



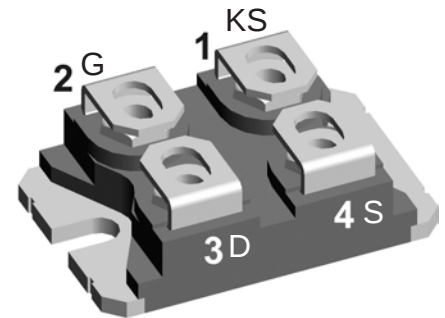
SiC Power MOSFET

preliminary

$$\begin{aligned} I_{D25} &= 90 \text{ A} \\ V_{DSS} &= 1700 \text{ V} \\ R_{DS(on) \text{ max}} &= 35 \text{ m}\Omega \end{aligned}$$

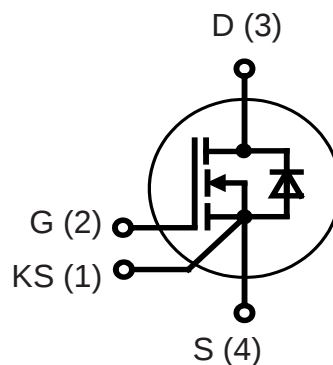
Kelvin Source gate connection

Part number
IXFN90N170SK



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

Terms & Conditions of usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.



preliminary

MOSFET				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
$V_{(BR)DSS}$	drain source breakdown voltage	$I_D = 200 \mu A$	$T_{VJ} = 25^\circ C$	1700			V
$V_{GS(max)}$	max transient gate source voltage	recommended operational value		-10		+25	V
V_{GS}	continous gate source voltage			-5		+20	V
I_{D25}	drain current	$V_{GS} = 20 V$	$T_C = 25^\circ C$			90	A
I_{D80}			$T_C = 80^\circ C$			67	A
I_{D100}			$T_C = 100^\circ C$			56	A
R_{DSon}	static drain source on resistance	$I_D = 100 A; V_{GS} = 20 V$	$T_{VJ} = 25^\circ C$		23	35	mΩ
			$T_{VJ} = 150^\circ C$		45		mΩ
$V_{GS(th)}$	gate threshold voltage	$I_D = 36 mA; V_{GS} = V_{DS}$	$T_{VJ} = 25^\circ C$	2.0	2.4	4.0	V
			$T_{VJ} = 150^\circ C$		1.8		V
I_{DSS}	drain source leakage current	$V_{DS} = 1700 V; V_{GS} = 0 V$	$T_{VJ} = 25^\circ C$		5	200	μA
I_{GSS}	gate source leakage current	$V_{DS} = 0 V; V_{GS} = 20 V$	$T_{VJ} = 25^\circ C$			1.2	μA
R_G	internal gate resistance	$f = 1 MHz, V_{AC} = 25 mV, ESR \text{ of } C_{ISS}$			1.9		Ω
C_{ISS}	input capacitance	$V_{DS} = 1000 V; V_{GS} = 0 V; f = 1 MHz \quad T_{VJ} = 25^\circ C$			7340		pF
C_{OSS}	output capacitance				342		pF
C_{RSS}	reverse transfer (Miller) capacitance				13.5		pF
Q_g	total gate charge	$V_{DS} = 1200 V; I_D = 100 A; V_{GS} = -5/20 V$ $T_{VJ} = 25^\circ C$			376		nC
Q_{gs}	gate source charge				88		nC
Q_{gd}	gate drain (Miller) charge				114		nC
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{DS} = 1200 V; I_D = 70 A \quad T_{VJ} = 25^\circ C$ $V_{GS} = -5 / 20 V; R_G = 2.5 \Omega \text{ (external)}$ Free wheeling diode: Body diode @ $V_{GS} = -5 V$			34		ns
t_r	current rise time				13		ns
$t_{d(off)}$	turn-off delay time				75		ns
t_f	current fall time				27		ns
E_{on}	turn-on energy per pulse				2.58		mJ
E_{off}	turn-off energy per pulse				0.77		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				0.66		mJ
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{DS} = 1200 V; I_D = 70 A \quad T_{VJ} = 150^\circ C$ $V_{GS} = -5 / 20 V; R_G = 2.5 \Omega \text{ (external)}$ Free wheeling diode: Body diode @ $V_{GS} = -5 V$			36		ns
t_r	current rise time				13		ns
$t_{d(off)}$	turn-off delay time				105		ns
t_f	current fall time				33		ns
E_{on}	turn-on energy per pulse				4.90		mJ
E_{off}	turn-off energy per pulse				1.05		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				1.89		mJ
R_{thJC}	thermal resistance junction to case	with heatsink compound; IXYS test setup				0.22	K/W
R_{thJH}	thermal resistance junction to heatsink				0.30		K/W

Source-Drain Diode				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
V_{SD}	forward voltage drop	$I_F = 70 A; V_{GS} = -5 V$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 150^\circ C$		4.3 3.8		V V
t_{rr}	reverse recovery time	$V_{GS} = -5 V; I_F = 70 A; V_R = 1200 V \quad T_{VJ} = 25^\circ C$ Mosfet gate drive: $V_{GS} = -5 / 20 V; R_G = 2.5 \Omega$			24		ns
Q_{RM}	reverse recovery charge (intrinsic diode)				1.4		μC
I_{RM}	max. reverse recovery current				92		A
dI_F/dt	current slew rate				7300		A/μs
t_{rr}	reverse recovery time	$V_{GS} = -5 V; I_F = 70 A; V_R = 1200 V \quad T_{VJ} = 150^\circ C$ Mosfet gate drive: $V_{GS} = -5 / 20 V; R_G = 2.5 \Omega$			38		ns
Q_{RM}	reverse recovery charge (intrinsic diode)				3.9		μC
I_{RM}	max. reverse recovery current				170		A
dI_F/dt	current slew rate				6350		A/μs

Note:

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

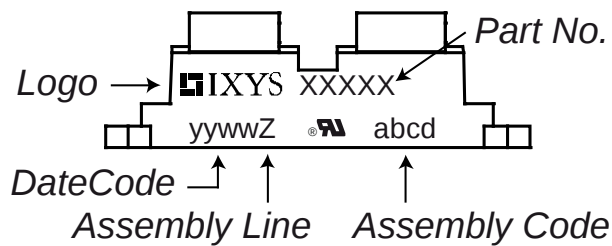


preliminary

Package SOT-227B (minibloc)

Symbol	Definitions	Conditions	min.	Ratings		Unit
				typ.	max.	
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		150	°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	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz},$ $t = 1 \text{ sec.}$ $t = 1 \text{ minute}$	3000 2500			V V

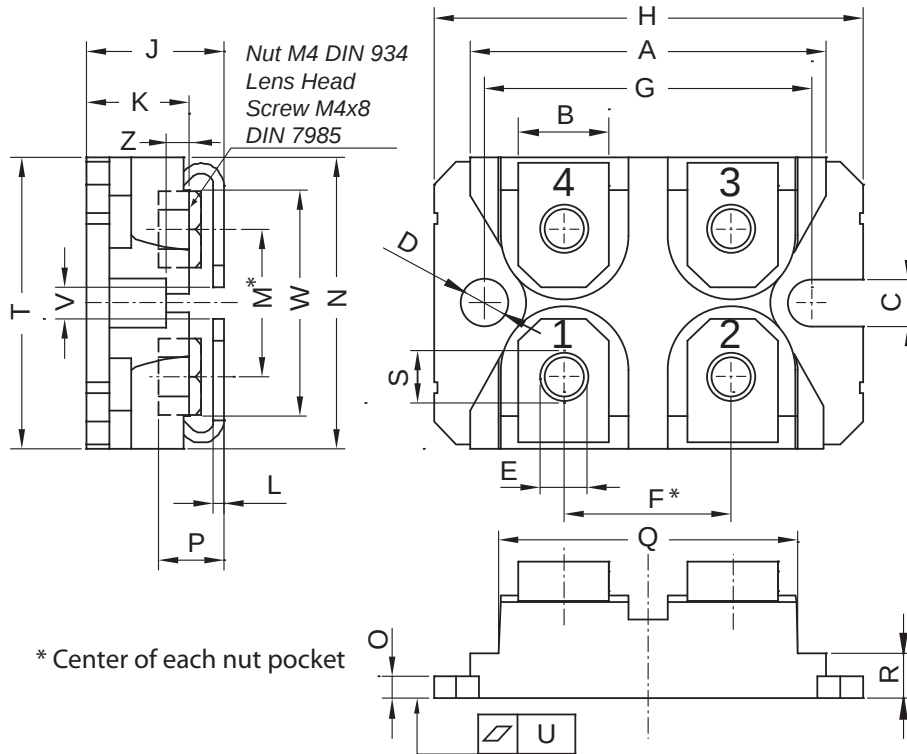
Product Marking



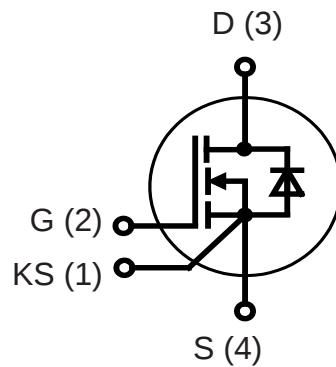
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN90N170SK	IXFN90N170SK	Tube	10	519108



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

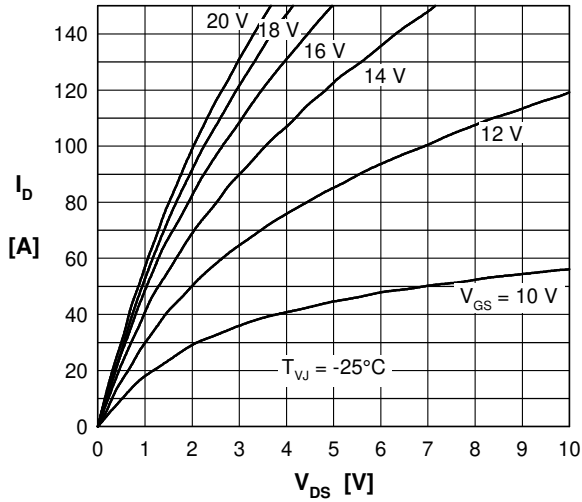


Fig. 1 Typical output characteristics (-25°C)

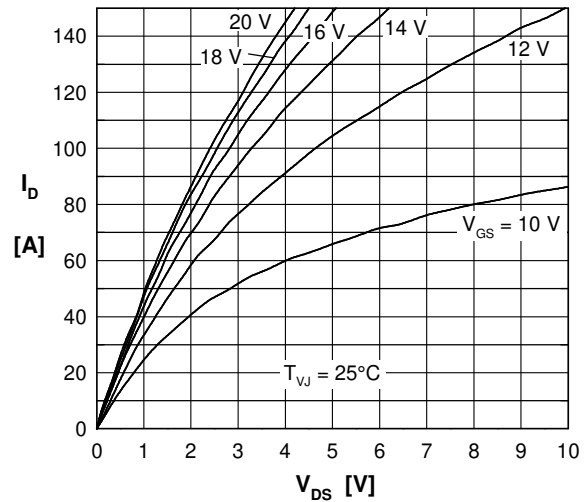


Fig. 2 Typical output characteristics (25°C)

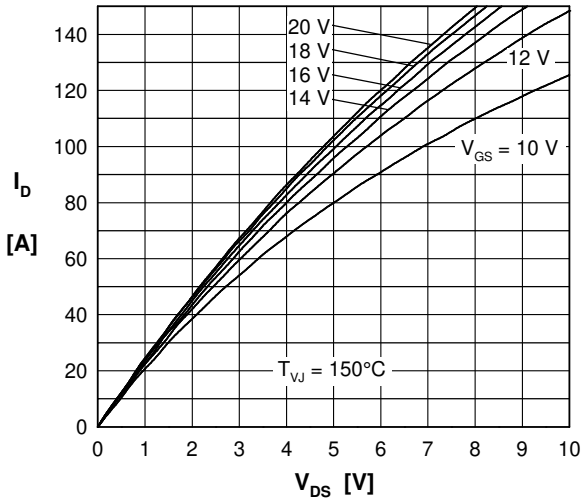


Fig. 3 Typical output characteristics (150°C)

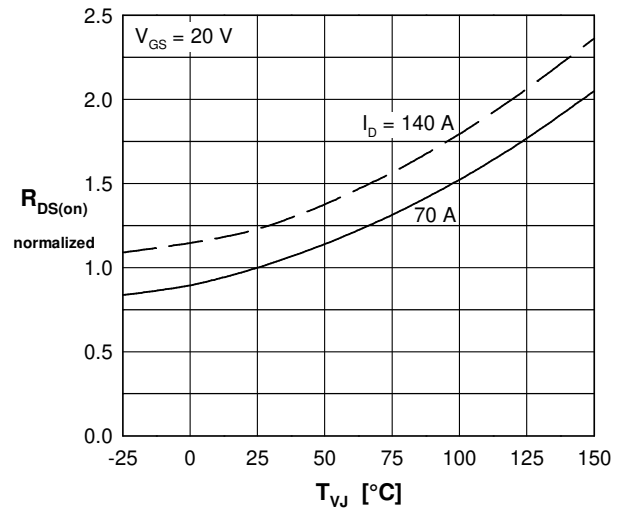


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

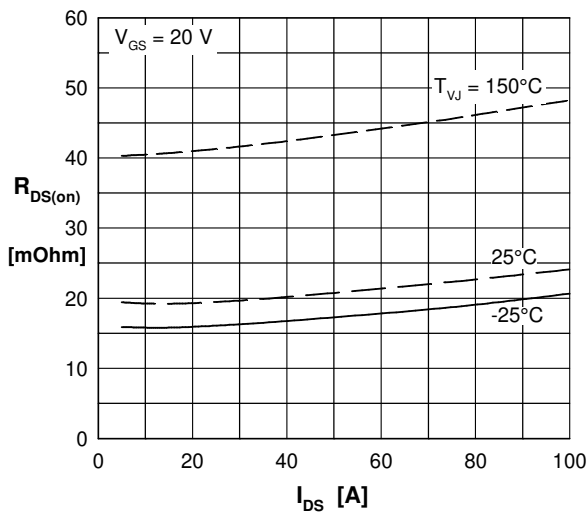


Fig. 5 $R_{DS(on)}$ versus drain current

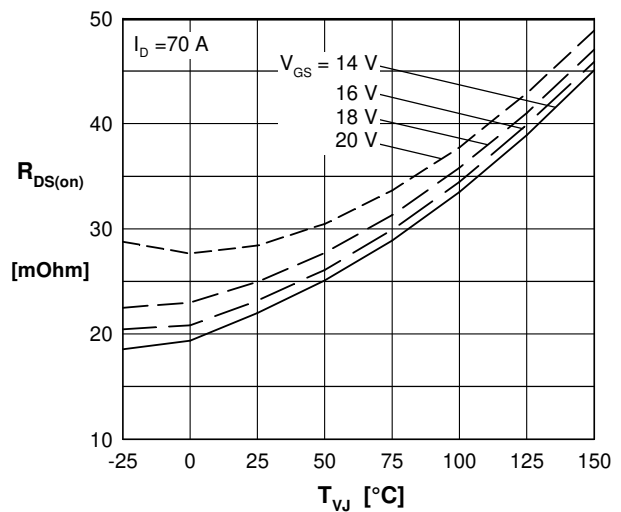


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}



Curves

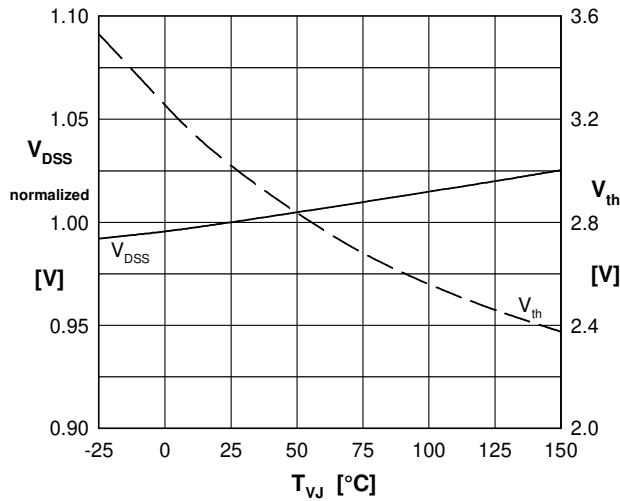


Fig. 7 Threshold voltage V_{TH} and normalized V_{DSS} versus junction temperature T_{VJ}

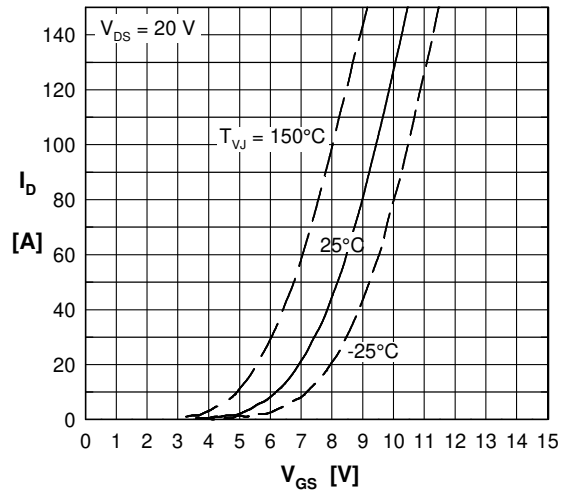


Fig. 8 Typical transfer characteristics

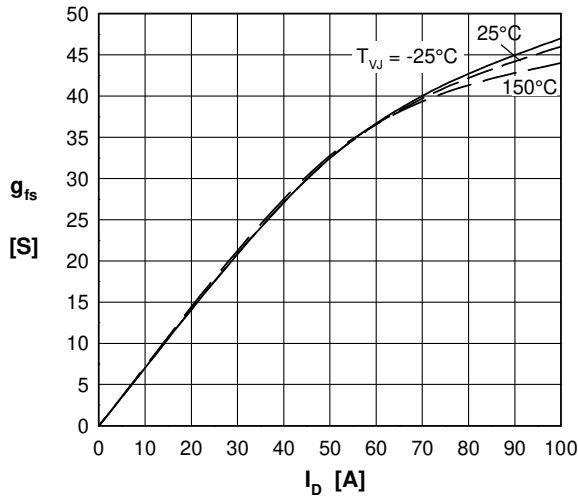


Fig. 9 Typical forward transconductance

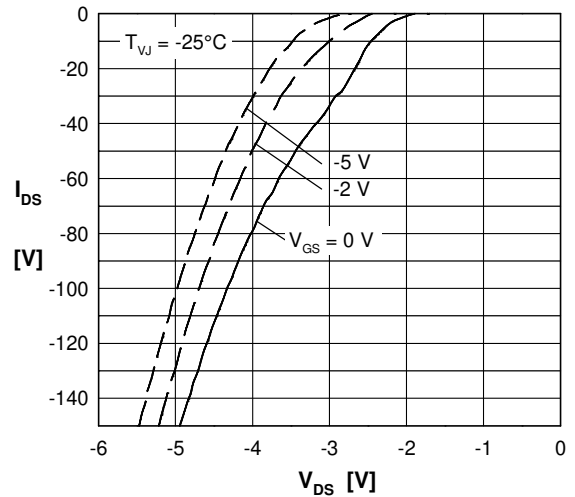


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -25°C

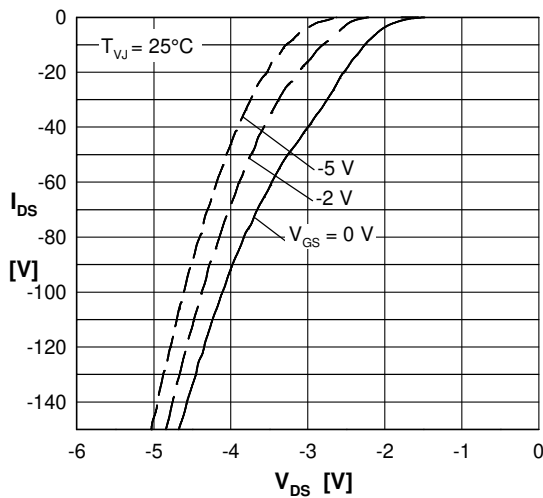


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

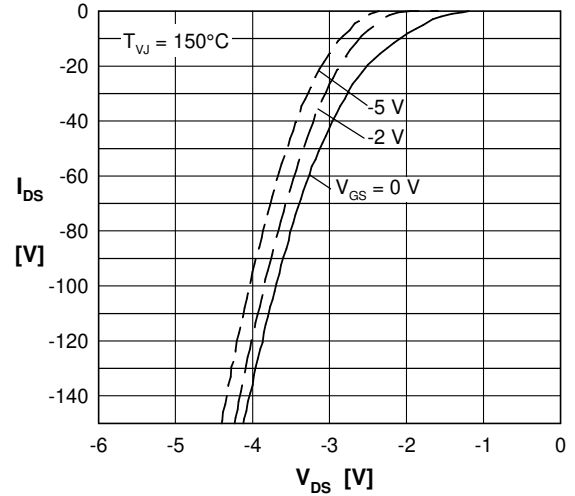
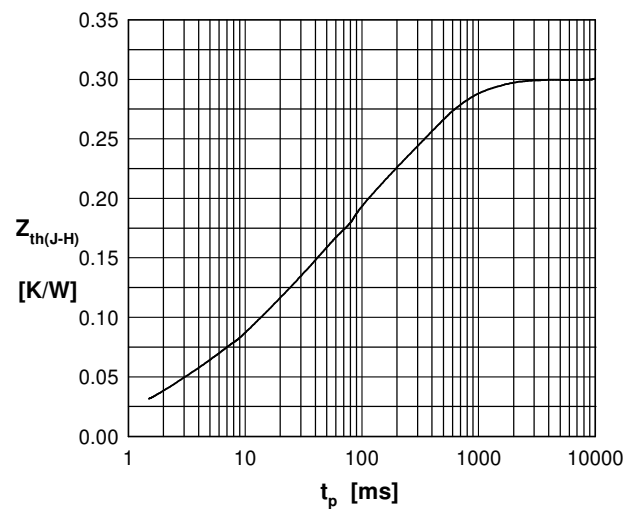
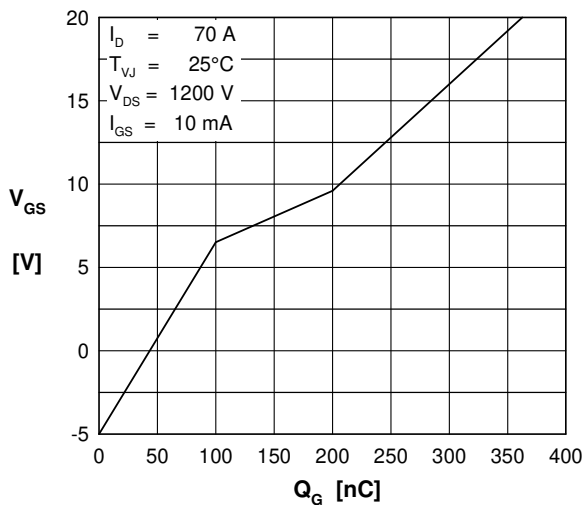
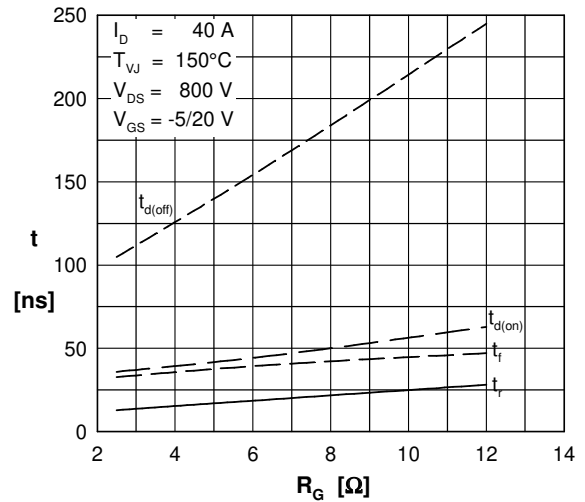
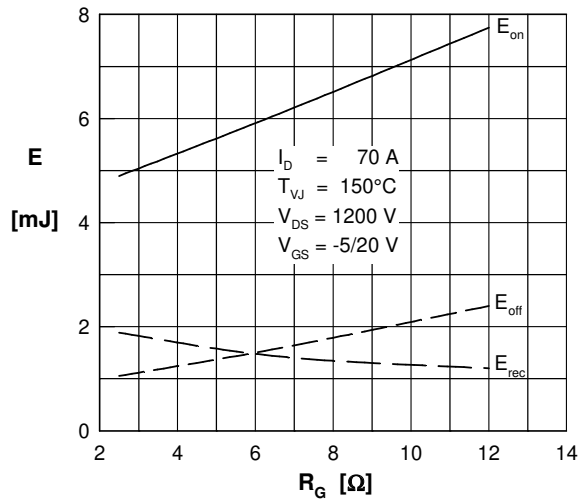
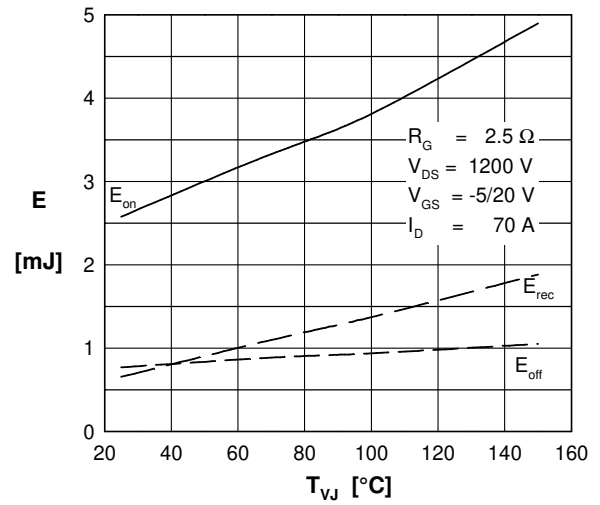
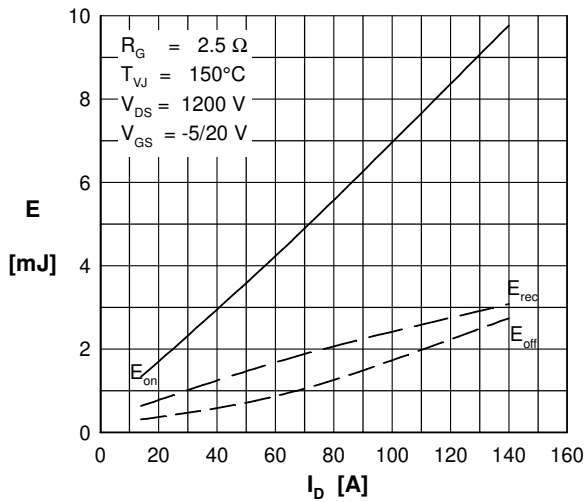


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C



Curves



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