

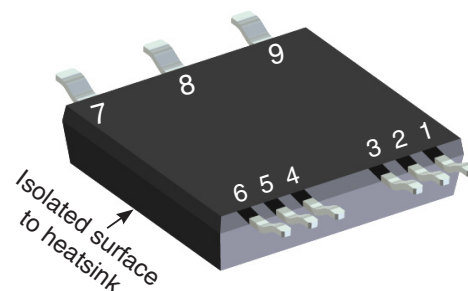
SiC Power MOSFET

$$I_{D25} = 25.5 \text{ A}$$

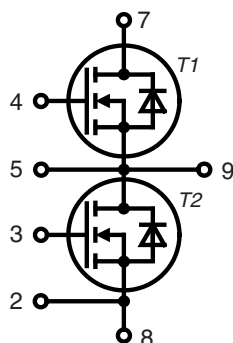
$$V_{DSS} = 1200 \text{ V}$$

$$R_{DS(on) \text{ max}} = 98 \text{ m}\Omega$$

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

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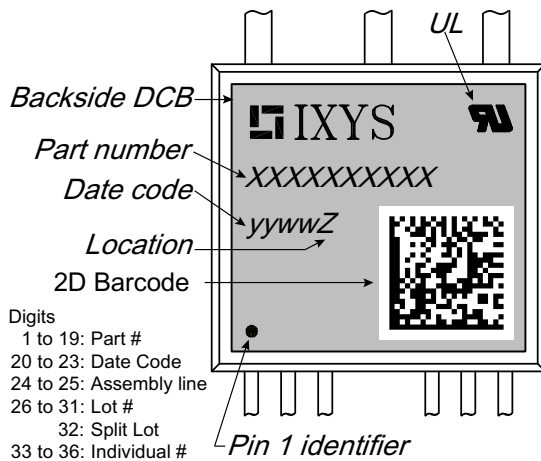
MOSFET			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
V_{DSS}	drain source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = 100\ \mu\text{A}$	1200			V
V_{GSM}	max transient gate source voltage		-10		+25	V
V_{GS}	continous gate source voltage	recommended operational value	-5		+20	V
I_{D25}	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	98	mΩ
				155		mΩ
$V_{GS(th)}$	gate threshold voltage	$I_D = 5\text{ mA}$; $V_{GS} = V_{DS}$	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	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			950		pF
C_{OSS}	output capacitance	$V_{DS} = 1000\text{ V}$; $V_{GS} = 0\text{ V}$; $f = 1\text{ MHz}$ $T_{VJ} = 25^\circ\text{C}$		80		pF
C_{RSS}	reverse transfer (Miller) capacitance			7.6		pF
Q_g	total gate charge			62		nC
Q_{gs}	gate source charge	$V_{DS} = 800\text{ V}$; $I_D = 40\text{ A}$; $V_{GS} = -5/20\text{ V}$ $T_{VJ} = 25^\circ\text{C}$		23		nC
Q_{gd}	gate drain (Miller) charge			37		nC
$t_{d(on)}$	turn-on delay time			19		ns
t_r	current rise time			7		ns
$t_{d(off)}$	turn-off delay time	Inductive switching		66		ns
t_f	current fall time	$V_{DS} = 800\text{ V}$; $I_D = 20\text{ A}$ $T_{VJ} = 25^\circ\text{C}$		23		ns
E_{on}	turn-on energy per pulse	$V_{GS} = -5 / 20\text{ V}$; $R_G = 22\ \Omega$ (external)		0.41		mJ
E_{off}	turn-off energy per pulse	Freewheeling diode is Mosfet's body diode		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			7		ns
$t_{d(off)}$	turn-off delay time	Inductive switching		75		ns
t_f	current fall time	$V_{DS} = 800\text{ V}$; $I_D = 20\text{ A}$ $T_{VJ} = 150^\circ\text{C}$		21		ns
E_{on}	turn-on energy per pulse	$V_{GS} = -5 / 20\text{ V}$; $R_G = 22\ \Omega$ (external)		0.49		mJ
E_{off}	turn-off energy per pulse	Freewheeling diode is Mosfet's body diode		0.20		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off			0.10		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		1.5		K/W

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

Note:

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

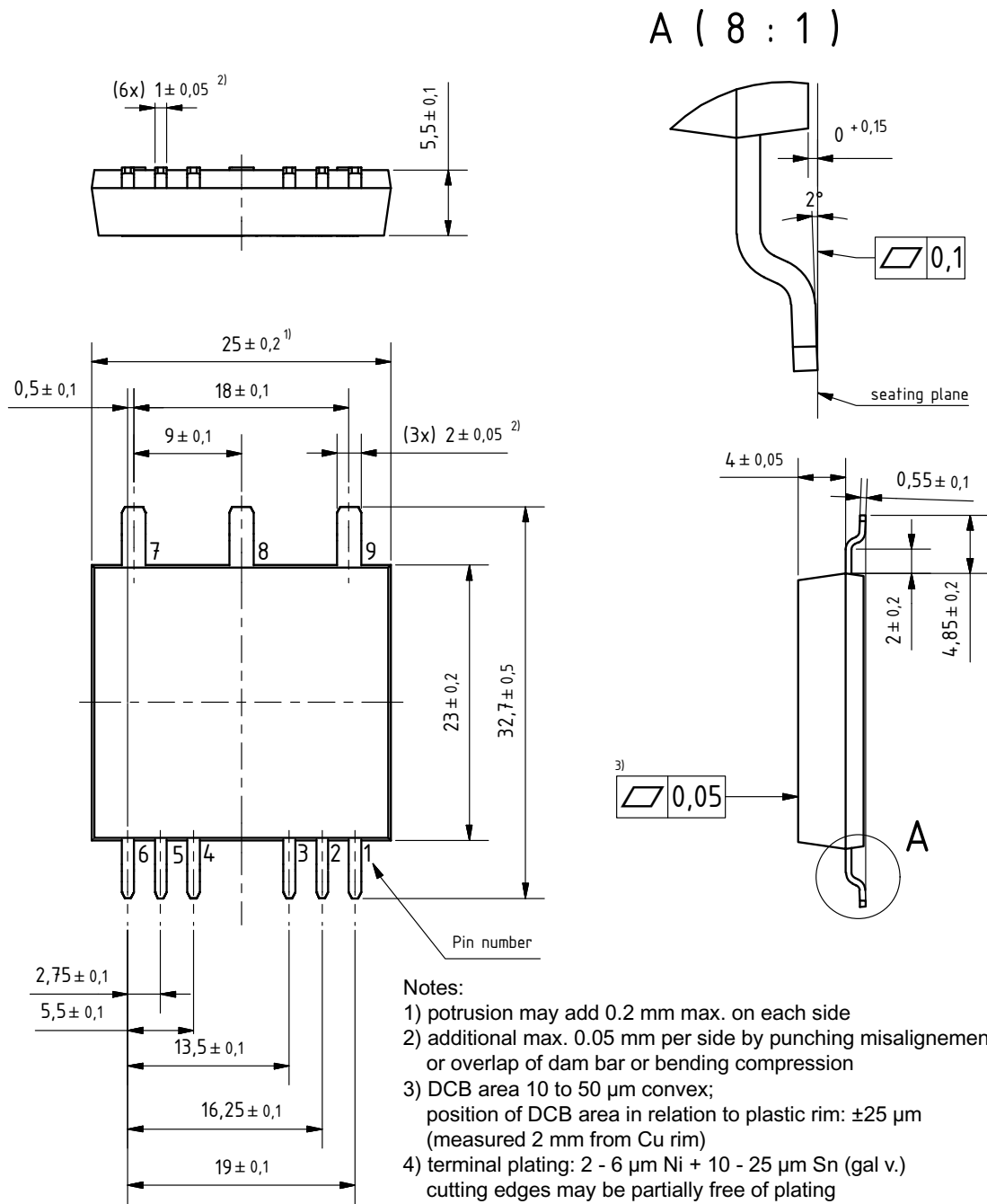
Package SMPD			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
I_{RMS}	RMS current	wide terminal standard terminal			100 60	A A
T_{stg}	storage temperature		-55		150	°C
T_{op}	operation temperature		-55		150	°C
T_{VJ}	virtual junction temperature		-55		175	°C
Weight				8		g
F_c	mounting force 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
		50/60 Hz; RMS; $I_{ISOL} < 1$ mA				


Part number

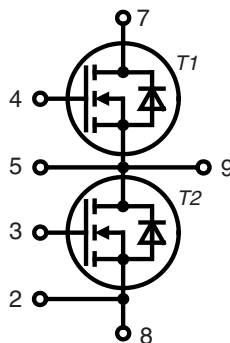
M = Mosfet
 C = SiC MOSFET
 B = Generation 2
 20 = Current Rating [A]
 P = Phase leg
 1200 = Reverse Voltage [V]
 LB = SMPD-B

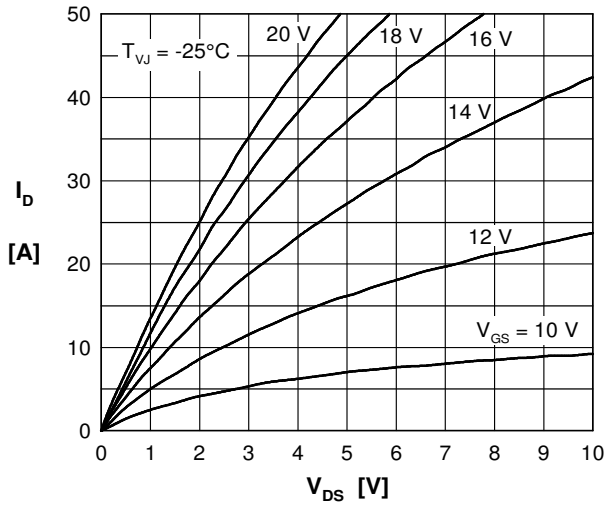
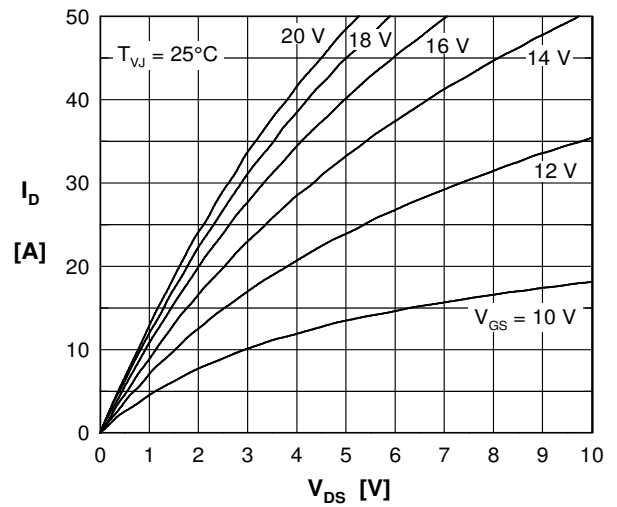
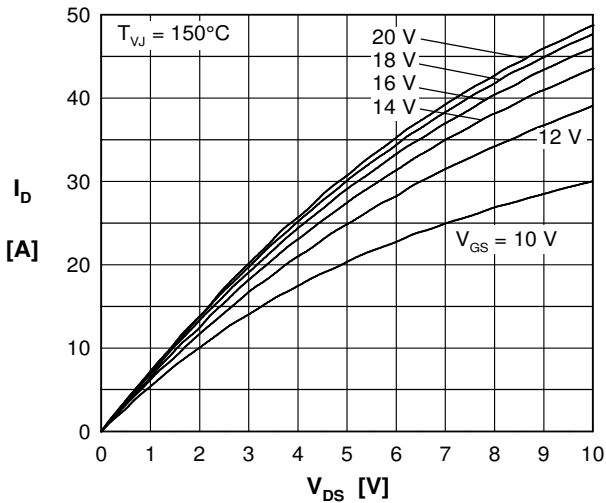
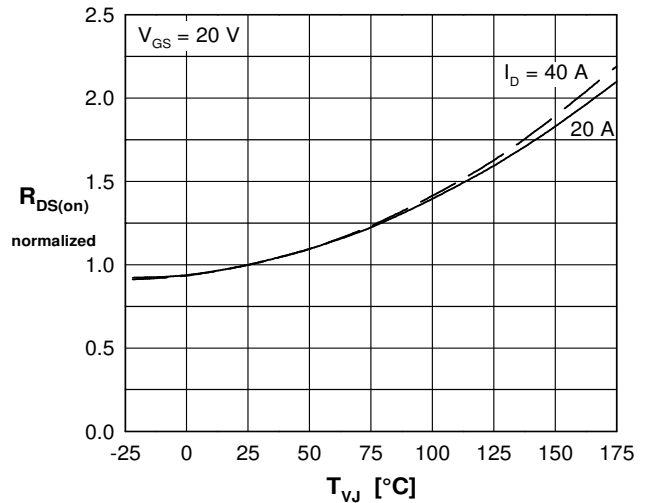
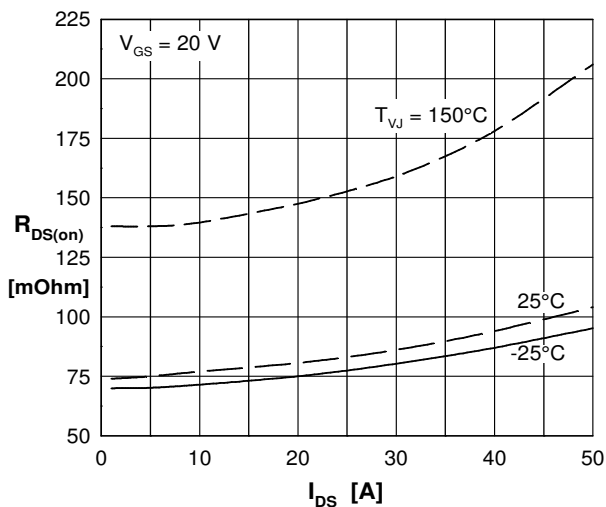
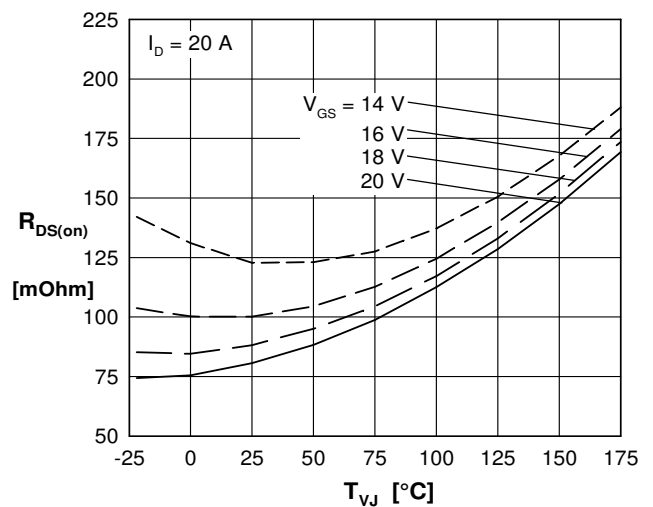
Digits
 1 to 19: Part #
 20 to 23: Date Code
 24 to 25: Assembly line
 26 to 31: Lot #
 32: Split Lot
 33 to 36: Individual #

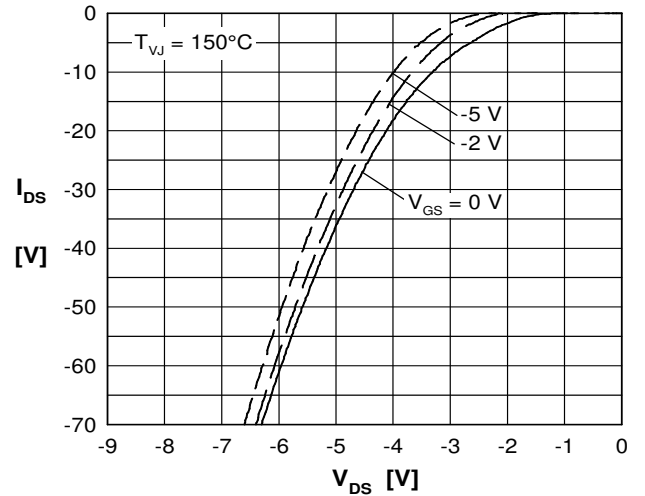
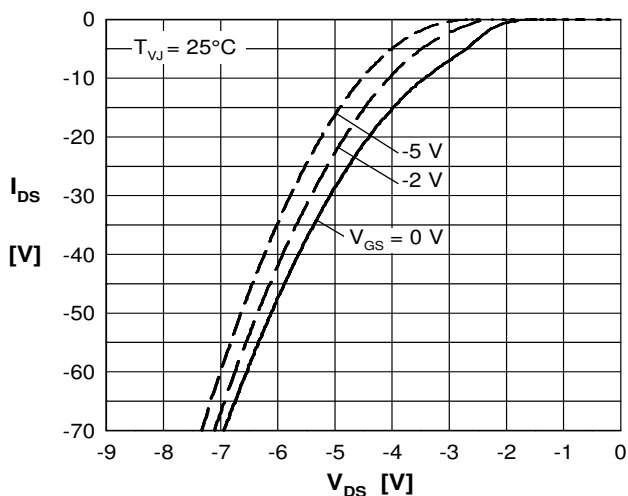
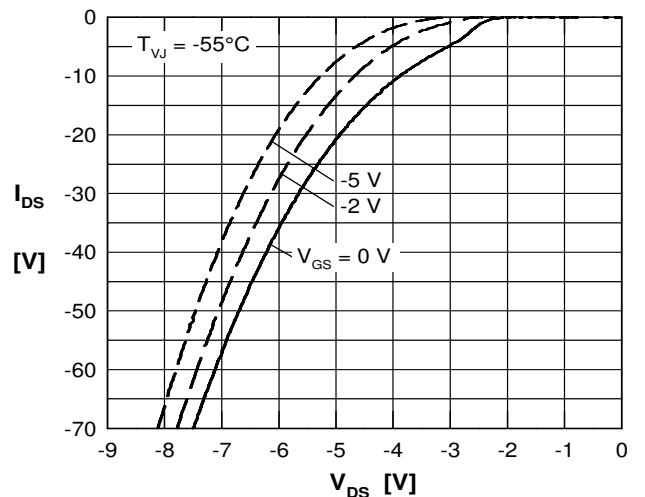
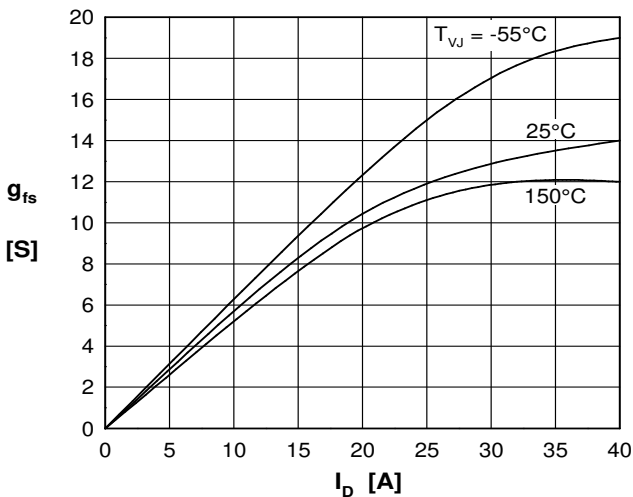
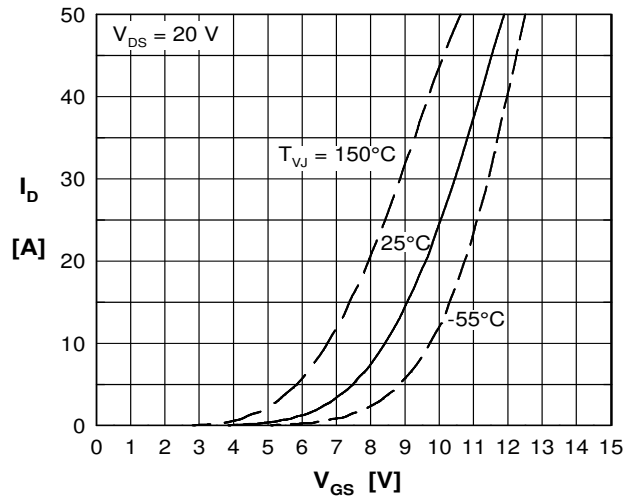
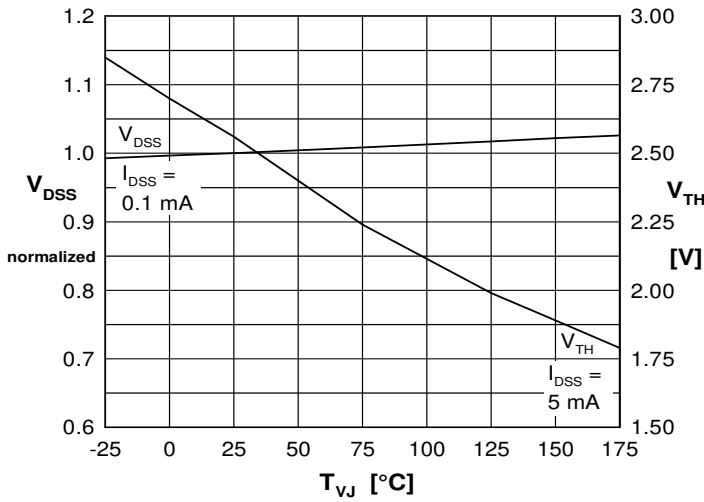
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MCB20P1200LB-TUB	MCB20P1200LB	Tube	20	MCB20P1200LB-TUB
Alternative	MCB20P1200LB-TRR	MCB20P1200LB	Tape&Reel	200	MCB20P1200LB-TRR

Outlines SMPD-B


Dimensions in mm
 (1 mm = 0.0394")



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


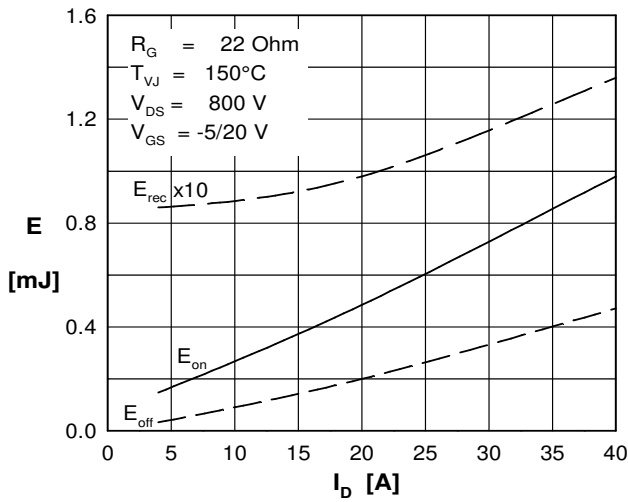
Curves


Fig. 13 Typical switching energy versus drain current

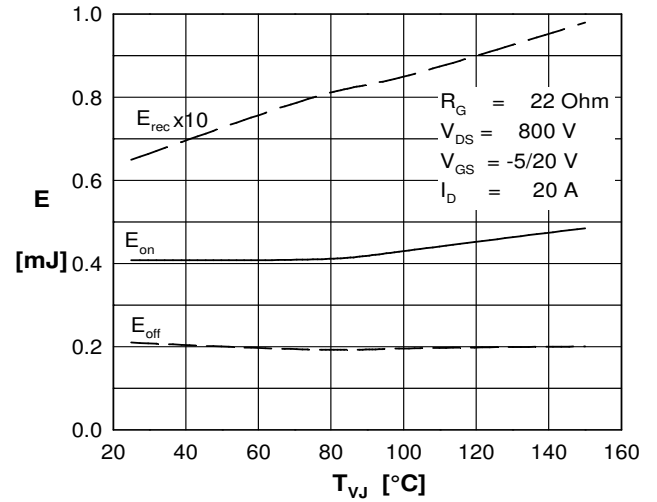


Fig. 14 Typical switching energy versus temperature

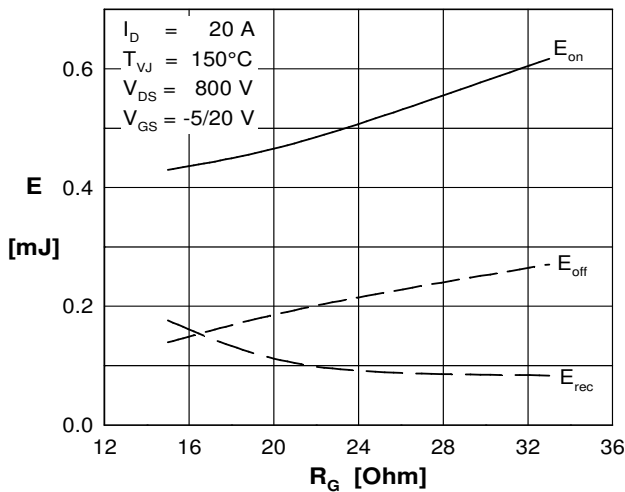


Fig. 15 Typical switching energy versus external gate resistor

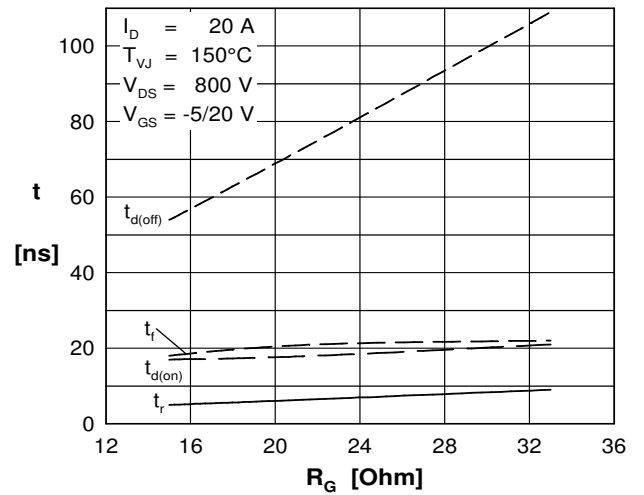


Fig. 16 Typical switching time versus external gate resistor

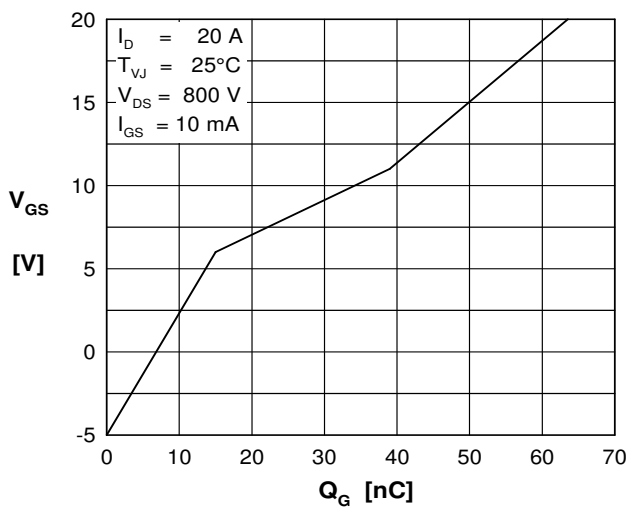


Fig. 17 Typical turn on gate charge, trendline

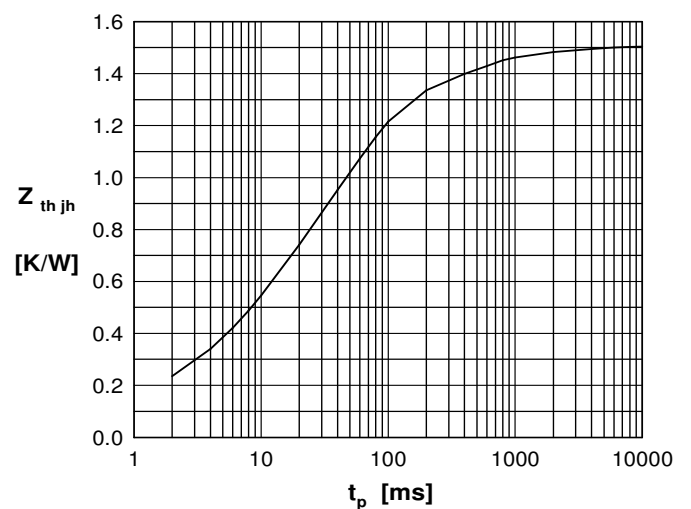


Fig. 18 Typical transient thermal impedance