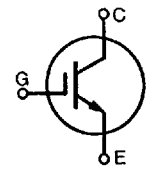
IXYS

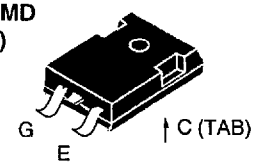
Preliminary data

HiPerFAST™ IGBT

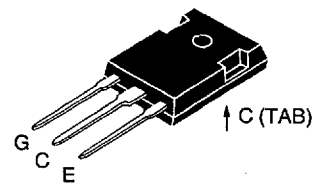
	V_{CES}	$I_{C(25)}$	$V_{CE(sat)}$	t_{fi}
IXGH24N50B	500 V	48 A	2.3 V	80 ns
IXGH24N60B	600 V	48 A	2.5 V	80 ns



TO-247 SMD (24NBS)**



TO-247 AD



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

Symbol	Test Conditions	Maximum Ratings		
		24N50	24N60	
V_{CES}	T_J = 25°C to 150°C	500	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	500	600	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		48	A
I_{C90}	T_C = 90°C		24	A
I_{CM}	T_C = 25°C, 1 ms		96	A
SSOA (RBSOA)	V_{GE}= 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 100 µH		I_{CM} = 48 @ 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
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s			300	°C
M_d	Mounting torque (M3)		1.13/10	Nm/lb.in.
Weight			6	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	24N50	500			V
		24N60	600			V
$V_{GE(th)}$	I_C = 250 µA, V_{CE} = V_{GE}		2.5		5	V
I_{CES}	V_{CE} = 0.8 • V_{CES}	T_J = 25°C			200	µA
	V_{GE} = 0 V	T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V	24N50			2.3	V
		24N60			2.5	V

Features

- International standard packages JEDEC TO-247 SMD surface mountable and JEDEC TO-247 AD
- High frequency IGBT
- High current handling capability
- 3rd generation HDMOS™ process
- MOS Gate turn-on
  - drive simplicity

Applications

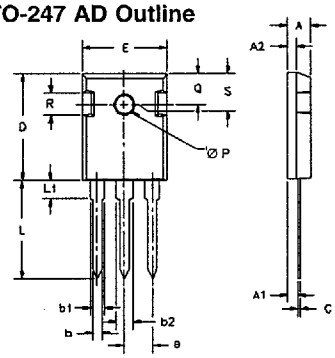
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies

Advantages

- High power density
- Switching speed for high frequency applications
- Easy to mount with 1 screw (insulated mounting screw hole)

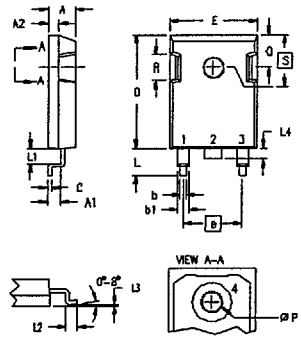
Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %		9	13		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz			1500		pF
C_{oes}				135		pF
C_{res}				40		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}			90	120	nC
Q_{ge}				11	15	nC
Q_{gc}				30	40	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**			25		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH,			15		ns
E_{on}	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 10 Ω			0.6		mJ
$t_{d(off)}$	Remarks: Switching times may			150	200	ns
t_{fi}	increase for V_{CE} (Clamp) > 0.8 • V_{CES},			80	150	ns
E_{off}	higher T_J or increased R_G	24N50B		0.62		mJ
		24N60B		0.80		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**			25		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH			15		ns
E_{on}	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 10 Ω			0.8		mJ
$t_{d(off)}$	Remarks: Switching times may			250		ns
t_{fi}	increase for V_{CE} (Clamp) > 0.8 • V_{CES},			100		ns
E_{off}	higher T_J or increased R_G	24N50B		0.9		mJ
		24N60B		1.4		mJ
R_{thJC}					0.83	K/W
R_{thCK}				0.25		K/W

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
ØP	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	

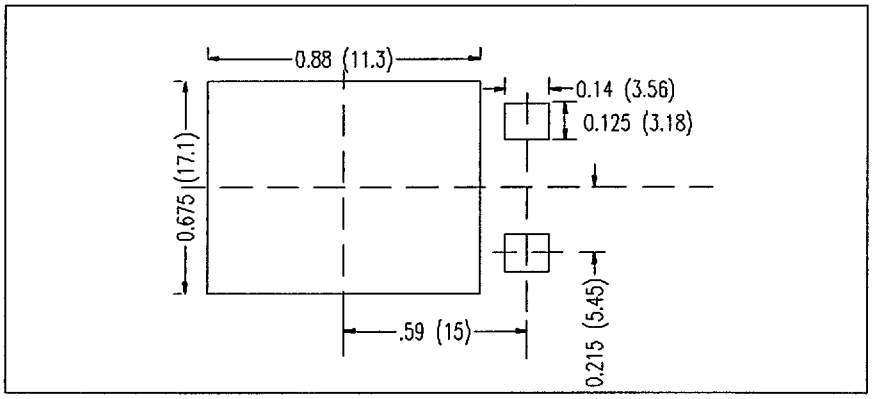
TO-247 SMD Outline



1. Gate
2. Collector
3. Emitter
4. Collector

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b1	1.91	2.13	.075	.084
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45	BSC	.215	BSC
L	4.90	5.10	.193	.201
L1	2.70	2.90	.106	.114
L2	2.10	2.30	.083	.091
L3	0.00	0.10	.00	.004
L4	1.90	2.10	.075	.083
ØP	3.55	3.65	.140	.144
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190
S	6.15	BSC	.242	BSC

Min. Recommended Footprint (Dimensions in inches and (mm))



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

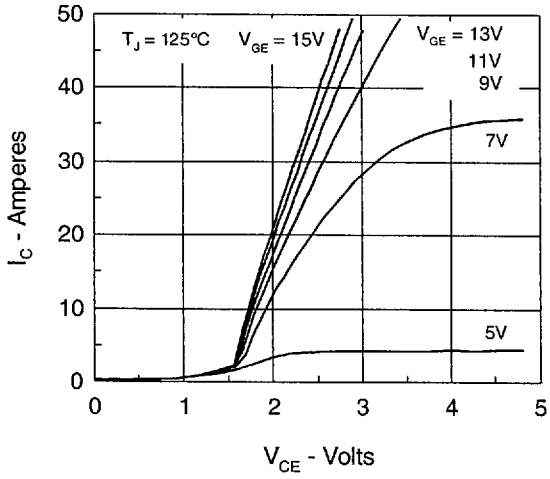


Fig. 1. Saturation Voltage Characteristics

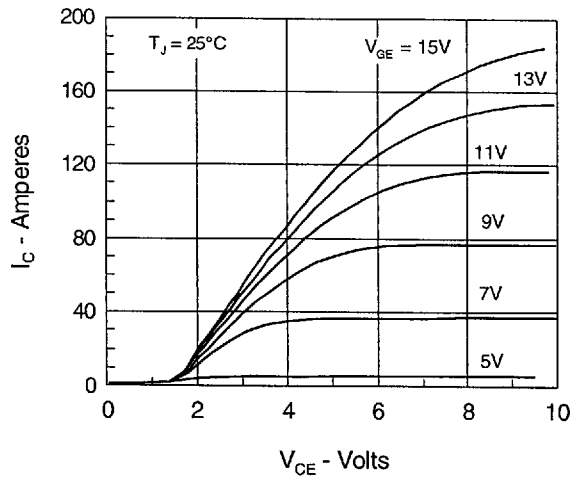


Fig. 2. Extended Output Characteristics

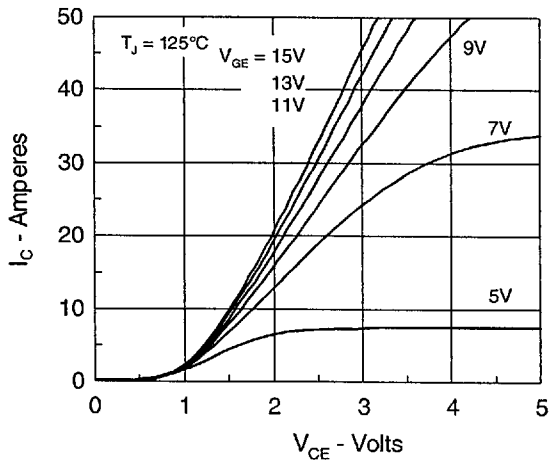


Fig. 3. Saturation Voltage Characteristics

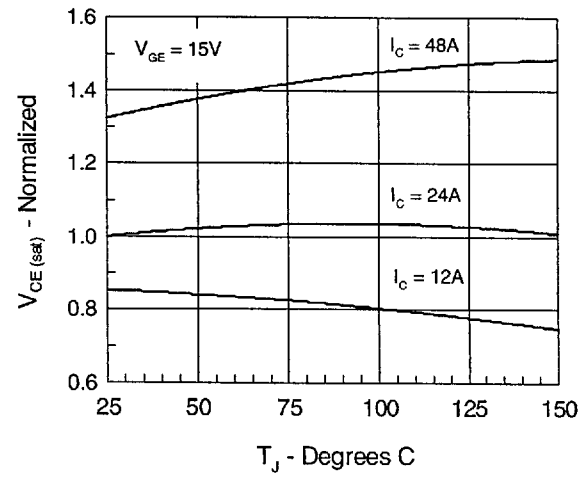


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

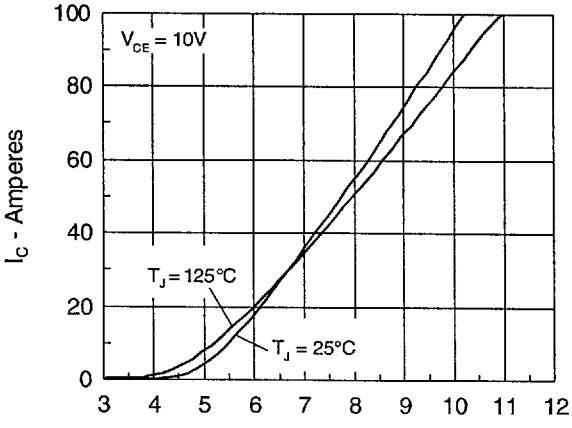


Fig. 5. Admittance Curves

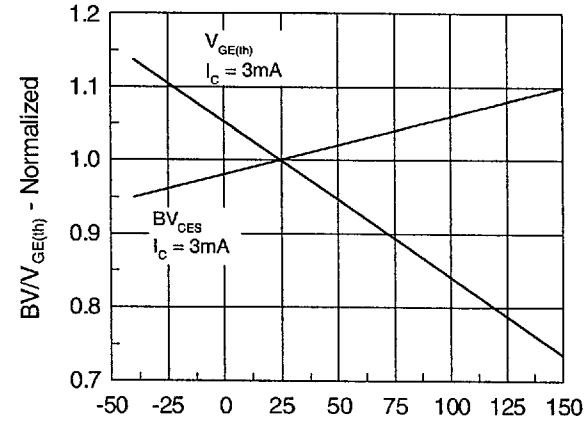


Fig. 6. Temperature Dependence of BV_{DSS} & $V_{GE(th)}$

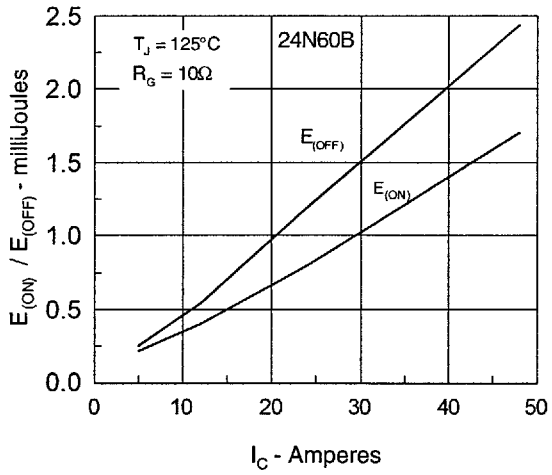


Fig. 7. Dependence of tfi and E_{OFF} on I_C.

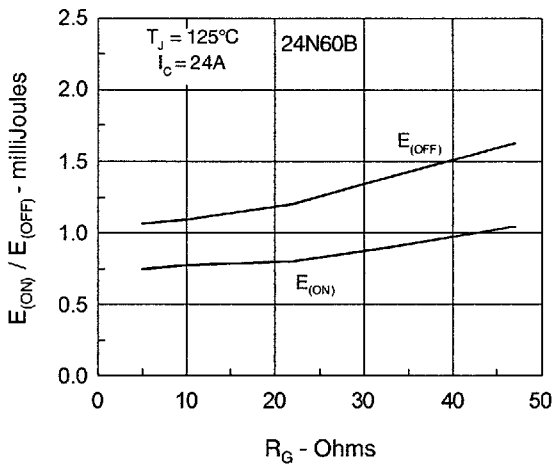


Fig. 8. Dependence of tfi and E_{OFF} on R_G.

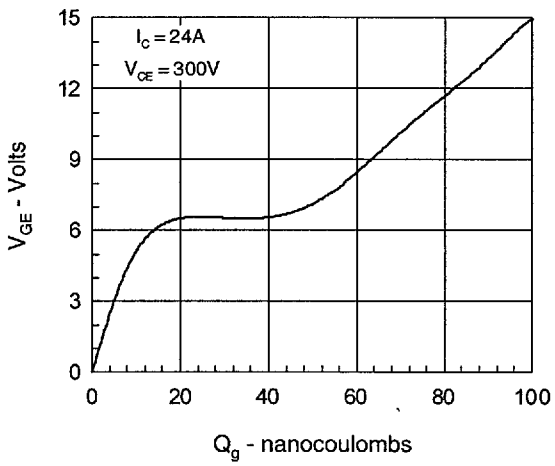


Fig. 9. Gate Charge

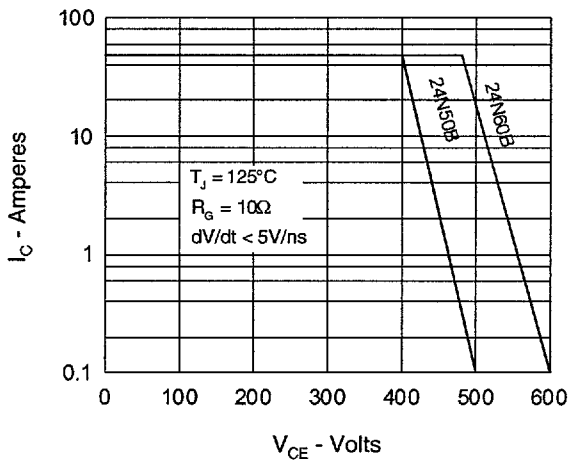


Fig. 10. Turn-off Safe Operating Area

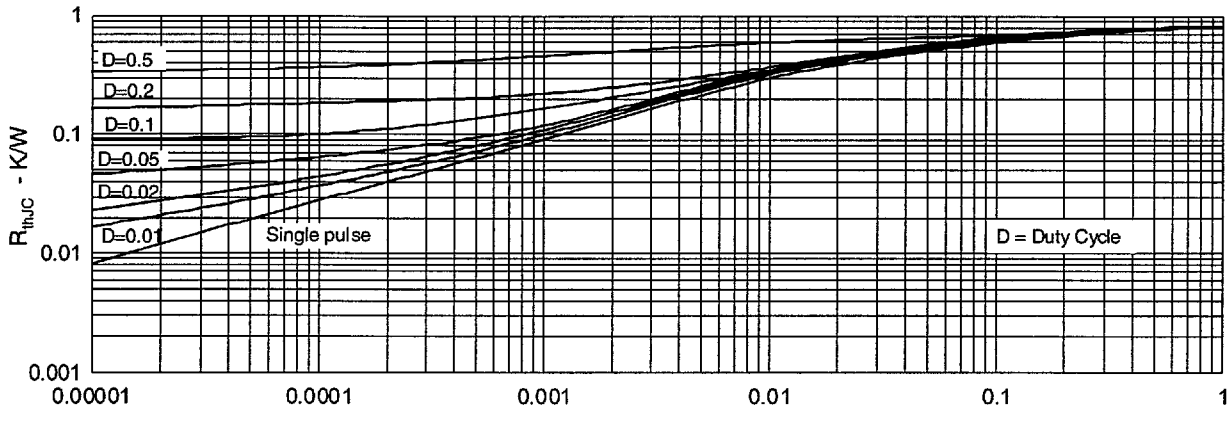


Fig. 11. Transient Thermal Resistance