

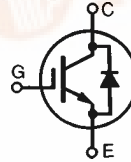


Preliminary data

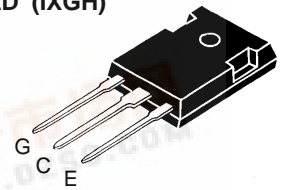
Low $V_{CE(sat)}$ High speed IGBT with Diode

IXGH25N100U1
IXGH25N100AU1

V_{CES}	I_{C25}	$V_{CE(sat)}$
1000 V	50 A	3.5 V
1000 V	50 A	4.0 V



TO-247 AD (IXGH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	1000	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1\text{ M}\Omega$	1000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	50	A
I_{C90}	$T_C = 90^\circ\text{C}$	25	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	100	A
SSOA (RBSOA)	$V_{GE} = 15\text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 33\ \Omega$ Clamped inductive load, $L = 100\ \mu\text{H}$	$I_{CM} = 50$ @ $0.8 V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	200	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 (M3)	1.13/10	Nm/lb.in.
Weight		TO-204 = 18 g, TO-247 = 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 package JEDEC TO-247 AD
- IGBT and anti-parallel FRED in one package
- 2nd generation HDMOS™ process
- Low $V_{CE(sat)}$
 - for minimum on-state conduction losses
- MOS Gate turn-on
 - drive simplicity
- Fast Recovery Epitaxial Diode (FRED)
 - soft recovery with low I_{RM}

Applications

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

Advantages

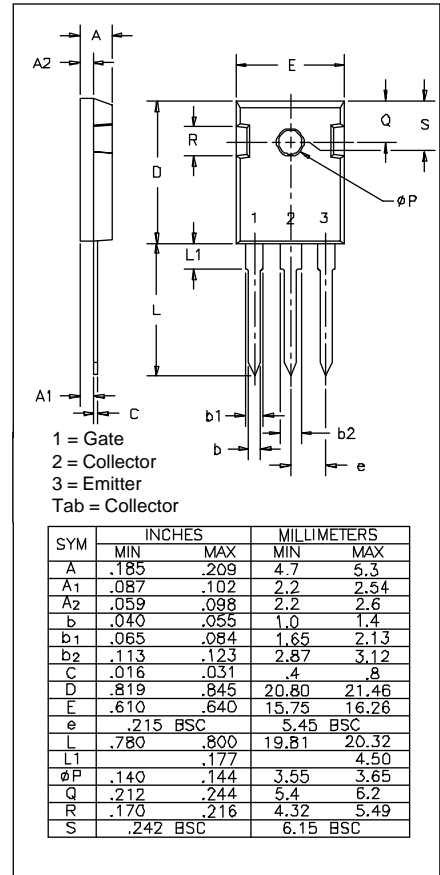
- Saves space (two devices in one package)
- Easy to mount (isolated mounting screw hole)
- Reduces assembly time and cost

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 4.5\text{ mA}$, $V_{GE} = 0\text{ V}$	1000		V
$V_{GE(th)}$	$I_C = 500\ \mu\text{A}$, $V_{CE} = V_{GE}$	2.5		5.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	500 μA 8 mA
I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = \pm 20\text{ V}$			$\pm 100\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$		25N100U1 25N100AU1	3.5 V 4.0 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, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$	8	15	S
C_{ies} C_{oes} C_{res}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		2750	pF
			270	pF
				50
Q_g Q_{ge} Q_{gc}	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		130	180 nC
			25	60 nC
			55	90 nC
$t_{d(on)}$ t_{ri} $t_{d(off)}$ t_{fi} E_{off}	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$, $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 33\ \Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or increased R_G	25N100AU1	100	ns
		25N100AU1	200	ns
		25N100AU1	500	ns
		25N100AU1	500	ns
		25N100AU1	5	mJ
$t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off}	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$, $V_{CE} = 0.8 V_{CES}$, $R_G = R_{off} = 33\ \Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CES}$, higher T_J or increased R_G		100	ns
			250	ns
			3.5	mJ
			720	1000 ns
		25N100U1	950	3000 ns
		25N100AU1	800	ns
		25N100U1 25N100AU1	10 6	mJ mJ
R_{thJC} R_{thCK}			0.25	0.62 K/W K/W

TO-247 AD Outline



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 $d \leq 2\%$			2.5 V
I_{RM} t_{rr}	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, $-di_F/dt = 240\text{ A}/\mu\text{s}$ $V_R = 540\text{ V}$	$T_J = 125^\circ\text{C}$	16	18 A
		$T_J = 25^\circ\text{C}$	120	35
R_{thJC}				1 K/W

Fig. 1. Saturation Characteristics

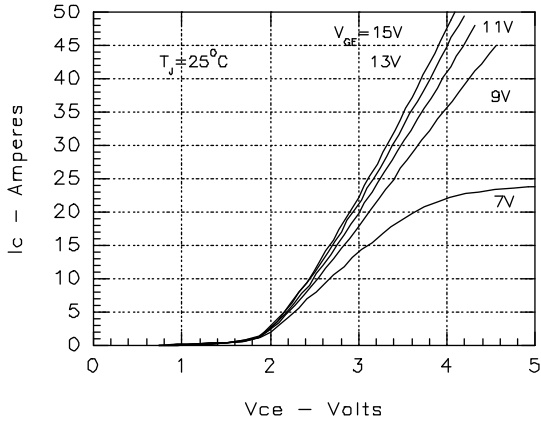


Fig. 2. Output Characteristics

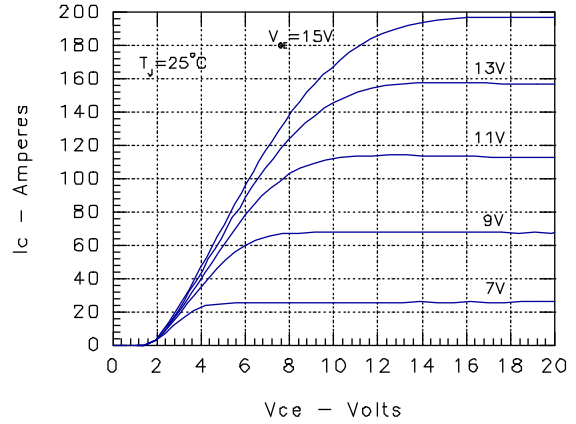


Fig. 3. Collector-Emitter Voltage vs. Gate-Emitter Voltage

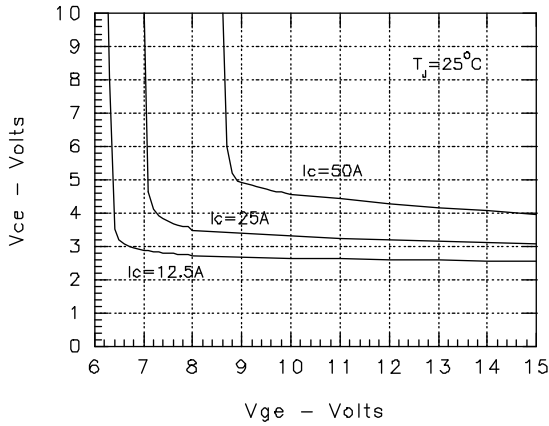


Fig. 4. Temperature Dependence of Output Saturation Voltage

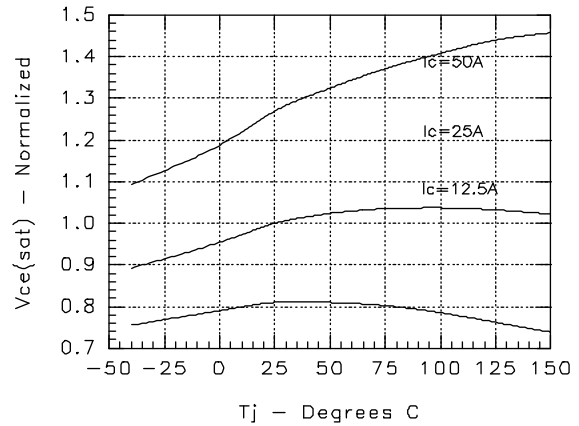


Fig. 5. Input Admittance

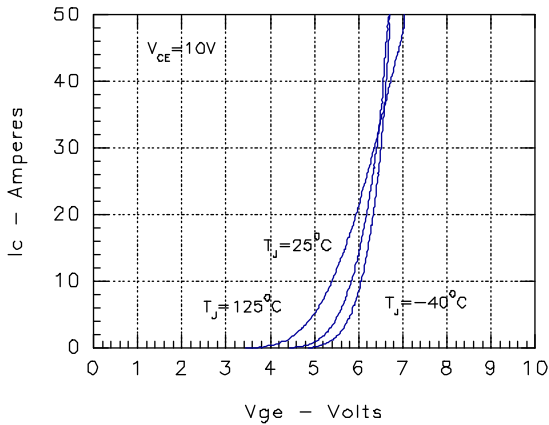


Fig. 6. Temperature Dependence Breakdown and Threshold Voltage

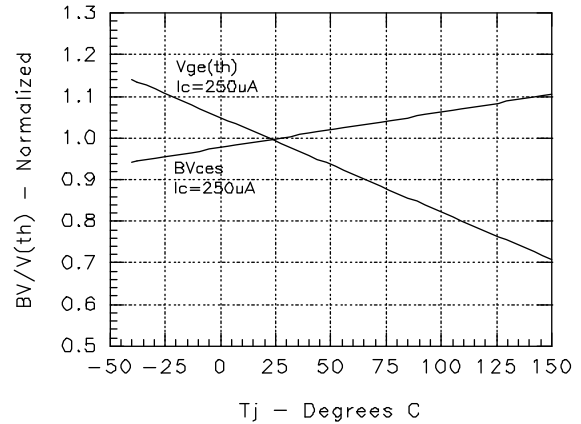


Fig. 7. Gate Charge

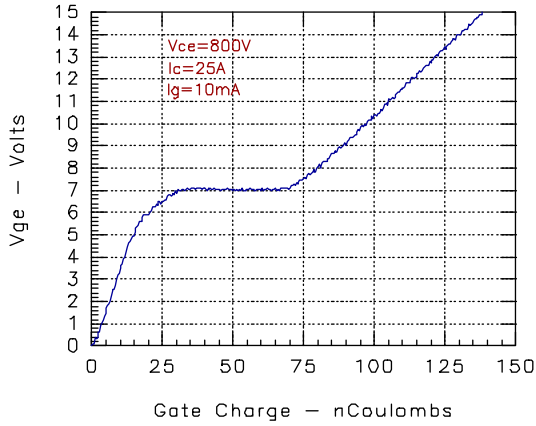


Fig. 8. Turn-Off Safe Operating Area

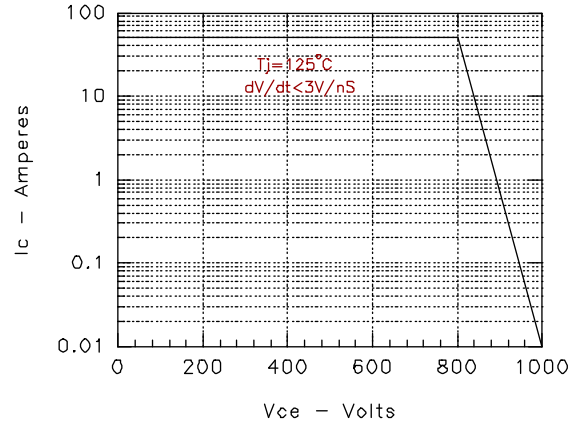


Fig. 9. Capacitance Curves

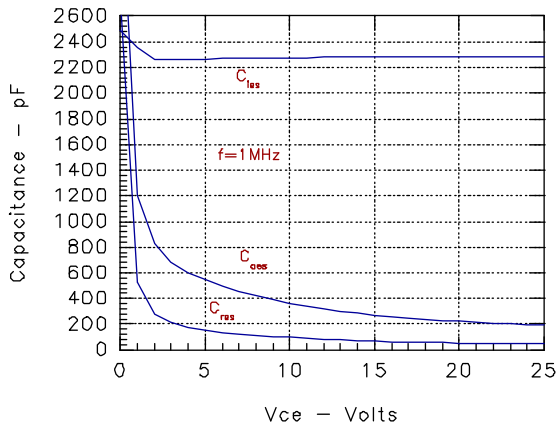


Fig. 10. Transient Thermal Impedance

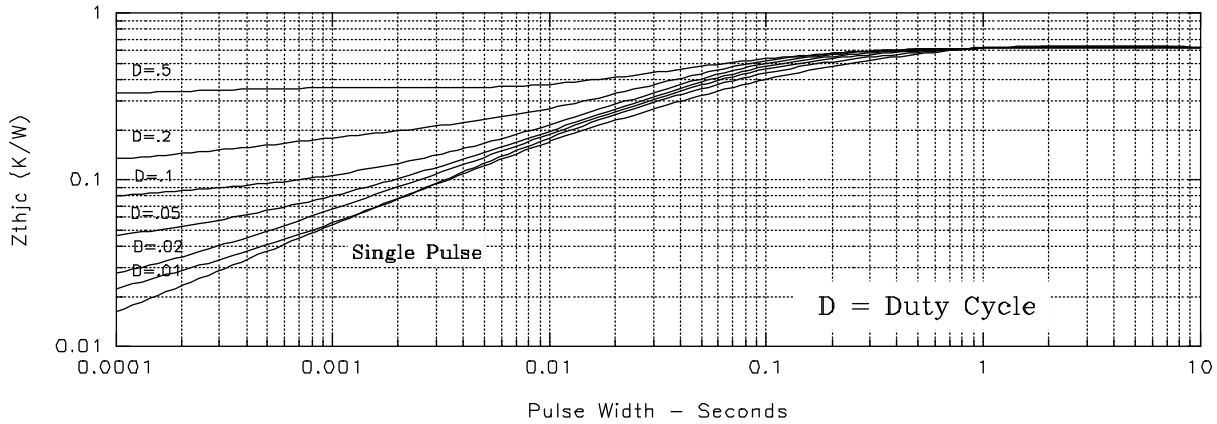


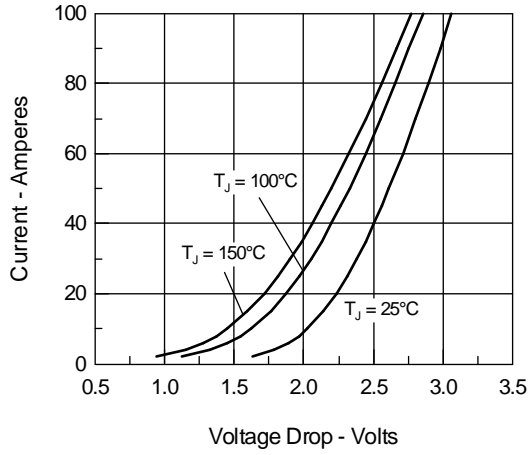
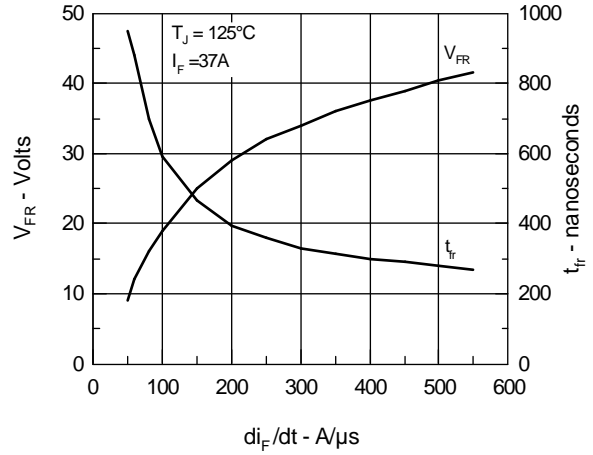
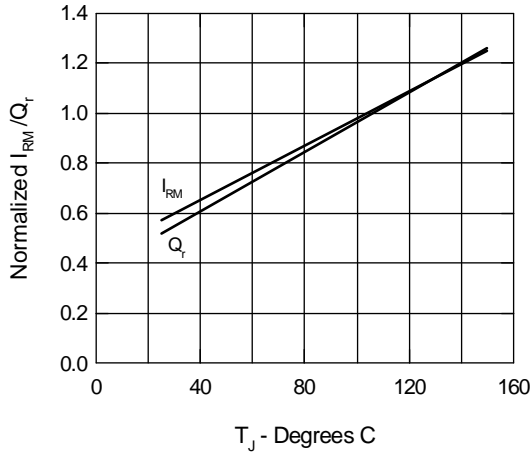
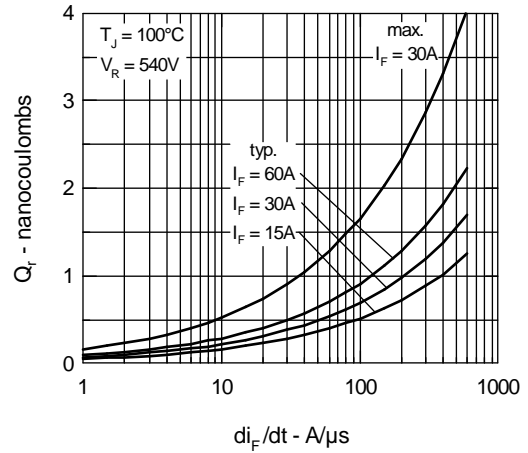
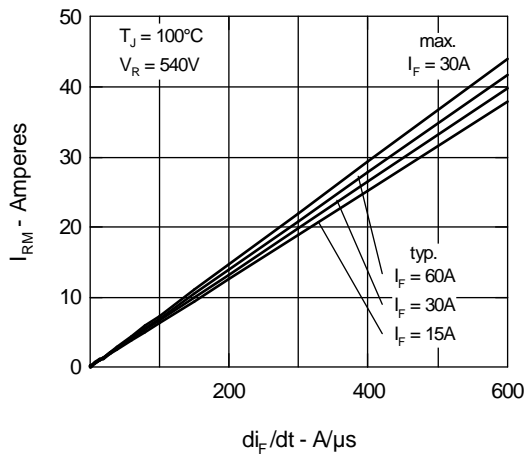
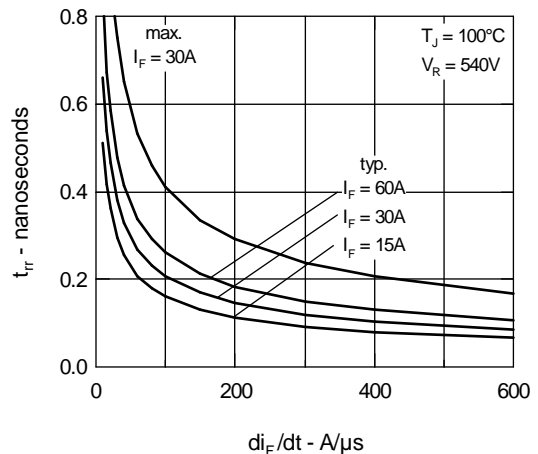
Fig.11 Maximum Forward Voltage Drop

Fig.12 Peak Forward Voltage V_{FR} and Forward Recovery Time t_{FR}

Fig.13 Junction Temperature Dependence off I_{RM} and Q_r

Fig.14 Reverse Recovery Charge

Fig.15 Peak Reverse Recovery Current

Fig.16 Reverse Recovery Time


Fig.17 Diode Transient Thermal resistance junction to case

