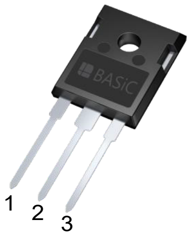
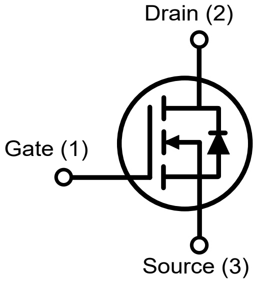
Product Summary

V_{DS}	**1700 V**
I_D (T_C=25°C)	**7 A**
$R_{DS(on).typ}$	**600 mΩ@V_{GS}=18V**

Package: TO-247-3





Features

- Low On-Resistance with High Blocking Voltage
- Low Capacitance
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant

Benefits

- High Frequency Operation
- Enabling Higher Switching Frequency
- Increased Power Density
- Reduction of Heat Sink Requirements

Applications

- Switch Mode Power Supplies (SMPS)
- Power Inverter & Solar Inverter
- Motor Drivers & EV Charging Station
- DC/DC Converter

Package Pin Definitions

- Pin1 - Gate
- Pin2 - Drain
- Pin3 - Source

Package Parameters

Part Number	Marking	Package
B2M600170H	B2M600170H	TO-247-3

Maximum Ratings

Symbol	Parameter	Test conditions	Value	Unit
V_{DSmax}	Drain-Source Voltage	V_{GS}=0V, I_D=100μA	1700	V
V_{GSmax}	Gate-Source Voltage		-10/22	V
V_{GSop}	Recommended Gate-Source Voltage		-4/18	V
I_D	Continuous Drain Current	V_{GS}=18V, T_C=25°C	7	A
		V_{GS}=18V, T_C=100°C	5	A
$I_{D,pulse}$	Pulsed Drain Current	Pulse width t_p=1ms limited by T_{jmax}	10	A
		Pulse width t_p=10μs limited by T_{jmax}	25	
P_{tot}	Power Dissipation	T_C=25°C, T_j=175°C	75	W
E_{AS}	Single pulse avalanche energy	T_C=25°C, L=0.5mH, I_{AS}=8.5A, V_{DD}=140V	18	mJ
T_j	Operating Junction Temperature		-55~175	°C
T_{stg}	Storage Temperature		-55~175	°C
M_d	TO-247 mounting torque	M3 Screw	0.7	N·m

Electrical Characteristics (Defined at T_j=25°C unless otherwise specified)

Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=100μA	1700			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=0.5mA	2.3	2.7	3.5	V
		V_{GS}=V_{DS}, I_D=0.5mA, T_j=175°C		1.9		
I_{GSS}	Gate-Source Leakage Current	V_{GS}=18V, V_{DS}=0V			100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1700V, V_{GS}=0V		1	50	μA
		V_{DS}=1700V, V_{GS}=0V, T_j=175°C		10	200	
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=18V, I_D=2A		600	750	mΩ
		V_{GS}=18V, I_D=2A, T_j=175°C		1230		
		V_{GS}=15V, I_D=2A		750		
g_{fs}	Transconductance	V_{DS}=10V, I_D=2A		1		S

Thermal Characteritics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal Resistance from Junction to Case		2.00		K/W

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=1000V f =1MHz,, V_{AC}=25mV		170		pF
C_{oss}	Output Capacitance			11		pF
C_{rss}	Reverse Transfer Capacitance			2		pF
E_{oss}	C_{oss} Stored Energy			6.3		μJ
$C_{O(ER)}$	Effective Output Capacitance, Energy Related	V_{GS}=0V, 0V < V_{DS} < 1000V		12.7		pF
$C_{O(TR)}$	Effective Output Capacitance, Time Related	V_{GS}=0V, 0V < V_{DS} < 1000V		18		pF
$R_{G(int)}$	Internal Gate Resistance	f =1MHz, V_{AC}=25mV		30		Ω

Gate Charge Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_{GS}	Gate to Source Charge	V_{DS} =1000V I_D =2A V_{GS} =-4/+18V		2		nC
Q_{GD}	Gate to Drain Charge			11		nC
Q_G	Total Gate Charge			14		nC

Switching Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$t_{d(on)}$	Turn-On Delay Time	V_{DC}=1000V, V_{GS}=-4/18V I_D=2A, $R_{G(ext)}$=2.2Ω L_σ=70nH, T_j=25°C diode: body diode at V_{GS}=-4V Inductive Load Eon includes diode reverse recovery		12		ns
t_r	Rise Time			24		ns
$t_{d(off)}$	Turn-Off Delay Time			20		ns
t_f	Fall Time			66		ns
E_{on}	Turn-On Energy (FWD=Body Diode)			80		uJ
E_{off}	Turn-Off Energy (FWD=Body Diode)			13		uJ
$t_{d(on)}$	Turn-On Delay Time	V_{DC}=1000V, V_{GS}=-4/18V I_D=2A, $R_{G(ext)}$=2.2Ω L_σ=70nH, T_j=175°C diode: body diode at V_{GS}=-4V Inductive Load Eon includes diode reverse recovery		14		ns
t_r	Rise Time			22		ns
$t_{d(off)}$	Turn-Off Delay Time			24		ns
t_f	Fall Time			67		ns
E_{on}	Turn-On Energy (FWD=Body Diode)			110		uJ
E_{off}	Turn-Off Energy (FWD=Body Diode)			13		uJ

Reverse Diode Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{SD}	Diode Forward Voltage	V_{GS}=-4V, I_{SD}=1A, T_j=25°C		5.2		V
		V_{GS}=-4V, I_{SD}=1A, T_j=175°C		4.5		
I_{SD}	Continuous Diode Forward Current	V_{GS}=-4V, T_C=25°C		6		A
$I_{SD,pulse}$	Pulse Diode Current	V_{GS}=-4V, pulse width t_p limited by T_{jmax}		9		A
t_{rr}	Reverse Recovery Time	V_{GS}= -4V, V_{DC}=1000V, I_{SD}=2A -di$_F$/dt=500A/μs T_j=25°C		39		ns
Q_{rr}	Reverse Recovery Charge			42		nC
I_{rrm}	Peak Reverse Recovery Current			2		A
t_{rr}	Reverse Recovery Time	V_{GS}= -4V, V_{DC}=1000V, I_{SD}=2A -di$_F$/dt=500A/μs T_j=175°C		38		ns
Q_{rr}	Reverse Recovery Charge			98		nC
I_{rrm}	Peak Reverse Recovery Current			3.5		A

Typical Performance

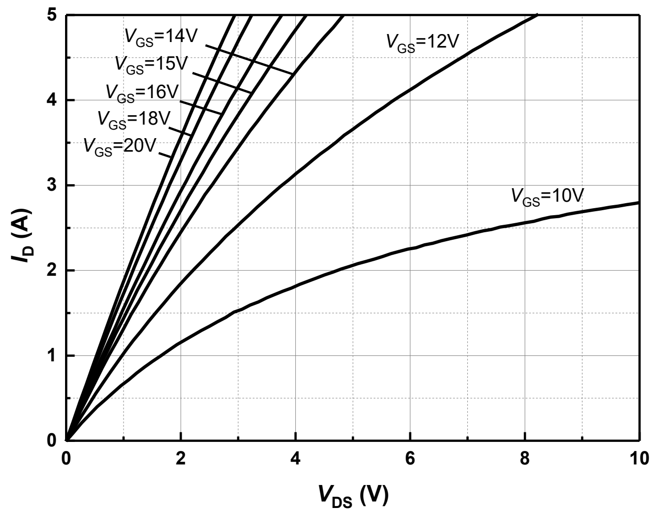


Figure 1 Typical Forward Output Characteristics at T_j=25°C

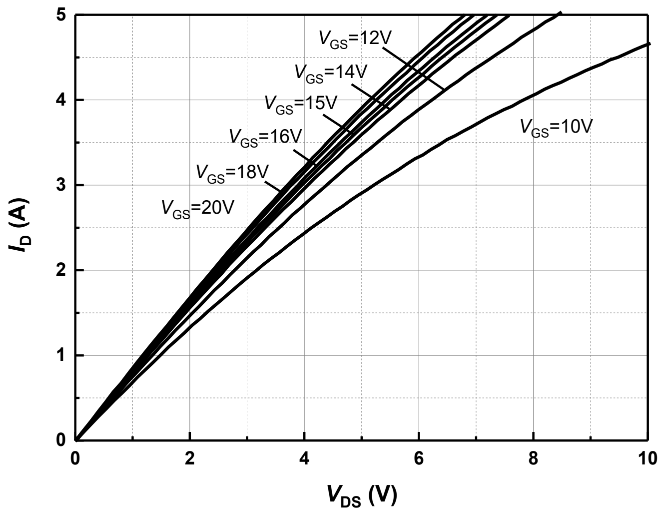


Figure 2 Typical Forward Output Characteristicsat T_j=175°C

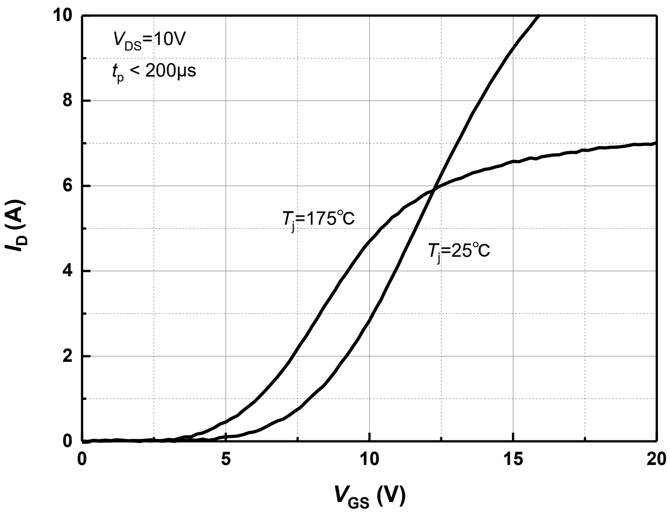


Figure 3 Transfer Characteristics for Various Temperature

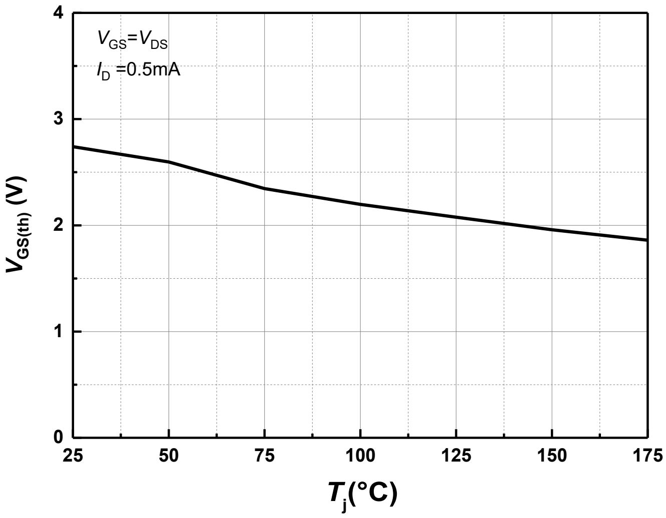


Figure 4 Threshold Voltage for Various Temperature

Typical Performance

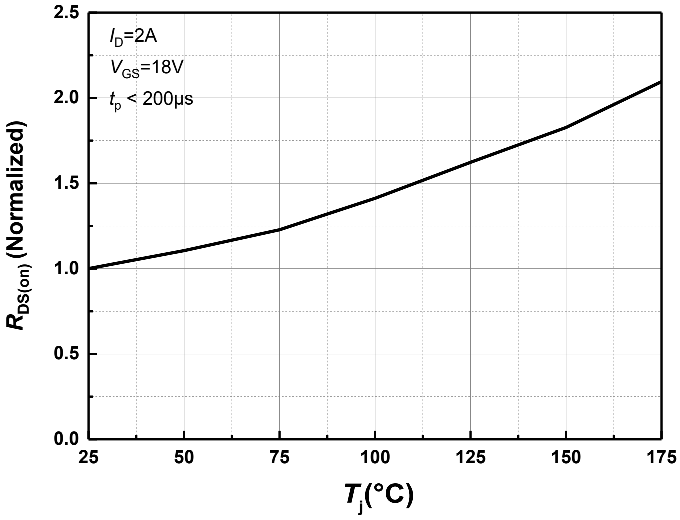


Figure 5 Normalized On-Resistance for Various Temperature

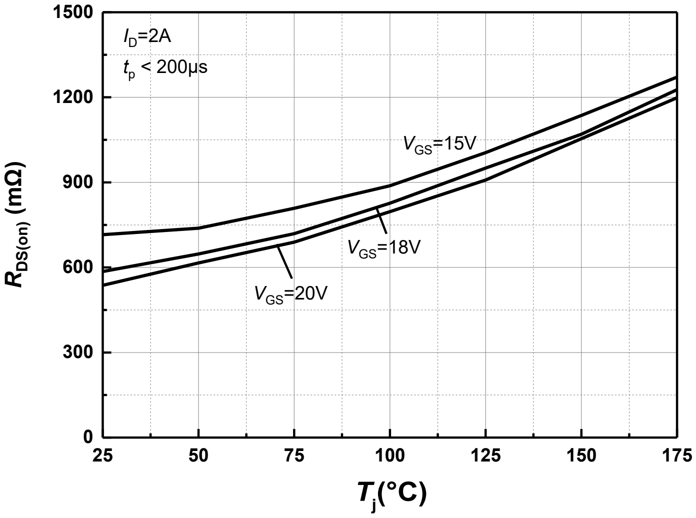


Figure 6 On-Resistance vs. Temperature for Various Gate-Source Voltage

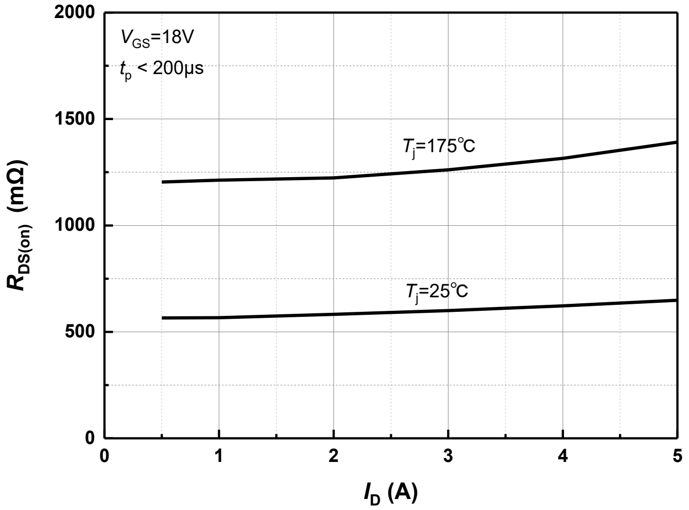


Figure 7 On-Resistance vs. Drain Current for Various Temperature

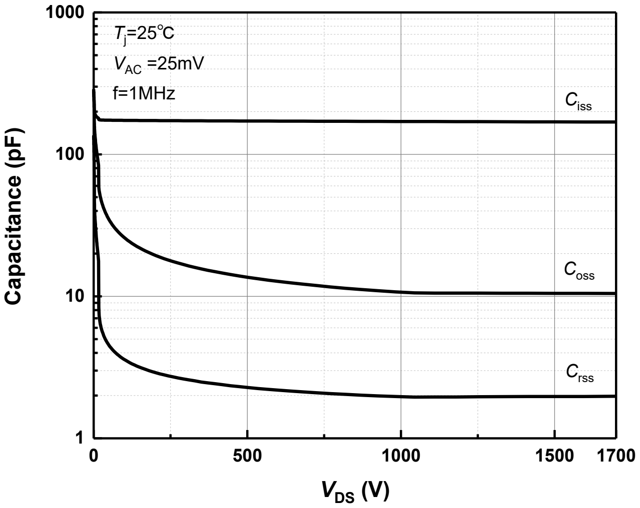
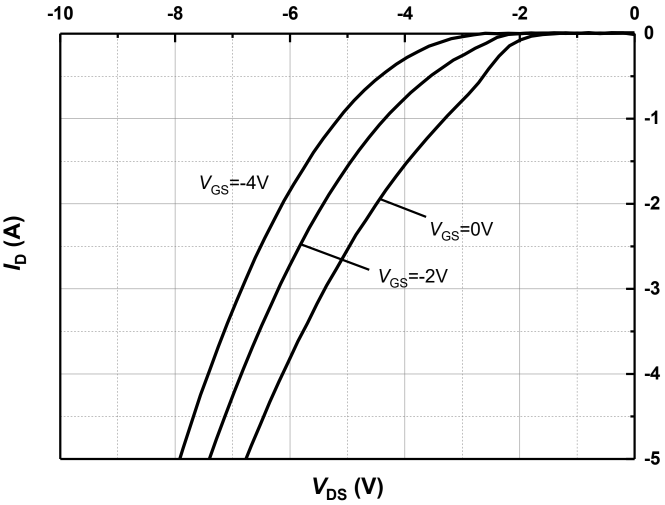


Figure 8 Capacitance vs. Drain-Source Voltage (0 - 1700V)

Typical Performance



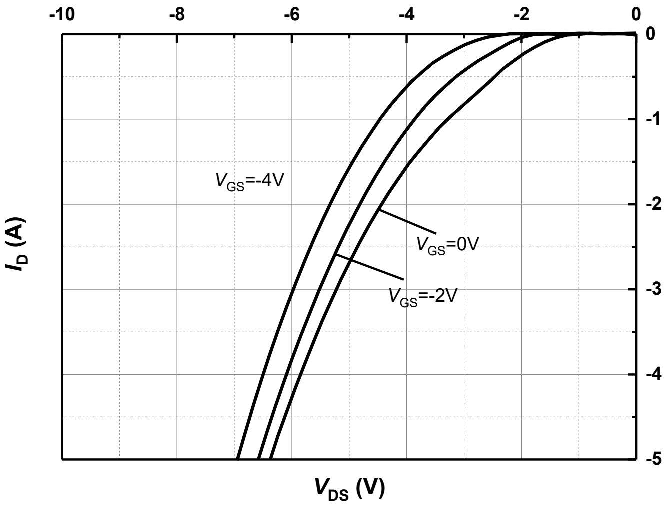
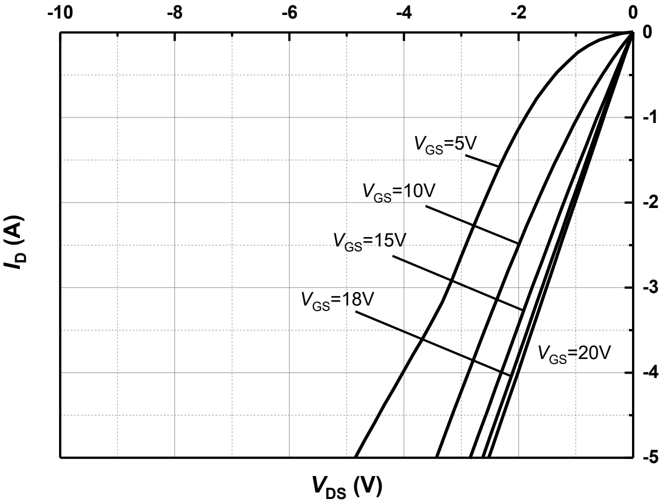


Figure 9 Body Diode Characteristics at T_j=25°C

Figure 10 Body Diode Characteristics at T_j=175°C



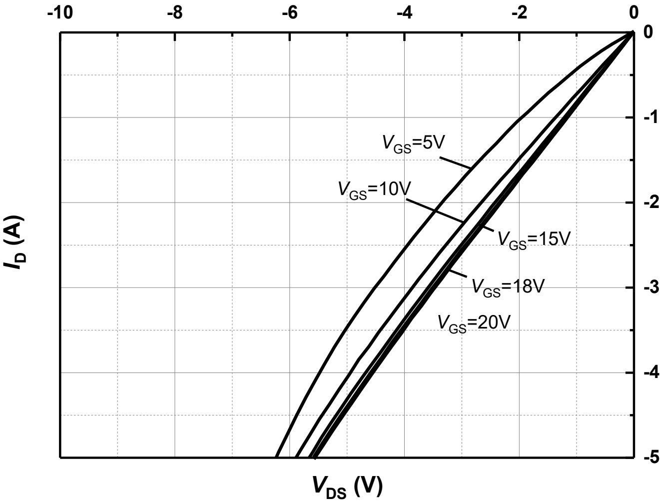


Figure 11 3rd Quadrant Characteristics at T_j=25°C

Figure 12 3rd Quadrant Characteristics at T_j=175°C

Typical Performance

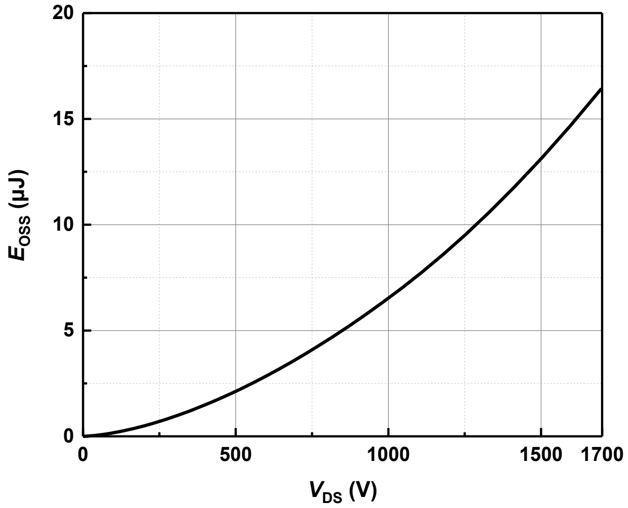


Figure 13 Output Capacitor stored Energy

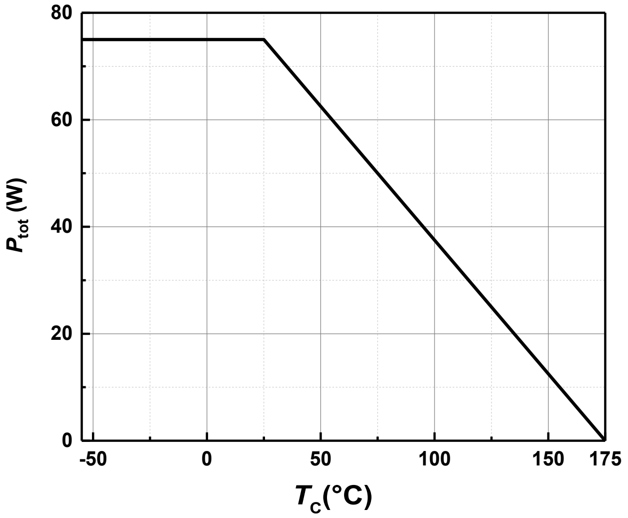


Figure 14 Maximum Power Dissipation Derating vs. Case Temperature

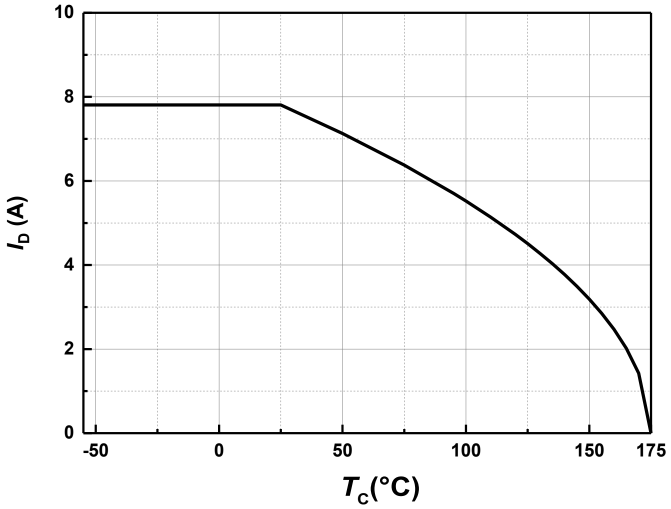


Figure 15 Continuous Drain Current Derating vs. Case Temperature

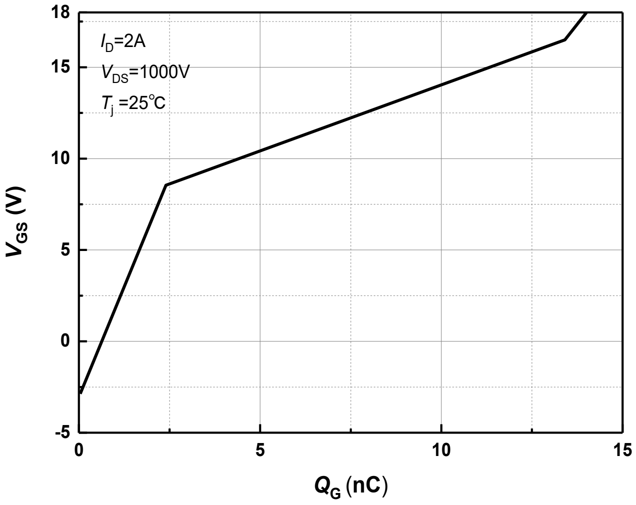


Figure 16 Gate Charge Characteristics

Typical Performance

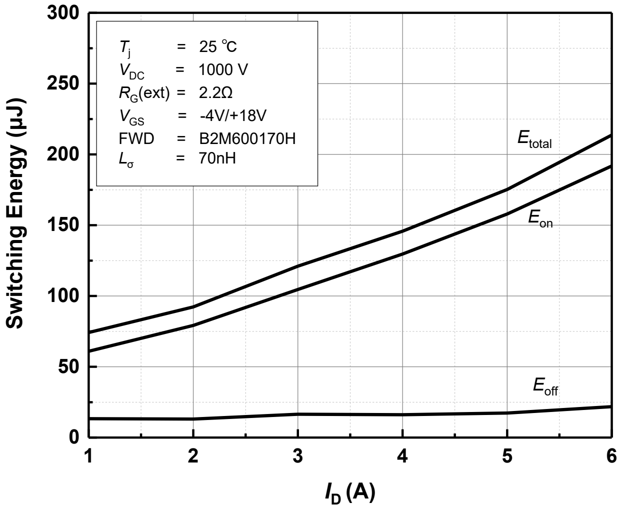


Figure 17 Clamped Inductive Switching Energy vs. Drain Current (V_{DC}= 1000V) at T_j=25°C

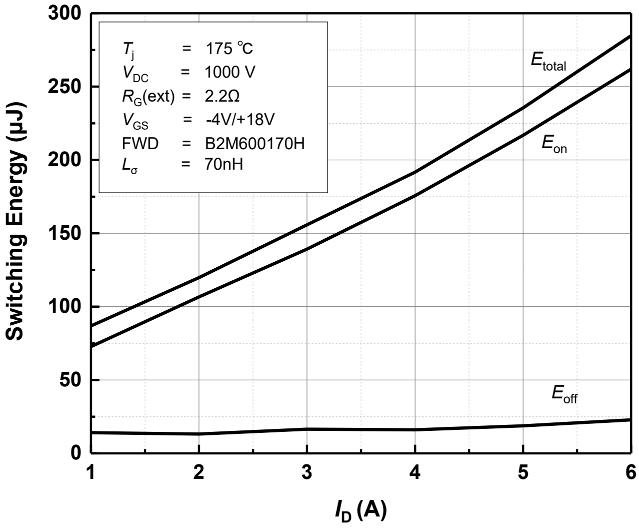


Figure 18 Clamped Inductive Switching Energy vs. Drain Current (V_{DC}= 1000V) at T_j=175°C

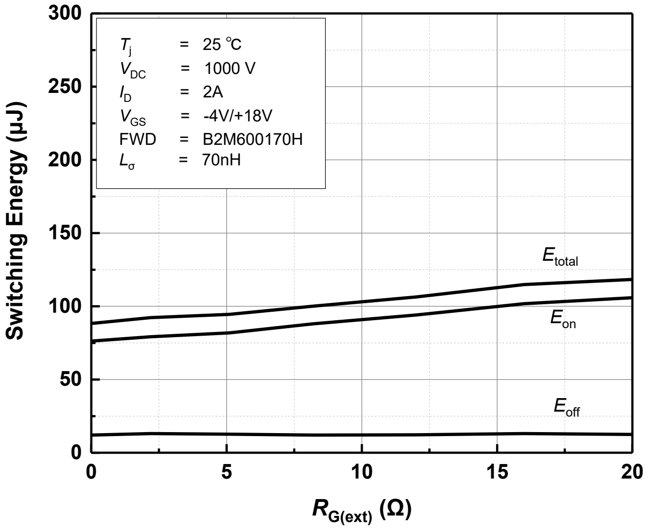


Figure 19 Clamped Inductive Switching Energy vs. External Gate Resistance at T_j=25°C

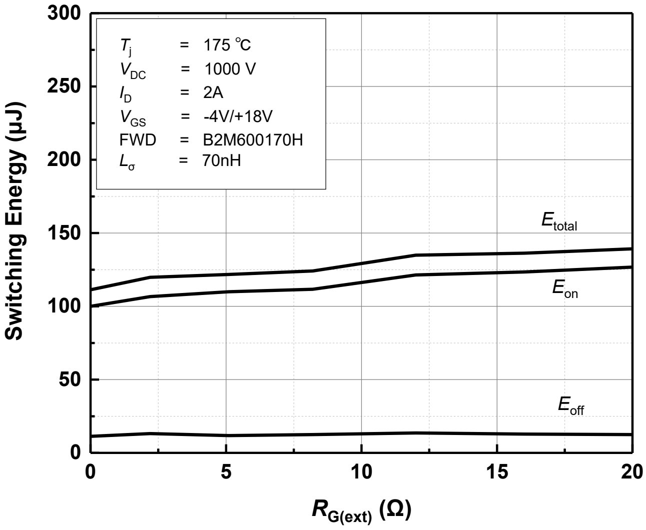


Figure 20 Clamped Inductive Switching Energy vs. External Gate Resistance at T_j=175°C

Typical Performance

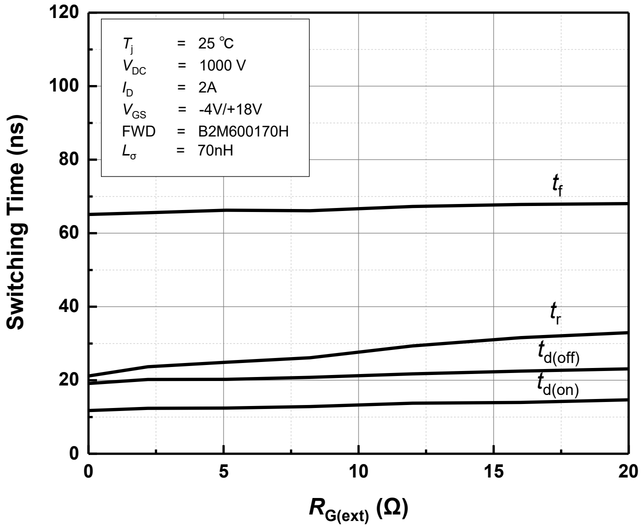


Figure 21 Clamped Inductive Switching Time vs. External Gate Resistance at T_j=25°C

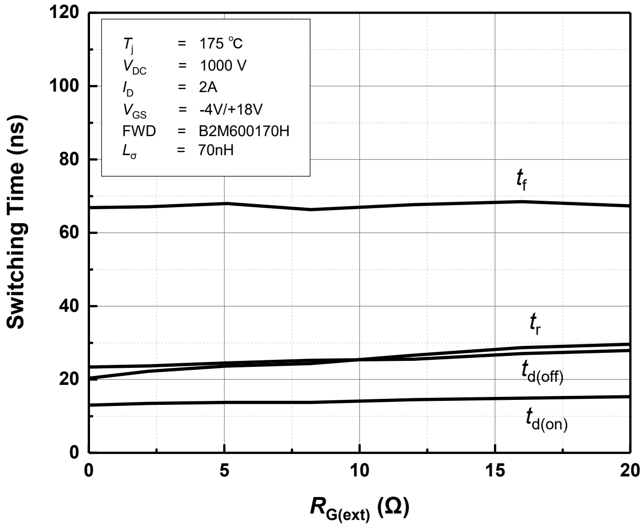


Figure 22 Clamped Inductive Switching Time vs. External Gate Resistance at T_j=175°C

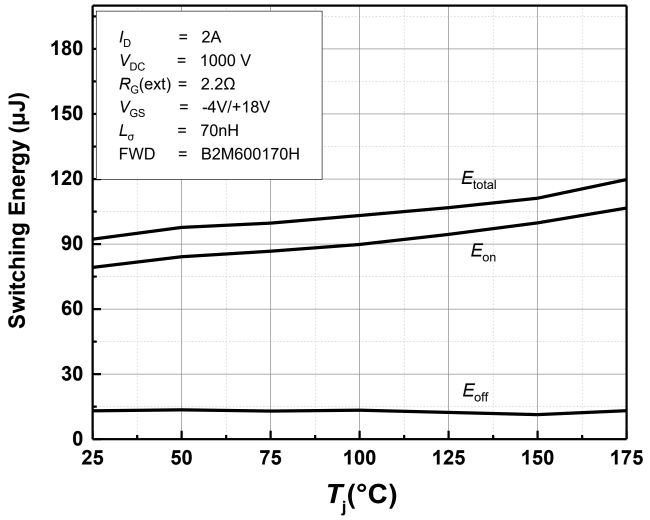


Figure 23 Clamped Inductive Switching Energy vs. Temperature

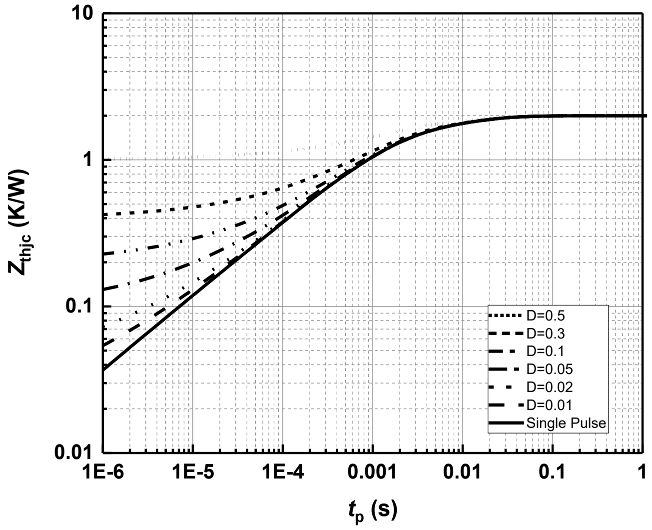


Figure 24 Transient Thermal Impedance (Junction - Case)

Typical Performance

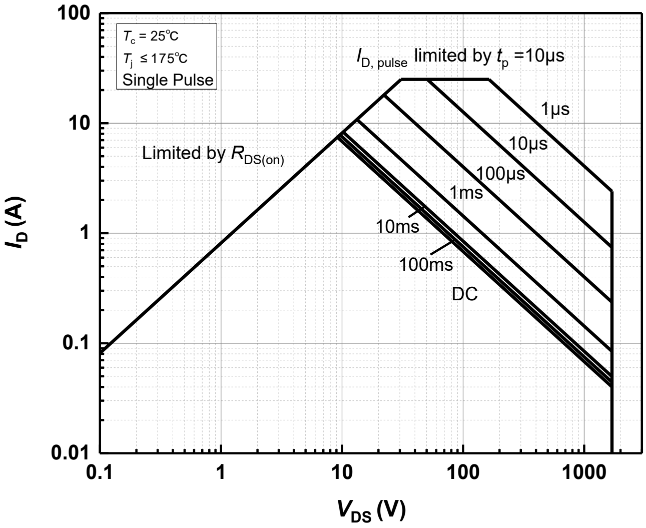
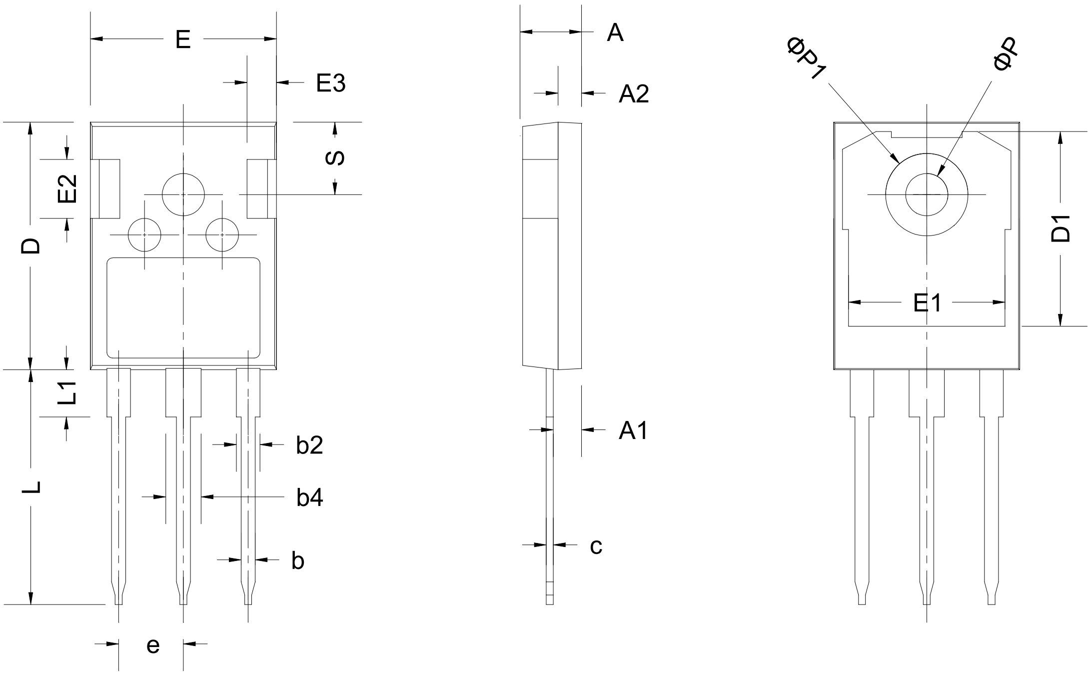
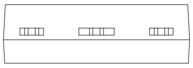


Figure 25 Forward Biased Safe Operating Area

Package Dimensions





SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ϕ P	3.40	3.60	3.80
ϕ P1	-	-	7.30
S	6.16 BSC		

Revision History

Document Version	Date of Release	Description of Changes
Rev. 0.0	2024-07-08	Draft datasheet created.
Rev. 0.1	2025-07-11	Fig 25 update.
Rev. 1.0	2025-11-10	$I_{D,pulse,}$ SOA.

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Information

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