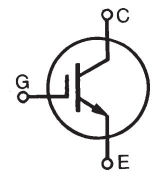
IXYS

High Voltage IGBT

Preliminary Data Sheet

IXGH 10N170A
IXGT 10N170A

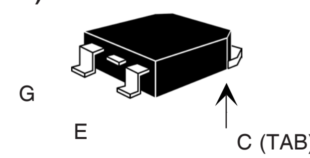
V_{CES}	=	1700	V
I_{C25}	=	10	A
$V_{CE(sat)}$	=	6.0	V
$t_{fi(typ)}$	=	35	ns



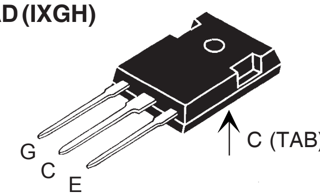
Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		1700	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ		1700	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		10	A
I_{C90}	T_C = 90°C		5	A
I_{CM}	T_C = 25°C, 1 ms		20	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22Ω Clamped inductive load		I_{CM} = 20 @ 0.8 V_{CES}	A
t_{SC}	T_J = 125°C, V_{CE} = 1200 V; V_{GE} = 15 V, R_G = 22Ω		10	µs
P_C	T_C = 25°C		140	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
M_d	Mounting torque (M3)	(TO-247)	1.13/10Nm/lb.in.	
	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Weight		TO-247	6	g
		TO-268	4	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 250 µA, V_{GE} = 0 V		1700			V
$V_{GE(th)}$	I_C = 250 µA, V_{CE} = V_{GE}		3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}	T_J = 25°C			25	µA
	V_{GE} = 0 V Note 1	T_J = 125°C			500	µA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V	T_J = 25°C		4.5	6.0	V
		T_J = 125°C		5.2		V

TO-268 (IXGT)



TO-247 AD (IXGH)



G = Gate, C = Collector,
E = Emitter, TAB = Collector

Features
- International standard packages JEDEC TO-268 and JEDEC TO-247 AD
- High current handling capability
- Very high frequency
- MOS Gate turn-on
  - drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification

Applications
- Pulser circuits
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies

Advantages
- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

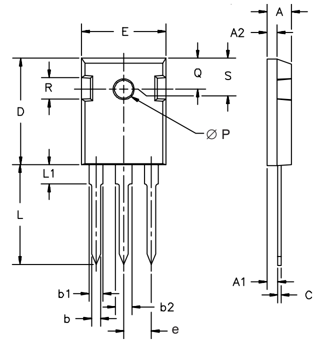
IXYS

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C25}$; V_{CE} = 20 V Note 2	3	5		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		650		pF
C_{oes}			40		pF
C_{res}			22		pF
Q_G	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		29		nC
Q_{GE}			5		nC
Q_{GC}			10		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** $I_C = I_{C25}$, V_{GE} = 15 V R_G = 22 Ω, V_{CE} = 0.5 V_{CES}		46		ns
t_{ri}			57		ns
$t_{d(off)}$			190	360	ns
t_{fi}			35		ns
E_{off}			0.38	0.8	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** $I_C = I_{C25}$, V_{GE} = 15 V R_G = 22 Ω, V_{CE} = 0.5 V_{CES}		48		ns
t_{ri}			59		ns
E_{on}			1.2		mJ
$t_{d(off)}$			200		ns
t_{fi}			40		ns
E_{off}			0.6		mJ
R_{thJC}				0.89	K/W
R_{thCK}	(TO-247)		0.25		K/W

Notes: 1. Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.

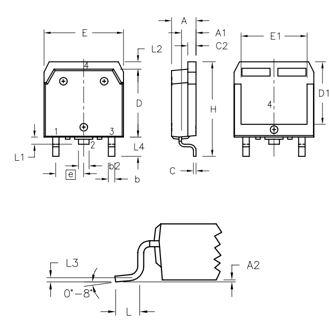
2. Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %

TO-247 AD Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.9	5.1	.193	.201
A_1	2.7	2.9	.106	.114
A_2	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b_2	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E_1	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L1	1.20	1.40	.047	.055
L2	1.00	1.15	.039	.045
L3	0.25 BSC		.010 BSC	
L4	3.80	4.10	.150	.161

Fig. 1. Output Characteristics
@ 25 Deg. C

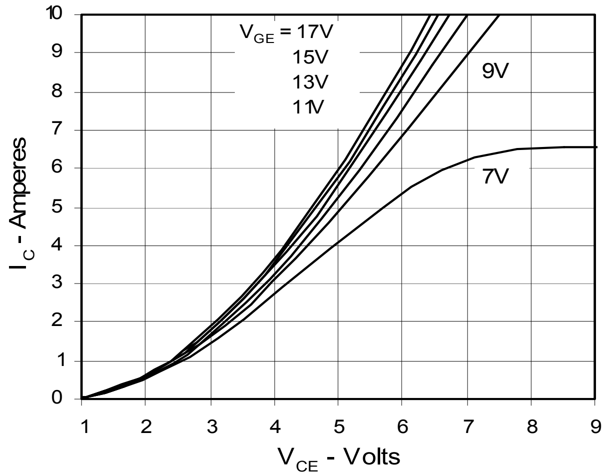


Fig. 2. Extended Output Characteristics
@ 25 deg. C

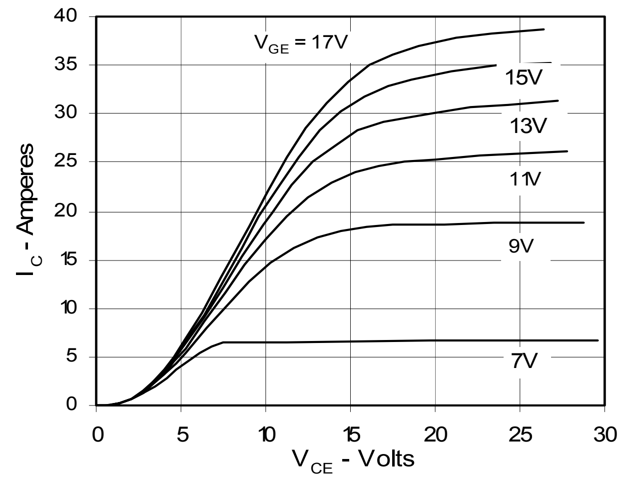


Fig. 3. Output Characteristics
@ 125 Deg. C

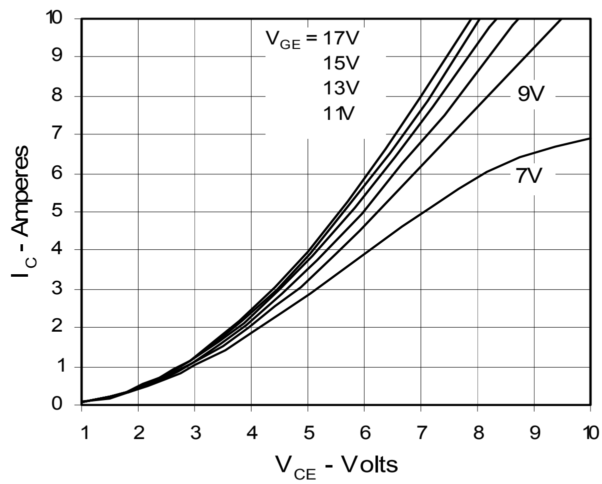


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

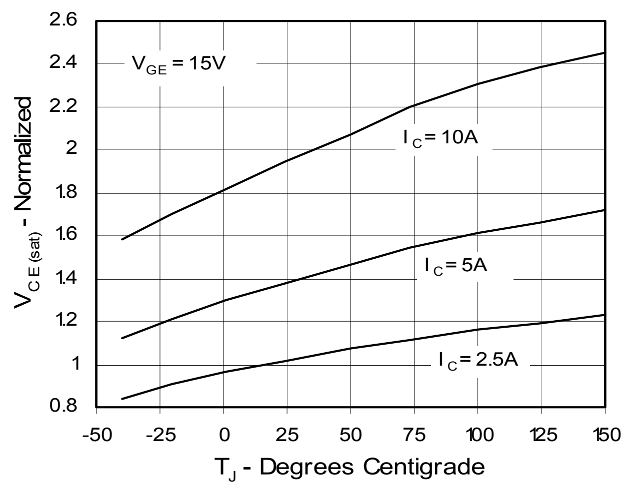


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emiiter voltage

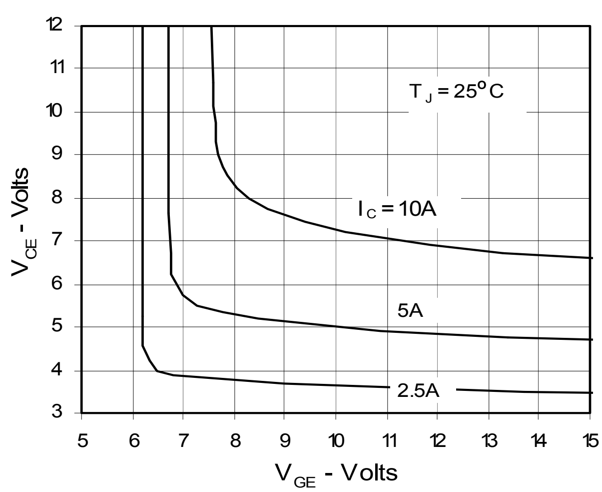


Fig. 6. Input Admittance

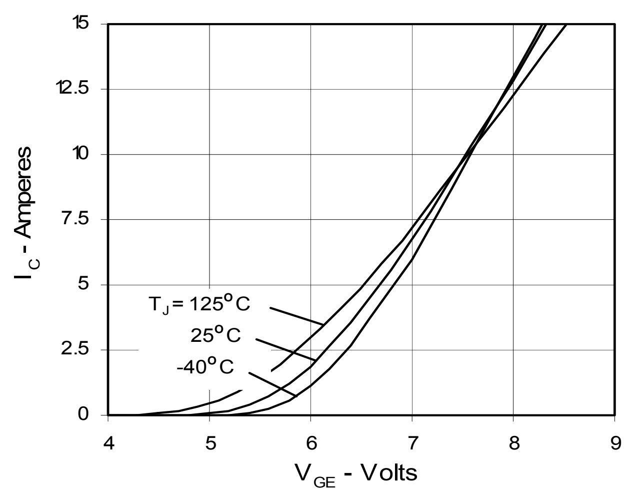


Fig. 7. Transconductance

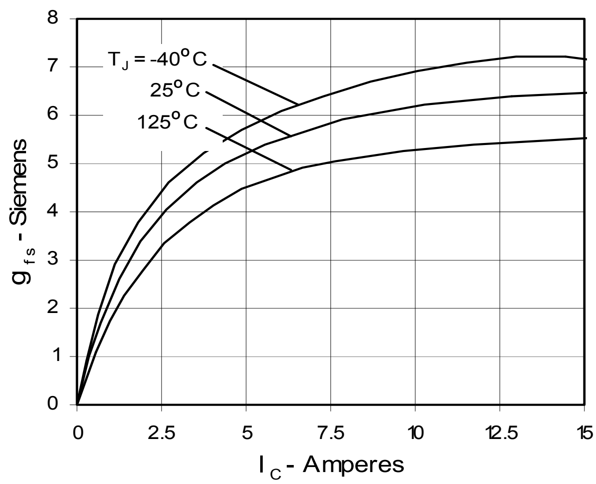


Fig. 8. Dependence of E_{off} on R_G

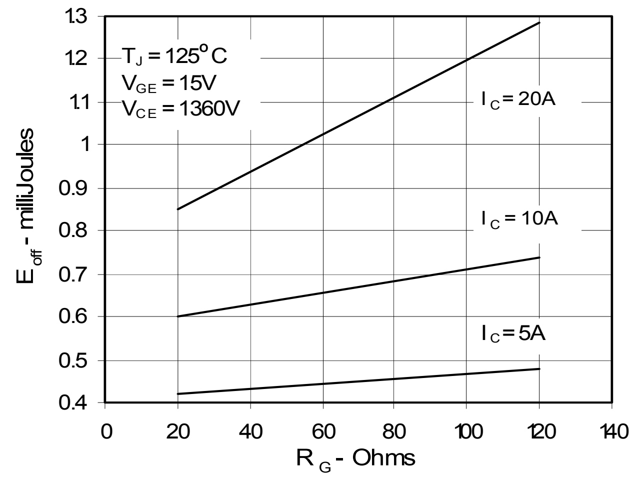


Fig. 9. Dependence of E_{off} on I_C

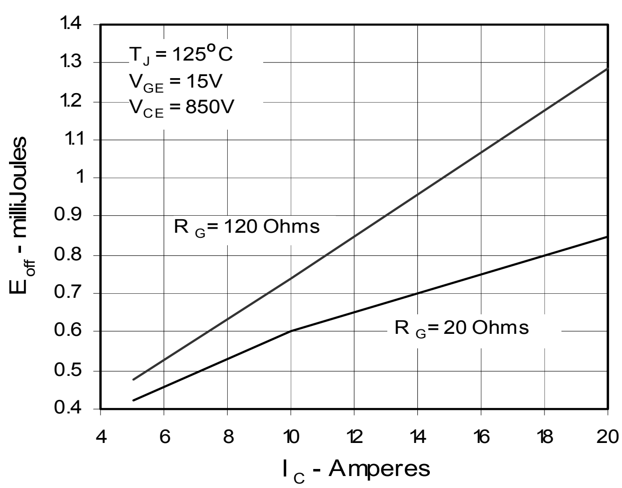


Fig. 10. Dependence of E_{off} on Temperature

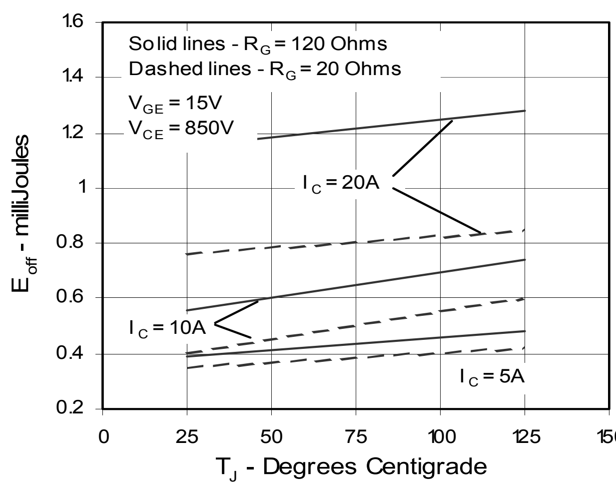


Fig. 11. Gate Charge

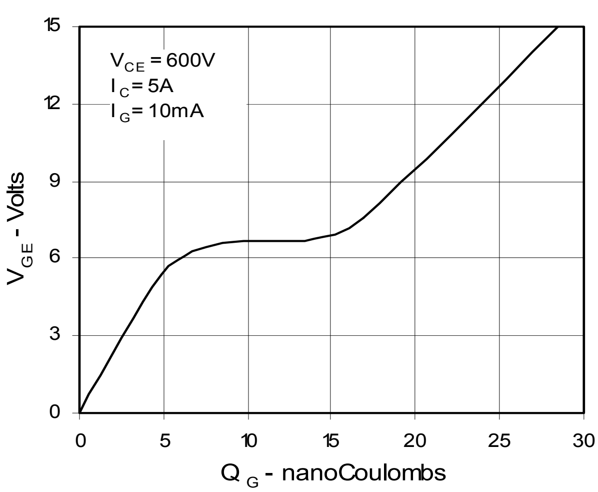
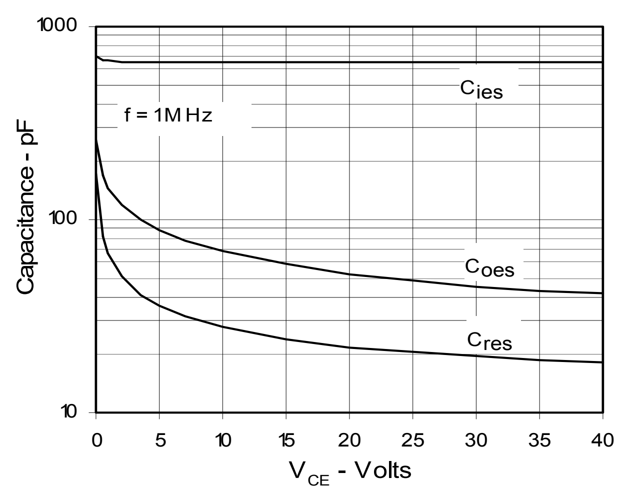


Fig. 12. Capacitance



IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 6,259,123B1 6,306,728B1 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343 6,583,505

Fig. 13. Maximum Transient Thermal Resistance