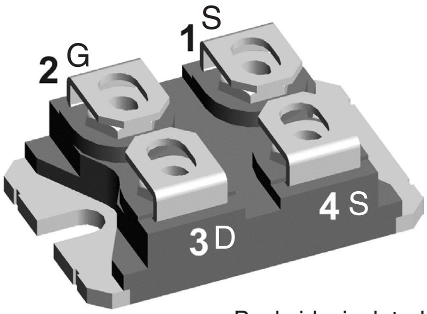
SiC Power MOSFET

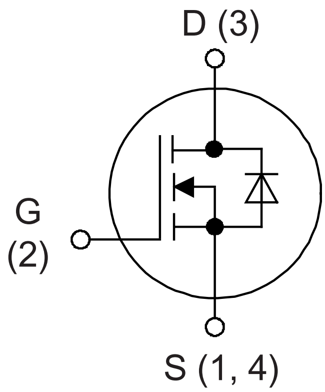
I_{D25} = 47 A
V_{DSS} = 1200 V
$R_{DS(on)\ max}$ = 50 mΩ

Part number
IXFN50N120SiC



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

MOSFET			Ratings			
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
V_{DSS}	*drain source breakdown voltage*	V_{GS} = 0 V, I_D = 200 µA	1200			V
V_{GSM} 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			47 35 30	A A A
$I_{D(pulse)}$	*pulsed drain current*	pulse width limited by $T_{VJ\,max}$			125	A
P_D	*power dissipation*	T_C = 25°C, T_{VJ} = 175°C			270	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 75	50	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 2.1	4.0	V V
I_{DSS}	*drain source leakage current*	V_{DS} = 1200 V; V_{GS} = 0 V; T_{VJ} = 25°C T_{VJ} = 150°C		2 20	200	µA µA
I_{GSS}	*gate source leakage current*	V_{DS} = 0 V; V_{GS} = 20 V; T_{VJ} = 25°C			0.5	µA
R_G	*internal gate resistance*				4.8	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		1900 160 13		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} = 0/20 V; T_{VJ} = 25°C		100 22 36		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 = 40 A; T_{VJ} = 25°C V_{GS} = -5 / 20 V; R_G = 10 Ω (external) Freewheeling diode is Mosfet's body diode		23 9 75 19 1.08 0.29 0.04		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 = 40 A; T_{VJ} = 150°C V_{GS} = -5 / 20 V; R_G = 10 Ω (external) Freewheeling diode is Mosfet's body diode		23 9 100 22 1.48 0.35 0.10		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		 0.62	0.55	K/W K/W

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

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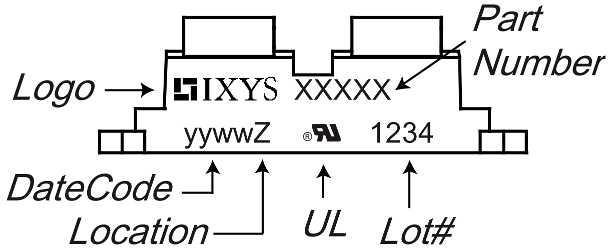
Package	Outlines SOT-227B (minibloc)			Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				100	A
T_{stg} T_{op} T_{VJ}	*storage temperature* *operation temperature* *virtual junction temperature*			-40 -40 -40		150 150 175	°C °C °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	IXFN50N120SiC	IXFN50N120SiC	Tube	10	IXFN50N120SIC

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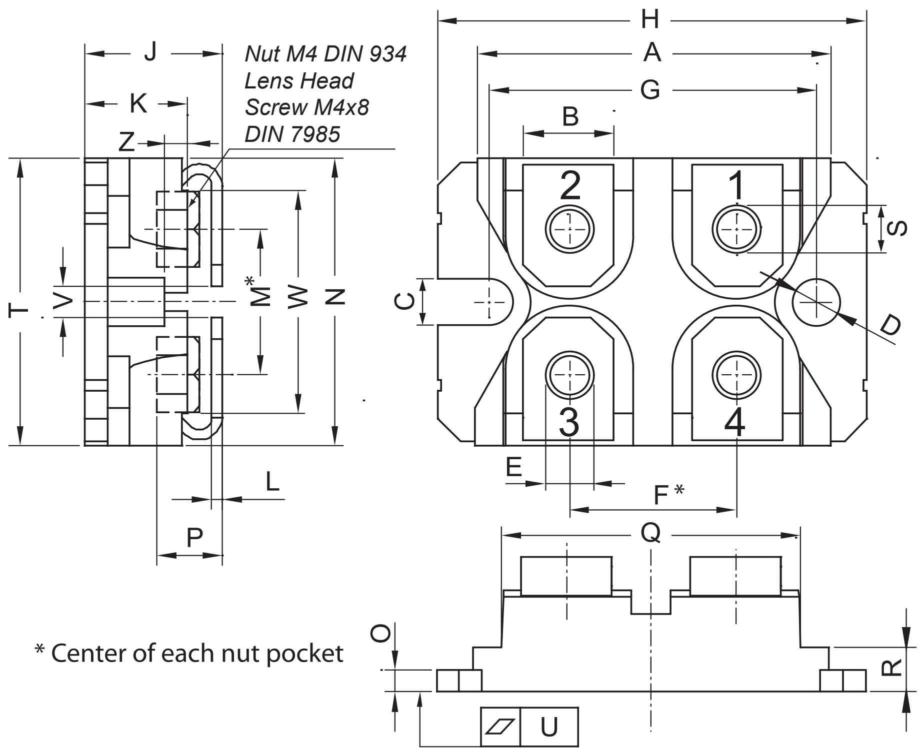
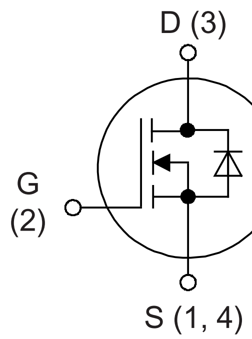
Outlines SOT-227B (minibloc)



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

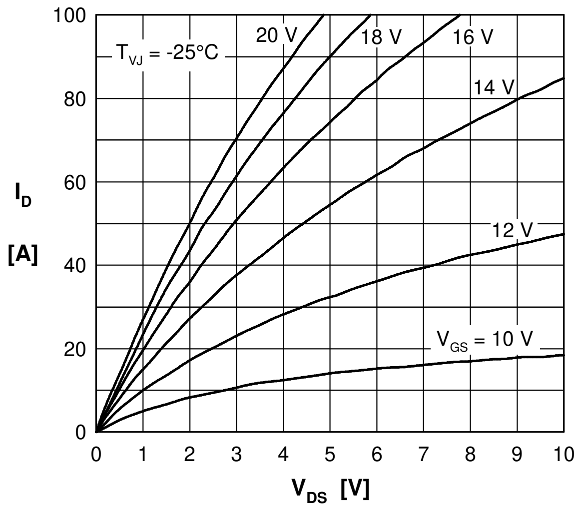


Fig. 1 Typical output characteristics (-25°C)

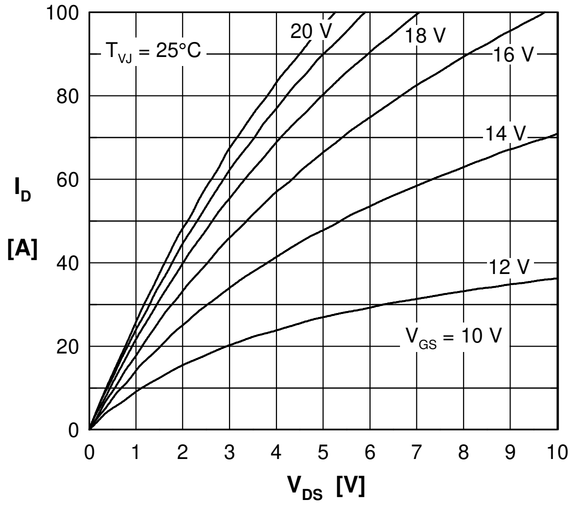


Fig. 2 Typical output characteristics (25°C)

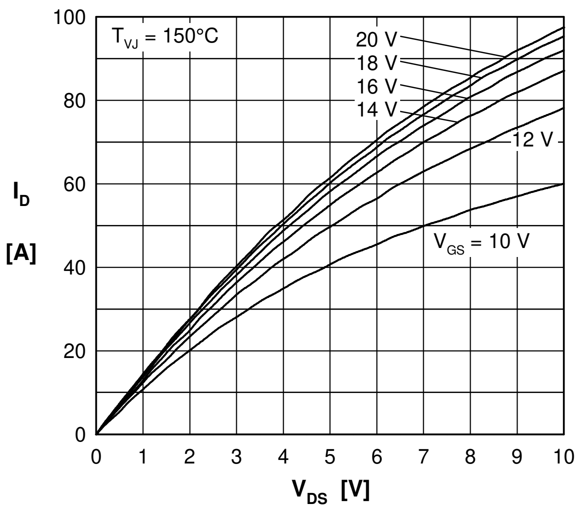


Fig. 3 Typical output characteristics (150°C)

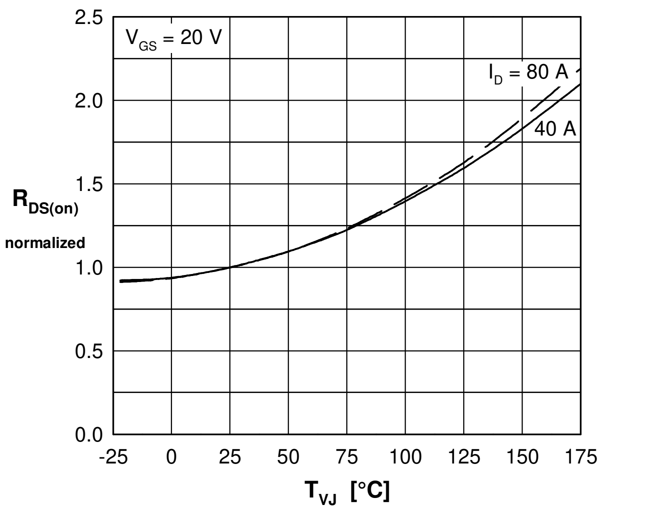


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

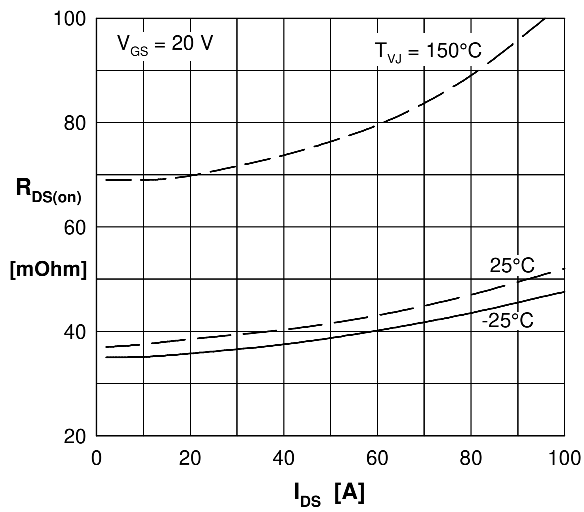


Fig. 5 $R_{DS(on)}$ versus drain current

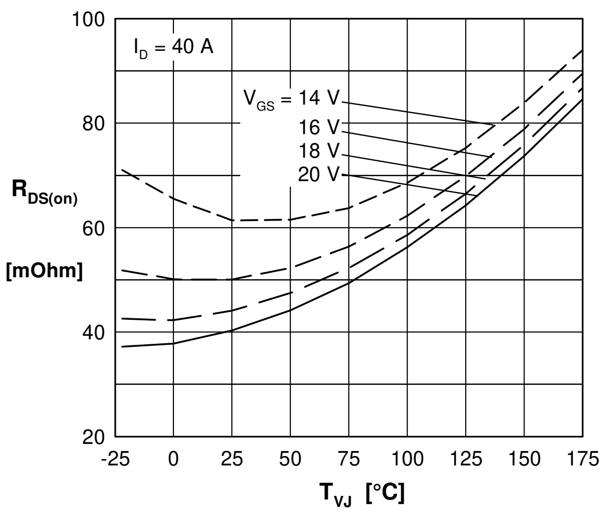


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

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Curves

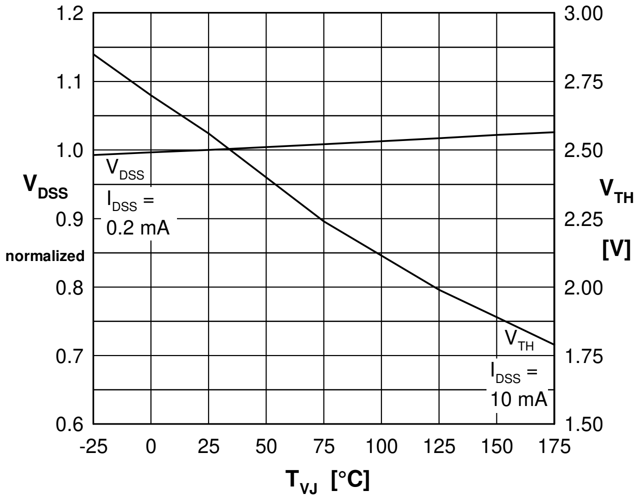

Fig. 7 Norm. breakdow V_{DSS} & treshhold voltage V_{TH} versus junction temperature T_{VJ}

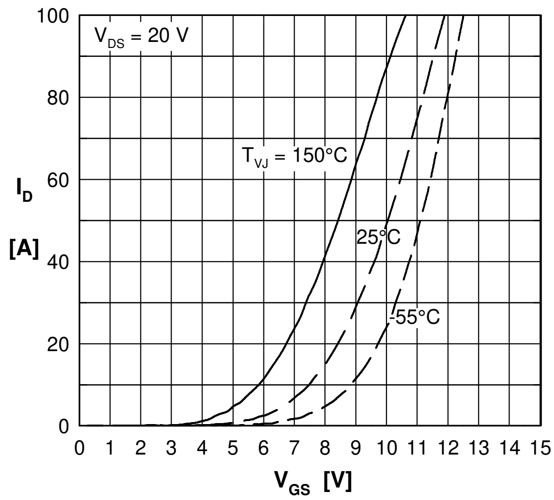

Fig. 8 Typical transfer characteristics

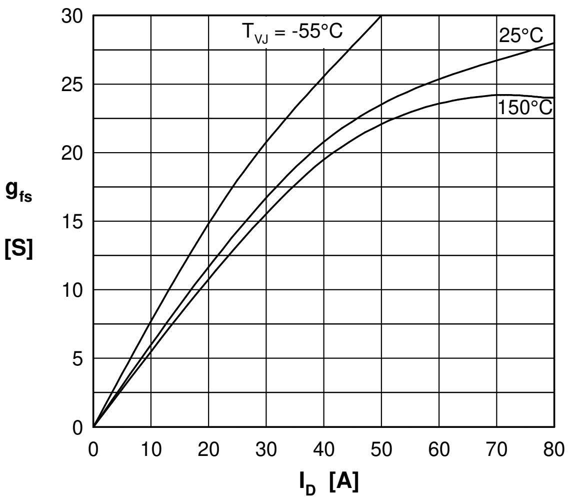

Fig. 9 Typical forward transconductance

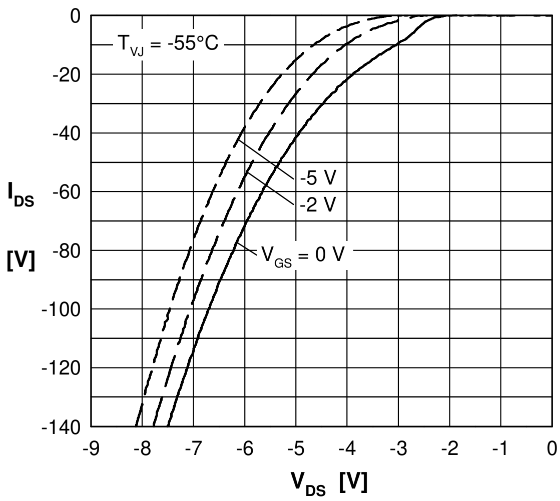

Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

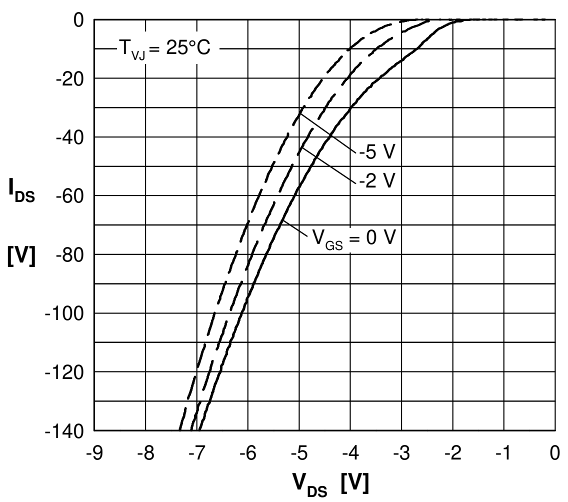

Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

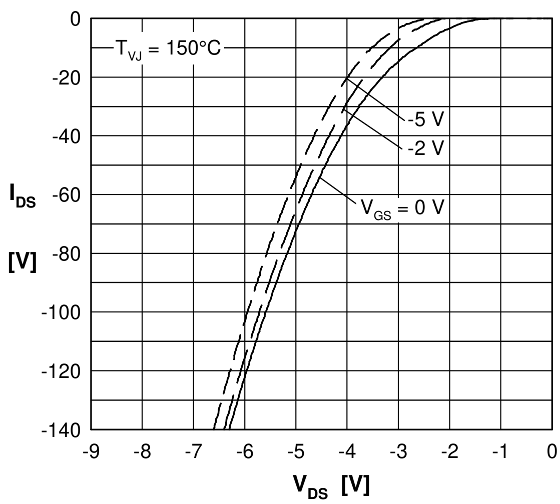

Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

Curves

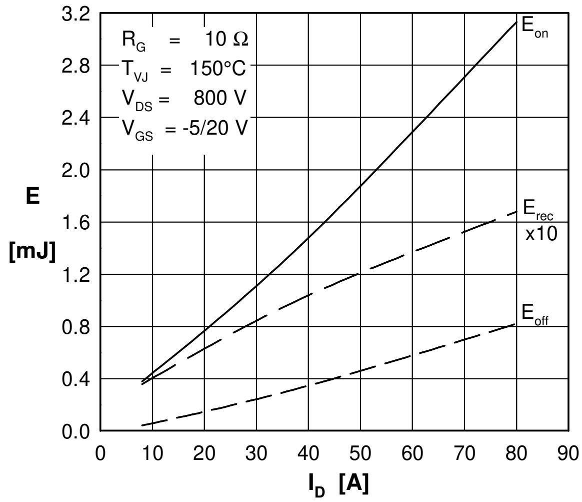

Fig. 13 Typical switching energy versus drain current

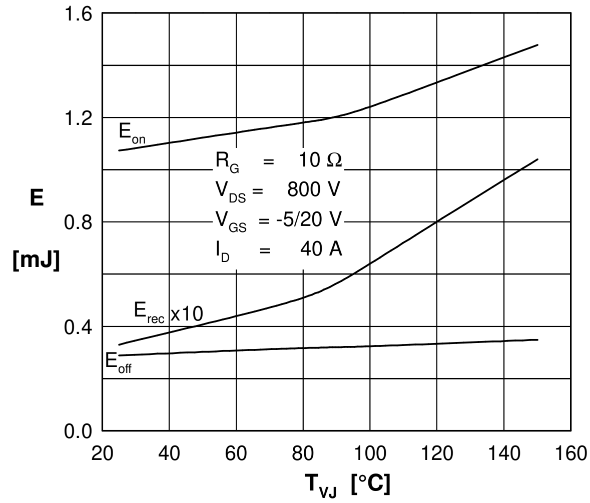

Fig. 14 Typical switching energy versus temperature

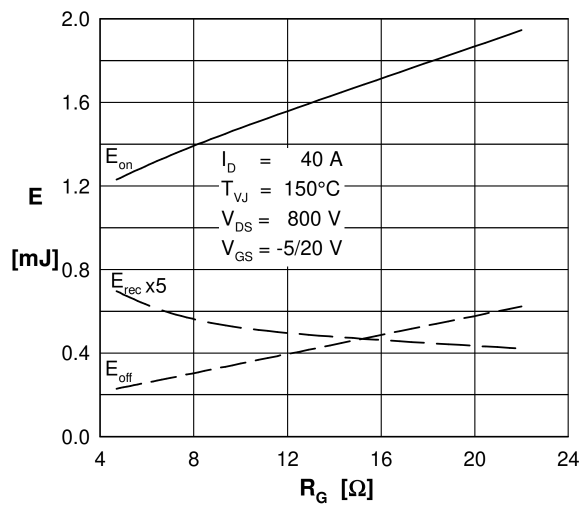

Fig. 15 Typical switching energy versus external gate resistor

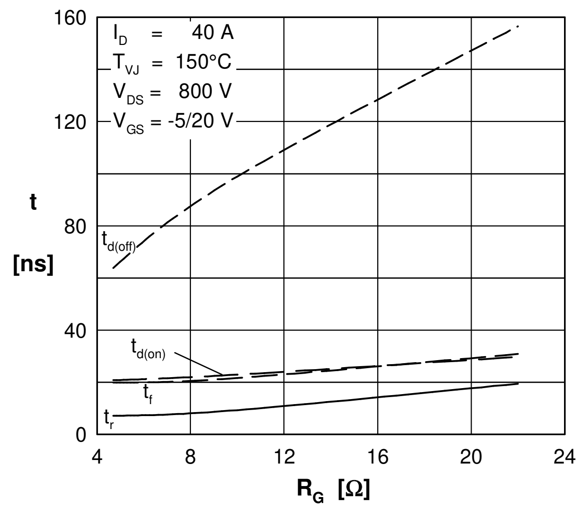

Fig. 16 Typical switching time versus external gate resistor

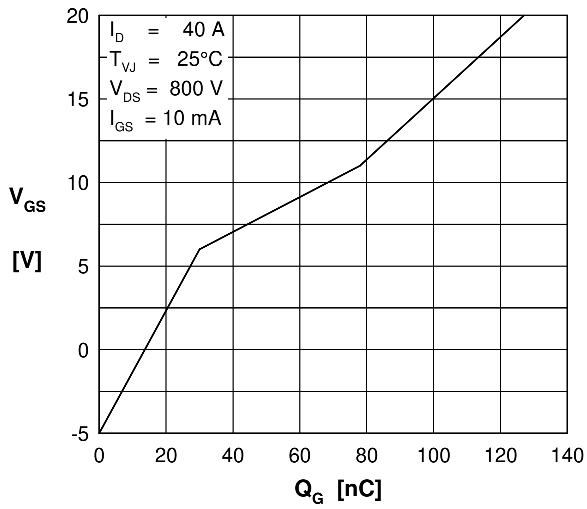

Fig. 17 Typical turn on gate charge, trendline

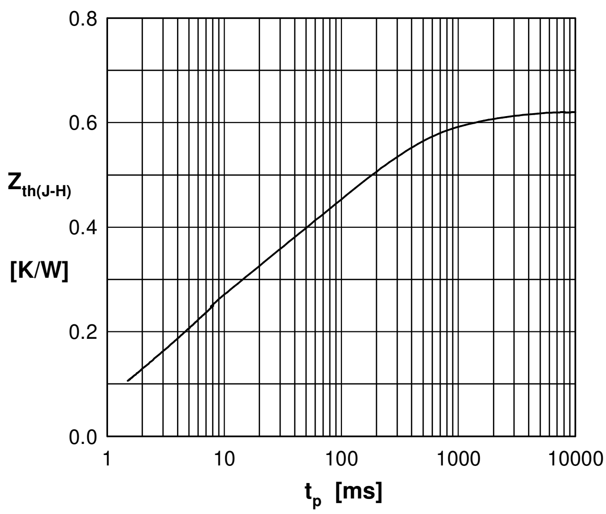

Fig. 18 Typical transient thermal impedance