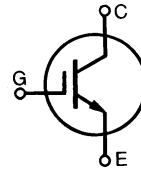


High Speed IGBT

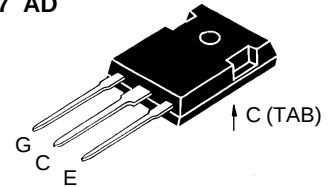
Short Circuit SOA Capability

IXSH10N60
IXSH10N60A

V_{CES}	$I_{C(25)}$	$V_{CE(sat)}$
600 V	20 A	2.5 V
600 V	20 A	3.0 V



TO-247 AD



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	20	A
I_{C90}	$T_C = 90^\circ\text{C}$	10	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	40	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 150 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$	$I_{CM} = 20$ @ $0.8 V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = 15 \text{ V}, V_{CE} = 360 \text{ V}, T_J = 125^\circ\text{C}$ $R_G = 82 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	100	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight			6 g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

Features

- International standard packages
- Guaranteed Short Circuit SOA capability
- Low $V_{CE(sat)}$
- for low on-state conduction losses
- High current handling capability
- MOS Gate turn-on
- drive simplicity
- Fast Fall Time for switching speeds up to 20 kHz

Applications

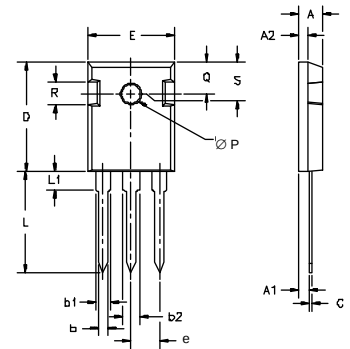
- AC motor speed control
- Uninterruptible power supplies (UPS)
- Welding

Advantages

- Easy to mount with 1 screw
(isolated mounting screw hole)
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 750 \mu\text{A}, V_{CE} = V_{GE}$	3.5		6.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$			200 μA 1 mA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}, V_{GE} = 15 \text{ V}$			2.5 V 3.0 V

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$I_C = I_{C90}$; $V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$	2		S
$I_{C(on)}$	$V_{GE} = 15\text{ V}$, $V_{CE} = 10\text{ V}$		50	A
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		750	pF
C_{oes}			125	pF
C_{res}			30	pF
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		40	nC
Q_{ge}			12	nC
Q_{gc}			20	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\text{ }\mu\text{H}$, $V_{CE} = 0.8 V_{CES}$, $R_G = 150\Omega$		100	ns
t_{ri}			200	ns
$t_{d(off)}$			250	750 ns
t_{fi}		10N60A	175	410 ns
E_{off}		10N60	720	ns
		10N60A	0.75	1.2 mJ
	Note 1	10N60	1.2	1.9 mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\text{ }\mu\text{H}$, $V_{CE} = 0.8 V_{CES}$, $R_G = 150\Omega$		100	ns
t_{ri}			200	ns
E_{on}			1.0	mJ
$t_{d(off)}$			300	ns
t_{fi}		10N60AU1	400	ns
E_{off}	Note 1	10N60AU1	1.5	mJ
R_{thJC}			1.25	K/W
R_{thCK}			0.25	K/W

TO-247 AD Outline


Dim.	Millimeter		Inches	
	Min.	Max.	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

- Notes:
- Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or R_G values.
 - Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.

Fig.1. Output Characteristics

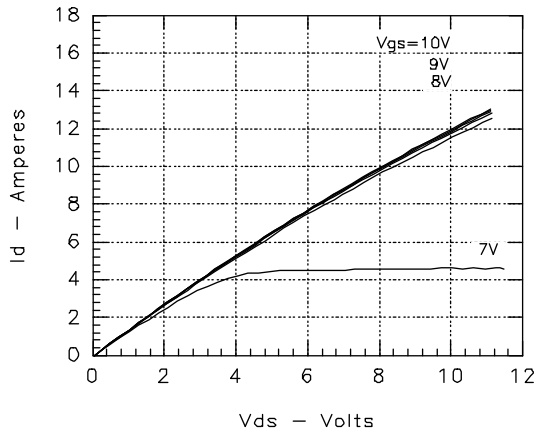


Fig. 2. Input Admittance

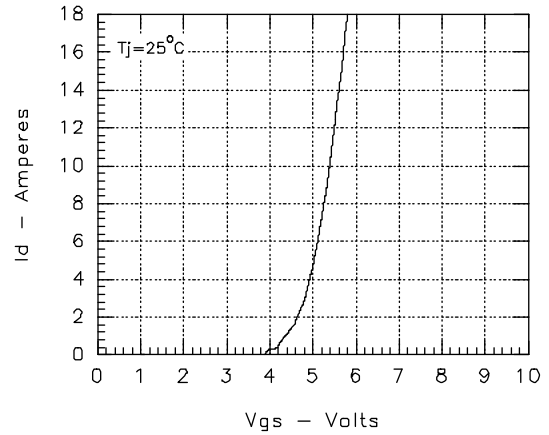


Fig. 3. $R_{ds(on)}$ vs. Drain Current

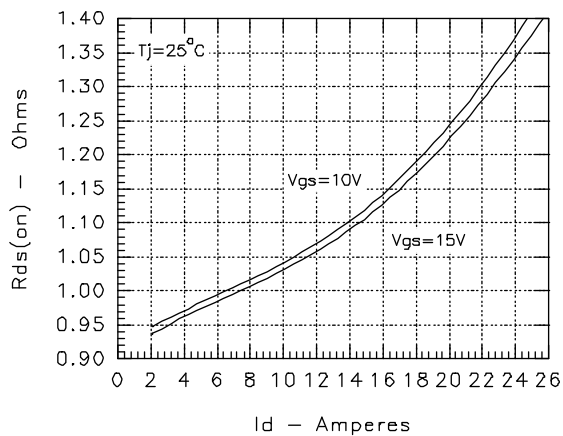


Fig. 4. Temperature Dependence of Drain to Source Resistance

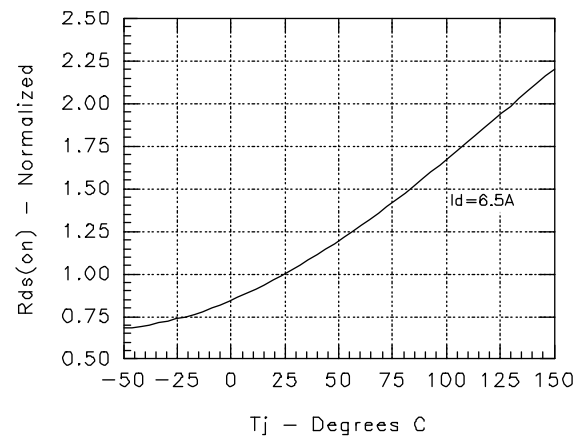


Fig. 5. Drain Current vs. Case Temperature

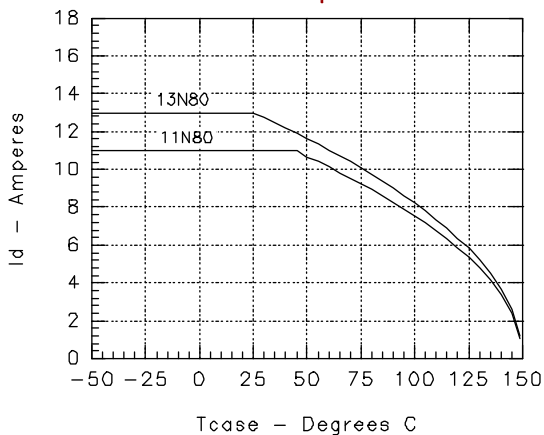


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage

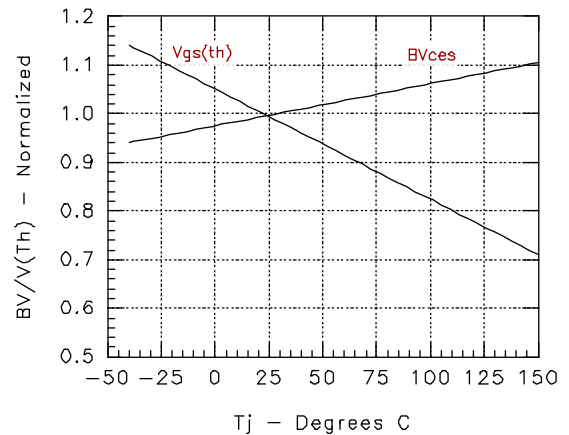


Fig. 7. Gate Charge

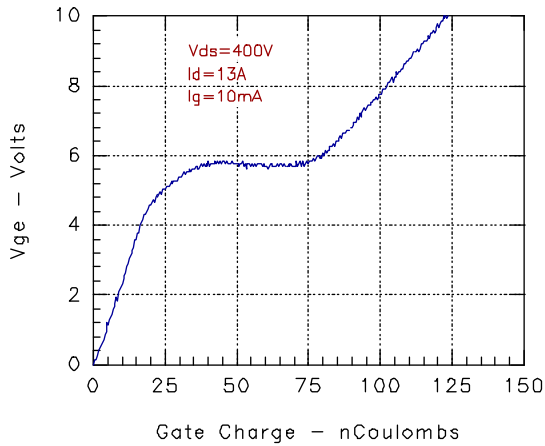


Fig. 8. Forward Bias Safe Operating Area

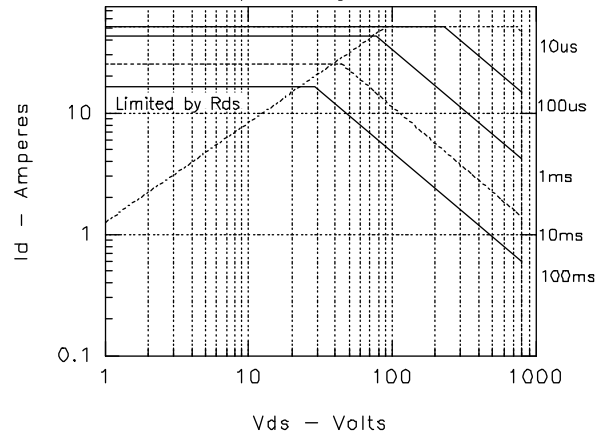


Fig. 9. Capacitance Curves

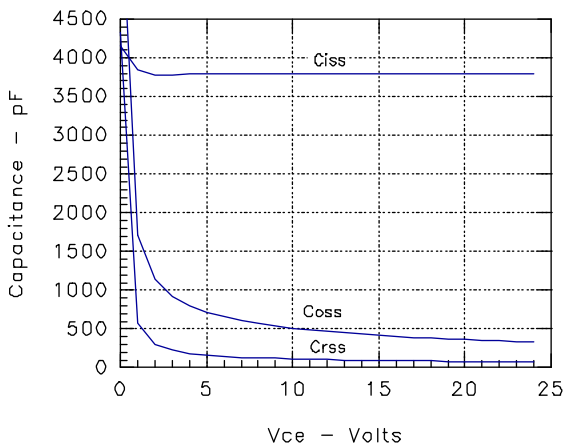


Fig. 10. Source Current vs. Source to Drain Voltage

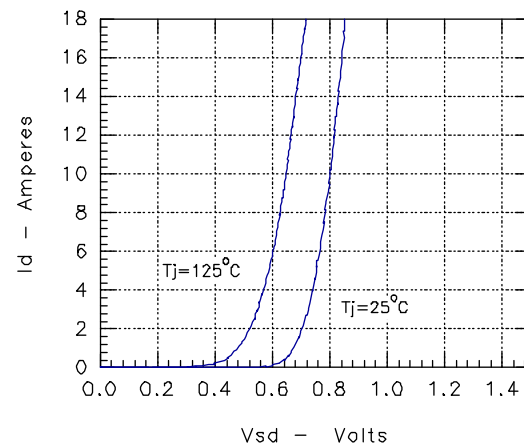


Fig. 11. Transient Thermal Impedance

