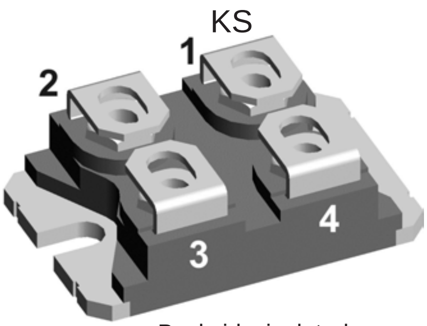
preliminary

SiC Power MOSFET

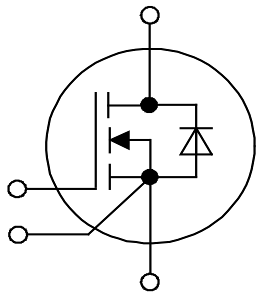
I_{D25} = 68 A
V_{DSS} = 1200 V
$R_{DS(on)\,max}$ = 34 mΩ

Kelvin Source gate connection

Part number
IXFN70N120SK



Backside: isolated
UL pending



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 isolation
- Advanced power cycling

preliminary

MOSFET

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{DSS}	*drain source breakdown voltage*	V_{GS} = 0 V, I_D = 100 µA		1200			V
V_{GSM}	*max transient gate source voltage*			-10		+25	V
V_{GS}	*continous gate source voltage*	recommended operational value		-5		+20	V
I_{D25}	*drain current*		T_C = 25°C			68	A
I_{D80}		V_{GS} = 20 V	T_C = 80°C			55	A
I_{D100}			T_C = 100°C			48	A
R_{DSon}	*static drain source on resistance*	I_D = 50 A; V_{GS} = 20 V	T_{VJ} = 25°C		25	34	mΩ
			T_{VJ} = 175°C		52		mΩ
$V_{GS(th)}$	*gate threshold voltage*	I_D = 15 mA; V_{GS} = V_{DS}	T_{VJ} = 25°C	2.0	2.6	4.0	V
			T_{VJ} = 175°C		2.1		V
I_{DSS}	*drain source leakage current*	V_{DS} = 1200 V; V_{GS} = 0 V	T_{VJ} = 25°C		2	100	µA
I_{GSS}	*gate source leakage current*	V_{DS} = 0 V; V_{GS} = 20 V	T_{VJ} = 25°C			0.6	µA
R_G	*internal gate resistance*	f = 1 MHz, V_{AC} = 25 mV, ESR of C_{ISS}			1.1		Ω
C_{iss}	*input capacitance*				2790		pF
C_{oss}	*output capacitance*	V_{DS} = 1000 V; V_{GS} = 0 V; f = 1 MHz	T_{VJ} = 25°C		220		pF
C_{rss}	*reverse transfer (Miller) capacitance*				15		pF
Q_g	*total gate charge*				161		nC
Q_{gs}	*gate source charge*	V_{DS} = 800 V; I_D = 50 A; V_{GS} = -5/20 V	T_{VJ} = 25°C		46		nC
Q_{gd}	*gate drain (Miller) charge*				50		nC
$t_{d(on)}$	*turn-on delay time*				30		ns
t_r	*current rise time*	Inductive switching			15		ns
$t_{d(off)}$	*turn-off delay time*	V_{DS} = 800 V; I_D = 50 A	T_{VJ} = 25°C		82		ns
t_f	*current fall time*	V_{GS} = -5 / 20 V; R_G = 15 Ω (external)			27		ns
E_{on}	*turn-on energy per pulse*	Freewheeling diode is Mosfet's body diode			1.35		mJ
E_{off}	*turn-off energy per pulse*				0.76		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*				0.13		mJ
$t_{d(on)}$	*turn-on delay time*				28		ns
t_r	*current rise time*	Inductive switching			12		ns
$t_{d(off)}$	*turn-off delay time*	V_{DS} = 800 V; I_D = 50 A	T_{VJ} = 150°C		125		ns
t_f	*current fall time*	V_{GS} = -5 / 20 V; R_G = 15 Ω (external)			28		ns
E_{on}	*turn-on energy per pulse*	Freewheeling diode is Mosfet's body diode			1.71		mJ
E_{off}	*turn-off energy per pulse*				0.78		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*				0.29		mJ
R_{thJC}	*thermal resistance junction to case*					0.45	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heatsink compound; IXYS test setup			0.6		K/W

Source-Drain Diode

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{SD}	*forward voltage drop*	I_F = 50 A; V_{GS} = -5 V	T_{VJ} = 25°C		4.3		V
			T_{VJ} = 150°C		3.7		V
t_{rr}	*reverse recovery time*				35		ns
Q_{RM}	*reverse recovery charge (intrinsic diode)*	V_{GS} = -5 V; I_F = 50 A; V_R = 800 V	T_{VJ} = 25°C		0.52		µC
I_{RM}	*max. reverse recovery current*	Mosfet gate drive:			33		A
dI_F/dt	*current slew rate*	V_{GS} = -5 / 20 V; R_G = 15 Ω			3380		A/µs
t_{rr}	*reverse recovery time*				30		ns
Q_{RM}	*reverse recovery charge (intrinsic diode)*	V_{GS} = -5 V; I_F = 50 A; V_R = 800 V	T_{VJ} = 150°C		1.23		µC
I_{RM}	*max. reverse recovery current*	Mosfet gate drive:			59		A
dI_F/dt	*current slew rate*	V_{GS} = -5 / 20 V; R_G = 15 Ω			4250		A/µs

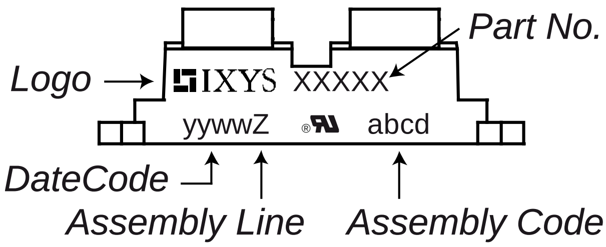
Note:
When using SiC Body Diode the maximum recommended V_{GS} = -5V

IXYS reserves the right to change limits, test conditions and dimensions. 20180405a

Package SOT-227B (minibloc)

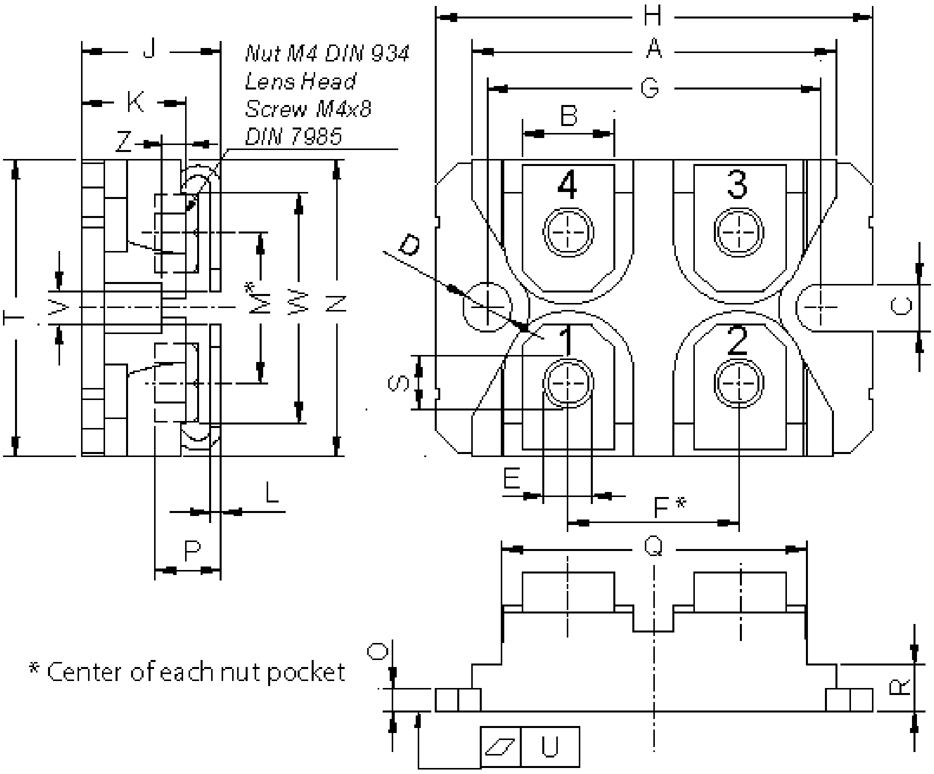
Symbol	Definitions	Conditions		min.	Ratings typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal					A
T_{stg}	*storage temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		150	°C
T_{VJ}	*virtual junction temperature*			-40		175	°C
Weight					30		g
M_D	*mounting torque*			1.1		1.5	Nm
M_T	*terminal 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

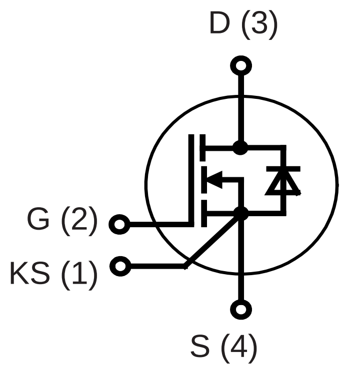


Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN70N120SK	IXFN70N120SK	Tube	10	517981

Outlines SOT-227B (minibloc)



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



Curves

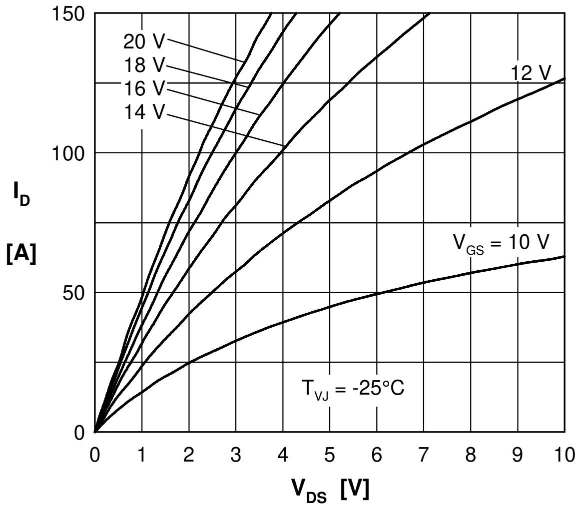


Fig. 1 Typical output characteristics (-25°C)

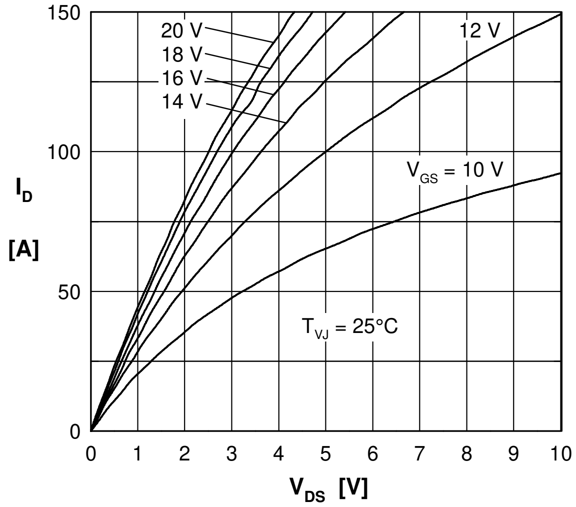


Fig. 2 Typical output characteristics (25°C)

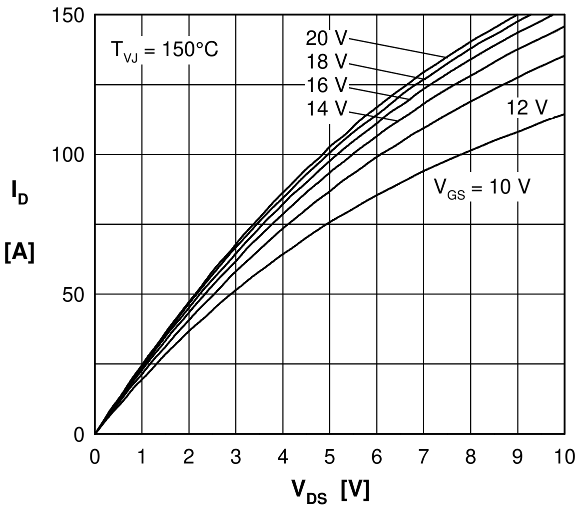


Fig. 3 Typical output characteristics (150°C)

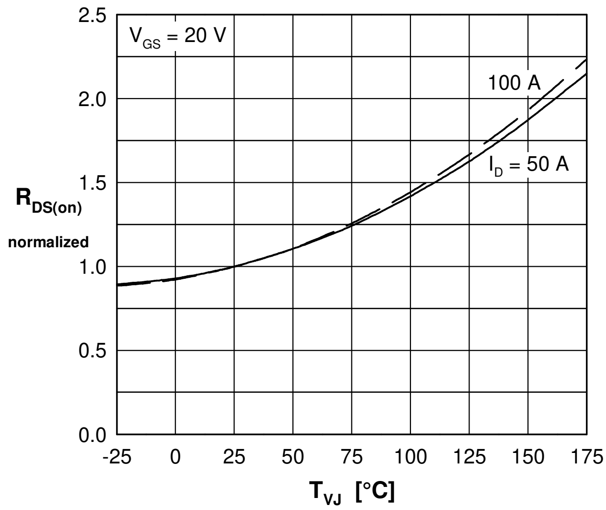


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

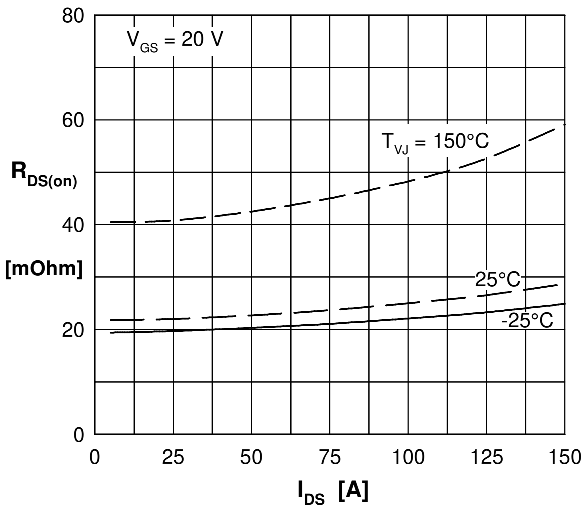


Fig. 5 $R_{DS(on)}$ versus drain current

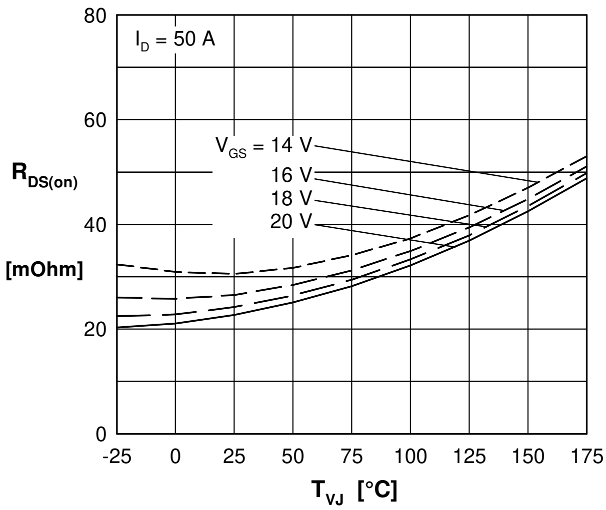


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

Curves

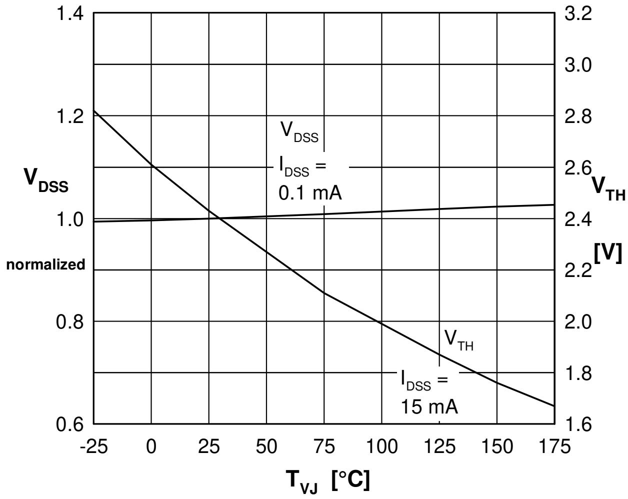


Fig. 7 Norm. breakdow V_{DSS} & treshhold voltage V_{TH} versus junction temperature T_{VJ}

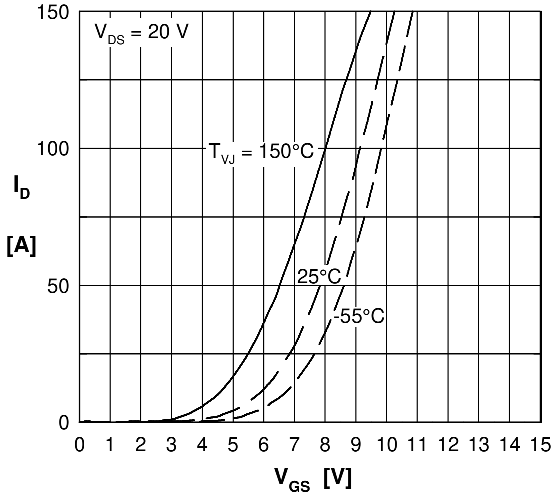


Fig. 8 Typical transfer characteristics

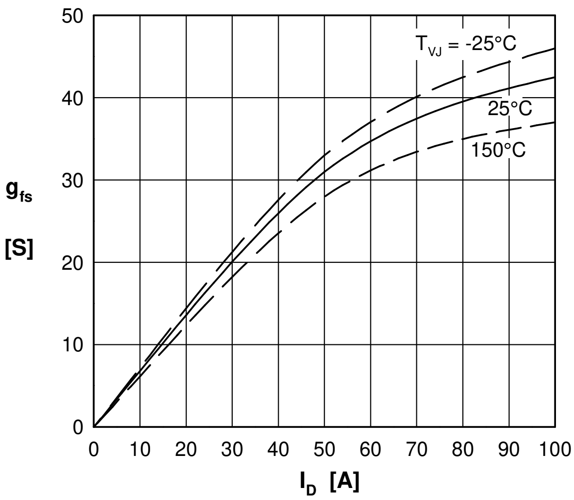


Fig. 9 Typical forward transconductance

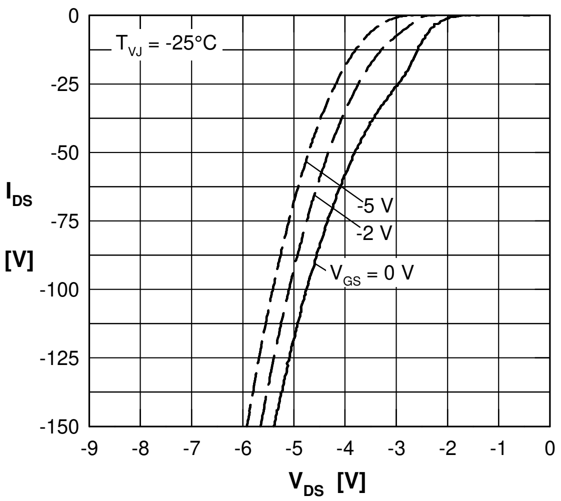


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

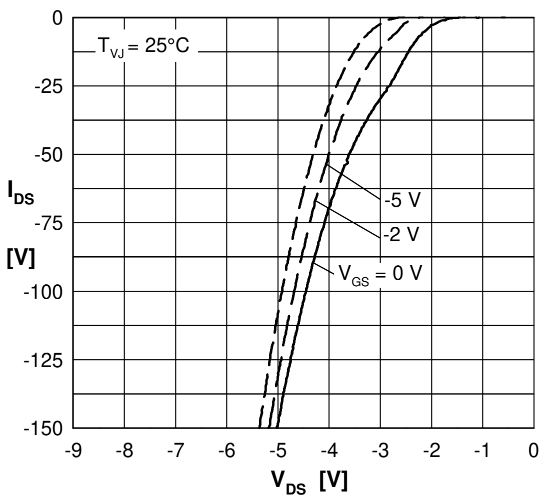


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

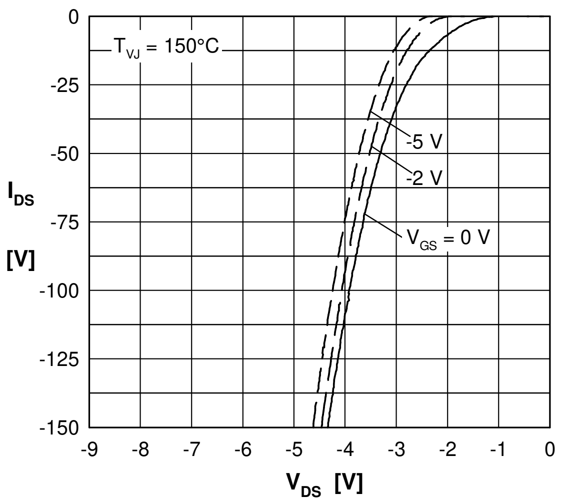


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C