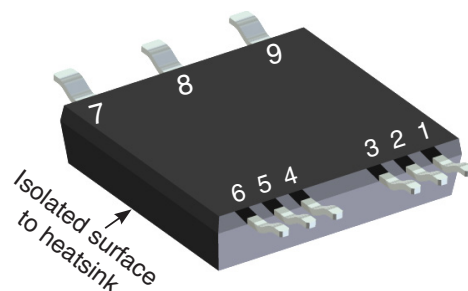


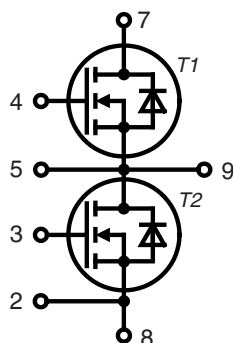
SiC Power MOSFET

$$\begin{aligned}
 I_{D25} &= 25.5 \text{ A} \\
 V_{DSS} &= 1200 \text{ V} \\
 R_{DS(on) \text{ max}} &= 98 \text{ m}\Omega
 \end{aligned}$$

Part number
MCB20P1200LB



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: SMPD

- DCB isolated backside
- Isolation Voltage 2500 V
- Epoxy meets UL 94V-0
- RoHS compliant
- Advanced power cycling

Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

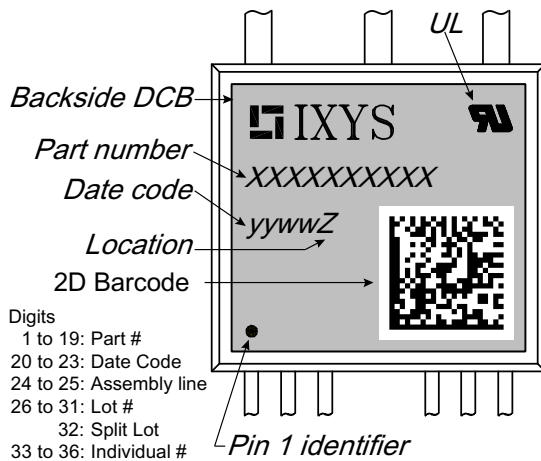
MOSFET				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
V_{DS}	drain source breakdown voltage	$V_{GS} = 0 \text{ V}$; $I_D = 100 \mu\text{A}$	1200			V	
V_{GSM}	max transient gate source voltage		-10		+25	V	
V_{GS}	continous gate source voltage	recommended operational value	-5		+20	V	
I_{D25}	drain current	$V_{GS} = 20 \text{ V}$			25.5	A	
I_{D80}					20.5	A	
I_{D100}					18	A	
R_{DSon}	static drain source on resistance	$I_D = 50 \text{ A}$; $V_{GS} = 20 \text{ V}$		80 155	98	mΩ mΩ	
$V_{GS(th)}$	gate threshold voltage	$I_D = 5 \text{ mA}$; $V_{GS} = V_{DS}$	2.0	2.6 2.1	4.0	V V	
I_{DSS}	drain source leakage current	$V_{DS} = 1200 \text{ V}$; $V_{GS} = 0 \text{ V}$		2	100	μA	
I_{GSS}	gate source leakage current	$V_{DS} = 0 \text{ V}$; $V_{GS} = 20 \text{ V}$			250	nA	
R_G	internal gate resistance	$f = 1 \text{ MHz}$; $V_{AC} = 25 \text{ mV}$; ESR of C_{ISS}		4.6		Ω	
C_{iss}	input capacitance	$V_{DS} = 1000 \text{ V}$; $V_{GS} = 0 \text{ V}$; $f = 1 \text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$	950		pF	
C_{oss}	output capacitance			80		pF	
C_{rss}	reverse transfer (Miller) capacitance			7.6		pF	
Q_g	total gate charge	$V_{DS} = 800 \text{ V}$; $I_D = 40 \text{ A}$; $V_{GS} = -5/20 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$	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 $V_{DS} = 800 \text{ V}$; $I_D = 20 \text{ A}$ $V_{GS} = -5 / 20 \text{ V}$; $R_G = 22 \Omega$ (external) Freewheeling diode is Mosfet's body diode	$T_{VJ} = 25^\circ\text{C}$	19		ns	
t_r	current rise time			7		ns	
$t_{d(off)}$	turn-off delay time			66		ns	
t_f	current fall time			23		ns	
E_{on}	turn-on energy per pulse			0.41		mJ	
E_{off}	turn-off energy per pulse			0.21		mJ	
$E_{rec(off)}$	reverse recovery losses at turn-off			0.07		mJ	
$t_{d(on)}$	turn-on delay time			18		ns	
t_r	current rise time	Inductive switching $V_{DS} = 800 \text{ V}$; $I_D = 20 \text{ A}$ $V_{GS} = -5 / 20 \text{ V}$; $R_G = 22 \Omega$ (external) Freewheeling diode is Mosfet's body diode	$T_{VJ} = 150^\circ\text{C}$	7		ns	
$t_{d(off)}$	turn-off delay time			75		ns	
t_f	current fall time			21		ns	
E_{on}	turn-on energy per pulse			0.49		mJ	
E_{off}	turn-off energy per pulse			0.20		mJ	
$E_{rec(off)}$	reverse recovery losses at turn-off			0.10		mJ	
R_{thJC}	thermal resistance junction to case	with heatsink compound; IXYS test setup		1.5	1.0	K/W	
R_{thJH}	thermal resistance junction to heatsink					K/W	

Source-Drain Diode				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
V_{SD}	forward voltage drop	$I_F = 10 \text{ A}$; $V_{GS} = -5 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$	3.3 3.1		V V	
t_{rr}	reverse recovery time	$V_{GS} = -5 \text{ V}$; $I_F = 20 \text{ A}$; $V_R = 800 \text{ V}$ Mosfet gate drive: $V_{GS} = -5 / 20 \text{ V}$; $R_G = 22 \Omega$	$T_{VJ} = 25^\circ\text{C}$	15		ns	
Q_{RM}	reverse recovery charge (intrinsic diode)			0.20		μC	
I_{RM}	max. reverse recovery current			23		A	
dI_F/dt	current slew rate			3650		A/μs	
t_{rr}	reverse recovery time	$V_{GS} = -5 \text{ V}$; $I_F = 20 \text{ A}$; $V_R = 800 \text{ V}$ Mosfet gate drive: $V_{GS} = -5 / 20 \text{ V}$; $R_G = 22 \Omega$	$T_{VJ} = 150^\circ\text{C}$	19		ns	
Q_{RM}	reverse recovery charge (intrinsic diode)			0.42		μC	
I_{RM}	max. reverse recovery current			35		A	
dI_F/dt	current slew rate			4120		A/μs	

Note:

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

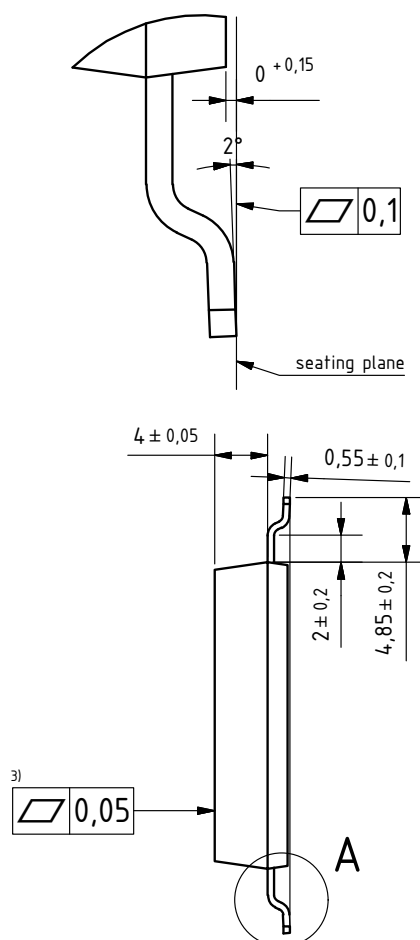
Package SMPD			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
I_{RMS}	RMS current	wide terminal standard terminal			100 60	A A
T_{stg}	storage temperature		-55		150	°C
T_{op}	operation temperature		-55		150	°C
T_{vj}	virtual junction temperature		-55		175	°C
Weight				8		g
F_c	mounting force with clip		40		130	N
$d_{Spp/App}$	creepage distance on surface /	terminal to terminal	1.6			mm
$d_{Spb/Appb}$	striking distance through air	terminal to backside	4.0			mm
V_{ISOL}	isolation voltage	t = 1 second t = 1 minute		3000 2500		V V


Part number

M = Mosfet
 C = SiC MOSFET
 B = Generation 2
 20 = Current Rating [A]
 P = Phase leg
 1200 = Reverse Voltage [V]
 LB = SMPD-B

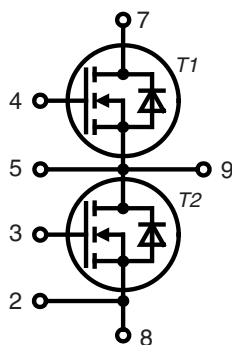
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MCB20P1200LB-TUB	MCB20P1200LB	Tube	20	MCB20P1200LB-TUB
Alternative	MCB20P1200LB-TRR	MCB20P1200LB	Tape&Reel	200	MCB20P1200LB-TRR

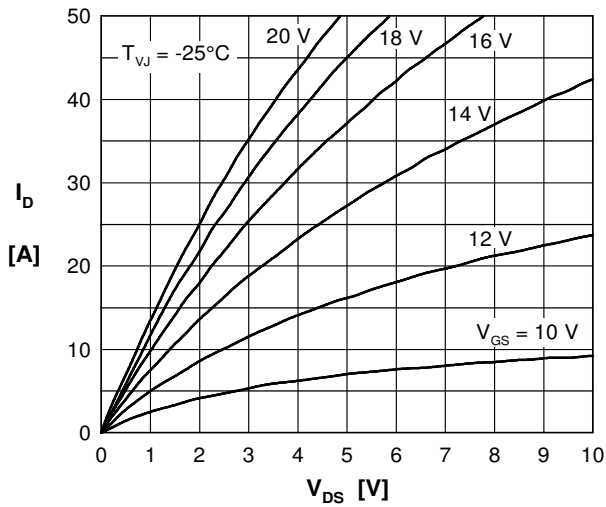
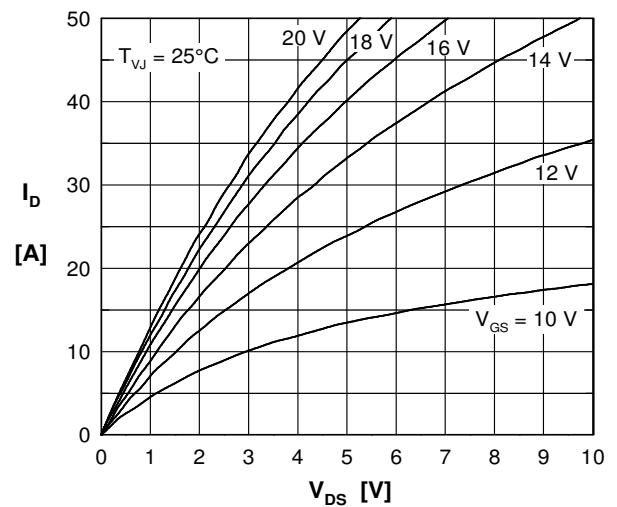
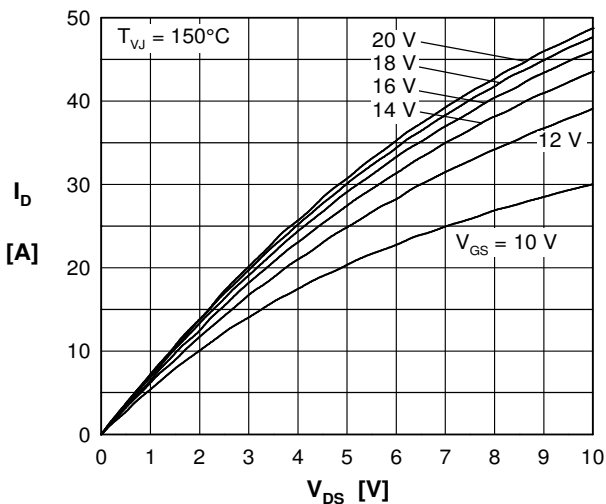
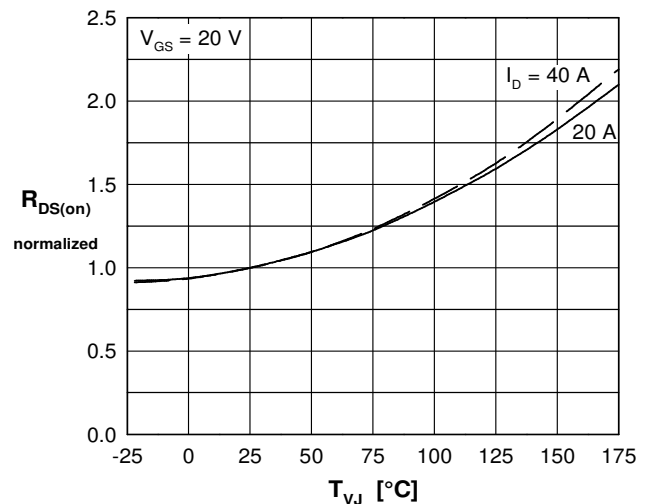
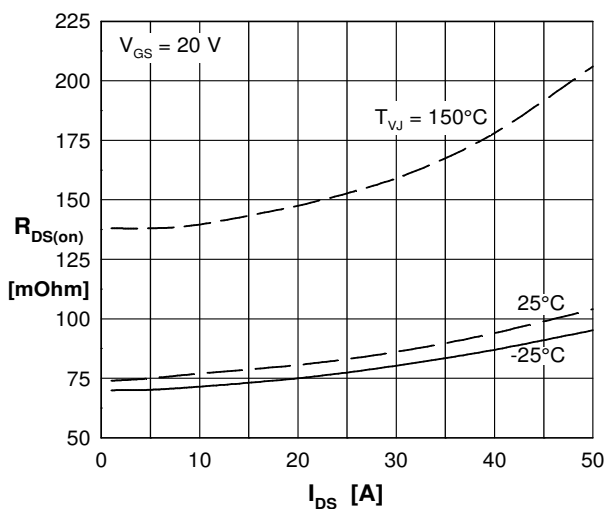
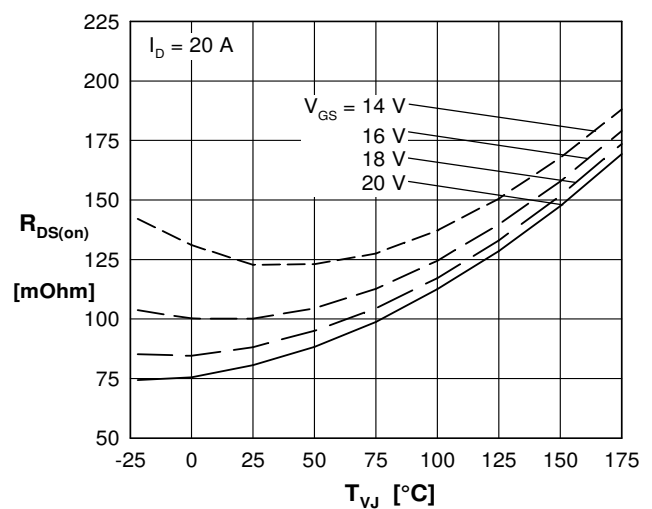
A (8 : 1)



Notes:

- 1) potrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression
- 3) DCB area 10 to 50 μm convex;
position of DCB area in relation to plastic rim: $\pm 25 \mu\text{m}$
(measured 2 mm from Cu rim)
- 4) terminal plating: 2 - 6 μm Ni + 10 - 25 μm Sn (gal v.)
cutting edges may be partially free of plating



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}

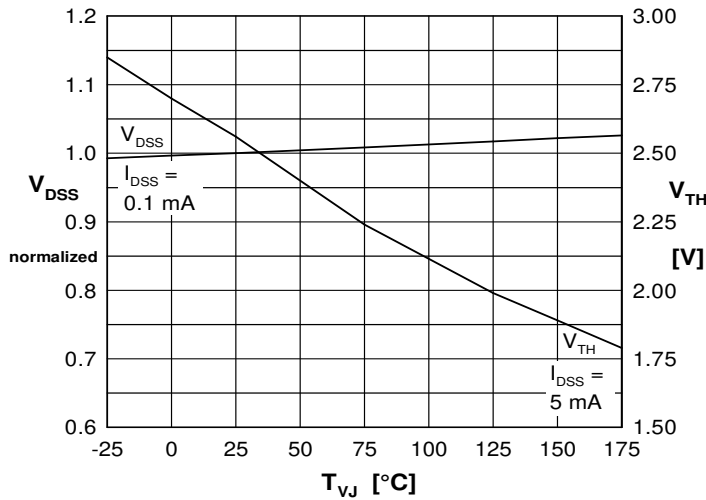
Curves


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

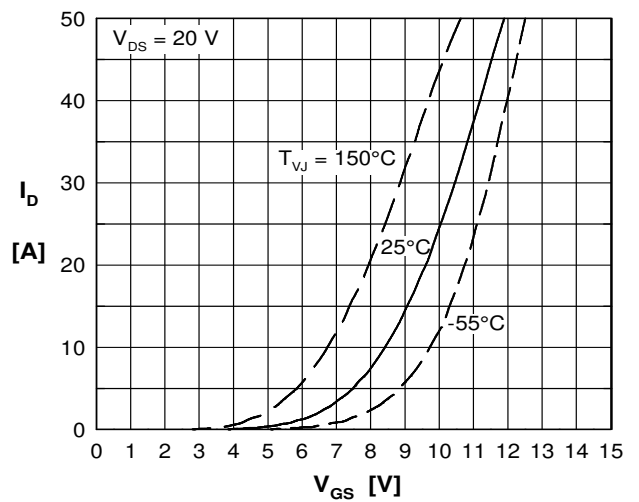


Fig. 8 Typical transfer characteristics

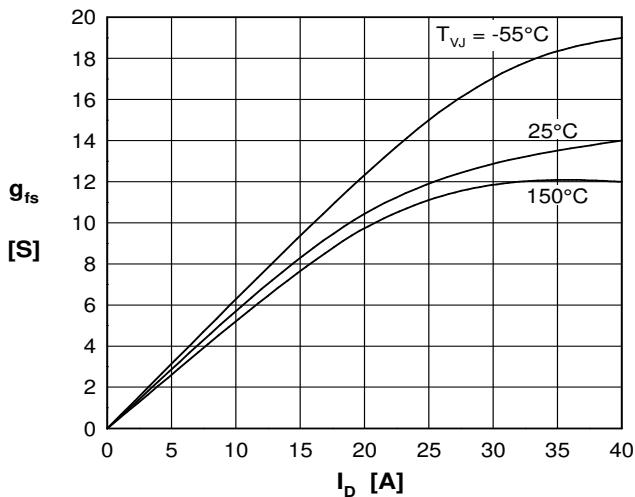


Fig. 9 Typical forward transconductance

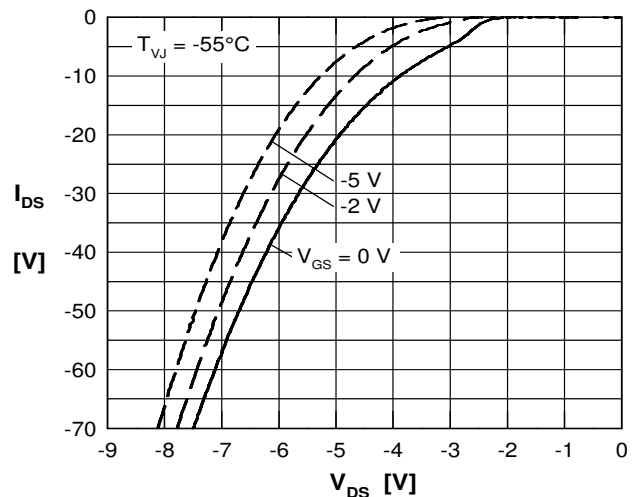


Fig. 10 Forward voltage drop of intrinsic diode versus V_{DS} measured at -55°C

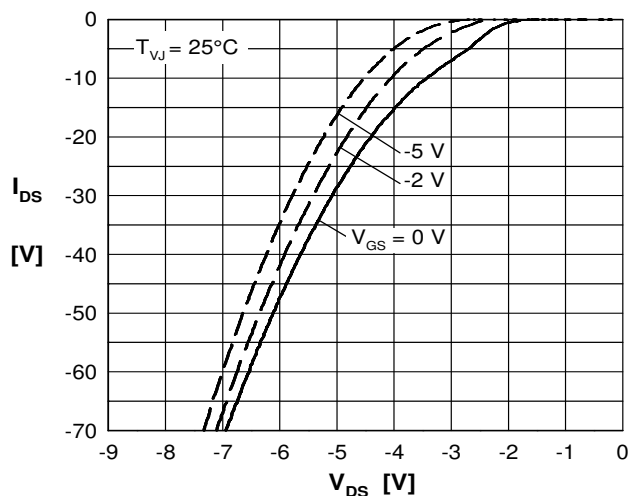


Fig. 11 Forward voltage drop of intrinsic diode versus V_{DS} measured at 25°C

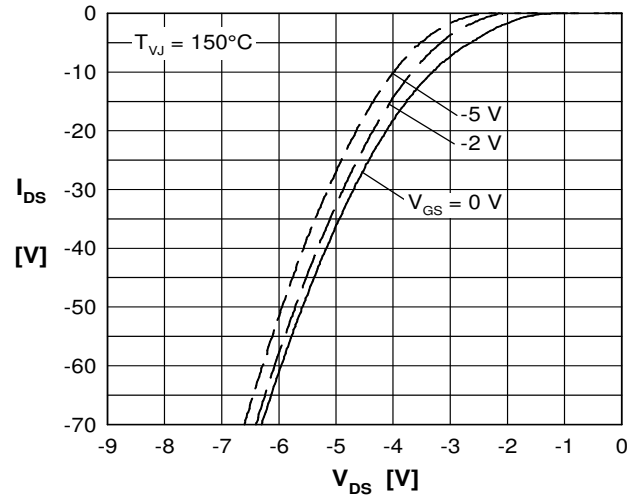


Fig. 12 Forward voltage drop of intrinsic diode versus V_{DS} measured at 150°C

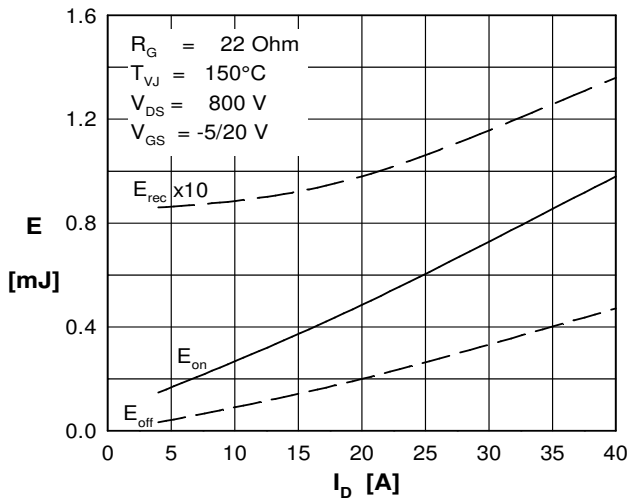
Curves


Fig. 13 Typical switching energy versus drain current

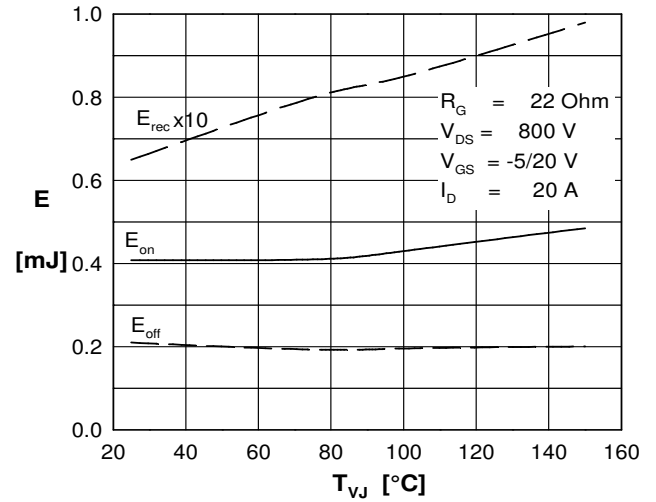


Fig. 14 Typical switching energy versus temperature

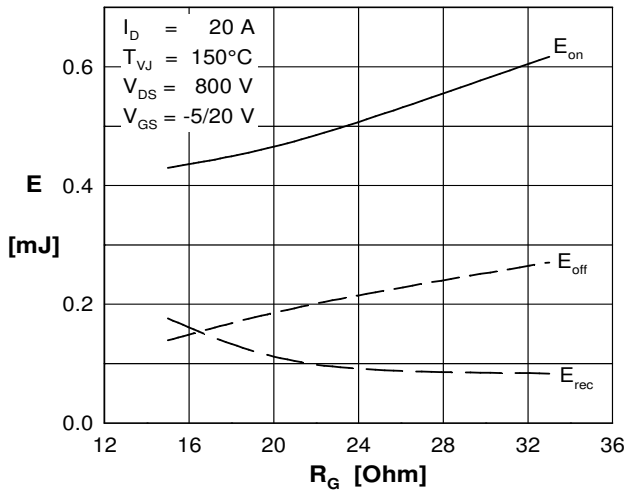


Fig. 15 Typical switching energy versus external gate resistor

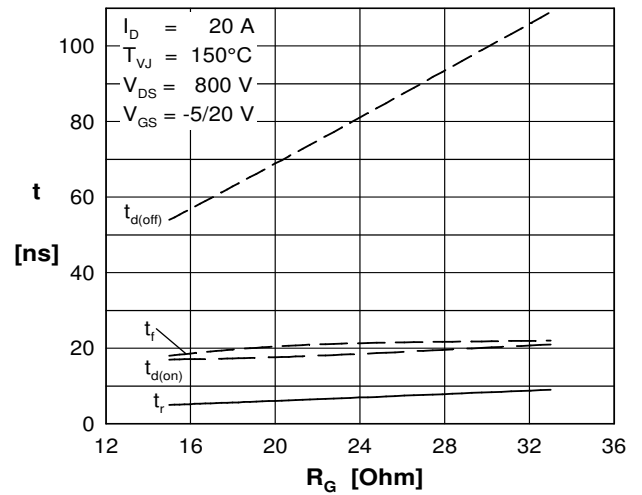


Fig. 16 Typical switching time versus external gate resistor

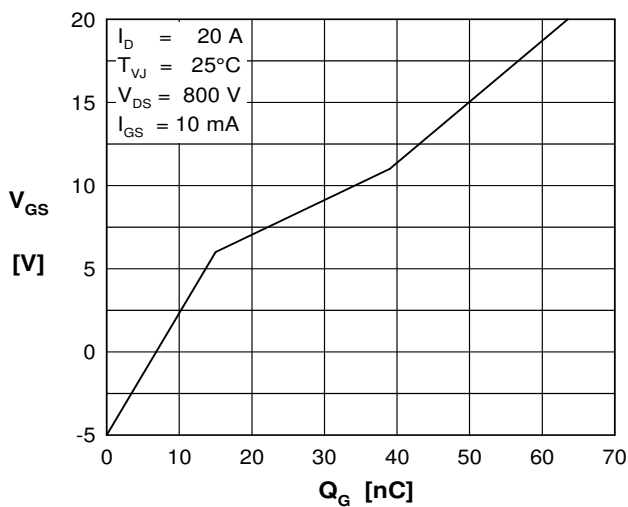


Fig. 17 Typical turn on gate charge, trendline

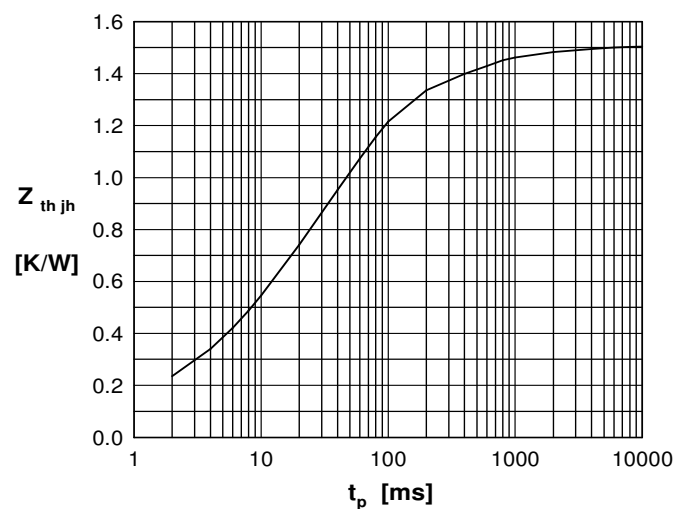


Fig. 18 Typical transient thermal impedance