

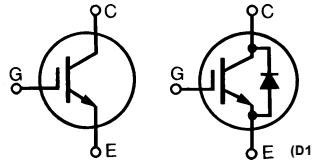
# HiPerFAST™ IGBT

## ISOPLUS247™

(Electrically Isolated Backside)

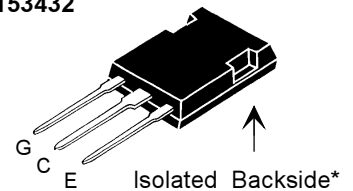
IXGR 40N60C  
IXGR 40N60CD1

$V_{CES} = 600 \text{ V}$   
 $I_{C25} = 75 \text{ A}$   
 $V_{CE(sat)} = 2.5 \text{ V}$   
 $t_{fi(typ)} = 75 \text{ ns}$



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	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	75	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	35	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	150	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 10 \Omega$ Clamped inductive load	$I_{CM} = 80$ @ $0.8 V_{CES}$	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	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
$M_d$	Mounting torque (M3)	1.13/10Nm/lb.in.	
<b>Weight</b>		5	g

### ISOPLUS 247



G = Gate, C = Collector  
E = Emitter

\* Patent pending

### Features

- DCB Isolated mounting tab
- Meets TO-247AD package Outline
- High current handling capability
- Latest generation HDMOS™ process
- MOS Gate turn-on - drive simplicity

### Applications

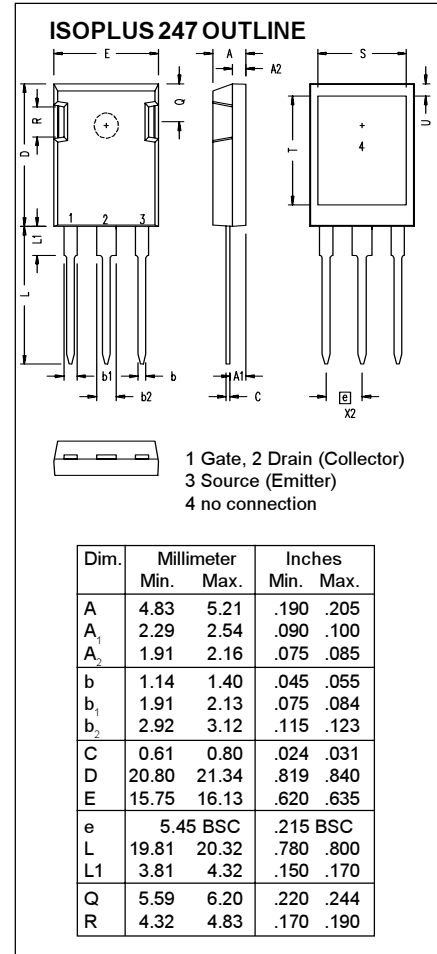
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

### Advantages

- Easy assembly
- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$	40N60C	600	V
	$I_C = 750 \mu\text{A}$	40N60CD1	600	
$V_{GE(th)}$	$I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$	40N60C	2.5	5.0 V
	$I_C = 500 \mu\text{A}$	40N60CD1	2.5	5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}, T_J = 25^\circ\text{C}$ $V_{GE} = 0 \text{ V}; \text{note } 1, T_J = 25^\circ\text{C}$	$T_J = 25^\circ\text{C}$	40N60C	200 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$	40N60CD1	650 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$	40N60C	1 mA
		$T_J = 125^\circ\text{C}$	40N60CD1	3 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_T, V_{GE} = 15 \text{ V}$			2.5 V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$g_{fs}$	$I_C = I_T; V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	30	40	S	
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	40N60C	3300	pF	
$C_{oes}$		40N60CD1	310	pF	
$C_{res}$			370	pF	
			65	pF	
$Q_g$	$I_C = I_T, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		116	nC	
$Q_{ge}$			23	nC	
$Q_{gc}$			55	nC	
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = R_{off} = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		25	ns	
$t_{ri}$			30	ns	
$t_{d(off)}$			100	150	ns
$t_{fi}$			75	150	ns
$E_{off}$			0.85	1.70	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = R_{off} = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		25	ns	
$t_{ri}$			35	ns	
$E_{on}$		40N60C	0.4	mJ	
$t_{d(off)}$		40N60CD1	1.2	mJ	
$t_{fi}$			150	ns	
$E_{off}$			105	ns	
			1.2	mJ	
$R_{thJC}$				0.6 K/W	
$R_{thCK}$		0.15		K/W	



Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = I_T, V_{GE} = 0\text{ V}$ , Note 1	$T_J = 150^\circ\text{C}$		1.3 V
		$T_J = 25^\circ\text{C}$		1.8 V
$I_{RM}$	$I_F = I_T, V_{GE} = 0\text{ V}, V_R = 100\text{ V}$ $-di_F/dt = 100\text{ A}/\mu\text{s}$	$T_J = 100^\circ\text{C}$		7.5 A
$t_{rr}$	$I_F = 1\text{ A}; -di/dt = 100\text{ A}/\mu\text{s}; V_R = 30\text{ V}$		3.5	ns
$R_{thJC}$				0.90 K/W

Note: 1. Pulse test,  $t_p \leq 300\text{ ms}$ , duty cycle:  $d \leq 2\%$   
2.  $I_T = 40\text{ A}$

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

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025