

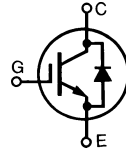
Low $V_{CE(sat)}$ IGBT with Diode

IXSH 16N60U1

$V_{CES} = 600V$
 $I_{C25} = 16A$
 $V_{CE(sat)typ} = 1.8V$

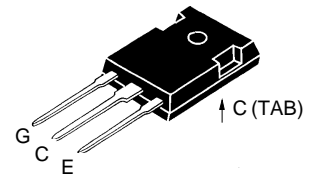
Short Circuit SOA Capability

Preliminary data



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	600	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$; $R_{GE} = 1 M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	32	A
I_{C90}	$T_C = 90^\circ C$	16	A
I_{CM}	$T_C = 25^\circ C$, 1 ms	52	A
SSOA (RBSOA)	$V_{GE} = 15 V$, $T_J = 125^\circ C$, $R_G = 150 \Omega$ Clamped inductive load, $L = 300 \mu H$	$I_{CM} = 32$ @ $0.8 V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = 15 V$, $V_{CE} = 360 V$, $T_J = 125^\circ C$ $R_G = 82 \Omega$, non repetitive	5	μs
P_C	$T_C = 25^\circ C$	100	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
Weight		2	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ C$
Maximum tab temperature for soldering for 10s		260	$^\circ C$

TO-247 AD



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

Features

- Latest generation HDMOS™ process
- International standard package
- 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

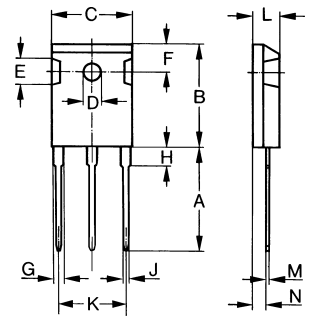
Advantages

- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ C$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 250 \mu A$, $V_{GE} = 0 V$	600		V
$V_{GE(th)}$	$I_C = 750 \mu A$, $V_{CE} = V_{GE}$	3.5		V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$, $T_J = 25^\circ C$ $V_{GE} = 0 V$, $T_J = 125^\circ C$			200 μA 1 mA
I_{GES}	$V_{CE} = 0 V$, $V_{GE} = \pm 20 V$			± 100 nA
$V_{CE(sat)}$	$I_C = I_{C90}$, $V_{GE} = 15 V$	1.8	2.3	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, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$	3.3	5.0	S	
$I_{C(on)}$	$V_{GE} = 15\text{ V}$, $V_{CE} = 10\text{ V}$		50	A	
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		920	pF	
C_{oes}			65	pF	
C_{res}			14	pF	
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		40	nC	
Q_{ge}			13	nC	
Q_{gc}			18	nC	
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 16\text{ A}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = 22\ \Omega$ Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or increased R_G		30	ns	
t_{ri}			30	ns	
$t_{d(off)}$			100	420	ns
t_{fi}			310	470	ns
E_{off}			1.9	2.9	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 16\text{ A}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = 22\ \Omega$ Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or increased R_G		30	ns	
t_{ri}			30	ns	
E_{on}			0.12	mJ	
$t_{d(off)}$			150	ns	
t_{fi}			510	ns	
E_{off}			3.0	mJ	
R_{thJC}			1.25	K/W	

TO-247 AD (IXSH) Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			1.75 V
I_{RM}	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, $-di_F/dt = 64\text{ A}/\mu\text{s}$ $V_R = 360\text{ V}$ $T_J = 100^\circ\text{C}$ $I_F = 1\text{ A}$; $-di/dt = 50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$ $T_J = 25^\circ\text{C}$		2.5	A
t_{rr}			165	ns
			35	50
R_{thJC}				2.5 K/W