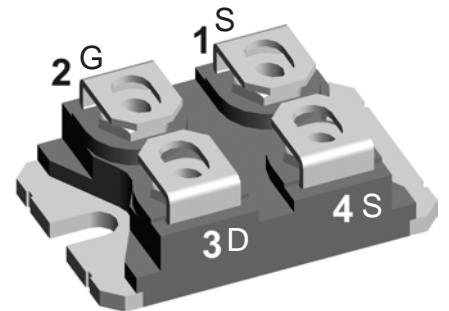


preliminary

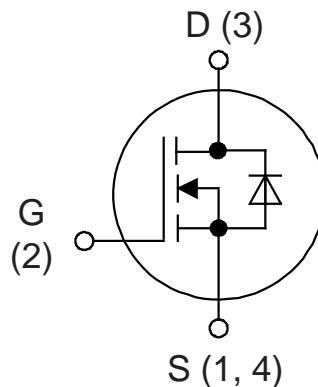
SiC Power MOSFET

I_{D25}	=	47 A
V_{DSS}	=	1200 V
$R_{DS(on) \max}$	=	50 mΩ

Part number
IXFN50N120SiC



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
- Avalanche ruggedness
- Resistant to latch-up

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.

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

20180223b

MOSFET				Ratings				
Symbol	Definitions	Conditions	min.	typ.	max.			
V_{DSS}	drain source breakdown voltage	$V_{GS} = 0\text{ V}, I_D = 200\mu\text{A}$	1200				V	
V_{GSM}	max transient gate source voltage		-10		+25		V	
V_{GS}	continuous gate source voltage	recommended operational value	-5		+20		V	
I_{D25}	drain current	$V_{GS} = 20\text{ V}$				47	A	
I_{D80}						35	A	
I_{D100}						30	A	
R_{DSon}	static drain source on resistance	$I_D = 40\text{ A}; V_{GS} = 20\text{ V}$		40	50		mΩ	
				75			mΩ	
$V_{GS(th)}$	gate threshold voltage	$I_D = 10\text{ mA}; V_{GS} = V_{DS}$	2.0	2.6	4.0		V	
				2.1			V	
I_{DSS}	drain source leakage current	$V_{DS} = 1200\text{ V}; V_{GS} = 0\text{ V}$		2	200		μA	
				20			μA	
I_{GSS}	gate source leakage current	$V_{DS} = 0\text{ V}; V_{GS} = 20\text{ V}$			0.5		μA	
R_G	internal gate resistance				4.8		Ω	
C_{iss}	input capacitance	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		1900		pF	
C_{oss}				output capacitance		160		pF
C_{rss}				reverse transfer (Miller) capacitance		13		pF
Q_g	total gate charge	$V_{DS} = 800\text{ V}; I_D = 40\text{ A}; V_{GS} = 0/20\text{ V}$	$T_{VJ} = 25^\circ\text{C}$		100		nC	
Q_{gs}				gate source charge		22		nC
Q_{gd}				gate drain (Miller) charge		36		nC
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{DS} = 800\text{ V}; I_D = 40\text{ A}$ $V_{GS} = -5 / 20\text{ V}; R_G = 10\ \Omega$ (external) Freewheeling diode is Mosfet's body diode	$T_{VJ} = 25^\circ\text{C}$		23		ns	
t_r				current rise time		9		ns
$t_{d(off)}$				turn-off delay time		75		ns
t_f				current fall time		19		ns
E_{on}				turn-on energy per pulse		1.08		mJ
E_{off}				turn-off energy per pulse		0.29		mJ
$E_{rec(off)}$				reverse recovery losses at turn-off		0.04		mJ
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{DS} = 800\text{ V}; I_D = 40\text{ A}$ $V_{GS} = -5 / 20\text{ V}; R_G = 10\ \Omega$ (external) Freewheeling diode is Mosfet's body diode	$T_{VJ} = 150^\circ\text{C}$		23		ns	
t_r				current rise time		9		ns
$t_{d(off)}$				turn-off delay time		100		ns
t_f				current fall time		22		ns
E_{on}				turn-on energy per pulse		1.48		mJ
E_{off}				turn-off energy per pulse		0.35		mJ
$E_{rec(off)}$				reverse recovery losses at turn-off		0.10		mJ
R_{thJC}	thermal resistance junction to case				0.55		K/W	
R_{thJH}	thermal resistance junction to heatsink	with heatsink compound; IXYS test setup		0.62			K/W	

Source-Drain Diode				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
V_{SD}	forward voltage drop	$I_F = 40\text{ A}; V_{GS} = -5\text{ V}$		5.2			V
				4.6			V
t_{rr}	reverse recovery time	$V_{GS} = -5\text{ V}; I_F = 40\text{ A}; V_R = 800\text{ V}$ Mosfet gate drive: $V_{GS} = -5 / 20\text{ V}; R_G = 10\ \Omega$	$T_{VJ} = 25^\circ\text{C}$		16		ns
Q_{RM}	reverse recovery charge (intrinsic diode)				330		nC
I_{RM}	max. reverse recovery current				35		A
dI_F/dt	current slew rate				4800		A/μs
t_{rr}	reverse recovery time	$V_{GS} = -5\text{ V}; I_F = 40\text{ A}; V_R = 800\text{ V}$ Mosfet gate drive: $V_{GS} = -5 / 20\text{ V}; R_G = 10\ \Omega$	$T_{VJ} = 150^\circ\text{C}$		26		ns
Q_{RM}	reverse recovery charge (intrinsic diode)				810		nC
I_{RM}	max. reverse recovery current				45		A
dI_F/dt	current slew rate				4600		A/μs

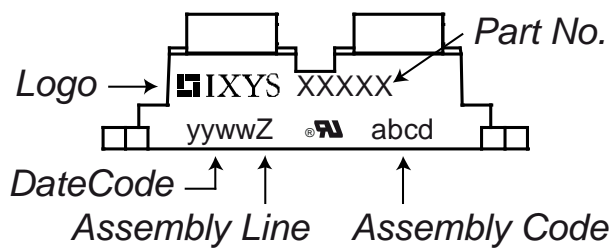
Note:

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

Package SOT-227B (minibloc)

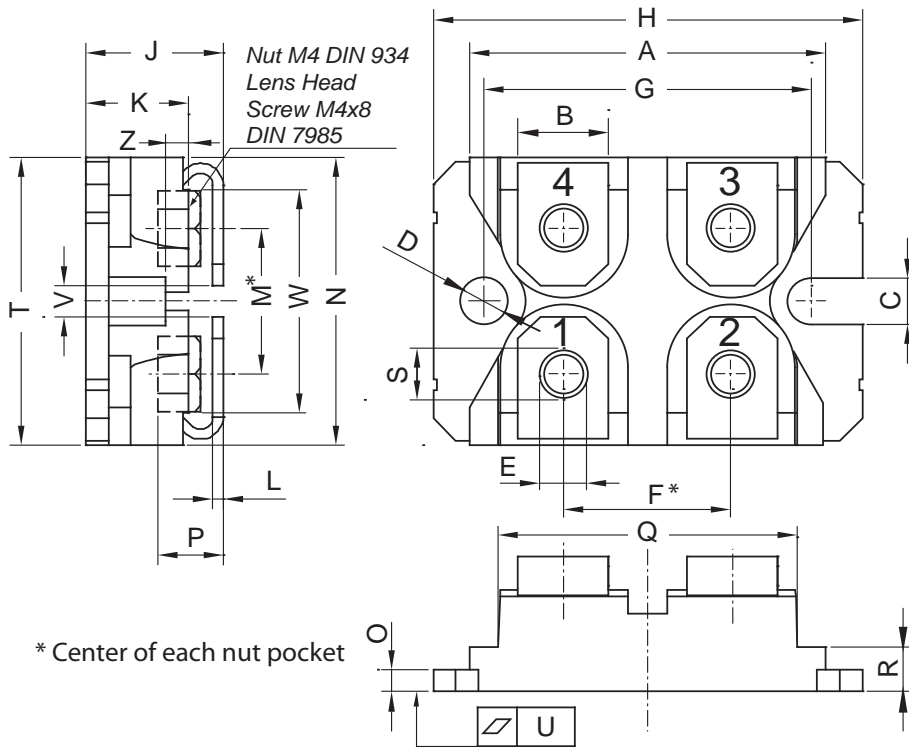
Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
I_{RMS}	RMS current	per terminal				A
T_{stg}	storage temperature		-40		150	°C
T_{op}	operation temperature		-40		150	°C
T_{vJ}	virtual junction temperature		-40		175	°C
Weight				30		g
M_D	mounting torque		1.1		1.5	Nm
M_T	terminal torque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

Product Marking

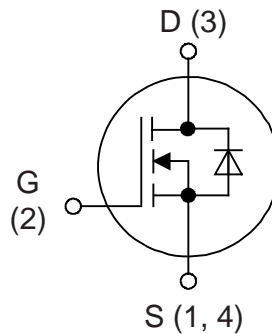


Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN50N120SiC	IXFN50N120SiC	Tube	10	515282

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

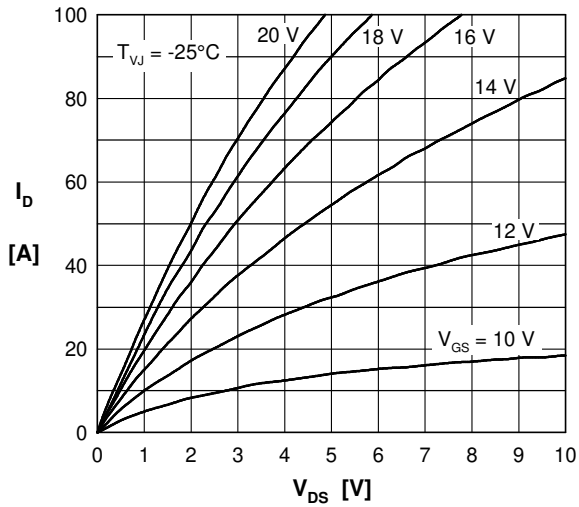


Fig. 1 Typical output characteristics (-25°C)

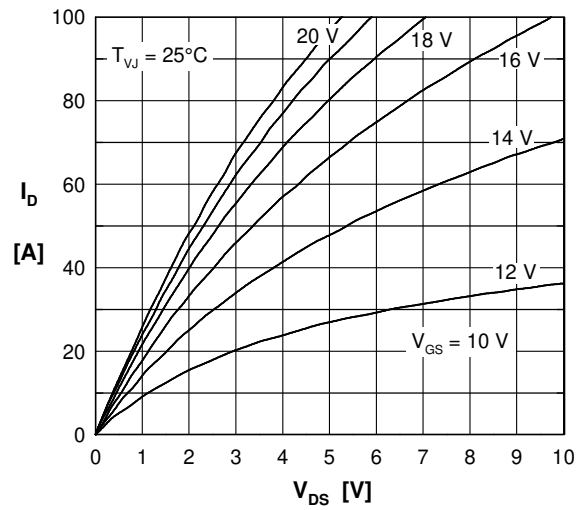


Fig. 2 Typical output characteristics (25°C)

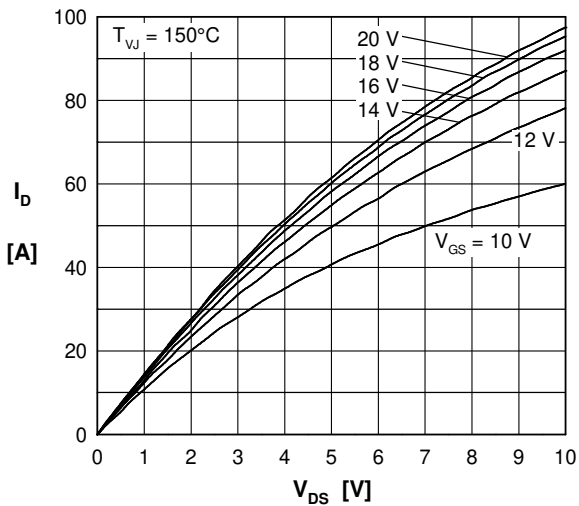


Fig. 3 Typical output characteristics (150°C)

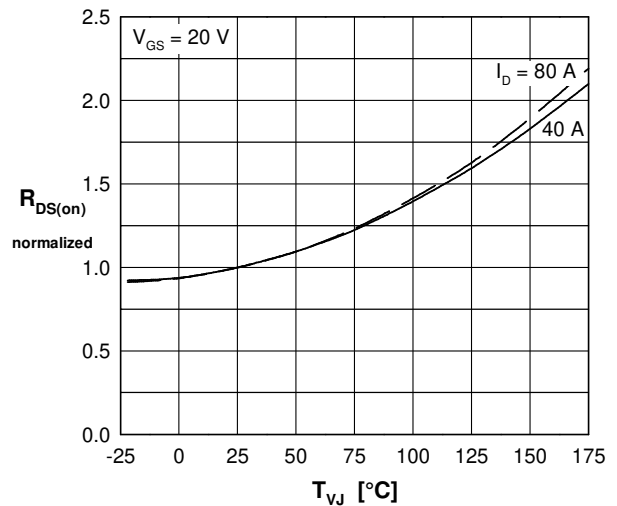


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

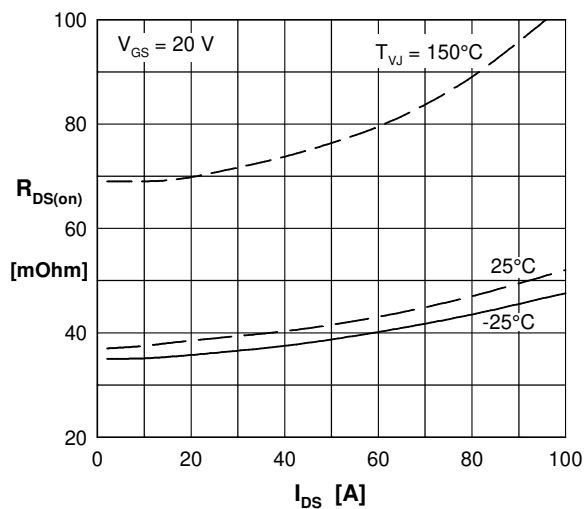


Fig. 5 $R_{DS(on)}$ versus drain current

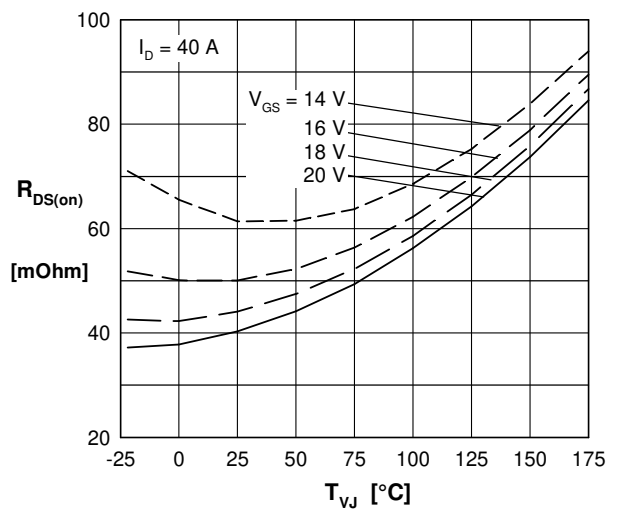


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

Curves

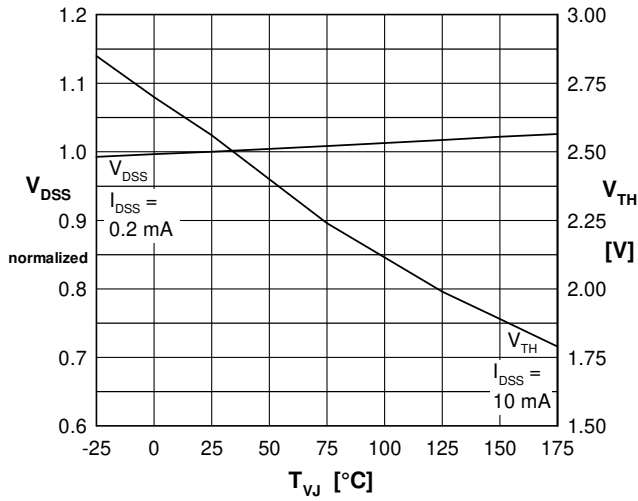


Fig. 7 Norm. breakdow V_{DSS} & treshhold voltage V_{TH} versus junction temperature T_{VJ}

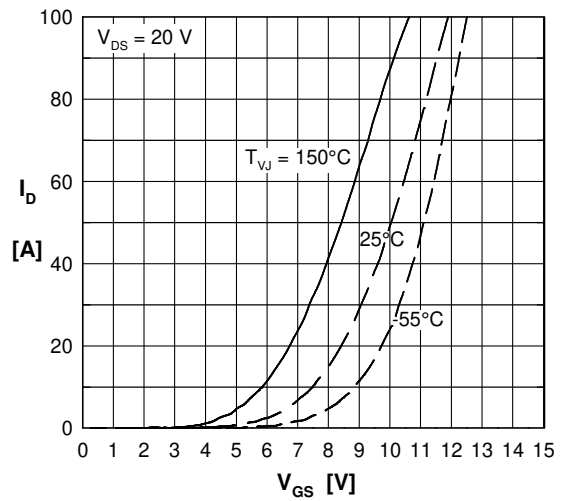


Fig. 8 Typical transfer characteristics

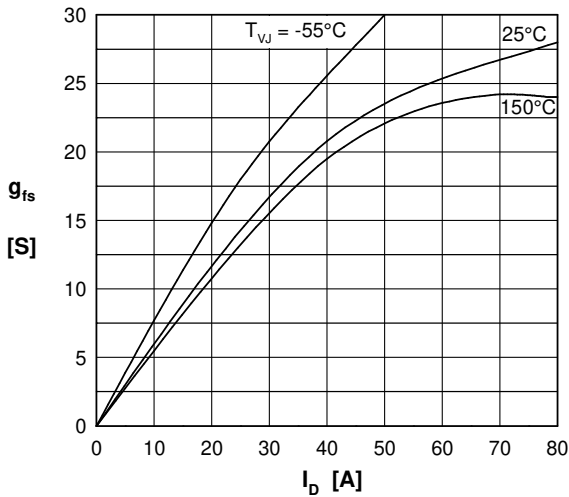


Fig. 9 Typical forward transconductance

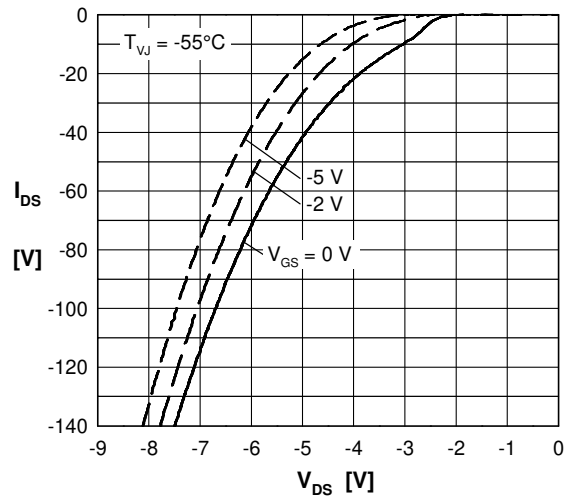


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

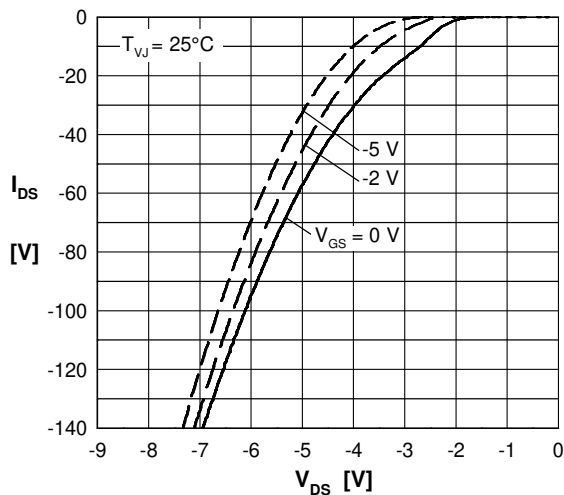


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

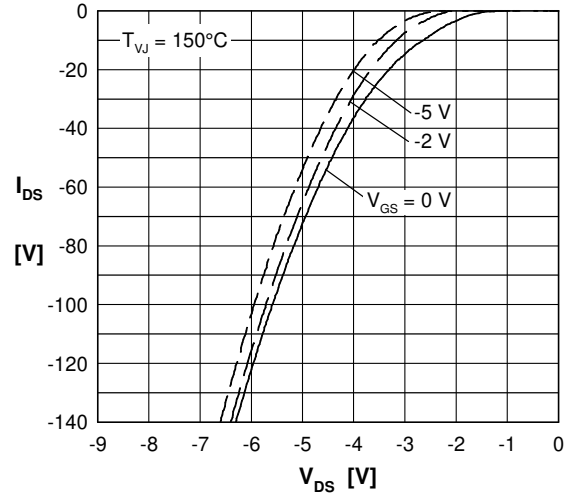


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

Curves

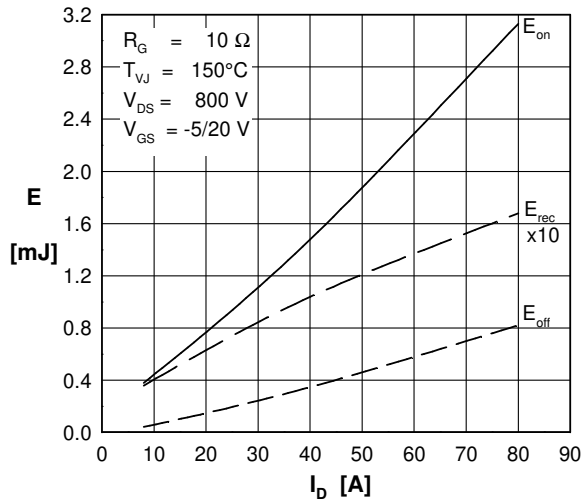


Fig. 13 Typical switching energy versus drain current

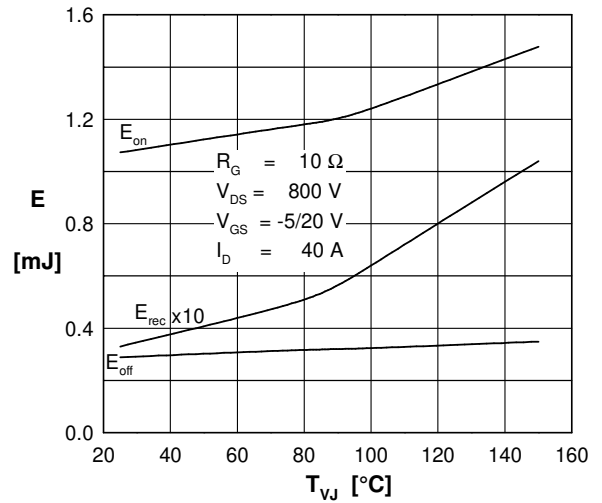


Fig. 14 Typical switching energy versus temperature

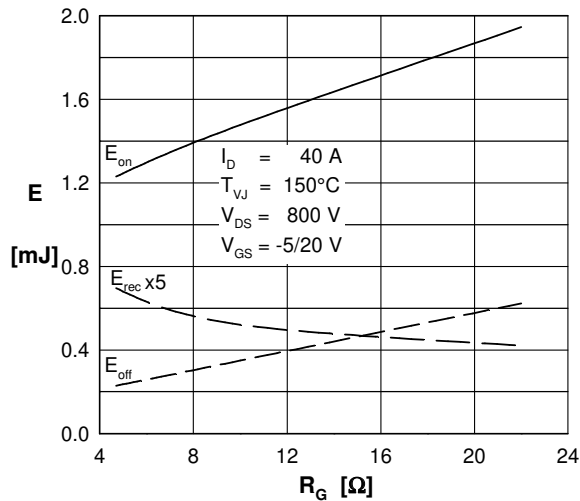


Fig. 15 Typical switching energy versus external gate resistor

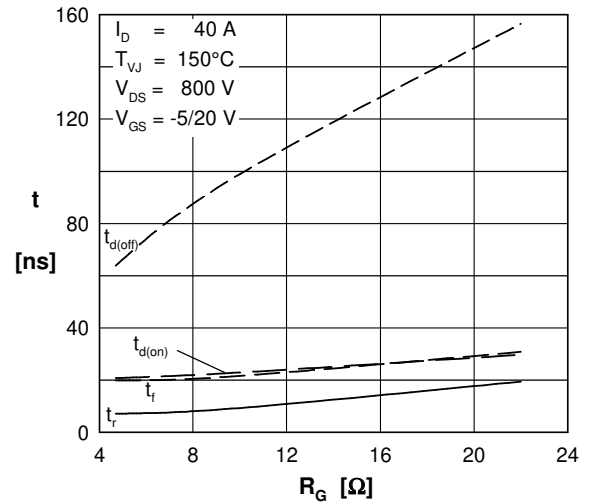


Fig. 16 Typical switching time versus external gate resistor

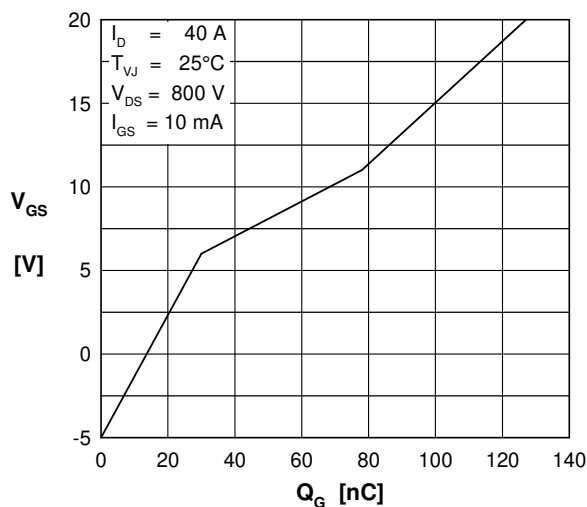


Fig. 17 Typical turn on gate charge, trendline

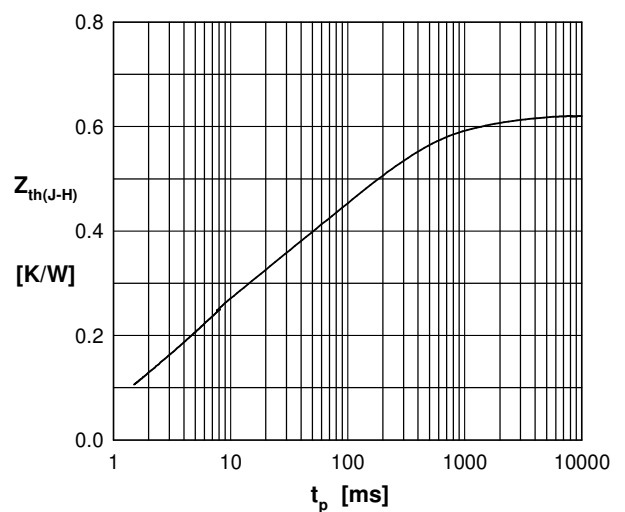


Fig. 18 Typical transient thermal impedance