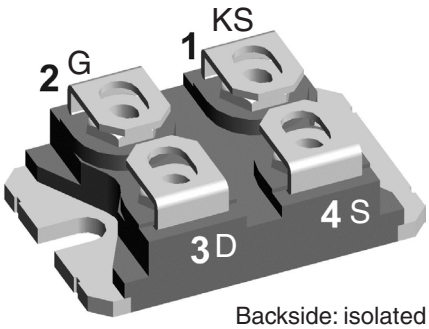
SiC Power MOSFET

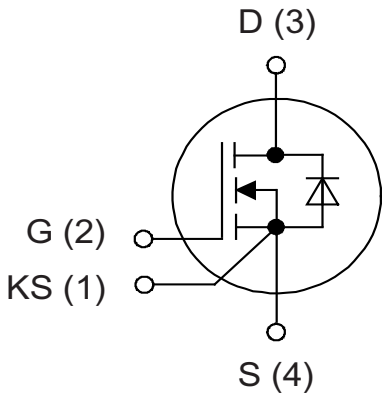
I_{D25} = 27 A
V_{DSS} = 1200 V
$R_{DS(on)\ max}$ = 98 mΩ

Kelvin Source gate connection

Part number
IXFN27N120SK



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 isolation
- Advanced power cycling

MOSFET			Ratings			
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
$V_{(BR)DSS}$	*drain source breakdown voltage*	I_D = 100 µA	1200			V
$V_{GS(max)}$	*max transient gate source voltage*		-10		+25	V
V_{GS}	*continous gate source voltage*	recommended operational value	-5		+20	V
I_{D25}	*drain current*	V_{GS} = 20 V, T_C = 25°C			27	A
I_{D80}		V_{GS} = 20 V, T_C = 80°C			21.5	A
I_{D100}		V_{GS} = 20 V, T_C = 100°C			19	A
$I_{D(pulse)}$	*pulsed drain current*	pulse width limited by $T_{VJ\,max}$			70	A
P_D	*power dissipation*	T_C = 25°C, T_{VJ} = 175°C			150	W
R_{DSon}	*static drain source on resistance*	I_D = 20 A; V_{GS} = 20 V, T_{VJ} = 25°C		80	98	mΩ
		I_D = 20 A; V_{GS} = 20 V, T_{VJ} = 175°C		155		mΩ
$V_{GS(th)}$	*gate threshold voltage*	I_D = 5 mA; V_{GS} = V_{DS}, T_{VJ} = 25°C	2.0	2.6	4.0	V
		I_D = 5 mA; V_{GS} = V_{DS}, T_{VJ} = 175°C		2.1		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			250	nA
R_G	*internal gate resistance*	f = 1 MHz, V_{AC} = 25 mV, ESR of C_{ISS}		4.6		Ω
C_{iss}	*input capacitance*	V_{DS} = 1000 V; V_{GS} = 0 V; f = 1 MHz, T_{VJ} = 25°C		950		pF
C_{oss}	*output capacitance*			80		pF
C_{rss}	*reverse transfer (Miller) capacitance*			7.6		pF
Q_g	*total gate charge*	V_{DS} = 800 V; I_D = 40 A; V_{GS} = -5/20 V, T_{VJ} = 25°C		62		nC
Q_{gs}	*gate source charge*			23		nC
Q_{gd}	*gate drain (Miller) charge*			37		nC
$t_{d(on)}$	*turn-on delay time*	Inductive switching, T_{VJ} = 25°C Free Wheeling Diode: Body Diode @ V_{GS} = -5V V_{DS} = 800 V; I_D = 20 A V_{GS} = -5/20 V; R_G = 22 Ω (external)		10		ns
t_r	*current rise time*			8		ns
$t_{d(off)}$	*turn-off delay time*			62		ns
t_f	*current fall time*			16		ns
E_{on}	*turn-on energy per pulse*			0.51		mJ
E_{off}	*turn-off energy per pulse*			0.22		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*			0.02		mJ
$t_{d(on)}$	*turn-on delay time*	Inductive switching, T_{VJ} = 150°C Free Wheeling Diode: Body Diode @ V_{GS} = -5V V_{DS} = 800 V; I_D = 20 A V_{GS} = -5/20 V; R_G = 22 Ω (external)		10		ns
t_r	*current rise time*			8		ns
$t_{d(off)}$	*turn-off delay time*			70		ns
t_f	*current fall time*			14		ns
E_{on}	*turn-on energy per pulse*			0.63		mJ
E_{off}	*turn-off energy per pulse*			0.21		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*			0.06		mJ
R_{thJC}	*thermal resistance junction to case*				1.0	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heatsink compound; IXYS test setup		1.25		K/W

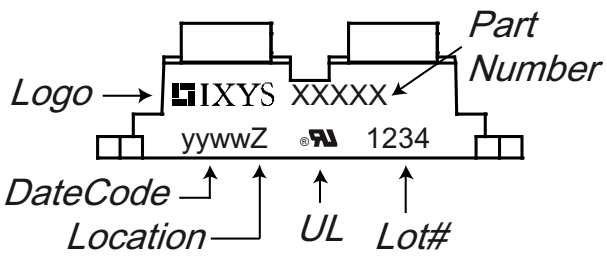
Source-Drain Diode			Ratings			
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
V_{SD}	*forward voltage drop*	I_F = 20 A; V_{GS} = -5 V, T_{VJ} = 25°C		5.2		V
		I_F = 20 A; V_{GS} = -5 V, T_{VJ} = 150°C		4.6		V
t_{rr}	*reverse recovery time*	V_{GS} = -5 V; I_F = 20 A; V_R = 800 V, T_{VJ} = 25°C Mosfet gate drive: V_{GS} = -5 / 20 V; R_G = 22 Ω		14		ns
Q_{RM}	*reverse recovery charge (intrinsic diode)*			0.12		µC
I_{RM}	*max. reverse recovery current*			15		A
dI_F/dt	*current slew rate*			2320		A/µs
t_{rr}	*reverse recovery time*	V_{GS} = -5 V; I_F = 20 A; V_R = 800 V, T_{VJ} = 150°C Mosfet gate drive: V_{GS} = -5 / 20 V; R_G = 22 Ω		29		ns
Q_{RM}	*reverse recovery charge (intrinsic diode)*			0.48		µC
I_{RM}	*max. reverse recovery current*			24		A
dI_F/dt	*current slew rate*			2740		A/µs

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

Package	Outlines SOT-227B (minibloc)			Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				100	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]	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

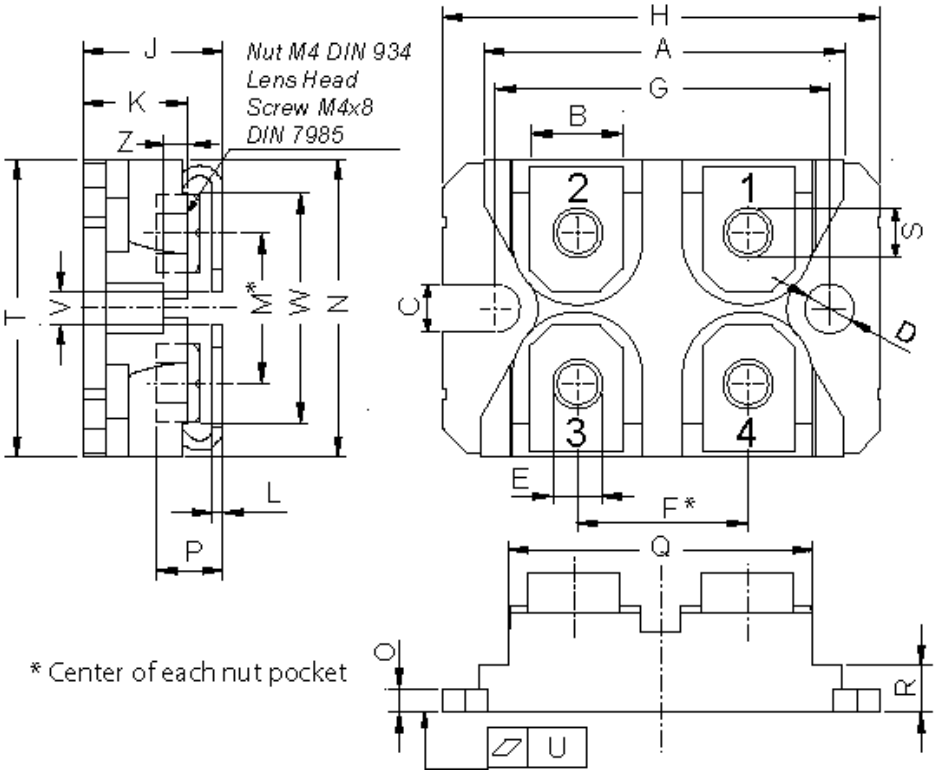
[1] further information see application note IXAN0073 on
www.ixys.com/TechnicalSupport/appnotes.aspx (General / Isolation, Mounting, Soldering, Cooling)

Product Marking

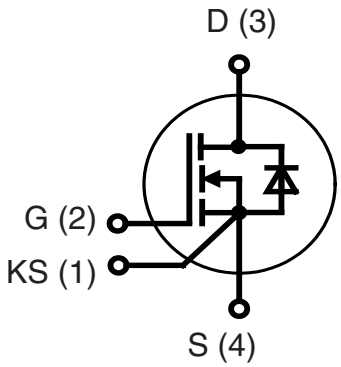


Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXFN27N120SK	IXFN27N120SK	Tube	10	IXFN27N120SK

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

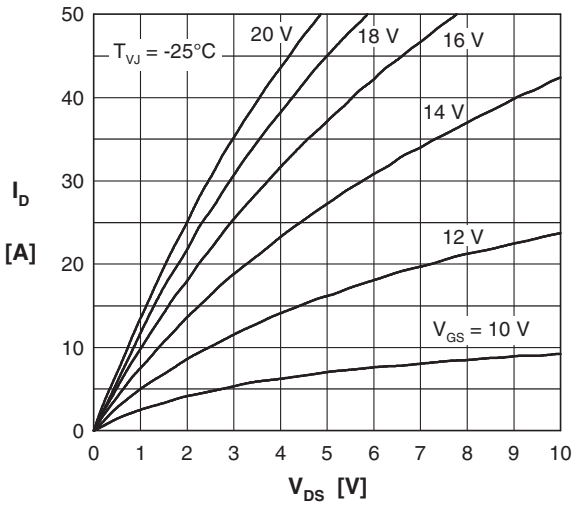


Fig. 1 Typical output characteristics (-25°C)

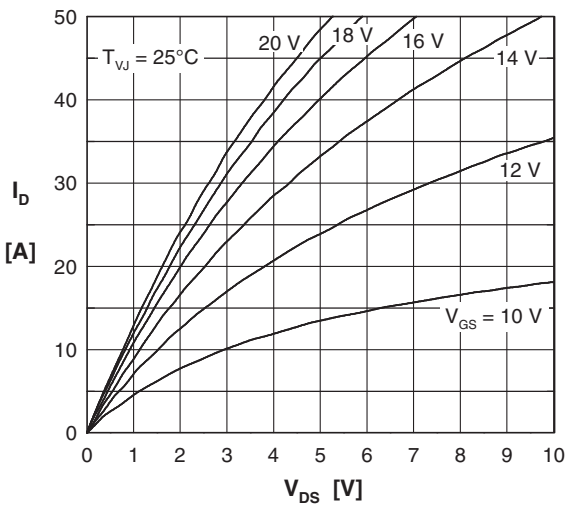


Fig. 2 Typical output characteristics (25°C)

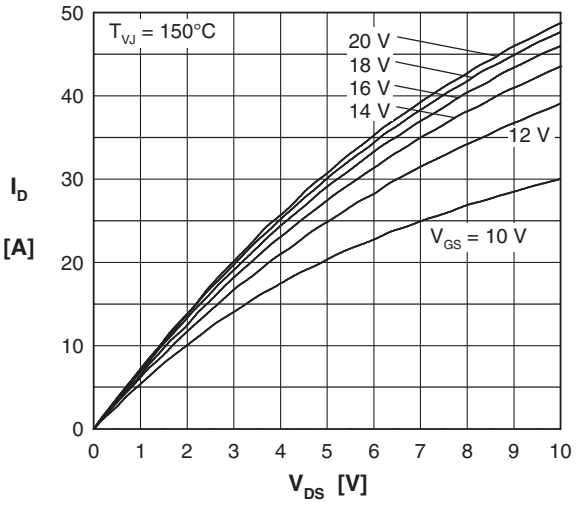


Fig. 3 Typical output characteristics (150°C)

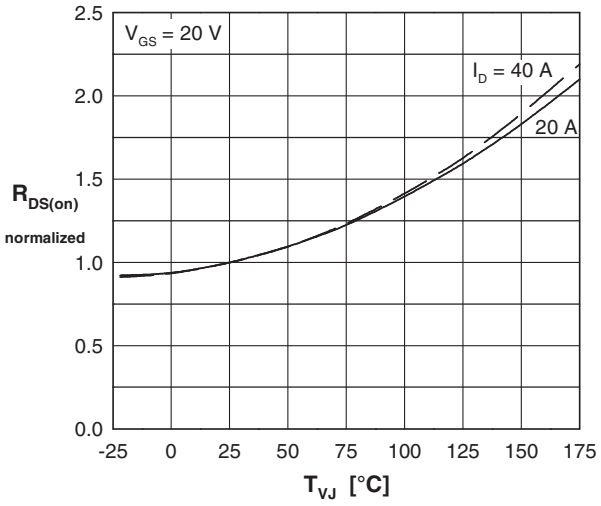


Fig. 4 $R_{DS(on)}$ normalized vs. junction temperature T_{VJ}

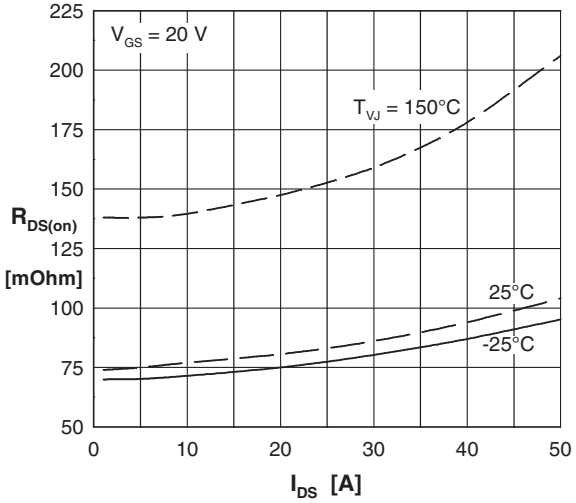


Fig. 5 $R_{DS(on)}$ versus drain current

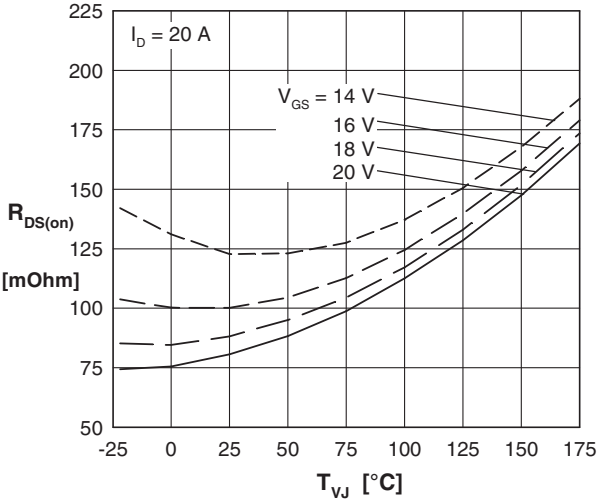


Fig. 6 $R_{DS(on)}$ versus junction temperature T_{VJ}

Curves

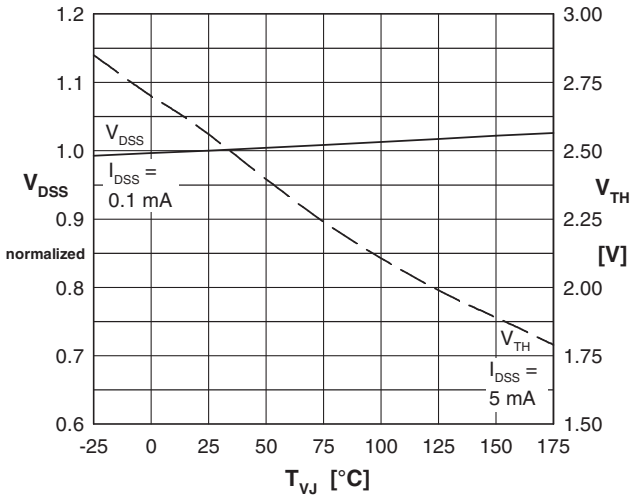


Fig. 7 Norm. breakdow V_{DSS} & treshhold voltage V_{TH} versus junction temperature T_{VJ}

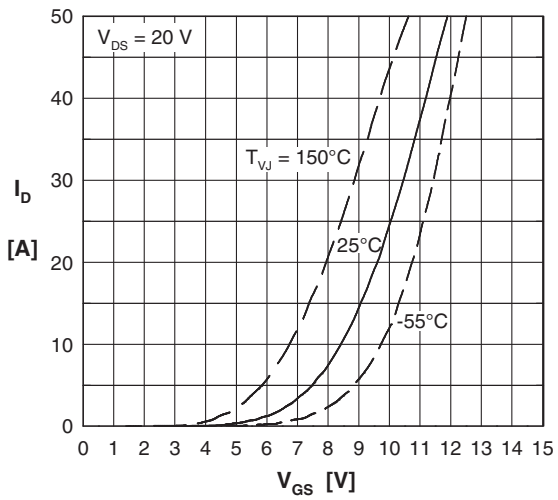


Fig. 8 Typical transfer characteristics

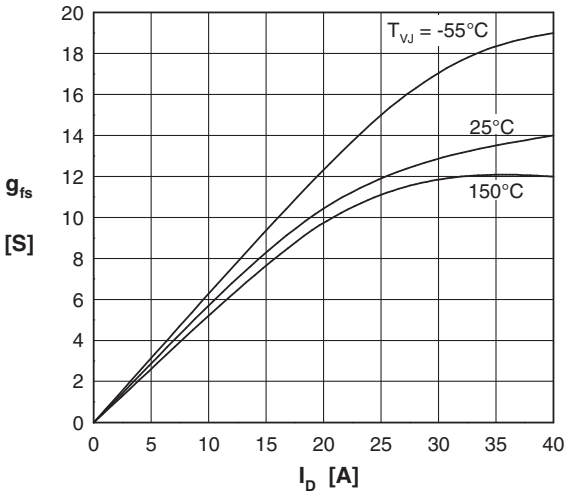


Fig. 9 Typical forward transconductance

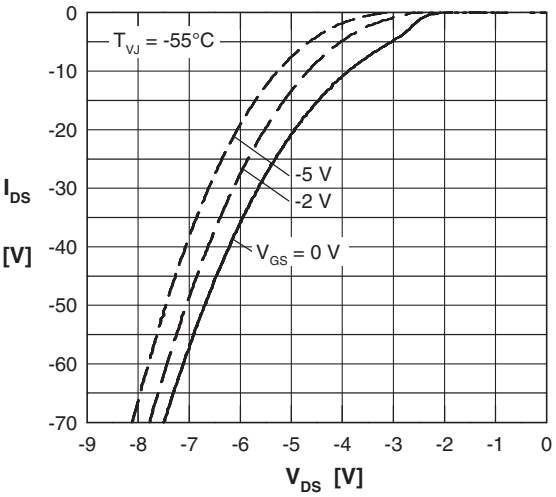


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

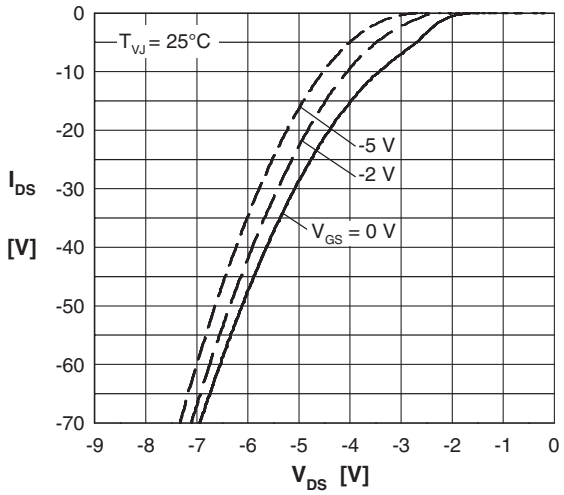


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

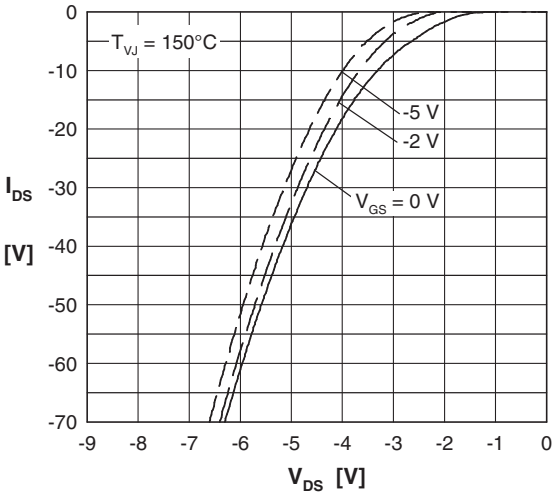


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

Curves

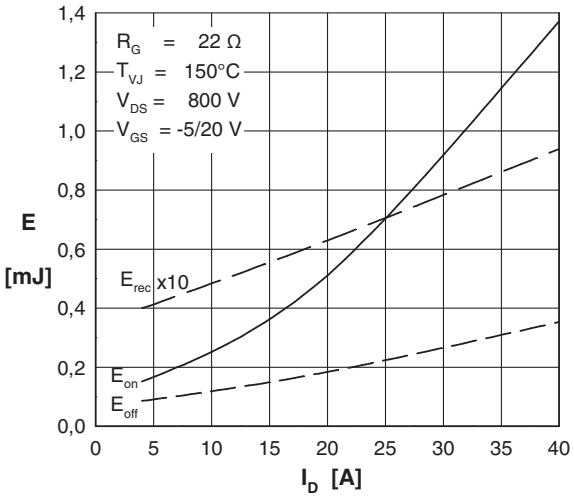


Fig. 13 Typical switching energy versus drain current

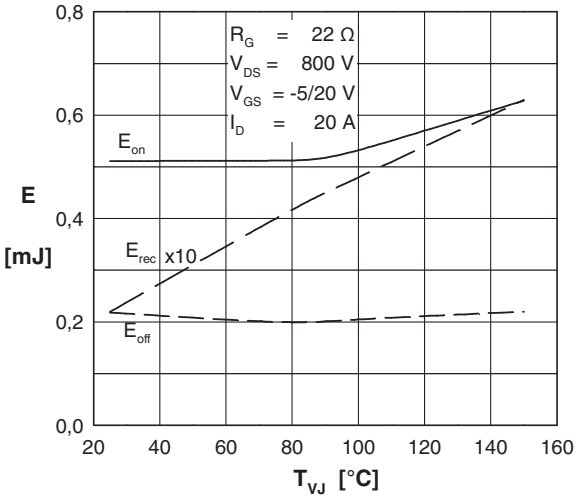


Fig. 14 Typical switching energy versus temperature

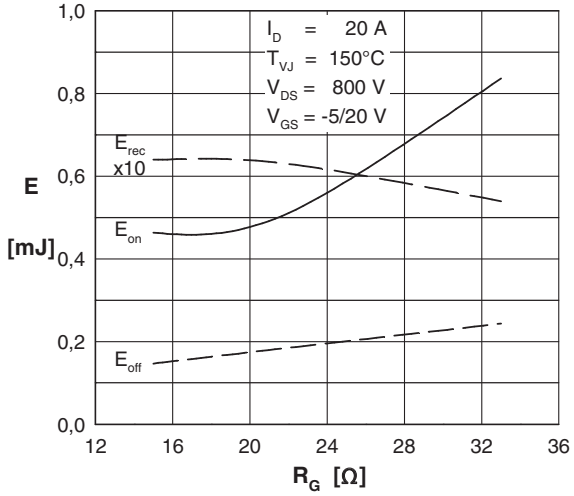


Fig. 15 Typical switching energy versus external gate resistor

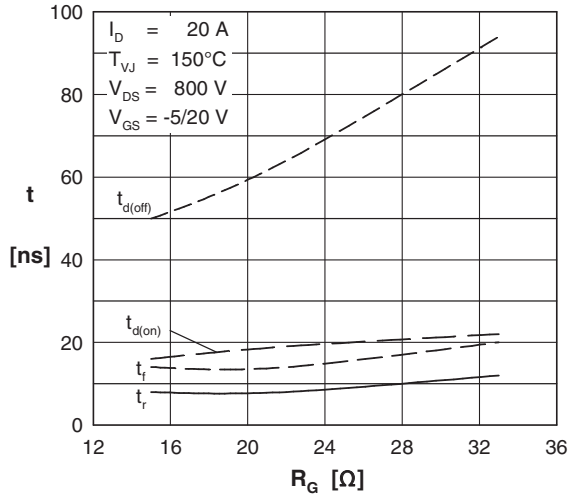


Fig. 16 Typical switching time versus external gate resistor

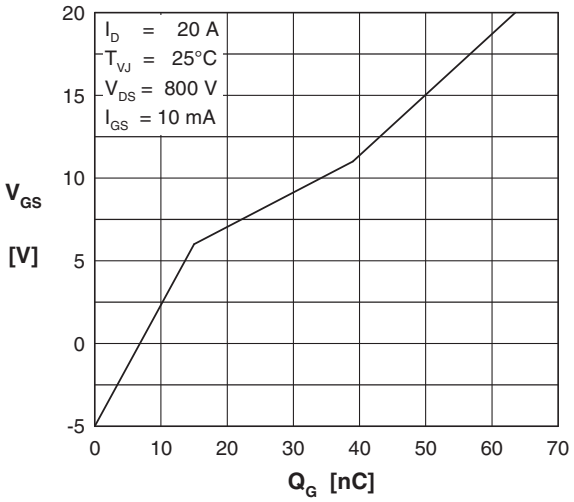


Fig. 17 Typical turn on gate charge, trendline

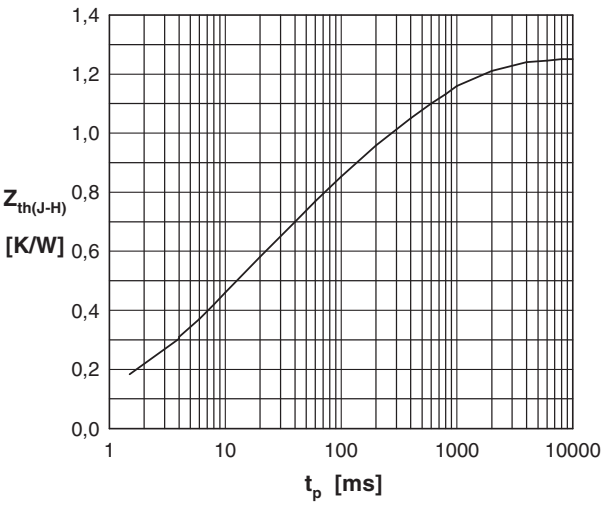


Fig. 18 Typical transient thermal impedance