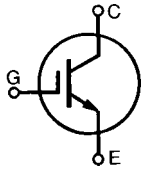
IXYS

High Speed IGBT

V_{CES}	I_{CES}	t_{fi}
600 V	**2.0 V**	**140 ns**
600 V	**2.5 V**	**70 ns**

IXSH/IXST 30N60B
IXSH/IXST 30N60C

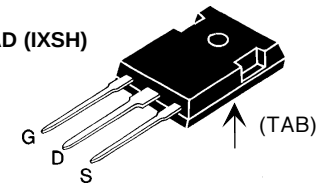
Short Circuit SOA Capability



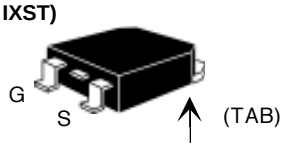
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	55	A
I_{C90}	T_C = 90°C	30	A
I_{CM}	T_C = 25°C, 1 ms	110	A
SSOA (RBSOA)	V_{GE} = 15 V, T_J = 125°C, R_G = 2.7 Ω Clamped inductive load, V_{CC} = 0.8 V_{CES}	I_{CM} = 60 @ 0.8 V_{CES}	A
t_{SC} **(SCSOA)**	V_{GE} = 15 V, V_{CE} = 360 V, T_J = 125°C R_G = 33 Ω, non repetitive	10	µs
P_C	T_C = 25°C	200	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247 TO-268	6 4	g g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C

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		600			V
$V_{GE(th)}$	I_C = 2.5 mA, V_{CE} = V_{GE}		4		7	V
I_{CES}	V_{CE} = 0.8 V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			100 1	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	V_{GE} = 15 V; I_C = I_{C90}	30N60B 30N60C			2.0 2.5	V V

TO-247 AD (IXSH)



TO-268 (D3) (IXST)



G = Gate
S = Source
TAB = Drain

Features

- International standard packages
- Short Circuit SOA capability
- High frequency IGBT
- New generation HDMOS™ process

Applications

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

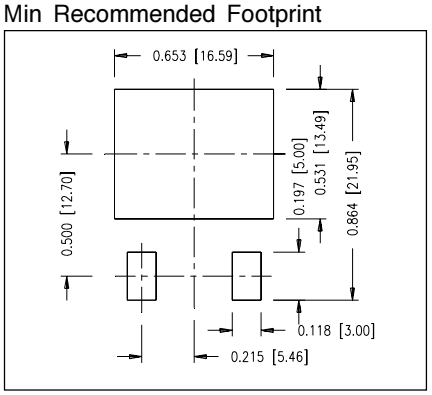
Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- Surface mountable, high power case style
- Reduce assembly time and cost
- High power density

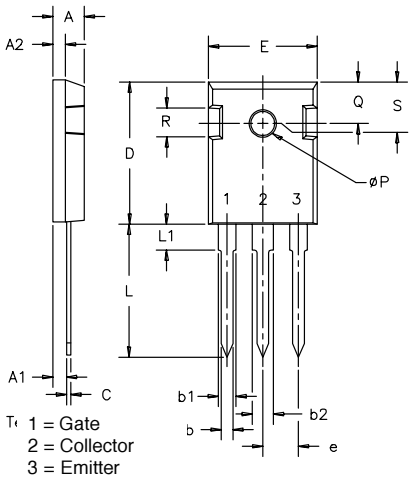
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %		10			S
C_{ies}				3100		pF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz			240		pF
C_{res}				30		pF
Q_g				100		nC
Q_{ge}	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}			30		nC
Q_{gc}				38		nC
$t_{d(on)}$				30		ns
t_{ri}	**Inductive load, T_J = 25°C**			30		ns
$t_{d(off)}$	$I_C = I_{C90}$, V_{GE} = 15 V	30N60B		150	270	ns
	V_{CE} = 0.8 V_{CES}, R_G = 4.7 Ω	30N60C		90	150	ns
t_{fi}	Note 1	30N60B		140	270	ns
		30N60C		70	120	ns
E_{off}		30N60B		1.5	2.5	mJ
		30N60C		0.7	1.2	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**			35		ns
t_{ri}				35		ns
E_{on}	$I_C = I_{C90}$, V_{GE} = 15 V			0.5		mJ
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, R_G = 4.7 Ω	30N60B		270		ns
	Note 1	30N60C		150		ns
t_{fi}		30N60B		250		ns
		30N60C		140		
E_{off}		30N60B		2.5		mJ
		30N60C		1.2		mJ
R_{thJC}					0.62	K/W
R_{thCK}	(TO-247)			0.25		K/W

Notes: 1. Switching times may increase for V_{CE} (Clamp) > 0.8 V_{CES}, higher T_J or increased R_G.

Min Recommended Footprint



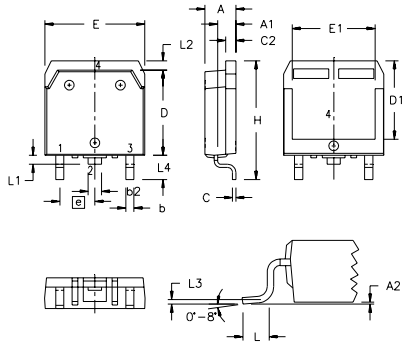
TO-247 AD Outline



1 = Gate
2 = Collector
3 = Emitter
Tab = Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.7	5.3
A_1	.087	.102	2.2	2.54
A_2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b_1	.065	.084	1.65	2.13
b_2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
øP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

TO-268 Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

Fig.1 Saturation Characteristics

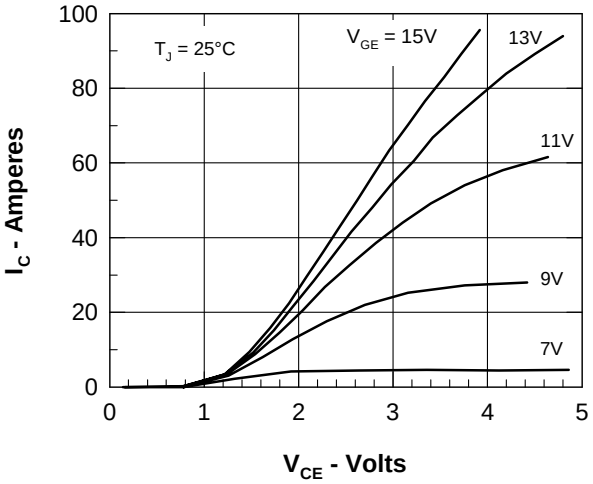


Fig.2 Output Characterstics

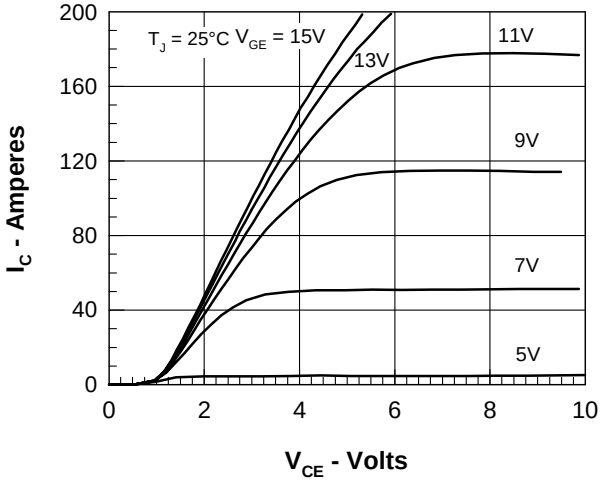


Fig.3 Collector-Emitter Voltage vs. Gate-Emitter Voltage

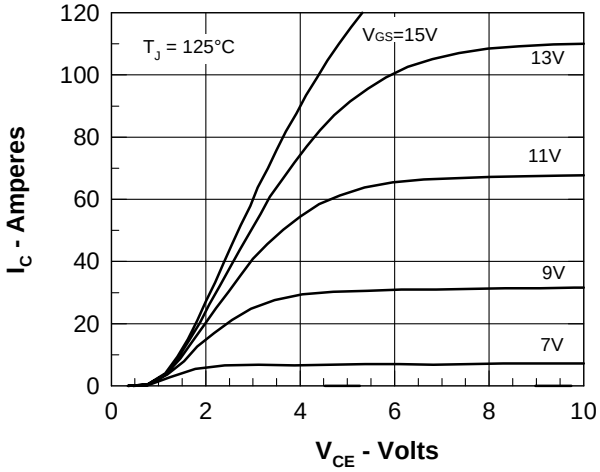


Fig.4 Temperature Dependence of Output Saturation Voltage

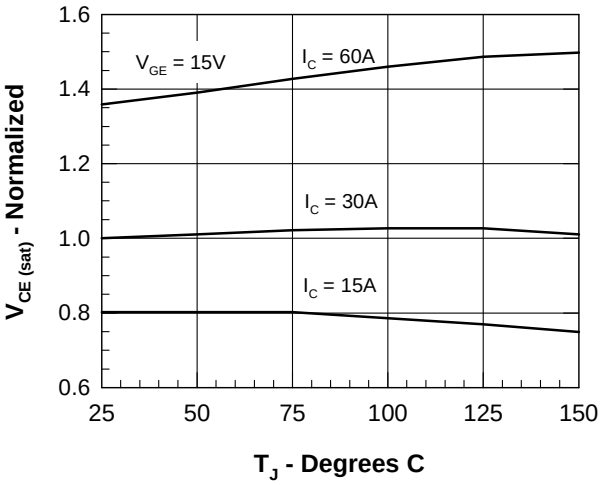


Fig.5 Input Admittance

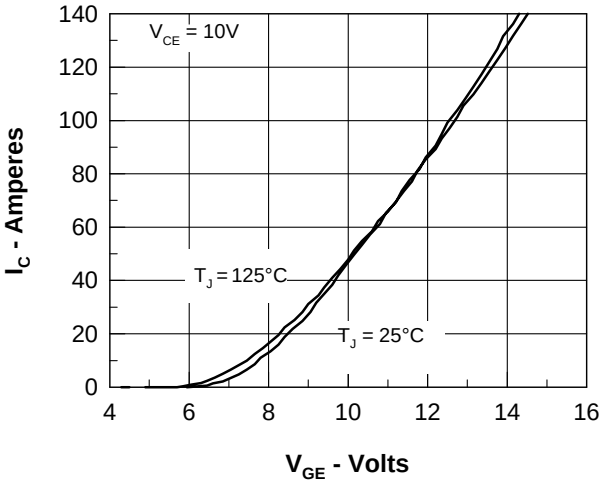


Fig.6 Temperature Dependence of Breakdown and Threshold Voltage

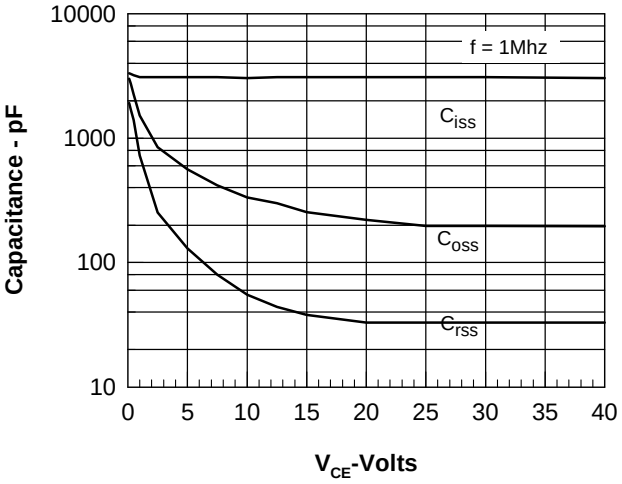


Fig.7 Turn-Off Energy per Pulse and Fall Time on Collector Current

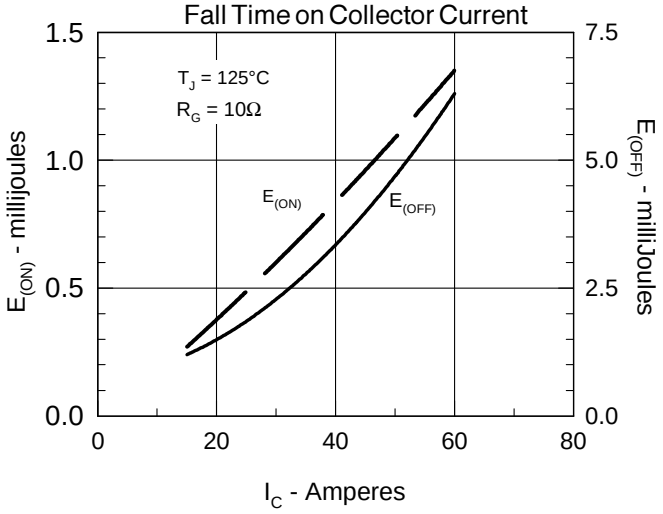


Fig.8 Dependence of Turn-Off Energy Per Pulse and Fall Time on R_G

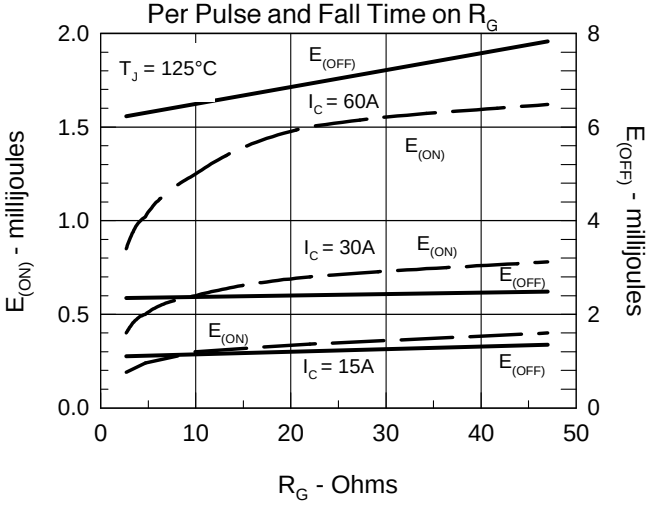


Fig.9 Gate Charge Characteristic Curve

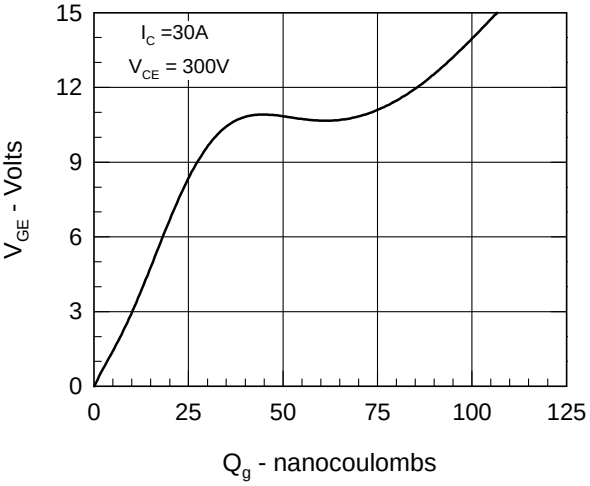


Fig.10 Turn-Off Safe Operating Area

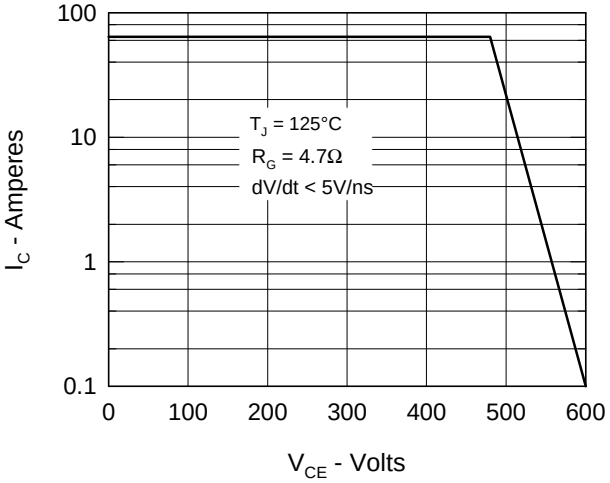


Fig.11 Transient Thermal Impedance