

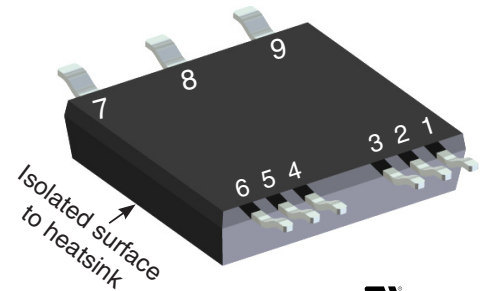
SiC Power MOSFET


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

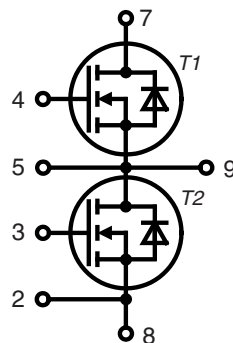
$$V_{DSS} = 1200 \text{ V}$$

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

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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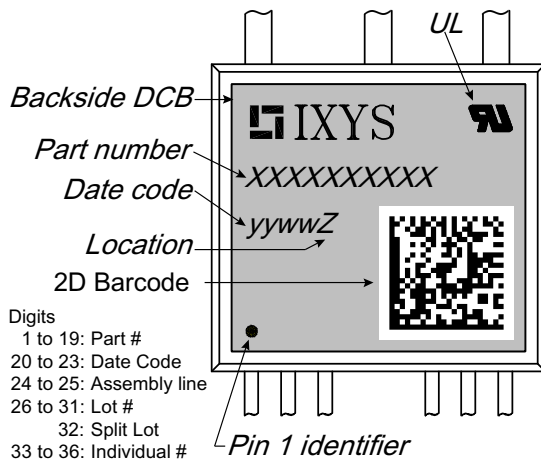
MOSFET				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
V_{DSS}	drain source breakdown voltage	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	1200				V
V_{GSM}	max transient gate source voltage		-10		+25		V
V_{GS}	continous gate source voltage	recommended operational value	-5		+20		V
I_{D25}	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	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}, \text{ESR of } C_{ISS}$		4.6			Ω
C_{ISS}	input capacitance			950			pF
C_{OSS}	output capacitance	$V_{DS} = 1000\text{ V}; V_{GS} = 0\text{ V}; f = 1\text{ MHz}$		80			pF
C_{RSS}	reverse transfer (Miller) capacitance	$T_{VJ} = 25^\circ\text{C}$		7.6			pF
Q_g	total gate charge			62			nC
Q_{gs}	gate source charge	$V_{DS} = 800\text{ V}; I_D = 40\text{ A}; V_{GS} = -5/20\text{ V}$		23			nC
Q_{gd}	gate drain (Miller) charge	$T_{VJ} = 25^\circ\text{C}$		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	$V_{DS} = 800\text{ V}; I_D = 20\text{ A}$		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	$V_{DS} = 800\text{ V}; I_D = 20\text{ A}$		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	$V_{GS} = -5\text{ V}; I_F = 20\text{ A}; V_R = 800\text{ V}$		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	$V_{GS} = -5\text{ V}; I_F = 20\text{ A}; V_R = 800\text{ V}$		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 $V_{GS} = -5\text{V}$

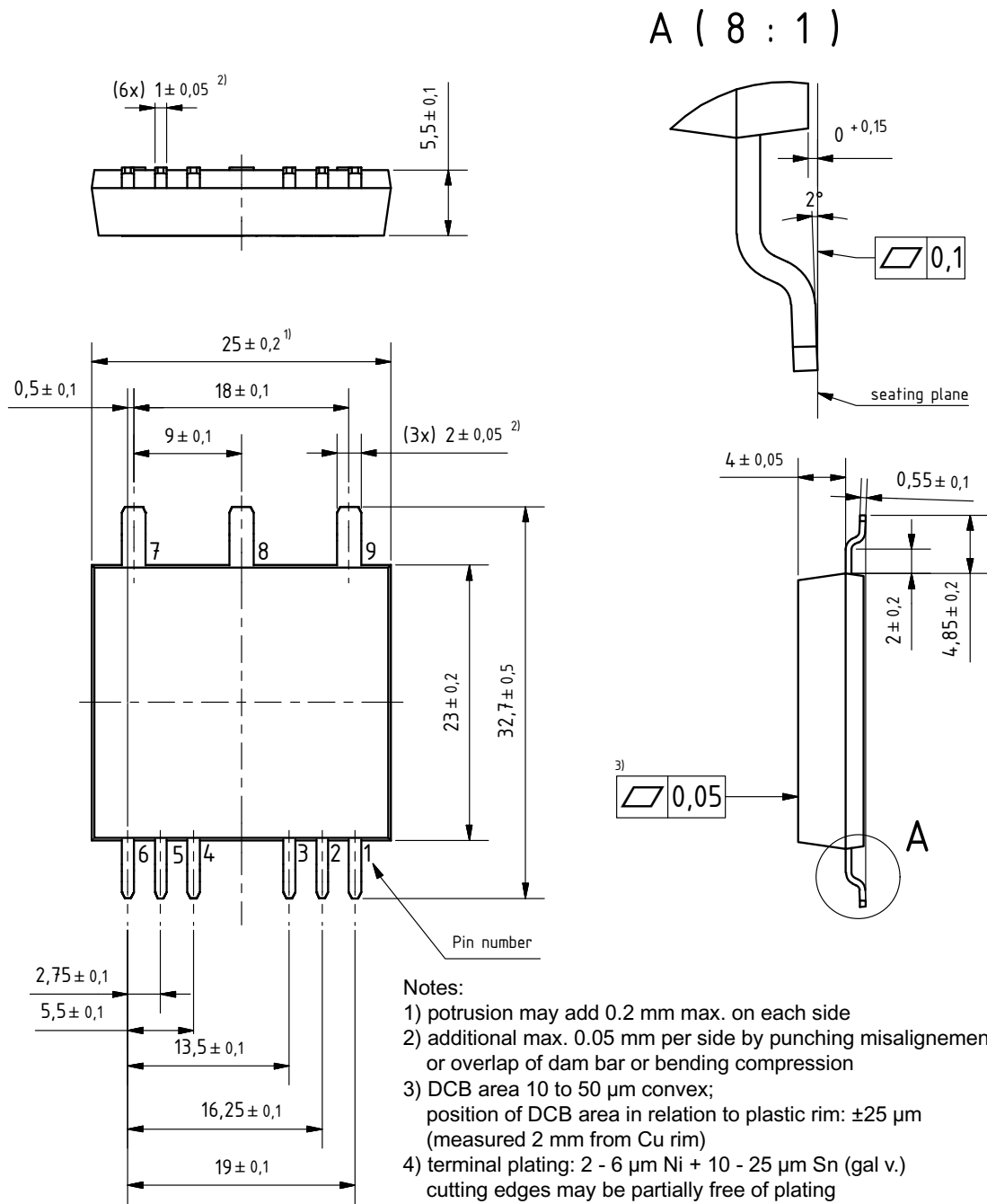
Package SMPD			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
I_{RMS}	RMS current	wide terminal standard terminal			100 60	A A
T_{stg}	storage temperature		-55		150	°C
T_{op}	operation temperature		-55		150	°C
T_{VJ}	virtual junction temperature		-55		175	°C
Weight				8		g
F_c	mounting force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

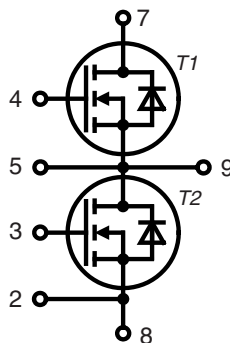
M = Mosfet
 C = SiC MOSFET
 B = Generation 2
 20 = Current Rating [A]
 P = Phase leg
 1200 = Reverse Voltage [V]
 LB = SMPD-B

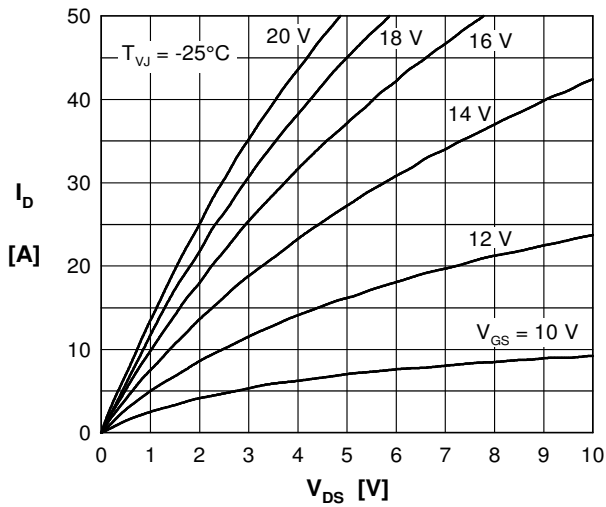
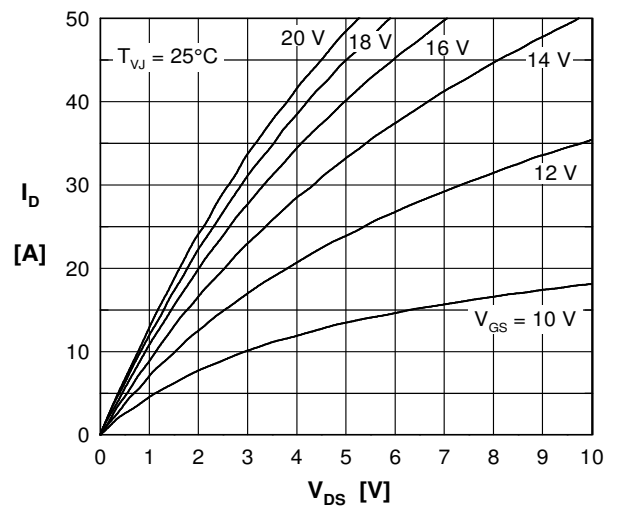
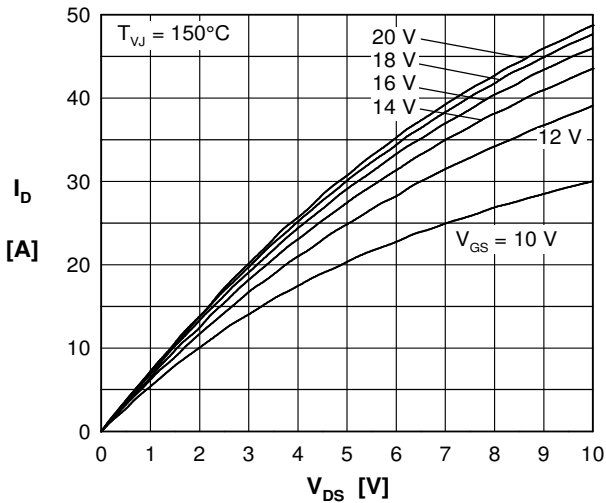
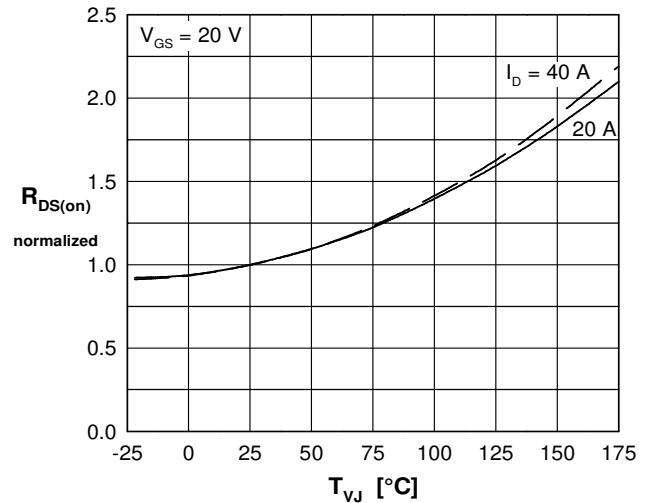
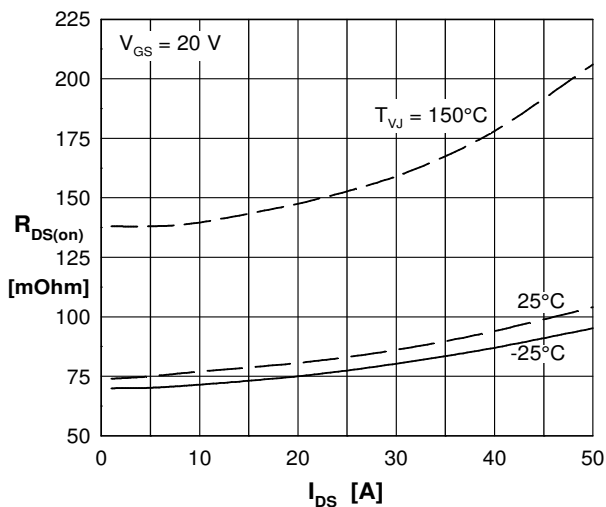
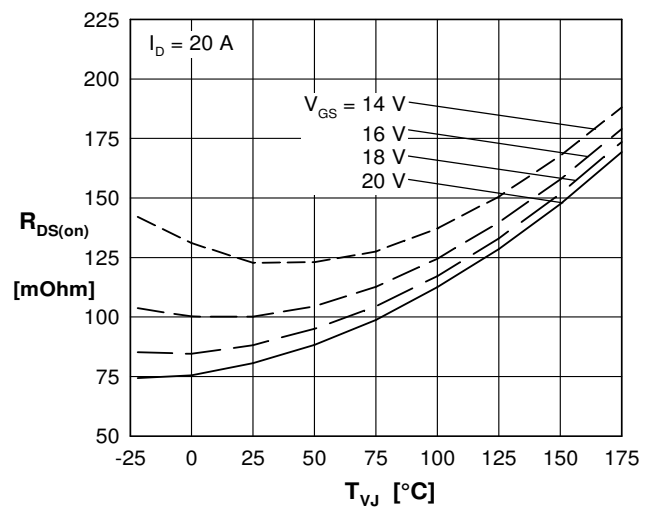
Digits
 1 to 19: Part #
 20 to 23: Date Code
 24 to 25: Assembly line
 26 to 31: Lot #
 32: Split Lot
 33 to 36: Individual #

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}

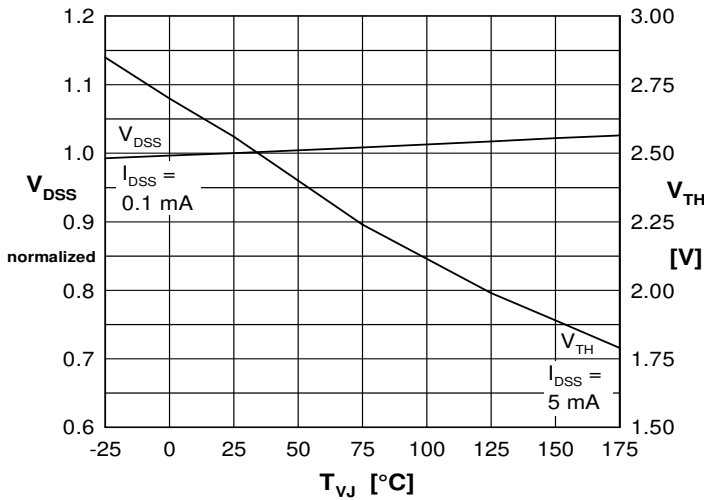
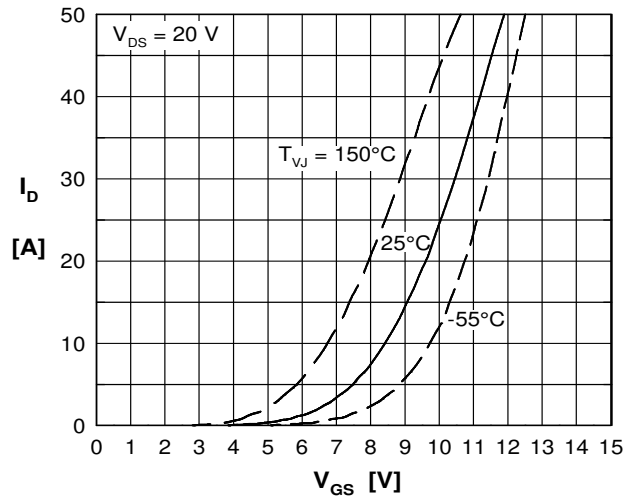
Curves

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


Fig. 8 Typical transfer characteristics

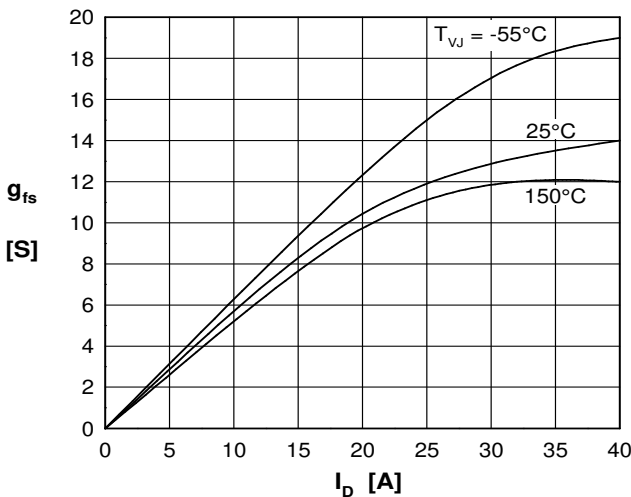
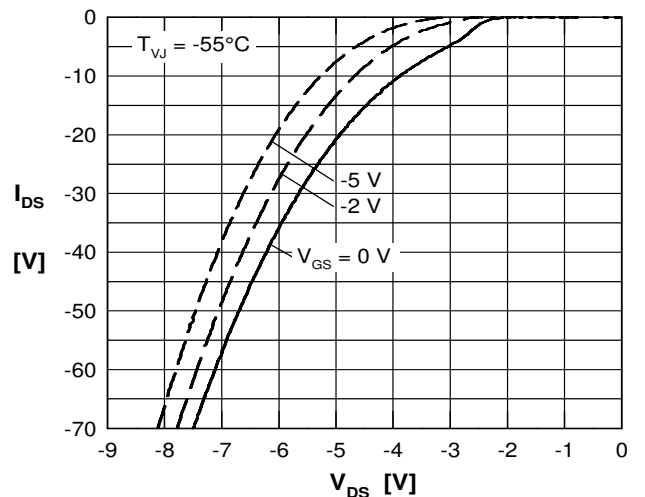
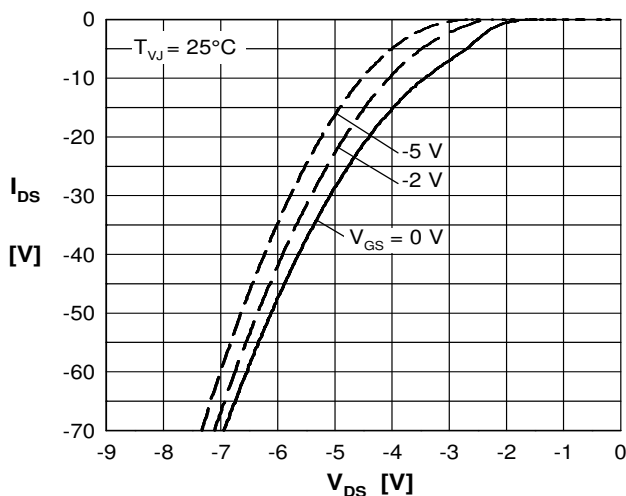
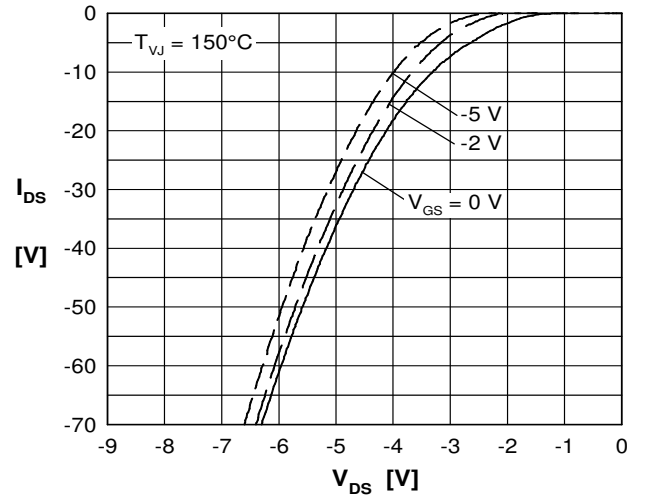


Fig. 9 Typical forward transconductance


 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

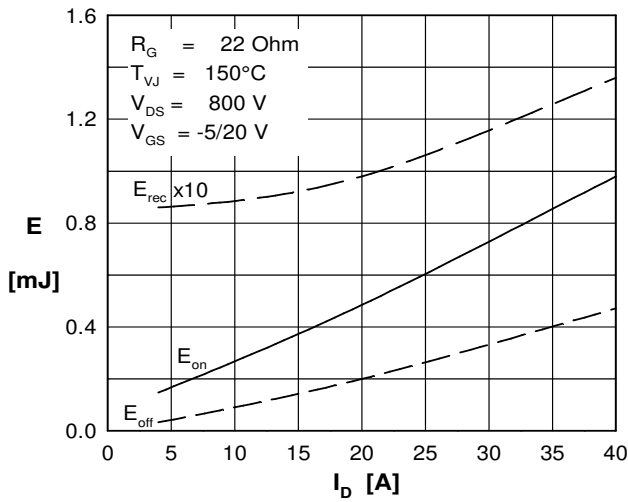
Curves


Fig. 13 Typical switching energy versus drain current

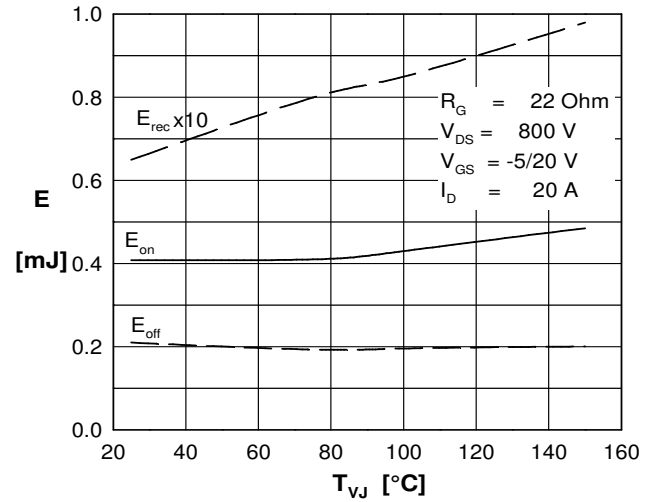


Fig. 14 Typical switching energy versus temperature

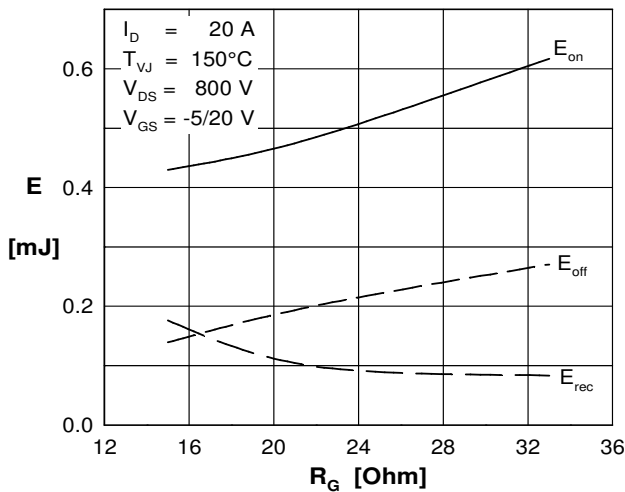


Fig. 15 Typical switching energy versus external gate resistor

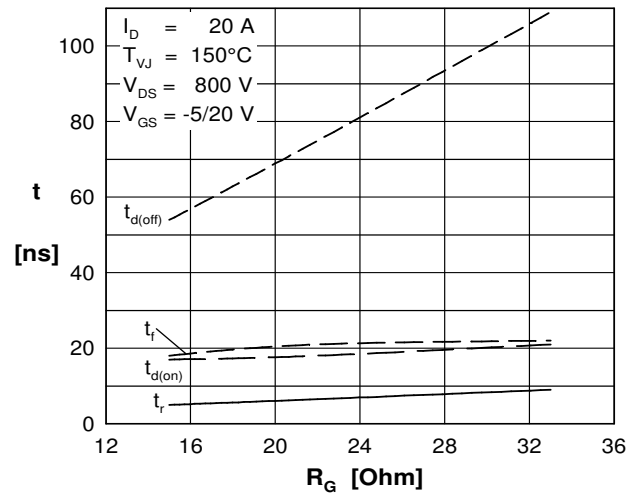


Fig. 16 Typical switching time versus external gate resistor

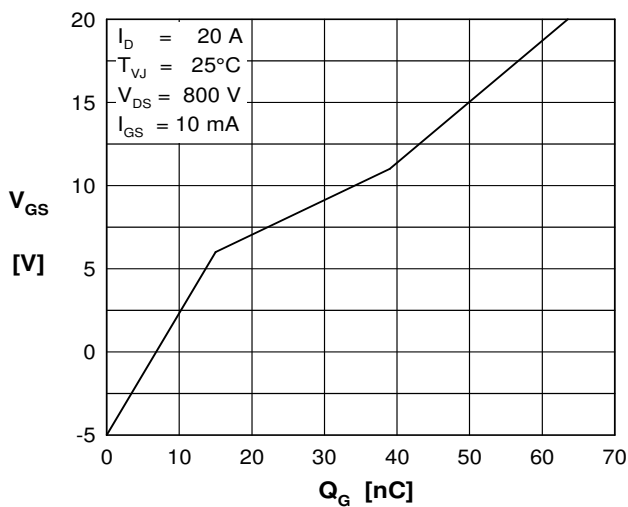


Fig. 17 Typical turn on gate charge, trendline

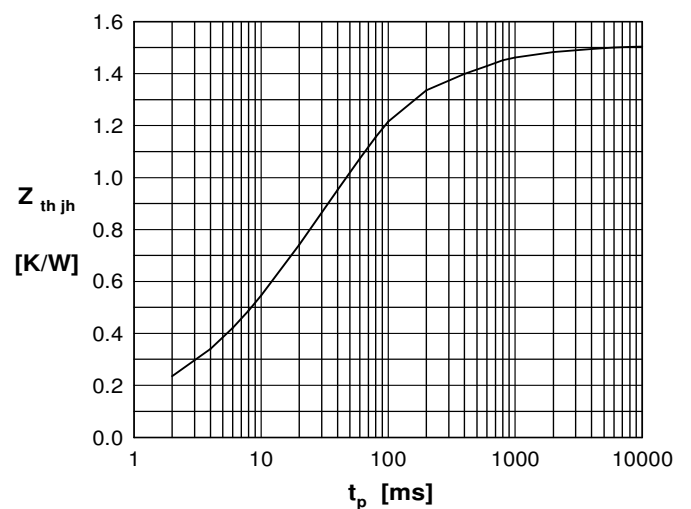


Fig. 18 Typical transient thermal impedance