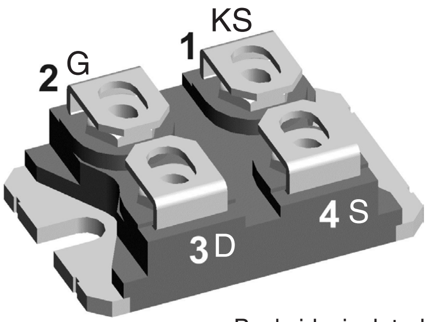
SiC Power MOSFET

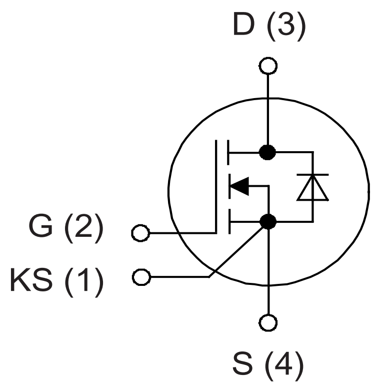
I_{D25} = 48 A
V_{DSS} = 1200 V
$R_{DS(on)\,max}$ = 50 mΩ

Kelvin Source gate connection

Part number
IXFN50N120SK



Backside: isolated
E72873



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: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate with Aluminium nitride insolation
- Advanced power cycling

MOSFET				Ratings		
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
$V_{DS(max)}$	*max drain source voltage*				1200	V
$V_{GS(max)}$ V_{GS}	*max transient gate source voltage* *continous gate source voltage*	 recommended operational value	-10 -5		+25 +20	V V
I_{D25} I_{D80} I_{D100}	*drain current*	V_{GS} = 20 V; T_C = 25°C T_C = 80°C T_C = 100°C			48 38 33	A A A
$I_{D(pulse)}$	*pulsed drain current*	pulse width limited by $T_{VJ\ max}$			110	A
P_D	*power dissipation*	T_C = 25°C, T_{VJ} = 175°C			250	W
R_{DSon}	*static drain source on resistance*	I_D = 40 A; V_{GS} = 20 V; T_{VJ} = 25°C T_{VJ} = 150°C		40 84	52	mΩ mΩ
$V_{GS(th)}$	*gate threshold voltage*	I_D = 10 mA; V_{GS} = V_{DS}; T_{VJ} = 25°C T_{VJ} = 150°C	2.0	2.6 2.0	4.0	V 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} C_{oss} C_{rss}	*input capacitance* *output capacitance* *reverse transfer (Miller) capacitance*	V_{DS} = 1000 V; V_{GS} = 0 V; f = 1 MHz; T_{VJ} = 25°C		1895 150 10		pF pF pF
Q_g Q_{gs} Q_{gd}	*total gate charge* *gate source charge* *gate drain (Miller) charge*	V_{DS} = 800 V; I_D = 40 A; V_{GS} = -5/20 V; T_{VJ} = 25°C		115 28 37		nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse* *reverse recovery losses at turn-off*	Inductive switching V_{DS} = 800 V; I_D = 20 A; T_{VJ} = 25°C V_{GS} = -5 / 20 V; R_G = 22 Ω (external) Freewheeling diode is Mosfet's body diode		10 8 62 16 0.51 0.22 0.02		ns ns ns ns mJ mJ mJ
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse* *reverse recovery losses at turn-off*	Inductive switching V_{DS} = 800 V; I_D = 20 A; T_{VJ} = 150°C V_{GS} = -5 / 20 V; R_G = 22 Ω (external) Freewheeling diode is Mosfet's body diode		10 8 70 14 0.63 0.21 0.06		ns ns ns ns mJ mJ mJ
R_{thJC} R_{thJH}	*thermal resistance junction to case* *thermal resistance junction to heatsink*	 with heatsink compound; IXYS test setup		 0.72	0.6	K/W K/W

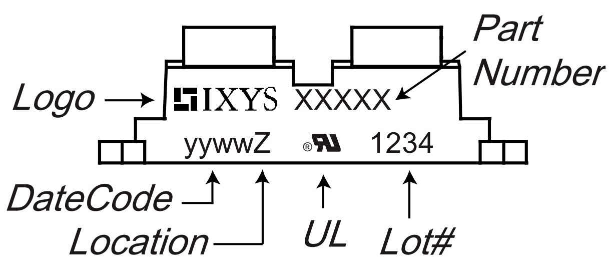
Source-Drain Diode				Ratings		
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
V_{SD}	*forward voltage drop*	I_F = 20 A; V_{GS} = -5 V; T_{VJ} = 25°C T_{VJ} = 150°C		3.3 3.1		V V
t_{rr} Q_{RM} I_{RM}	*reverse recovery time* *reverse recovery charge (intrinsic diode)* *max. reverse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

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

Package	Outlines SOT-227B (minibloc)			Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				100	A
T_{stg} T_{op} T_{VJ}	*storage temperature* *operation temperature* *virtual junction temperature*			-40 -40 -40		150 150 175	°C °C °C
Weight					30		g
M_D	*mounting torque* [1)]	screws to heatsink terminal connection screws				1.5 1.3	Nm Nm
d_{Spp} d_{Spb}	*creepage distance on surface*	terminal to terminal terminal to backside		10.5 8.5			mm mm
d_{App} d_{Apb}	*striking distance through air*	terminal to terminal terminal to backside		3.2 6.8			mm mm
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq 1$ mA; 50/60 Hz	t = 1 sec. t = 1 minute	3000 2500			V V
C_P	*coupling capacity per switch*	between drain and back side metallization with gate and source shorted			42		pF

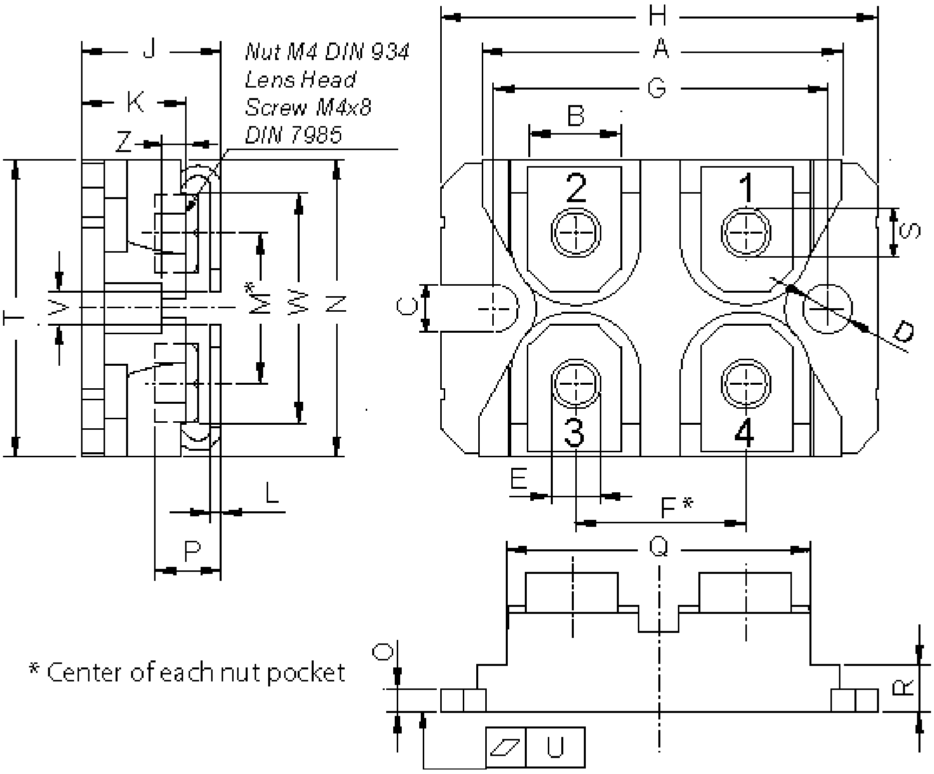
[1)] further information see application note IXAN0073 on www.ixys.com/TechnicalSupport/appnotes.aspx (General / Isolation, Mounting, Soldering, Cooling)

Product Marking

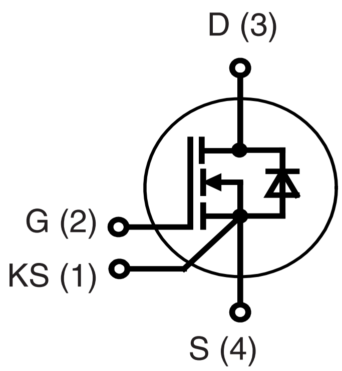


Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN50N120SK	IXFN50N120SK	Tube	10	IXFN50N120SK

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



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

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Curves

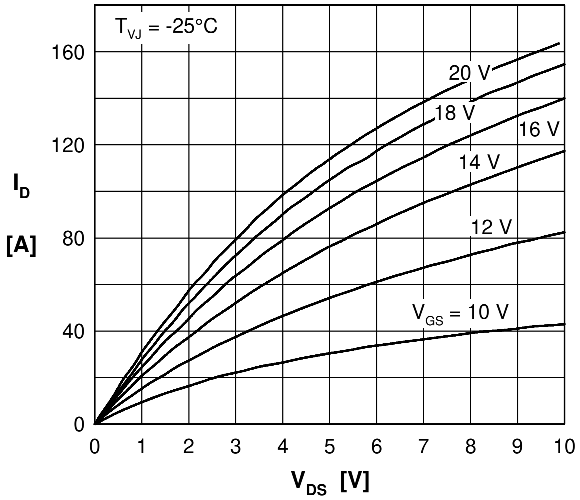

Fig. 1 Typical output characteristics (-25°C)

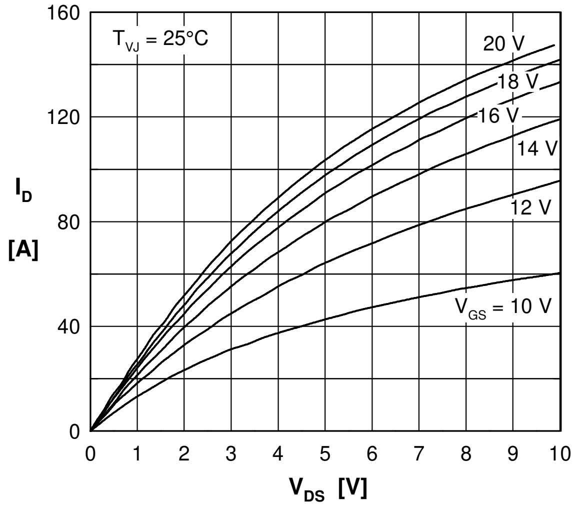

Fig. 2 Typical output characteristics (25°C)

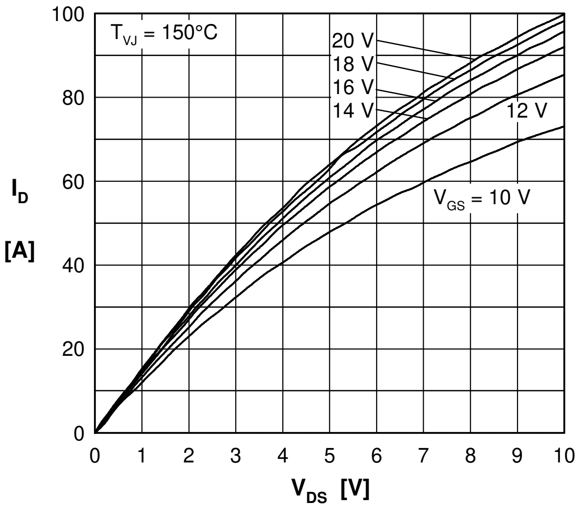

Fig. 3 Typical output characteristics (150°C)

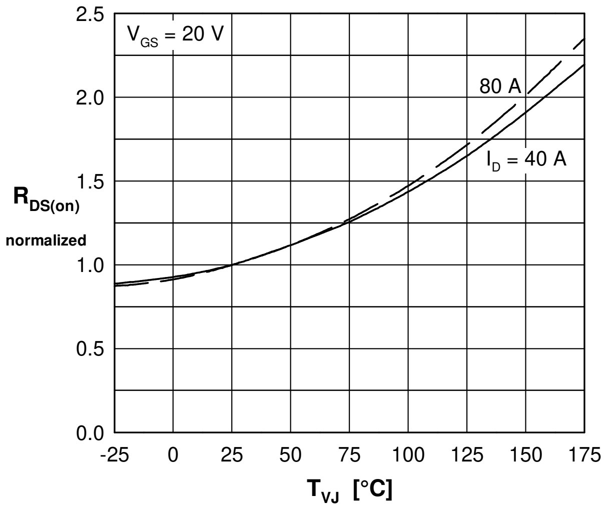

Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

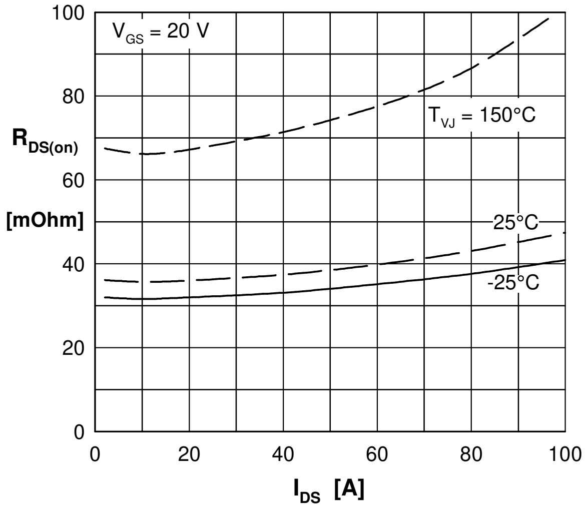

Fig. 5 $R_{DS(on)}$ versus drain current

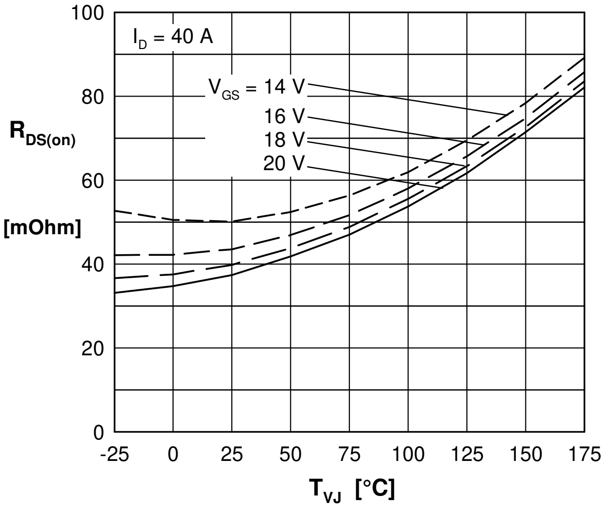

Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

Curves

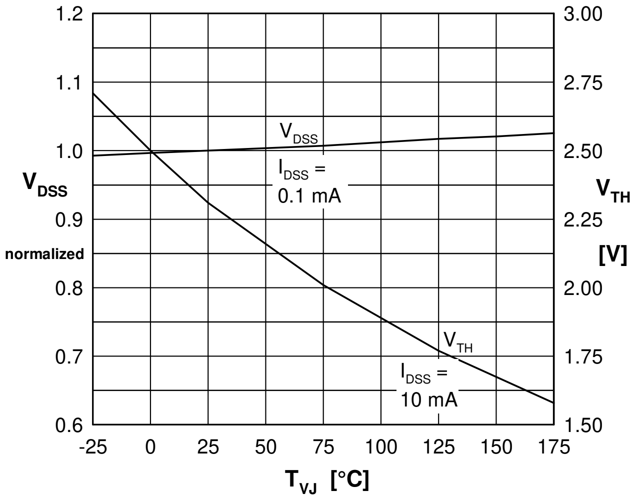

Fig. 7 Norm. breakdow V_{DSS} & treshhold voltage V_{TH} versus junction temperature T_{VJ}

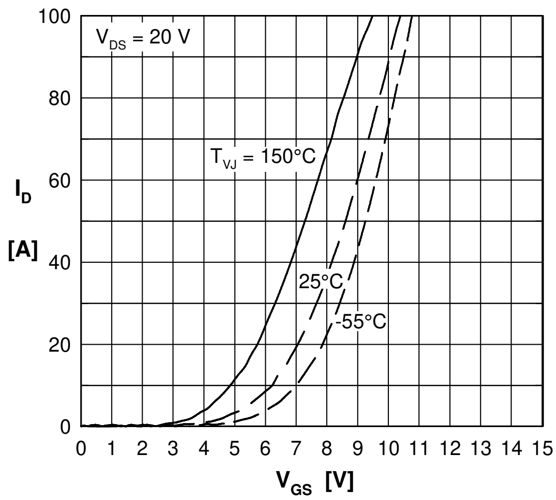

Fig. 8 Typical transfer characteristics

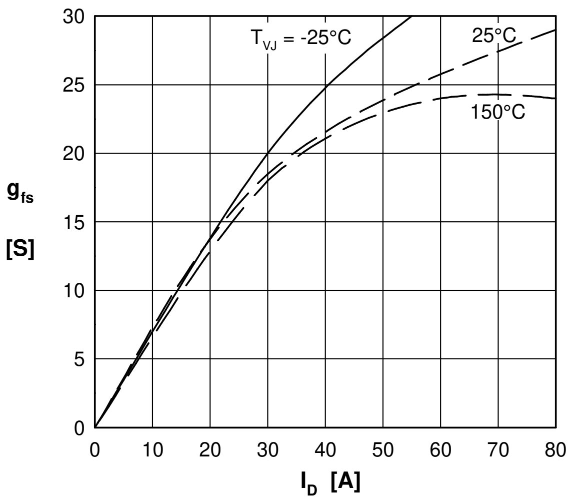

Fig. 9 Typical forward transconductance

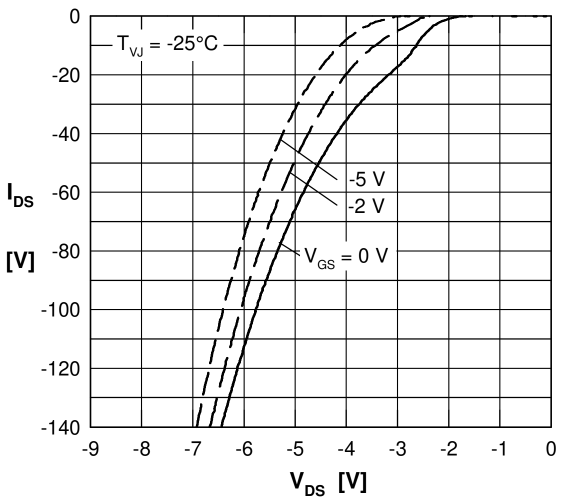

Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

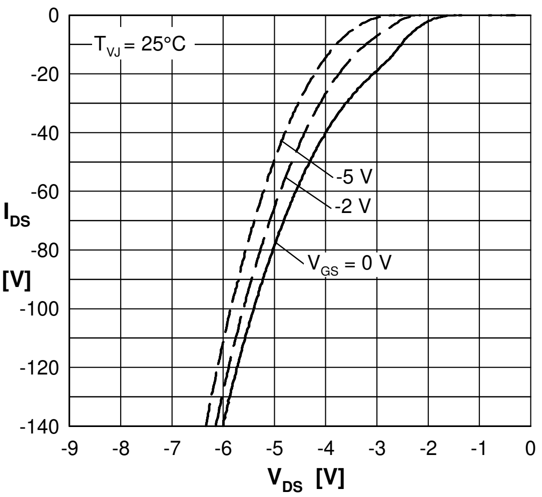

Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

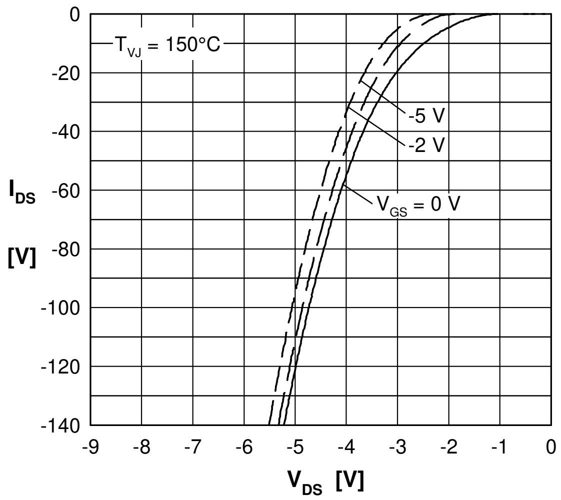

Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

Curves

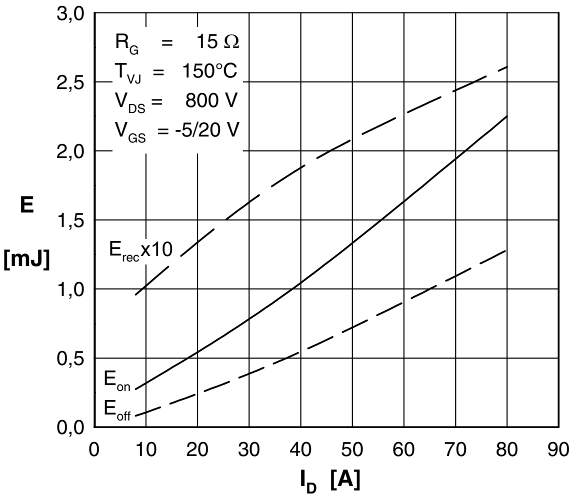

Fig. 13 Typical switching energy versus drain current

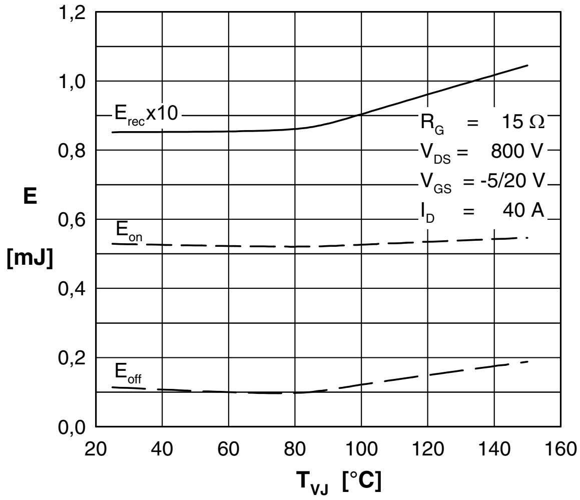

Fig. 14 Typical switching energy versus temperature

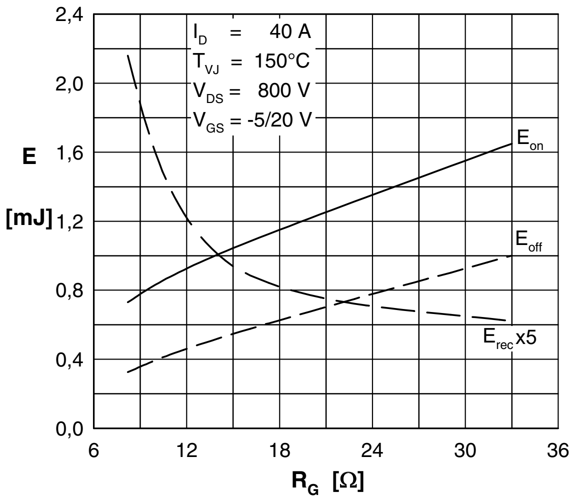

Fig. 15 Typical switching energy versus external gate resistor

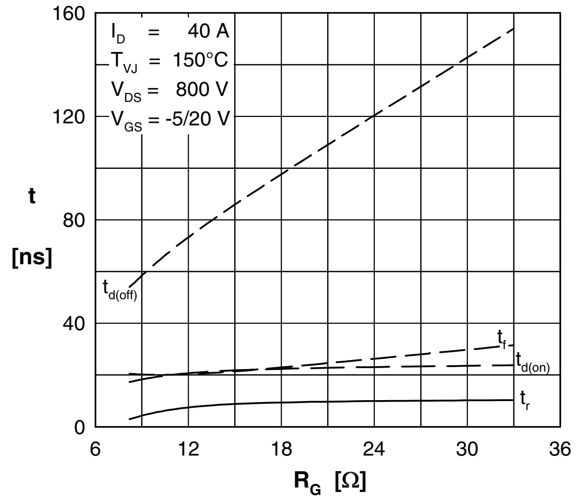

Fig. 16 Typical switching time versus external gate resistor

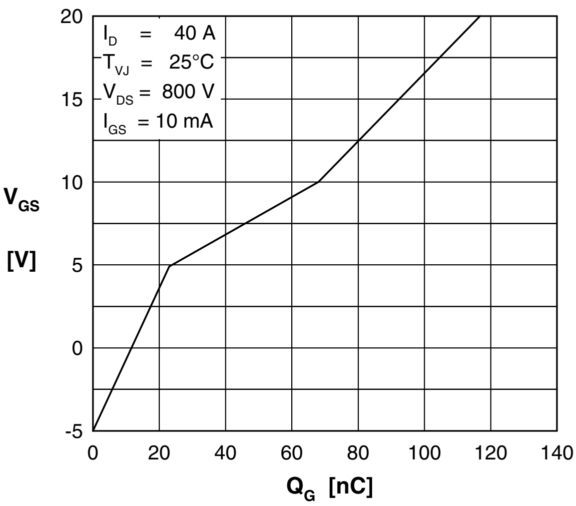

Fig. 17 Typical turn on gate charge, trendline

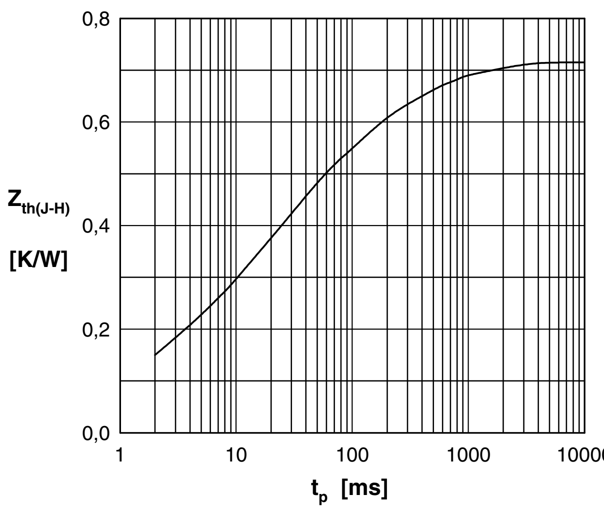

Fig. 18 Typical transient thermal impedance