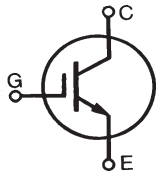
IXYS

Low $V_{CE(sat)}$ IGBT

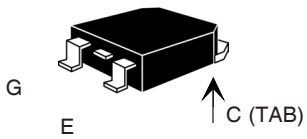
IXGH 28N60B
IXGT 28N60B

V_{CES} = 600 V
I_{C25} = 40 A
$V_{CE(sat)}$ = 2.0 V

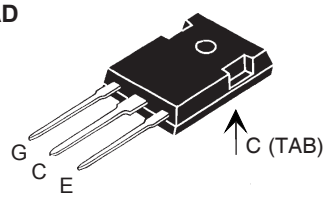


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	40	A
I_{C90}	T_C = 90°C	28	A
I_{CM}	T_C = 25°C, 1 ms	80	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 10 Ω Clamped inductive load	I_{CM} = 56 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	150	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque (M3) TO-247	1.13/10	Nm/lb.in.
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Weight	TO-247 TO-268	6 4	g g

TO-268 (IXGT)



TO-247 AD (IXGH)



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

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE}		2.5		5.5	V
I_{CES}	V_{CE} = V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			100 500	μA μA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V				2.0	V

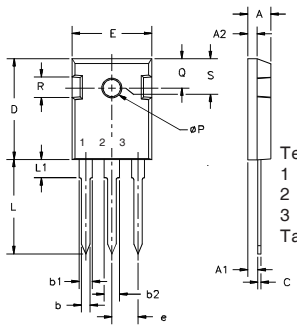
Features
- International standard packages
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- High current handling capability
- MOS Gate turn-on
  - drive simplicity

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

Advantages
- Easy to mount with 1 screw (isolated mounting screw hole)
- Low losses, high efficiency
- High power density

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, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	15	25		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		1500		pF
C_{oes}			130		pF
C_{res}			42		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		68	100	nC
Q_{ge}			15	30	nC
Q_{gc}			20	40	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** $I_C = I_{C90}$, V_{GE} = 15 V V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 10 Ω		15		ns
t_{ri}			25		ns
$t_{d(off)}$			175	400	ns
t_{fi}			260	400	ns
E_{off}			2	4	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** $I_C = I_{C90}$, V_{GE} = 15 V V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 10 Ω		15		ns
t_{ri}			25		ns
E_{on}			0.2		mJ
$t_{d(off)}$			400		ns
t_{fi}			400		ns
E_{off}			3		mJ
R_{thJC}				0.83	K/W
R_{thCK}	TO-247		0.25		K/W

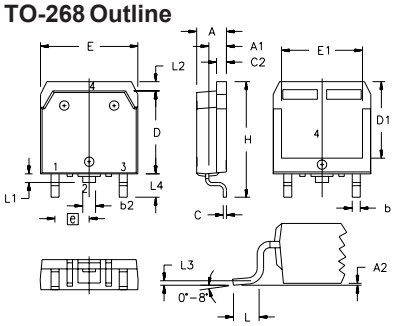
TO-247 AD Outline



Terminals:
1 - Gate
2 - Collector
3 - Emitter
Tab-Collector

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



Terminals: 1 - Gate 2 - Collector
3 - Emitter Tab - Collector

SYM	INCHES MIN	MAX	MILLIMETERS MIN	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
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
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	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

IXYS reserves the right to change limits, test conditions, and dimensions.

Fig. 1. Output Characteristics @ 25 Deg. C

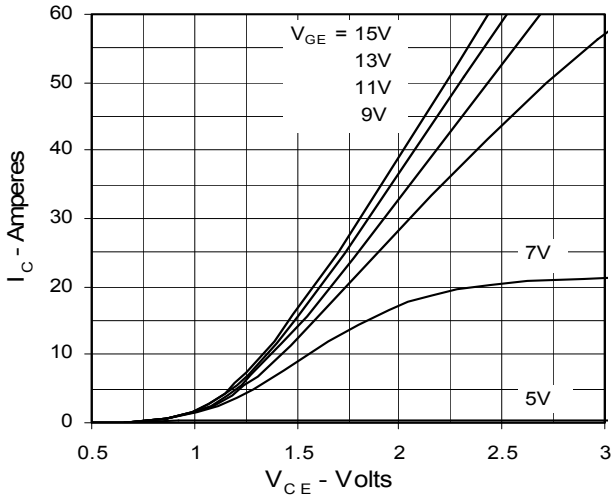


Fig. 2. Extended Output Characteristics @ 25 deg. C

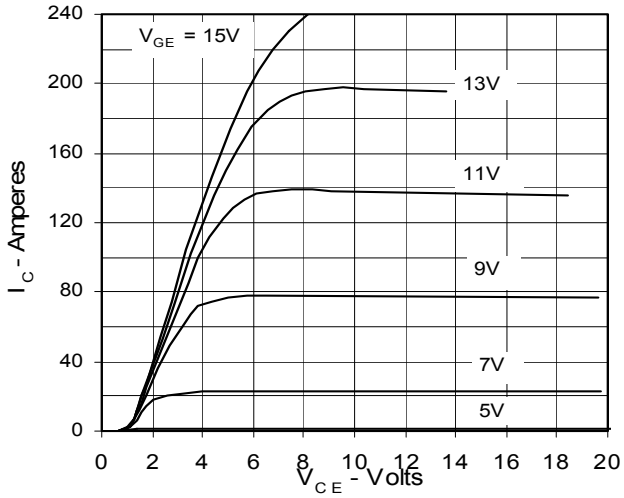


Fig. 3. Output Characteristics @ 125 Deg. C

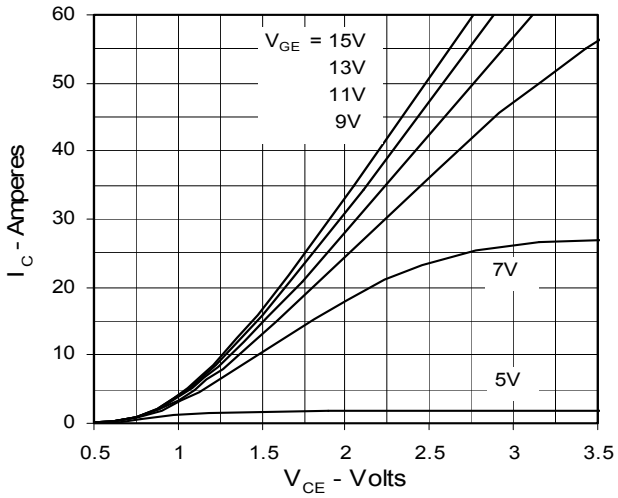


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

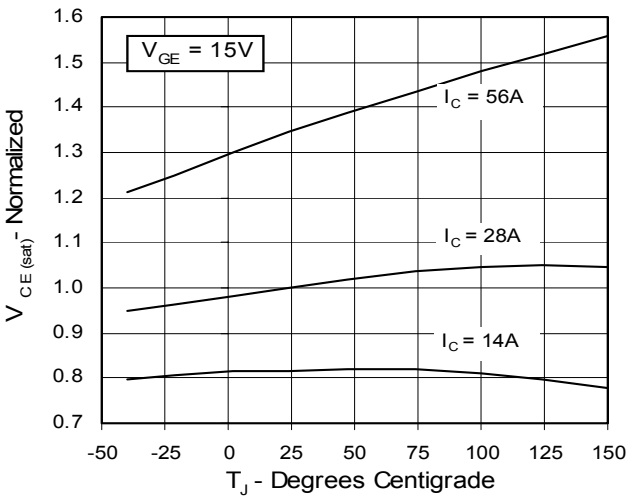


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

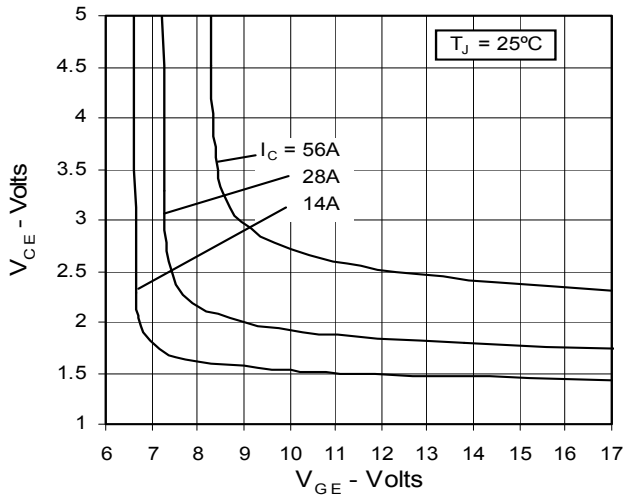


Fig. 6. Input Admittance

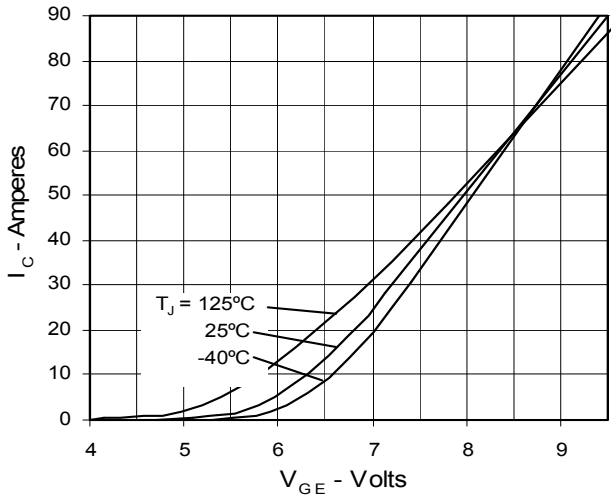


Fig. 7. Transconductance

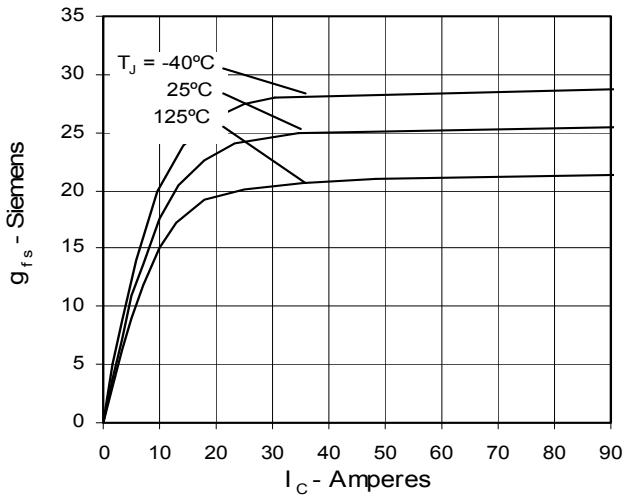


Fig. 8. Dependence of E_{off} on R_G

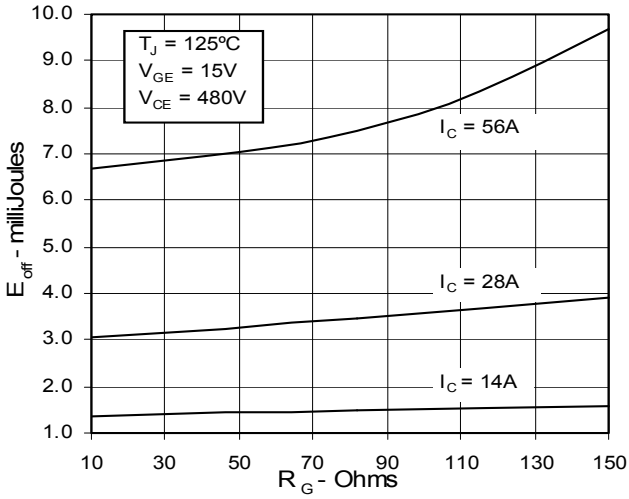


Fig. 9. Dependence of E_{off} on I_C

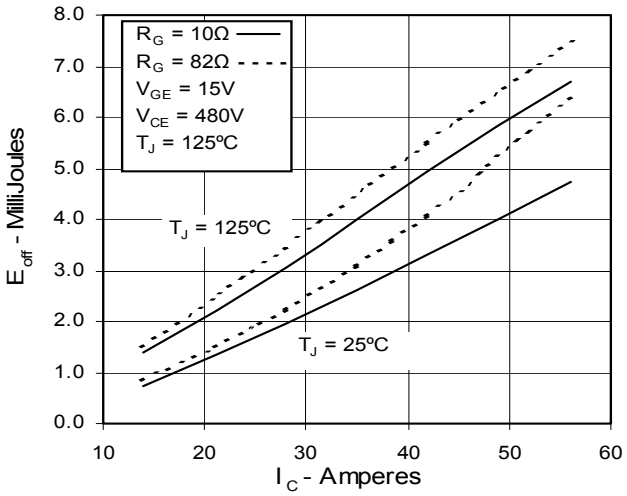


Fig. 10. Dependence of E_{off} on Temperature

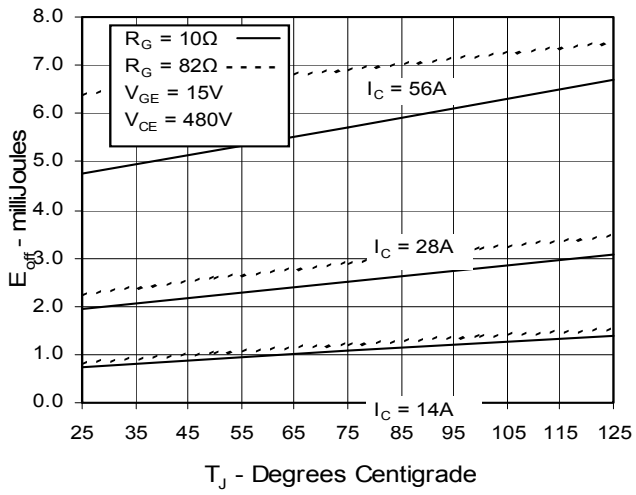


Fig. 11. Dependence of Switching Time on R_G

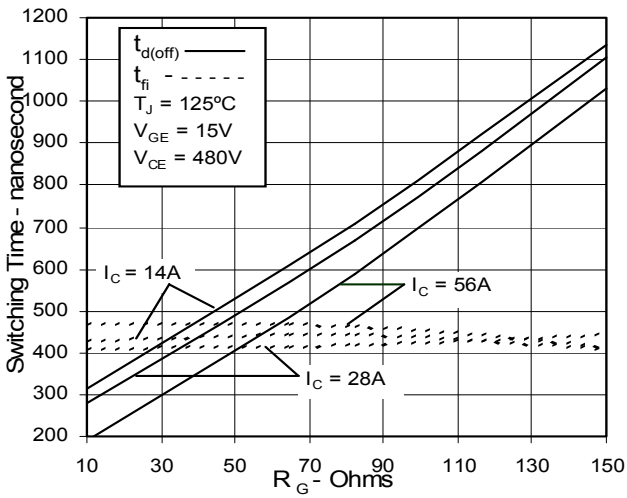


Fig. 12. Dependence of Switching Time on I_C

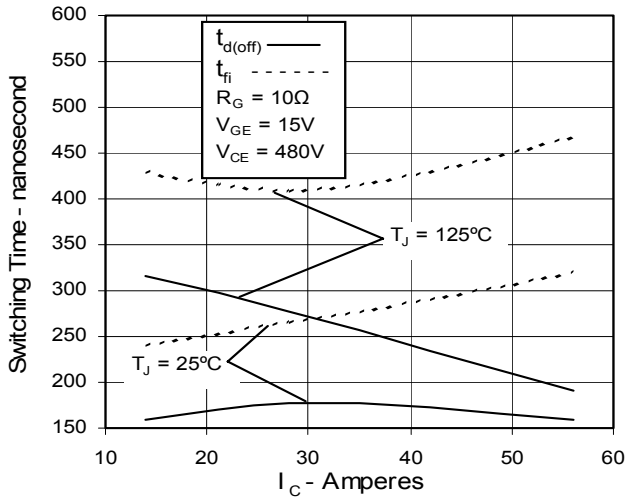


Fig. 13. Dependence of Switching Time on Temperature

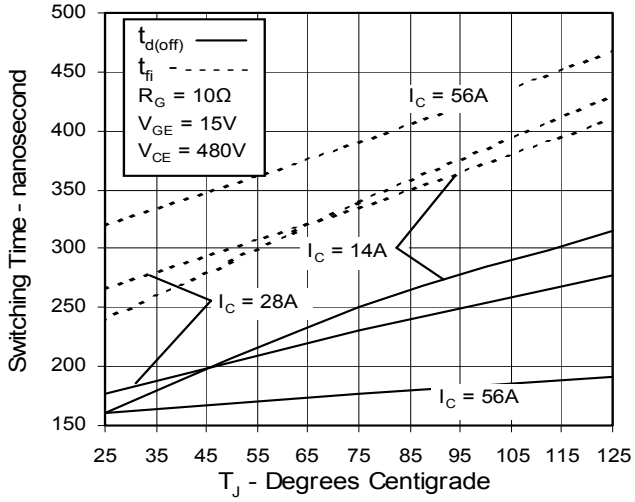


Fig. 14. Gate Charge

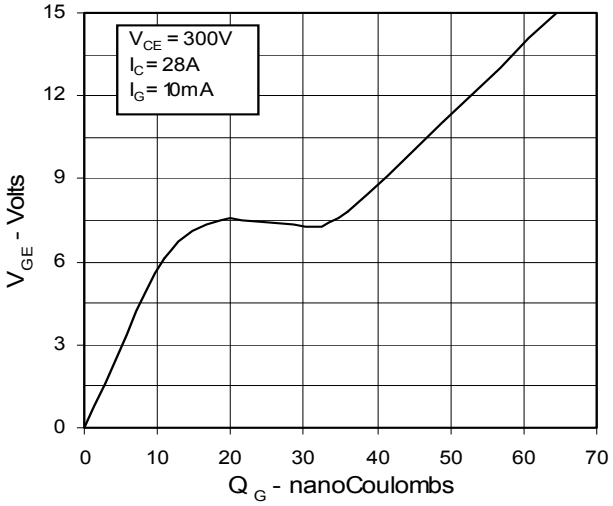


Fig. 15. Capacitance

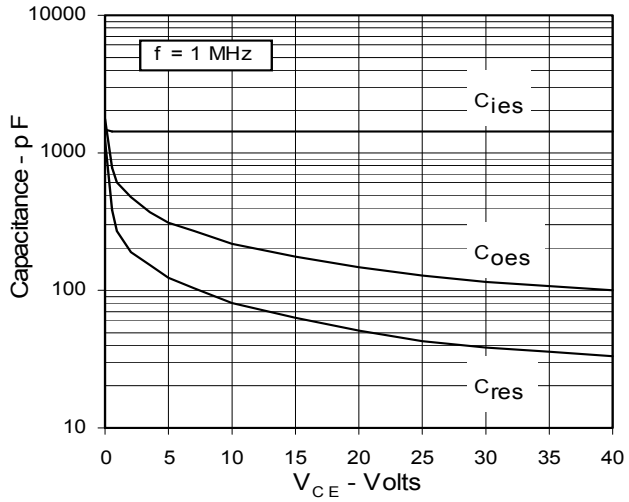


Fig. 16. Maximum Transient Thermal Resistance