SiC Power MOSFET

I_{D25} = 48 A
V_{DSS} = 1200 V
$R_{DS(on)\,max}$ = 50 mΩ

Kelvin Source gate connection

Part number
IXFN50N120SK

KS

2 G   1

3 D   4 S

Backside: isolated

E153432

D (3)

G (2)

KS (1)

S (4)
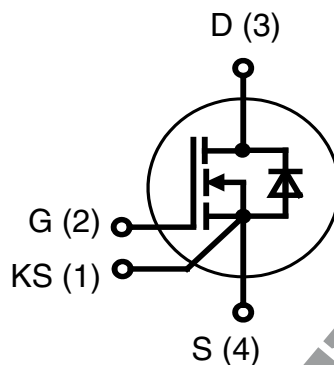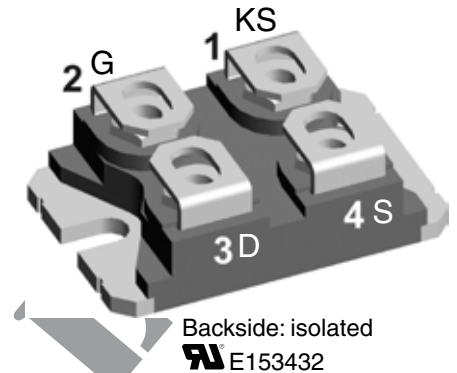
Features / Advantages:
- High speed switching with low capacitances
- High blocking voltage with low $R_{DS(on)}$
- Easy to parallel and simple to drive
- Resistant to latch-up
- Real Kelvin source connection

Applications:
- Solar inverters
- High voltage DC/DC converters
- Motor drives
- Switch mode power supplies
- UPS
- Battery chargers
- Induction heating

Package: SOT-227B (minibloc)
- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate with Aluminium nitride insolation
- Advanced power cycling

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IXYS

IXFN50N120SK

MOSFET

Symbol	Definitions	Conditions		min.	typ.	max.	
$V_{DS(max)}$	max drain source voltage					1200	V
$V_{GS(max)}$	max transient gate source voltage			-10		+25	V
V_{GS}	continous gate source voltage	recommended operational value		-5		+20	V
I_{D25}	drain current	$V_{GS} = 20$ V	$T_C = 25°C$			48	A
I_{D80}			$T_C = 80°C$			38	A
I_{D100}			$T_C = 100°C$			33	A
R_{DSon}	static drain source on resistance	$I_D = 40$ A; $V_{GS} = 20$ V	$T_{VJ} = 25°C$		40	52	mΩ
			$T_{VJ} = 150°C$		84		mΩ
$V_{GS(th)}$	gate threshold voltage	$I_D = 10$ mA; $V_{GS} = V_{DS}$	$T_{VJ} = 25°C$	2.4	2.8	tbd	V
			$T_{VJ} = 150°C$		2.0		V
I_{DSS}	drain source leakage current	$V_{DS} = 1200$ V; $V_{GS} = 0$ V	$T_{VJ} = 25°C$		1	100	µA
I_{GSS}	gate source leakage current	$V_{DS} = 0$ V; $V_{GS} = 20$ V	$T_{VJ} = 25°C$			0.25	µA
R_G	internal gate resistance	$f = 1$ MHz, $V_{AC} = 25$ mV			1.8		Ω
C_{iss}	input capacitance	$V_{DS} = 1000$ V; $V_{GS} = 0$ V; $f = 1$ MHz	$T_{VJ} = 25°C$		1895		pF
C_{oss}	output capacitance				150		pF
C_{rss}	reverse transfer (Miller) capacitance				10		pF
Q_g	total gate charge	$V_{DS} = 800$ V; $I_D = 40$ A; $V_{GS} = -5/20$ V	$T_{VJ} = 25°C$		115		nC
Q_{gs}	gate source charge				28		nC
Q_{gd}	gate drain (Miller) charge				37		nC
$t_{d(on)}$	turn-on delay time	Inductive switching	$T_{VJ} = 125°C$				ns
t_r	current rise time	Free Wheeling Diode: Body Diode @ $V_{GS} = -5V$					ns
$t_{d(off)}$	turn-off delay time	$V_{DS} = 800$ V; $I_D = 40A$					ns
t_f	current fall time	$V_{GS} = -5/20$ V; $R_G = 2.5$ Ω (external)					ns
E_{on}	turn-on energy per pulse						mJ
E_{off}	turn-off energy per pulse						mJ
R_{thJC}	thermal resistance junction to case					0.6	K/W
R_{thJH}	thermal resistance junction to heatsink	with heatsink compound; IXYS test setup			0.72		K/W

Source-Drain Diode

Symbol	Definitions	Conditions		min.	typ.	max.	
I_{S25}	continuous source current	$V_{GS} = -5$ V	$T_C = 25°C$				A
I_{S80}			$T_C = 80°C$				A
V_{SD}	forward voltage drop	$I_F = 20$ A; $V_{GS} = -5$ V	$T_{VJ} = 25°C$		3.3		V
			$T_{VJ} = 150°C$		3.1		V
t_{rr}	reverse recovery time	$V_{GS} = -5$ V; $I_F = 40$ A	$T_{VJ} = 25°C$		54		ns
Q_{RM}	reverse recovery charge (intrinsic diode)	$V_R = 800$ V; $-di_F/dt = 1000$ A/µs			285		nC
I_{RM}	max. reverse recovery current				15		A

Note:
When using SiC Body Diode the maximum recommended $V_{GS} = -5V$

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

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Package SOT-227B (minibloc)

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
					Ratings		
I_{RMS}	*RMS current*	per terminal					A
T_{stg}	*storage temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		150	°C
T_{VJ}	*virtual junction temperature*			-40		175	°C
Weight					30		g
M_D	*mounting torque*			1.1		1.5	Nm
M_T	*terminal torque*			1.1		1.5	Nm
$d_{Spp/App}$	*creepage distance on surface / striking distance through air*	*terminal to backside*	10.5 / 3.2				mm
$d_{Spb/Apb}$		*terminal to terminal*	8.6 / 6.8				mm
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq 1$ mA; 50/60 Hz,	t = 1 sec.	3000			V
			t = 1 minute	2500			V

Product Marking

Logo → IXYS XXXXX ← Part No.

yywwZ ®ᴿᵁ abcd

DateCode ↑   ↑   ↑
Assembly Line   Assembly Code
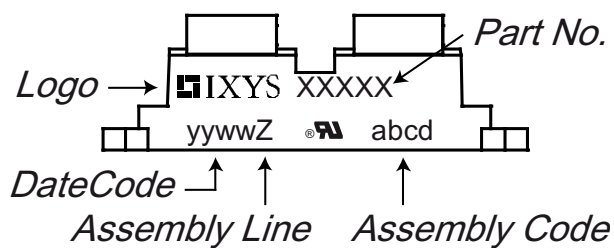
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN50N120SK	IXFN50N120SK	Tube	10	517988

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Outlines SOT-227B (minibloc)

Nut M4 DIN 934
Lens Head
Screw M4x8
DIN 7985
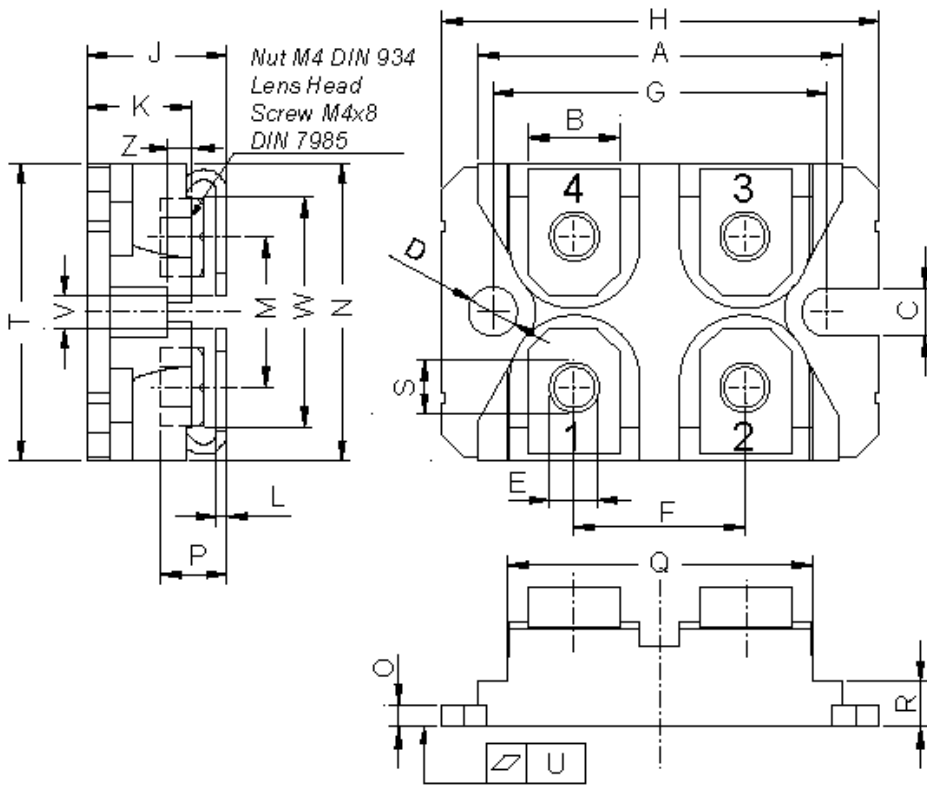
Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106

D (3)

G (2)

KS (1)

S (4)

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