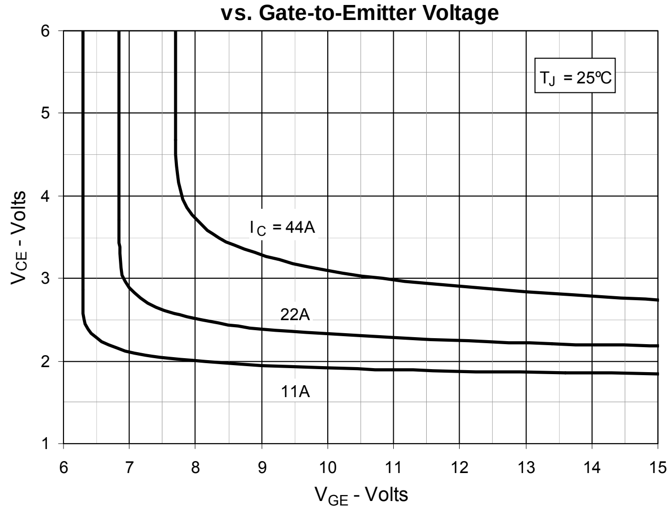


Fig. 6. Input Admittance

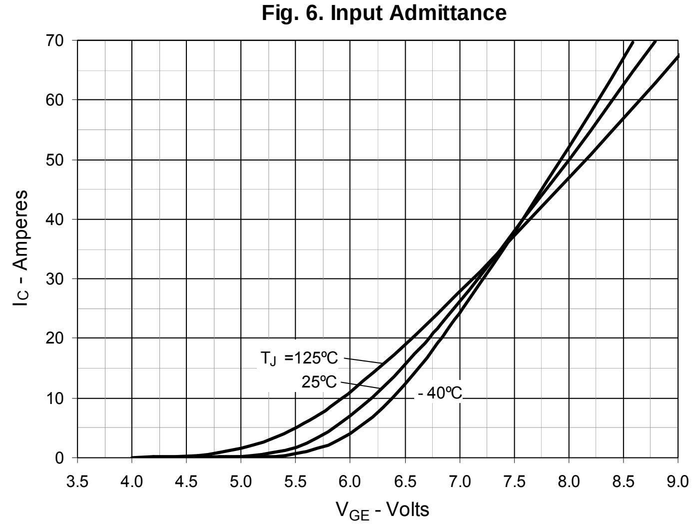


Fig. 7. Transconductance

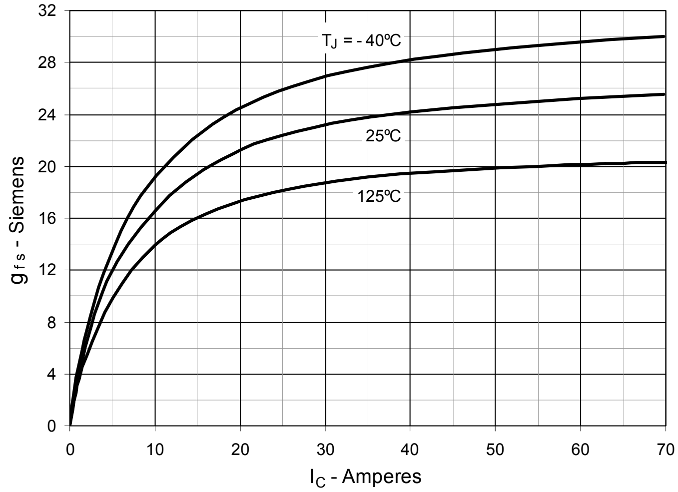


Fig. 8. Gate Charge

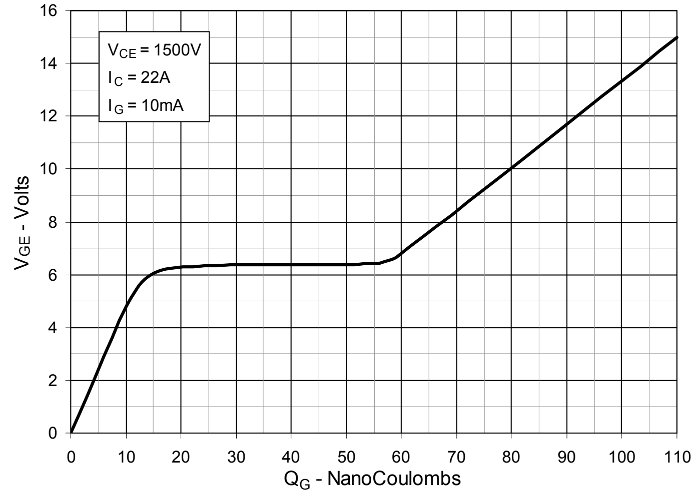


Fig. 9. Forward Voltage Drop of Intrinsic Diode

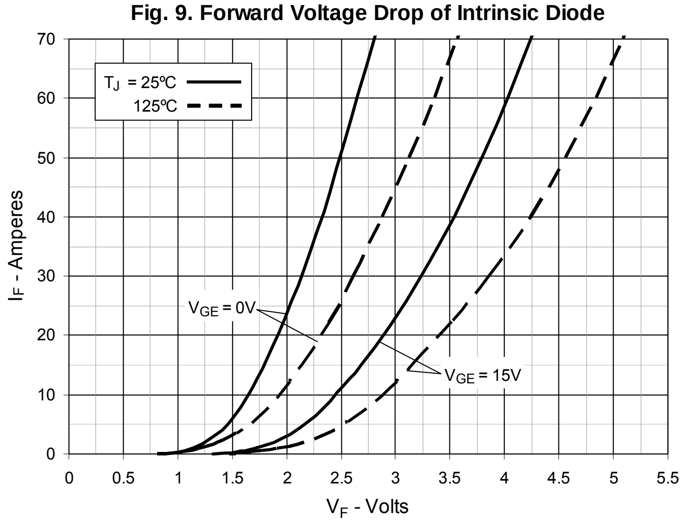


Fig. 10. Capacitance

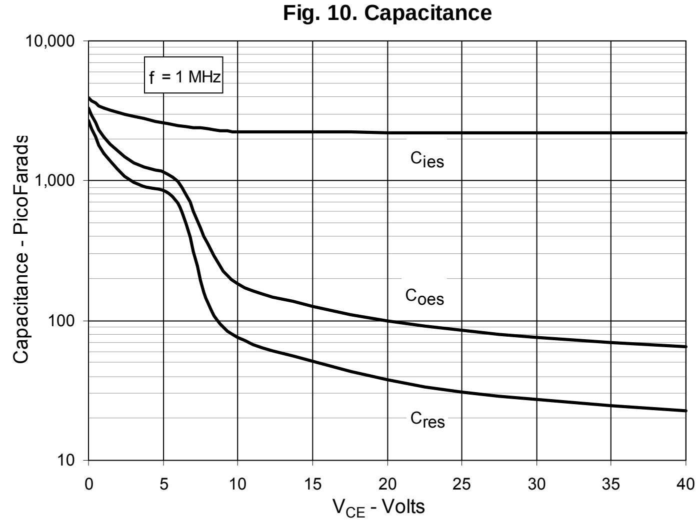


Fig. 11. Reverse-Bias Safe Operating Area

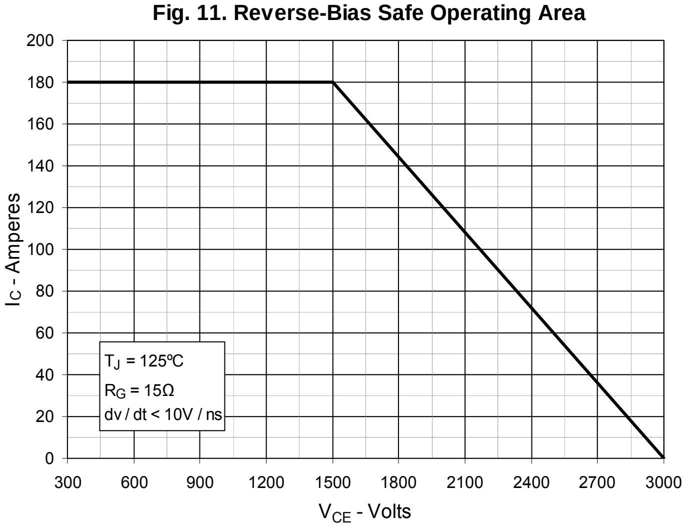


Fig. 12. Maximum Transient Thermal Impedance

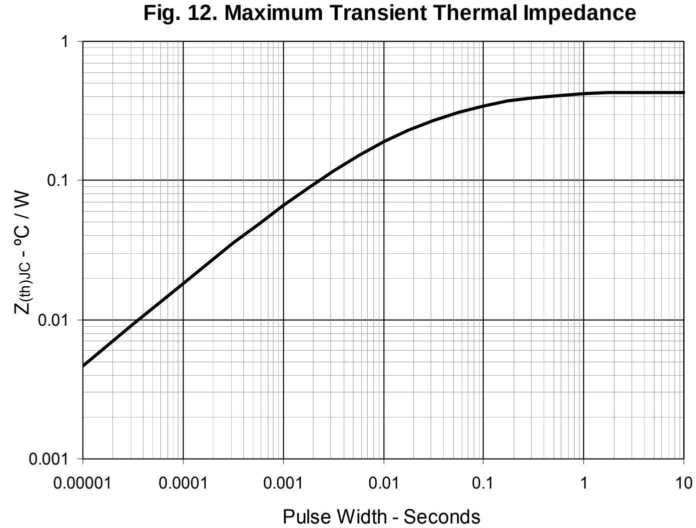


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

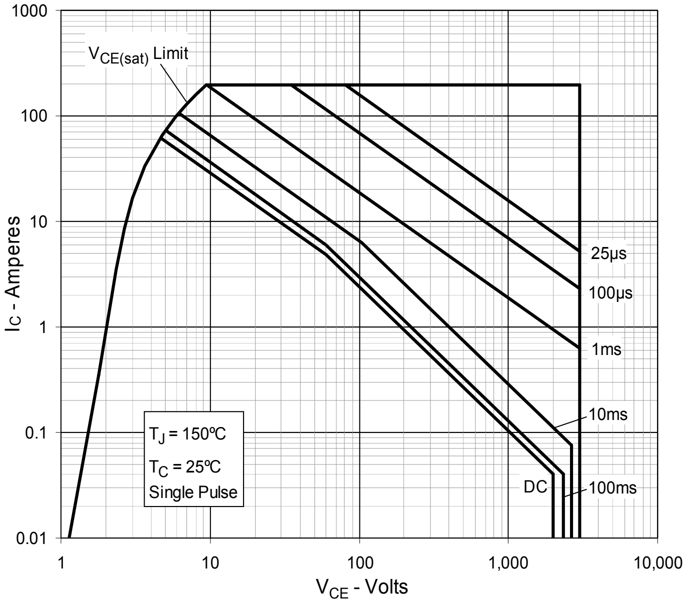


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC