

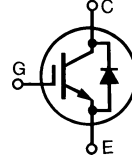
IGBT with Diode PLUS247™ package

IXSK 40N60CD1
IXSX 40N60CD1

V_{CES} = 600 V
I_{C25} = 75 A
V_{CE(sat)} = 2.5 V
t_{fi(typ)} = 70 ns

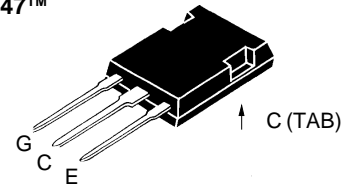
Short Circuit SOA Capability

Preliminary data

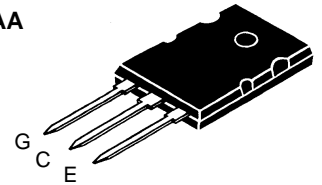


Symbol	Test Conditions	Maximum Ratings	
V _{CES}	T _J = 25°C to 150°C	600	V
V _{CGR}	T _J = 25°C to 150°C; R _{GE} = 1 MΩ	600	V
V _{GES}	Continuous	±20	V
V _{GEM}	Transient	±30	V
I _{C25}	T _C = 25°C, limited by leads	75	A
I _{C90}	T _C = 90°C	40	A
I _{CM}	T _C = 25°C, 1 ms	150	A
SSOA (RBSOA)	V _{GE} = 15 V, T _{VJ} = 125°C, R _G = 22 Ω Clamped inductive load, L = 30 μH	I _{CM} = 80 @ 0.8 V _{CES}	A
t_{SC} (SCSOA)	V _{GE} = 15 V, V _{CE} = 360 V, T _J = 125°C R _G = 22 Ω, non repetitive	10	μs
P _C	T _C = 25°C	280	W
T _J		-55 ... +150	°C
T _{JM}		150	°C
T _{stg}		-55 ... +150	°C
M _d	Mounting torque (TO-264)	0.9/6	Nm/lb.in.
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Weight	TO-264	10	g
	PLUS247	6	g

**PLUS 247™
(IXSX)**



**TO-264 AA
(IXSK)**



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

Features

- International standard packages
- Guaranteed Short Circuit SOA capability
- High frequency IGBT and anti-parallel FRED in one package
- Latest generation HDMOS™ process
- MOS Gate turn-on
 - drive simplicity
- Fast Recovery, low leakage Epitaxial Diode
 - 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

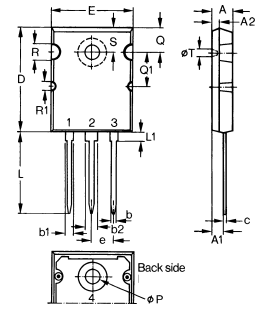
- PLUS 247™ package for clip or spring mounting
- Space savings (two devices in one package)
- Reduces assembly time and cost

Symbol	Test Conditions	Characteristic Values (T _J = 25°C, unless otherwise specified)		
		min.	typ.	max.
BV _{CES}	I _C = 1 mA, V _{GE} = 0 V	600		V
V _{GE(th)}	I _C = 4 mA, V _{CE} = V _{GE}	4		V
I _{CES}	V _{CE} = 0.8 • V _{CES} V _{GE} = 0 V	T _J = 25°C		650 μA
		T _J = 150°C		5 mA
I _{GES}	V _{CE} = 0 V, V _{GE} = ±20 V			±100 nA
V _{CE(sat)}	I _C = I _{C90} , V _{GE} = 15 V			2.5 V

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)			
		min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; $V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$	16	23	S	
C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		3700	pF	
C_{oss}			440	pF	
C_{riss}			60	pF	
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		190	nC	
Q_{ge}			45	nC	
Q_{gc}			88	nC	
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$, $V_{CE} = 0.8 V_{CES}$, $R_G = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		50	ns	
t_{ri}			50	ns	
$t_{d(off)}$			70	140	ns
t_{fi}			70	120	ns
E_{off}			1.0	1.7	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		50	ns	
t_{ri}			50	ns	
E_{on}			2.2	mJ	
$t_{d(off)}$			140	ns	
t_{fi}			140	ns	
E_{off}			1.7	mJ	
R_{thJC}			0.48	K/W	
R_{thCK}		0.15		K/W	

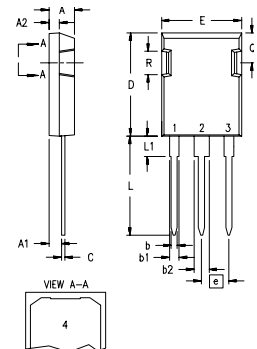
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = I_{C90}$; $V_{GE} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			1.8 V
I_{RM}	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, $-di_F/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$		2	2.5 A
t_{rr}		$I_F = 1\text{ A}$; $-di_F/dt = 200\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$		35
R_{thJC}				0.75 K/W

TO-264 AA Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

PLUS247™ (IXSX)



Dim.	Millimeter		Inches	
	Min.	Max.	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
b2	2.92	3.12	.115	.123
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	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190