
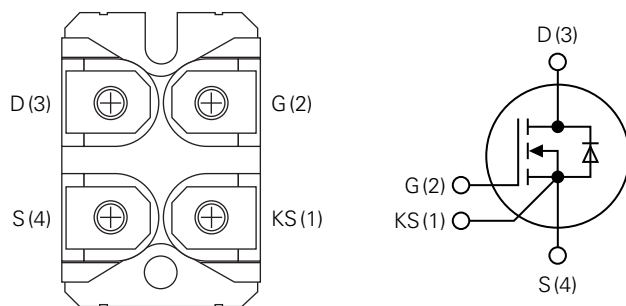


IXFN75N120SK1200 V, 21 m Ω , 75 A SiC Power MOSFET
 E72873
**Pinout Diagram** (SOT-227B miniBLOC)**D:** Drain; **G:** Gate; **S:** Source; **KS:** Kelvin Source; **Backside:** Isolated**Features & Benefits:**

- Latest Generation SiC MOSFET with Low $R_{DS(on)}$
- Ideal for High Frequency Switching Applications
- Compatible with 15 V Gate Drive Voltage
- Real Kelvin Source Connection

Applications:

- Solar Inverters
- DC/DC Converters
- Motor Drives
- Switch Mode Power Supplies
- UPS
- Battery Chargers
- Induction Heating

Package:

- Isolation Voltage: 2500 V AC
- RoHS Compliant
- Epoxy Meets UL 94V-0
- Baseplate with Aluminum Nitride Isolation

Product Summary

Characteristic	Value	Unit
I_{D25}	75	A
V_{DSS}	1200	V
$R_{DS(on)typ}$	21	m Ω

MOSFET

Symbol	Characteristic	Conditions	Value			Unit	
			Min.	Typ.	Max.		
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}, T_{VJ} = 25\ \text{°C}$	1200	–	–	V	
V_{GS}	Gate-Source Voltage	Continuous	$T_{VJ} = 25\ \text{°C}$	–4	–	15	V
		Transient		–8	–	19	V
I_{D25}	Continuous Drain Current	$V_{GS} = 15\text{ V}$	$T_C = 25\ \text{°C}$	–	–	75	A
I_{D80}			$T_C = 80\ \text{°C}$	–	–	60	
I_{D100}			$T_C = 100\ \text{°C}$	–	–	53	
$R_{DS(on)}$	Static Drain-Source on Resistance	$I_D = 50\text{ A}, V_{GS} = 15\text{ V}$	$T_{VJ} = 25\ \text{°C}$	–	21	27	mΩ
			$T_{VJ} = 150\ \text{°C}$	–	32	–	
$V_{GS(th)}$	Gate Threshold Voltage	$I_D = 18\text{ mA}, V_{GS} = V_{DS}$	$T_{VJ} = 25\ \text{°C}$	1.8	2.5	3.6	V
			$T_{VJ} = 150\ \text{°C}$	–	2.2	–	
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$	$T_{VJ} = 25\ \text{°C}$	–	1	25	μA
I_{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{ V}, V_{GS} = 15\text{ V}$	$T_{VJ} = 25\ \text{°C}$	–	–	250	nA
$R_{G(int)}$	Internal Gate Resistance	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}, \text{ESR of } C_{iss}$	–	3.3	–	Ω	
$T_{VJ,op}$	Virtual Junction Temperature	–	–40	–	150	°C	
$T_{VJ,max}$	Maximum virtual Junction Temperature	–	–	–	175	°C	
C_{iss}	Input Capacitance	$V_{DS} = 1000\text{ V}, V_{GS} = 0\text{ V},$ $f = 100\text{ kHz}$	$T_{VJ} = 25\ \text{°C}$	–	4820	–	pF
C_{oss}	Output Capacitance			–	180	–	pF
C_{rss}	Reverse Transfer Capacitance			–	12	–	pF
Q_g	Total Gate Charge	$V_{DS} = 800\text{ V}, I_D = 50\text{ A},$ $V_{GS} = -4 / 15\text{ V}$	$T_{VJ} = 25\ \text{°C}$	–	158	–	nC
Q_{gs}	Gate-Source Charge			–	50	–	nC
Q_{gd}	Gate-Drain Charge			–	39	–	nC
$t_{d(on)}$	Turn-on Delay Time	Inductive Switching $V_{DS} = 800\text{ V}, V_{GS} = -4 / 15\text{ V},$ $I_D = 50\text{ A}, R_{G(ext)} = 5\ \Omega,$ Free Wheeling Diode: Body Diode	$T_{VJ} = 25\ \text{°C}$	–	27	–	ns
			$T_{VJ} = 150\ \text{°C}$	–	24	–	
t_r	Current Rise Time		$T_{VJ} = 25\ \text{°C}$	–	47	–	ns
			$T_{VJ} = 150\ \text{°C}$	–	46	–	
$t_{d(off)}$	Turn-off Delay Time		$T_{VJ} = 25\ \text{°C}$	–	76	–	ns
			$T_{VJ} = 150\ \text{°C}$	–	89	–	
t_f	Current Fall Time		$T_{VJ} = 25\ \text{°C}$	–	17	–	ns
			$T_{VJ} = 150\ \text{°C}$	–	18	–	
E_{on}	Turn-on Energy per Pulse		$T_{VJ} = 25\ \text{°C}$	–	1321	–	μJ
			$T_{VJ} = 150\ \text{°C}$	–	1714	–	
E_{off}	Turn-off Energy per Pulse	$T_{VJ} = 25\ \text{°C}$	–	423	–	μJ	
		$T_{VJ} = 150\ \text{°C}$	–	469	–		
E_{rec}	Reverse Recovery Losses at Turn-off	$T_{VJ} = 25\ \text{°C}$	–	95	–	μJ	
		$T_{VJ} = 150\ \text{°C}$	–	299	–		

Thermal Characteristics

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
$R_{th,JC}$	Thermal Resistance, junction-to-case	$T_{VJ} = 125\ \text{°C}$	–	–	0.57	K/W
$R_{th,JH}$	Thermal Resistance, junction-to-heatsink	With heatsink compound $\lambda = 0.67\text{ W/mK}$	–	0.64	–	K/W

Source-Drain Diode

Symbol	Characteristic	Conditions	Value			Unit	
			Min.	Typ.	Max.		
V_{SD}	Forward Voltage Drop	$I_F = 30 \text{ A}; V_{GS} = -4 \text{ V}$	$T_{VJ} = 25 \text{ }^\circ\text{C}$	-	4.5	-	V
			$T_{VJ} = 150 \text{ }^\circ\text{C}$	-	4.0	-	V
t_{rr}	Reverse Recovery Time	$V_{GS} = -4 \text{ V}; I_F = 50 \text{ A}; V_R = 800 \text{ V}$ MOSFET Gate Drive: $V_{GS} = -4 / 15 \text{ V}; R_{G(ext)} = 5 \text{ } \Omega$	$T_{VJ} = 25 \text{ }^\circ\text{C}$	-	21	-	ns
			$T_{VJ} = 150 \text{ }^\circ\text{C}$	-	30	-	
Q_{rm}	Reverse Recovery Charge (Intrinsic Diode)		$T_{VJ} = 25 \text{ }^\circ\text{C}$	-	404	-	nC
			$T_{VJ} = 150 \text{ }^\circ\text{C}$	-	1055	-	
I_{rm}	Max. Reverse Recovery Current		$T_{VJ} = 25 \text{ }^\circ\text{C}$	-	32	-	A
			$T_{VJ} = 150 \text{ }^\circ\text{C}$	-	50	-	
dl_f/dt	Current Slew Rate		$T_{VJ} = 25 \text{ }^\circ\text{C}$	-	2925	-	A/ μs
			$T_{VJ} = 150 \text{ }^\circ\text{C}$	-	3214	-	

Note: When using SiC Body Diode the maximum recommended $V_{GS} = -4\text{V}$

Package SOT-227B (miniBLOC)

Symbol	Characteristic	Conditions	Value			Unit	
			Min.	Typ.	Max.		
I_{RMS}	RMS Current	Per Terminal	-	-	100	A	
T_{stg}	Storage Temperature	-	-40	-	150	$^\circ\text{C}$	
T_{op}	Operation Temperature	-	-40	-	150	$^\circ\text{C}$	
M_D	Mounting Torque ¹	Screws to Heatsink	-	-	1.5	Nm	
		Terminal Connection Screws	-	-	1.3	Nm	
V_{ISOL}	Isolation Voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}, 1 \text{ sec.}$	3000	-	-	V	
		$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}, 1 \text{ minute}$	2500	-	-	V	
$d_{Spp/APP}$ $d_{Spb/APb}$	Clearance Distance Through Air	Terminal to Terminal	Between Pin 1 to 2	7.1	-	-	mm
			Between Pin 3 to 4				
			Between Pin 2 to 3	3.2	-	-	mm
			Between Pin 4 to 1				
	Creepage Distance on Surface	Terminal to Terminal (With Nut)	Between Pin 1 to 2	9.6	-	-	mm
			Between Pin 3 to 4				
			Between Pin 2 to 3	10.5	-	-	mm
			Between Pin 4 to 1				
Clearance Distance Through Air	Terminal to Backside Plane	For All Terminals	8.6	-	-	mm	
Creepage Distance on Surface	Terminal to Backside Tab		10.5	-	-		
W	Weight	-	-	30	-	g	

1) For further information see application note "[Handling and Mounting Littelfuse miniBLOC - SOT227B](#)"

Characteristic Curves

Fig. 1. Typical Transfer Characteristics

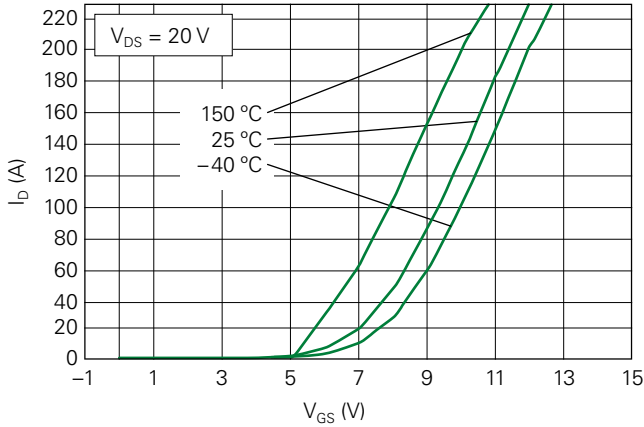


Fig. 2. Typical Forward Transconductance

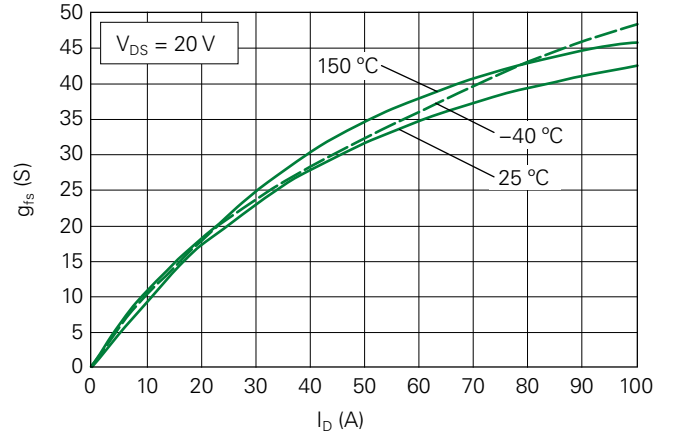


Fig. 3. Normalized Breakdown Voltage and Threshold Voltage vs. Junction Temperature

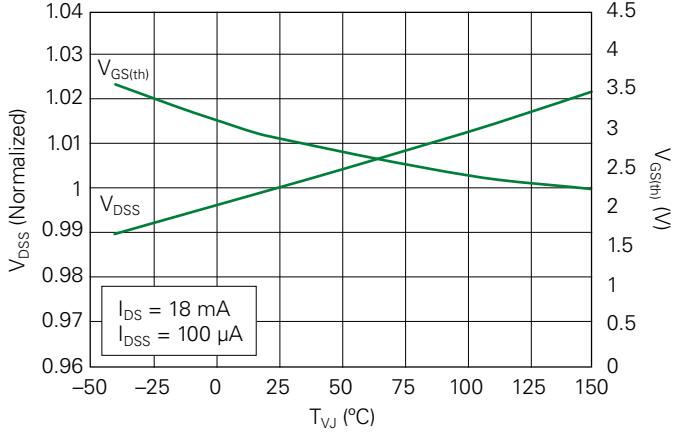


Fig. 4. Typical Output Characteristics ($T_{VJ} = -40$ °C)

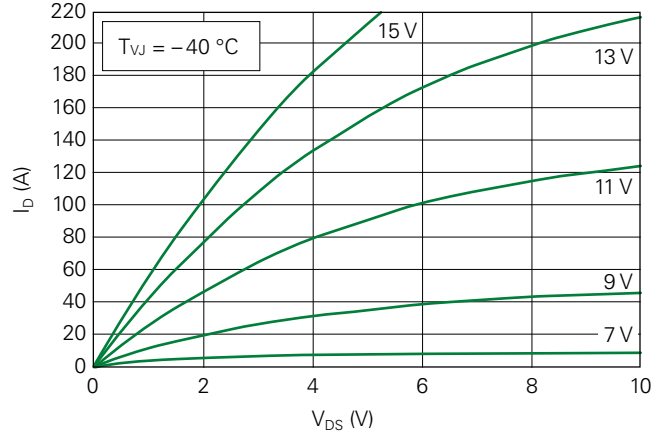


Fig. 5. Typical Output Characteristics ($T_{VJ} = 25$ °C)

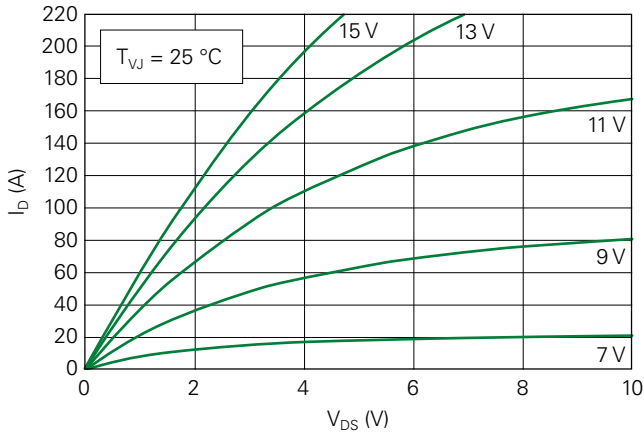
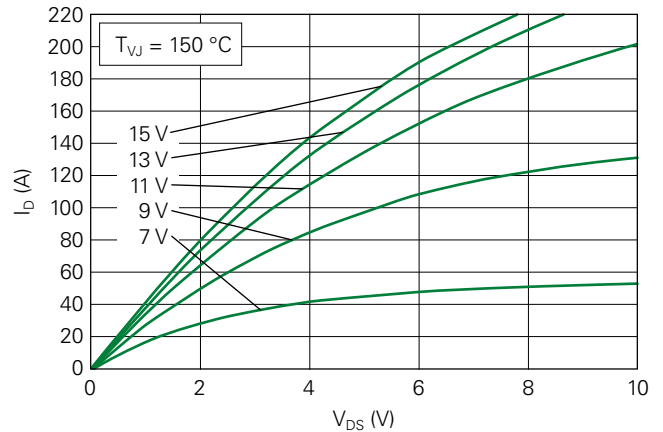
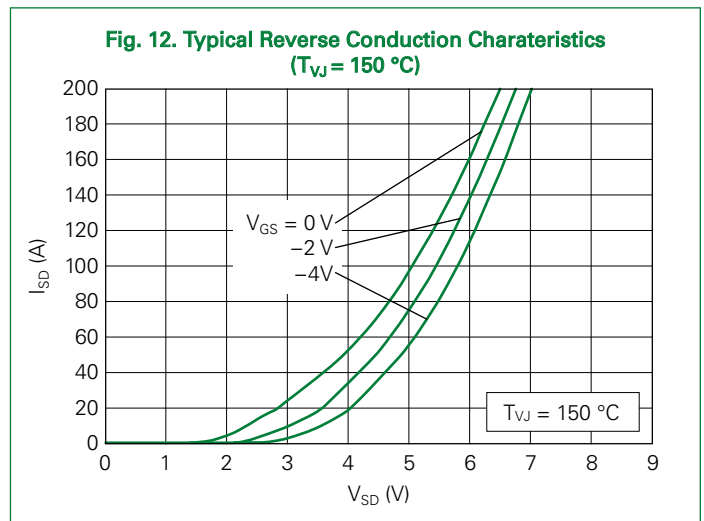
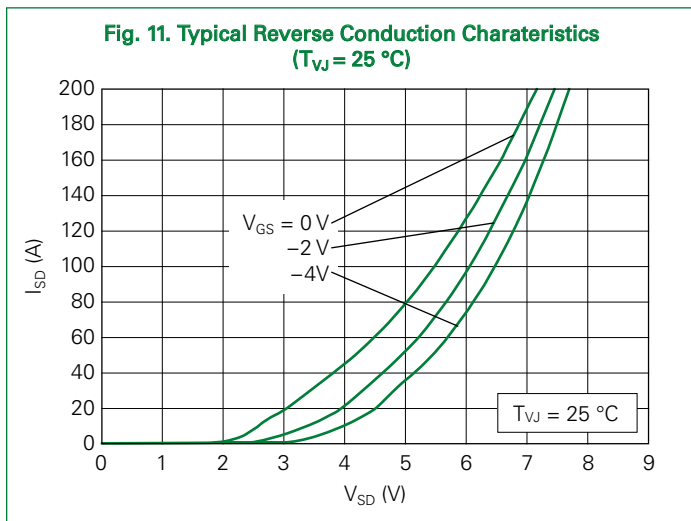
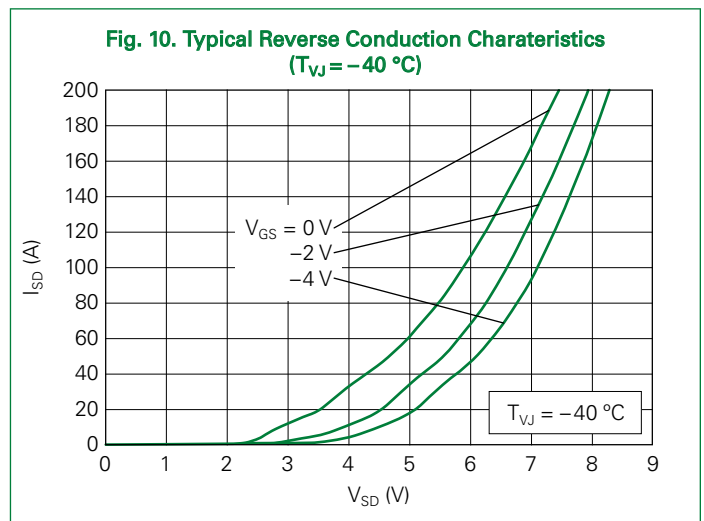
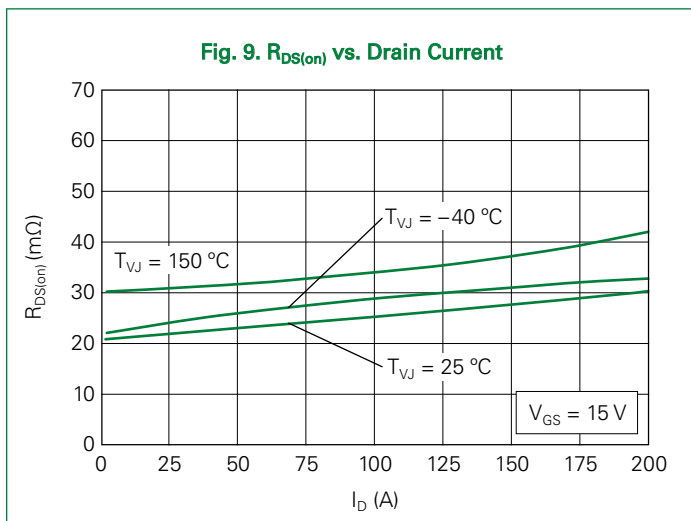
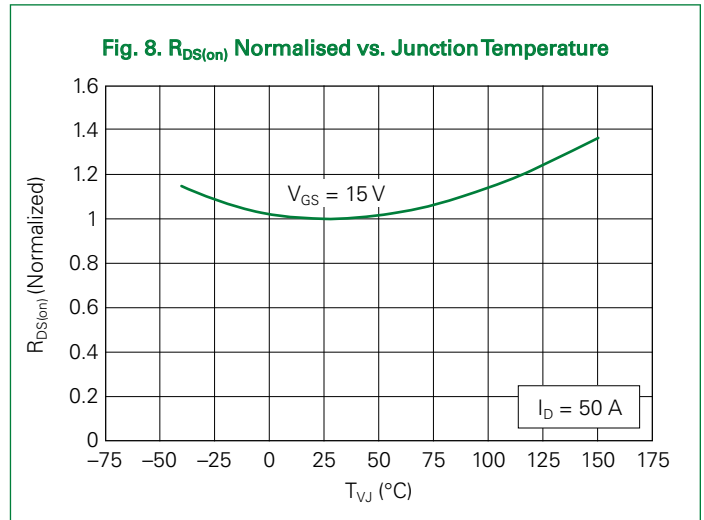
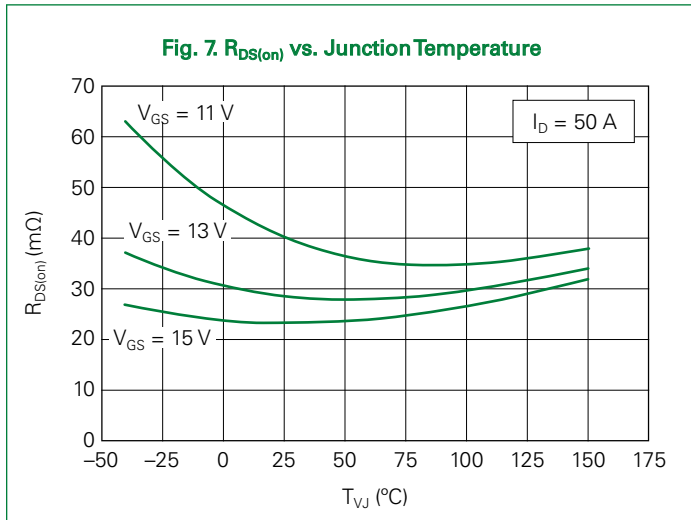


Fig. 6. Typical Output Characteristics ($T_{VJ} = 150$ °C)





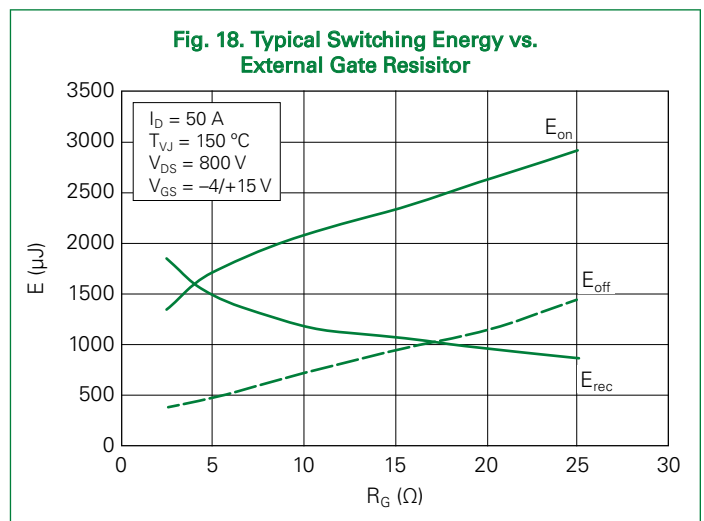
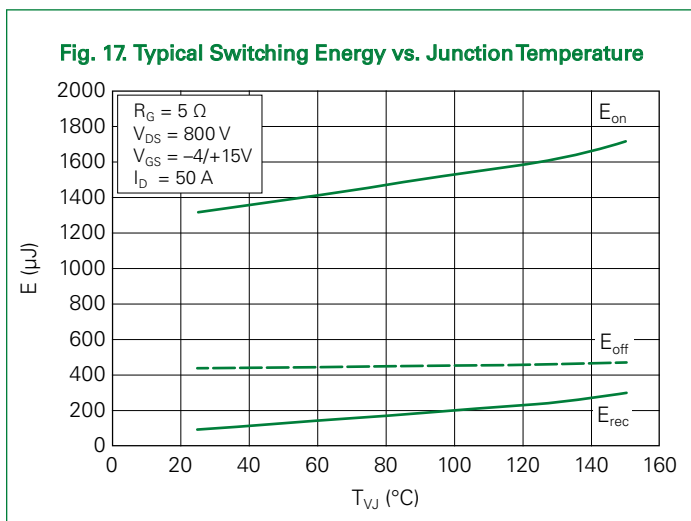
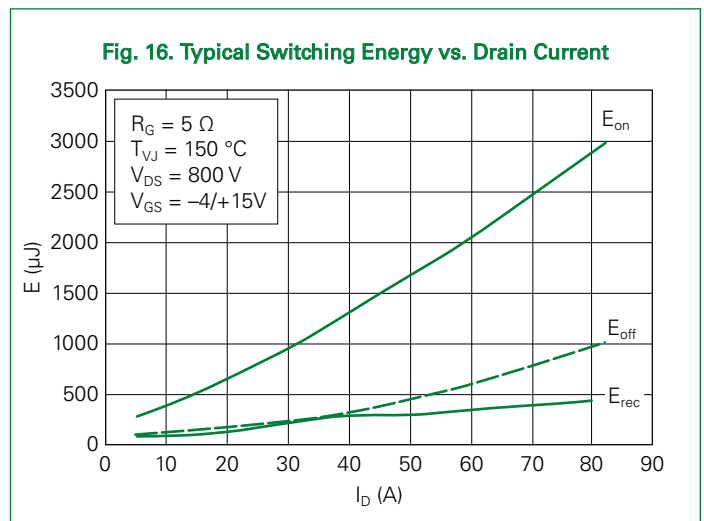
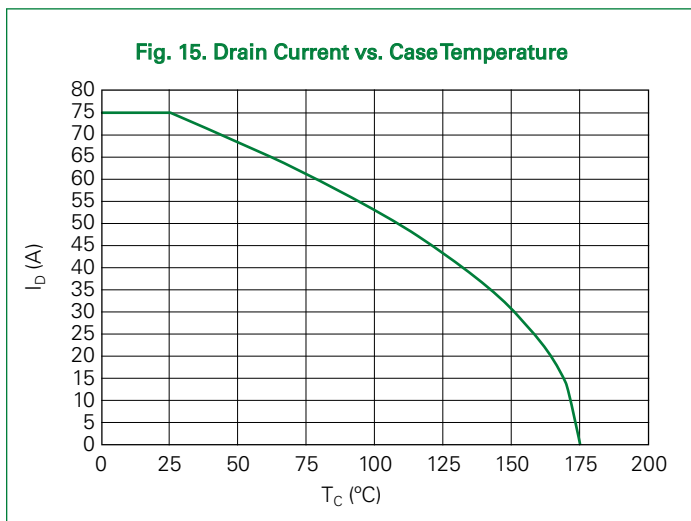
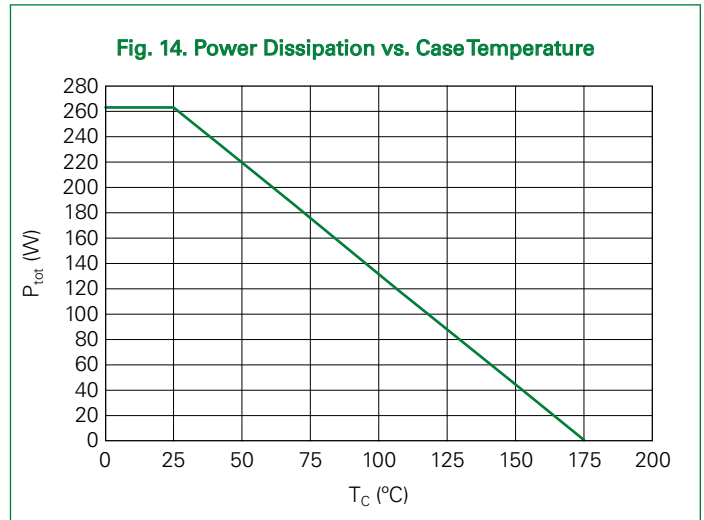
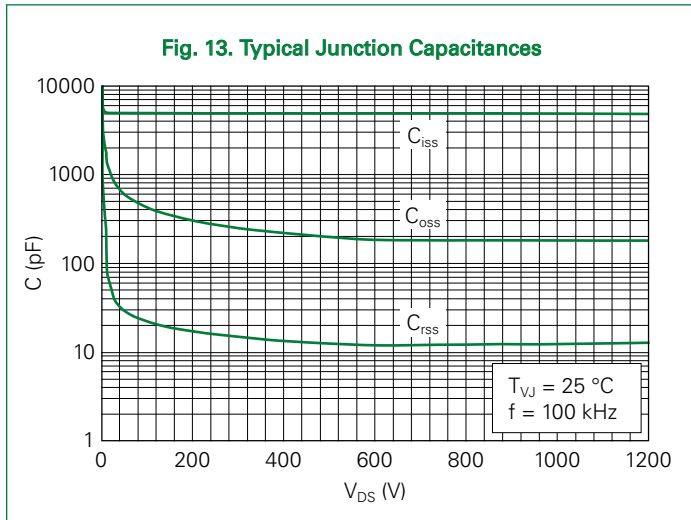


Fig. 19. Typical Switching Time vs. External Gate Resistor

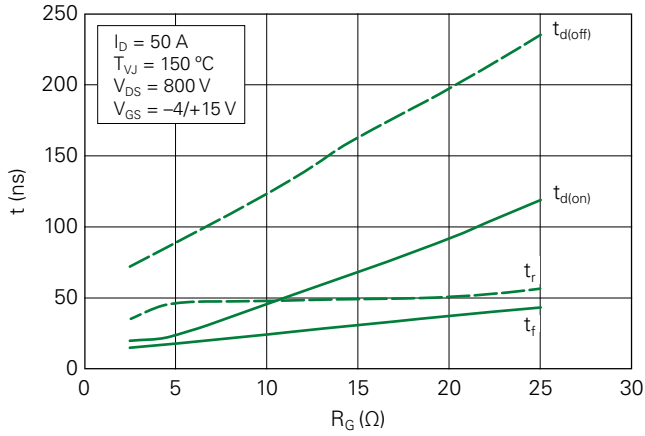


Fig. 20. Typical Turn on Gate Charge Trendline

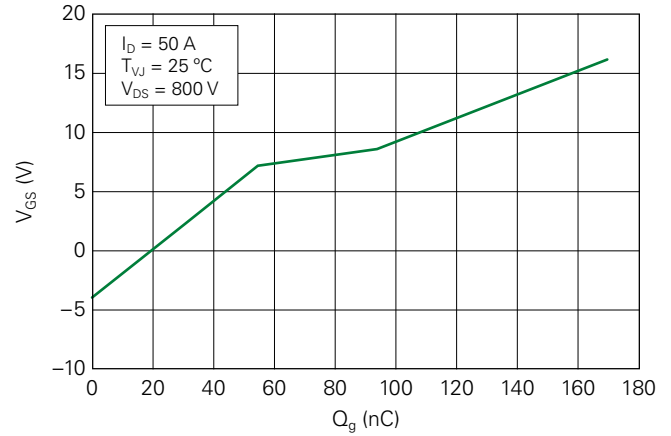
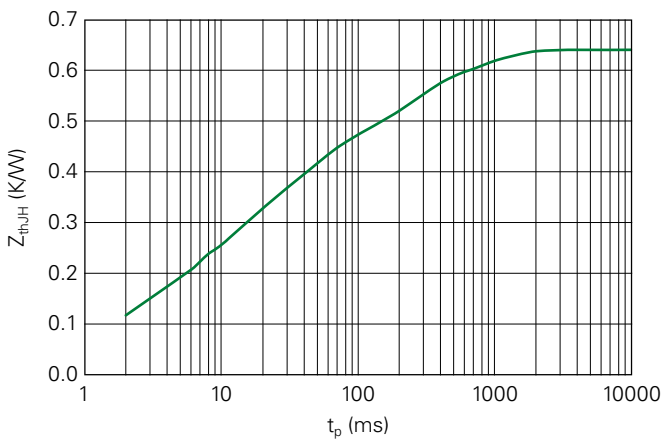
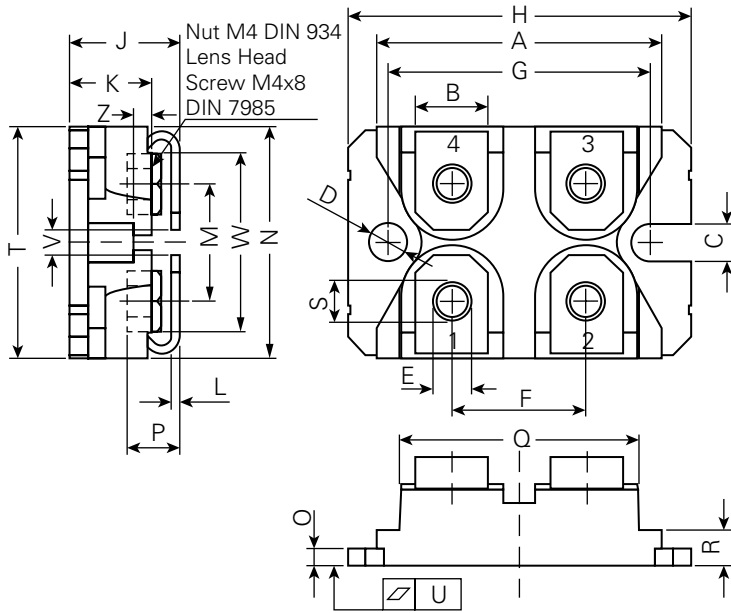


Fig. 21. Typical Transient Thermal Impedance

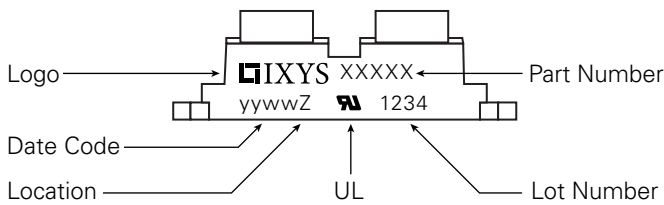


Part Outline Drawing (SOT-227B miniBLOC)



Symbol	Inches		Millimeters	
	Min.	Max.	Min.	Max
A	1.240	1.255	31.50	31.88
B	0.307	0.323	7.80	8.20
C	0.161	0.169	4.09	4.29
D	0.161	0.169	4.09	4.29
E	0.161	0.169	4.09	4.29
F	0.587	0.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.488	1.505	37.80	38.23
J	0.460	0.481	11.68	12.22
K	0.351	0.378	8.92	9.60
L	0.029	0.033	0.74	0.84
M	0.492	0.516	12.50	13.10
N	0.990	1.001	25.15	25.42
O	0.077	0.084	1.95	2.13
P	0.195	0.244	4.95	6.20
Q	1.045	1.059	26.54	26.90
R	0.155	0.167	3.94	4.42
S	0.179	0.191	4.55	4.85
T	0.968	0.994	24.59	25.25
U	-0.002	0.004	-0.05	0.10
V	0.126	0.217	3.20	5.50
W	0.780	0.830	19.81	21.08
Z	.098	0.106	2.50	2.70

Part Number and Marking



Ordering Information

Ordering	Part Number	Marking on Product	Delivering Mode	Base Quantity	Ordering Code
Standard	IXFN75N120SK	IXFN75N120SK	Tube	10	IXFN75N120SK

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Part of:

