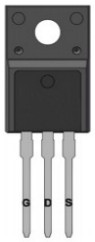
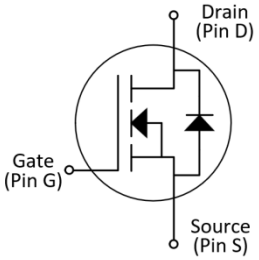
V_{DS}	=	800V
$R_{DS(ON)}$	=	95mΩ
$I_{D(MAX)@25^{\circ}C}$	=	20A

800V G1 Silicon Carbide Power MOSFET

N-Channel Enhancement Mode





Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitances
- Very low switching losses
- Avalanche ruggedness
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant
- Robust against parasitic turn-on even at 0V turn-off gate voltage

Benefits

- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

Applications

- Battery chargers
- DC/DC converters
- Switch mode power supplies
- Power delivery
- PV inverters

Part number	Package Type
CC3M10080F	TO-220FH-3L

Maximum Ratings (T_C=25˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain - Source Voltage	800	V	V_{GS} = 0V, I_D = 100μA
V_{GSmax}	Gate - Source Voltage	-10 /+22	V	Absolute maximum values
V_{GSop}	Gate - Source Voltage	-5 /+18	V	Recommended operational values
I_D	Continuous Drain Current	20	A	V_{GS} = 18V, T_C = 25˚C
		14		V_{GS} = 18V, T_C = 100˚C
$I_{D(pluse)}$	Pulsed Drain Current	70	A	Pulse width t_P limited by $T_{j,max}$
P_D	Power Dissipation	75	W	T_C = 25˚C, T_J = 175˚C
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C	/
T_L	Soldering Temperature	260	˚C	1.6mm (0.063”) from case for 10s

Electrical Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	800	-	-	V	V_{GS} = 0V, I_D = 100μA
$V_{GS(th)}$	Gate Threshold Voltage	2.2	3.2	4.2	V	V_{DS} = V_{GS}, I_D = 5mA
		-	2.3	-		V_{DS} = V_{GS}, I_D = 5mA T_J = 175˚C
I_{DSS}	Zero Gate Voltage Drain Current	-	1	50	μA	V_{DS} = 800V, V_{GS} = 0V
I_{GSS}	Gate-Source Leakage Current	-	-	200	nA	V_{GS} = 22V, V_{DS} = 0V
		-200	-	-	nA	V_{GS} = -10V, V_{DS} = 0V
$R_{DS(on)}$	Drain-Source On-State Resistance	-	95	115	mΩ	V_{GS} = 18V, I_D = 15A
		-	125	-		V_{GS} = 18V, I_D = 15A T_J = 175˚C
C_{iss}	Input Capacitance	-	736	-	pF	V_{DS} = 400V, V_{GS} = 0V V_{AC}=25mV f = 1MHz
C_{oss}	Output Capacitance	-	48	-		
C_{rss}	Reverse Transfer Capacitance	-	3	-		
E_{ON}	Turn-On Switching Energy	-	120	-	μJ	V_{DS} = 400V, V_{GS} = -5/+18V I_D = 15A, R_G = 5.1Ω
E_{OFF}	Turn-Off Switching Energy	-	39	-		
$t_{d(on)}$	Turn-On Delay Time	-	24	-	ns	
t_r	Rise Time	-	13	-		
$t_{d(off)}$	Turn-Off Delay Time	-	18	-		
t_f	Fall Time	-	8	-		
$R_{g(int)}$	Internal Gate Resistance	-	16	-	Ω	V_{AC}=25mV, f = 1MHz
Q_{gs}	Gate to Source Charge	-	14	-	nC	V_{DS} = 400V, V_{GS} = -5/+18V I_D = 15A
Q_{gd}	Gate to Drain Charge	-	4	-		
Q_g	Total Gate Charge	-	32	-		

Reverse Diode Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	4.2	-	V	V_{GS} = -5V, I_{SD} = 7.5A
		3.8	-		V_{GS} = -5V, I_{SD} = 7.5A T_J = 175˚C
I_{SD}	Continuous Diode Forward Current	-	19	A	V_{GS} = -5V
		-	10		V_{GS} = -5V, T_C = 100˚C
t_{rr}	Reverse Recover Time	22	-	ns	V_{DD} = 400V, I_{SD} = 15A di/dt = 1000A/μs,V_{GS} = -5V
Q_{rr}	Reverse Recovery Charge	66	-	nC	
I_{rrm}	Peak Reverse Recovery Current	5	-	A	

Thermal/Package Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.0	˚C/W

Typical Performance

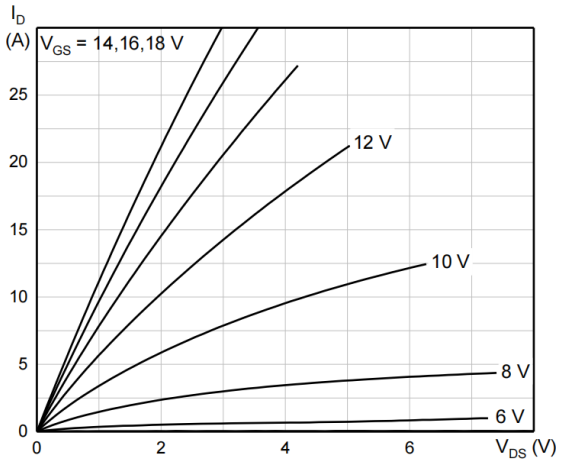


Figure 1. Output Characteristics T_J=25℃

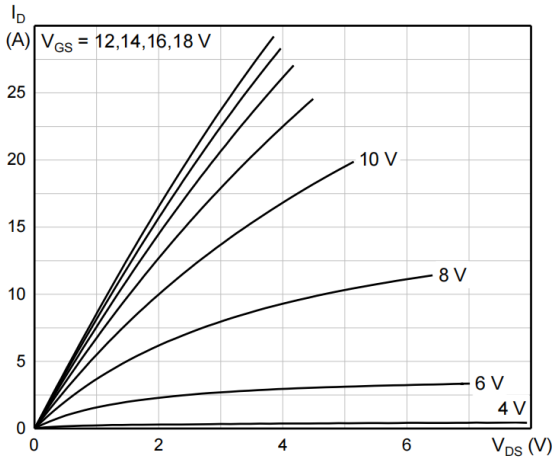


Figure 2. Output Characteristics T_J=175℃

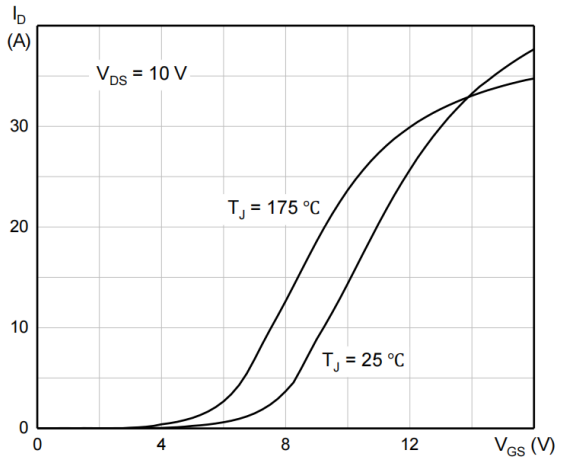


Figure 3. Transfer Characteristic for Various Junction Temperature

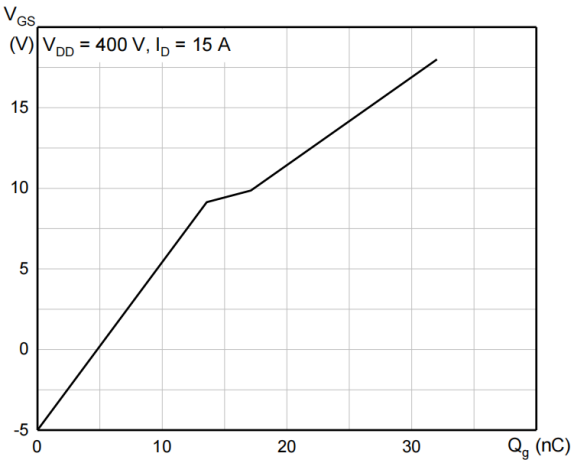


Figure 4. Gate Charge Characteristic

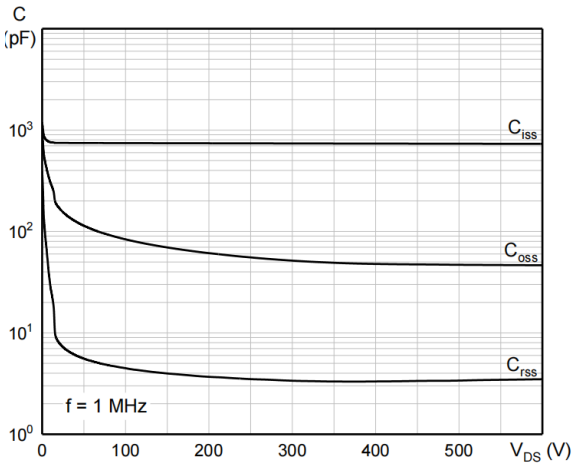


Figure 5. Capacitances vs. Drain to Source Voltage

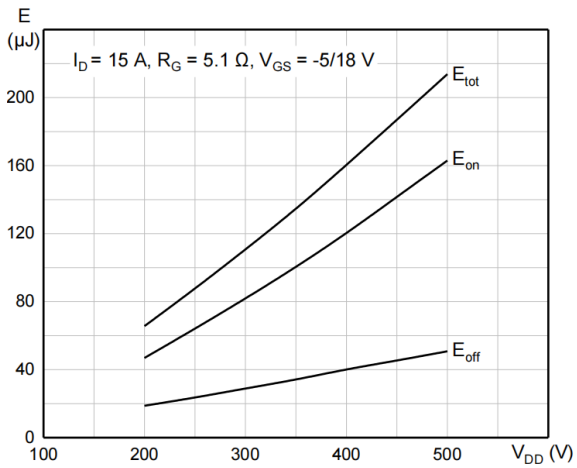


Figure 6. Clamped Inductive Switching Energy vs. Supply Voltage

Typical Performance

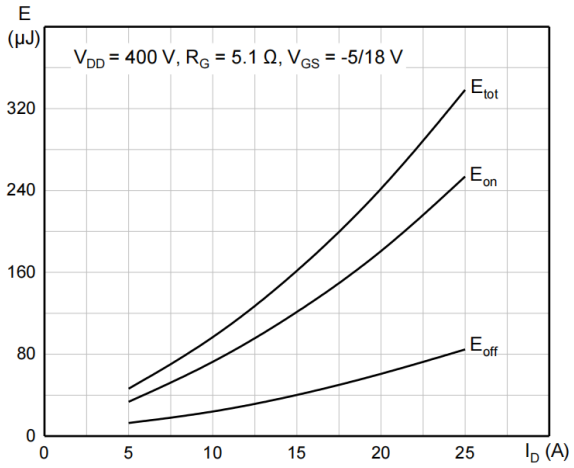


Figure 7. Clamped Inductive Switching Energy vs. Drain Current

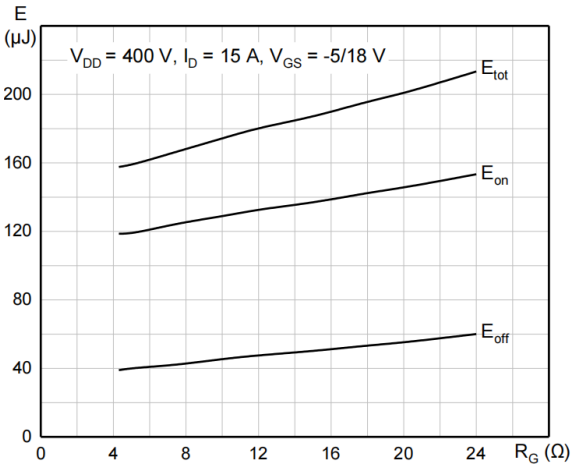


Figure 8. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

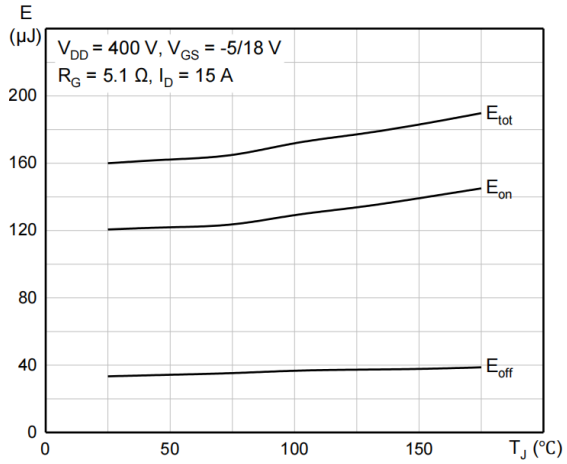


Figure 9. Clamped Inductive Switching Energy vs.Temperature

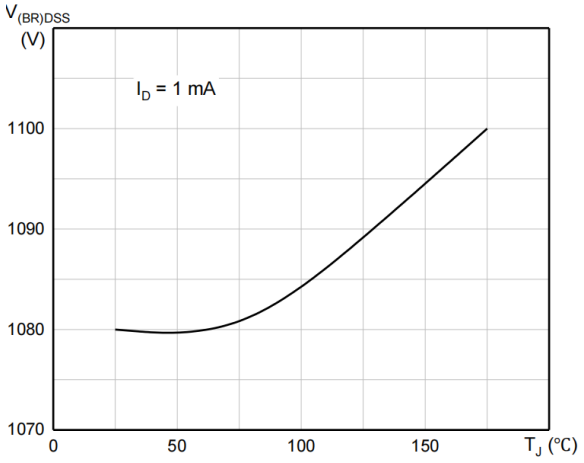


Figure 10. Breakdown Voltage vs. Temperature

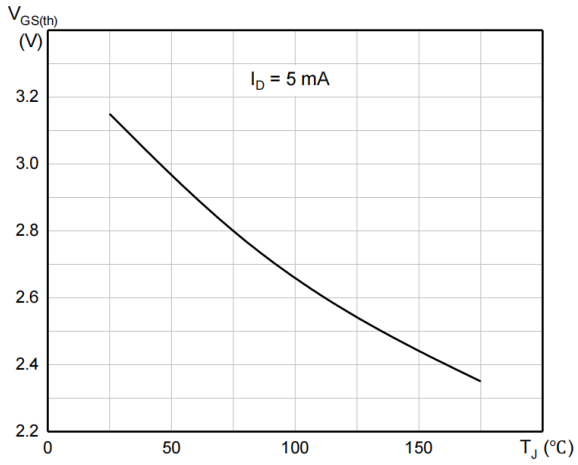


Figure 11. Threshold Voltage vs. Temperature

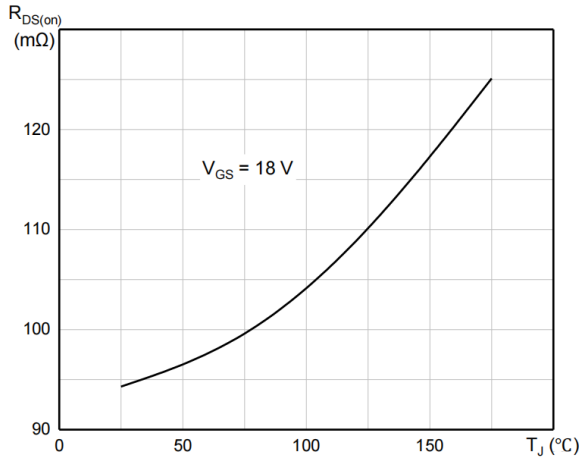


Figure 12. On Resistance vs. Temperature

Typical Performance

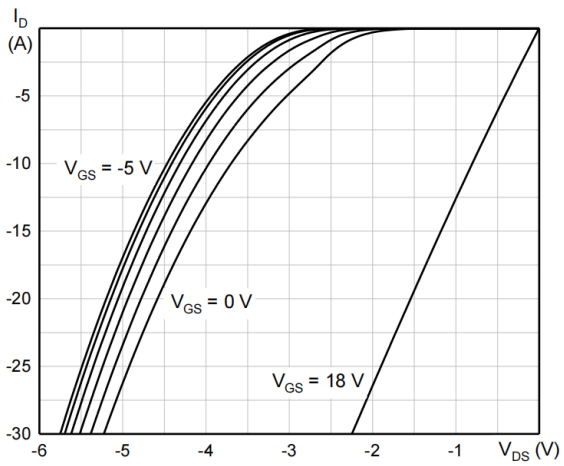


Figure 13.Body Diode Characteristic at T_J=25℃

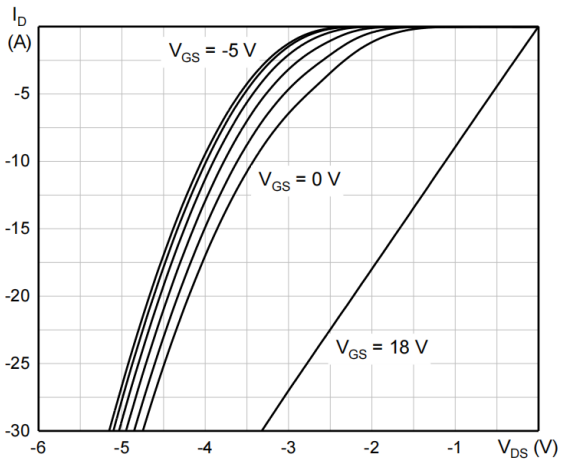


Figure 14. Body Diode Characteristic at T_J=175℃

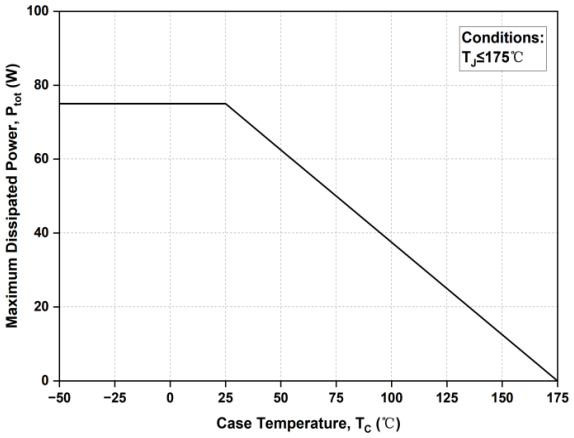
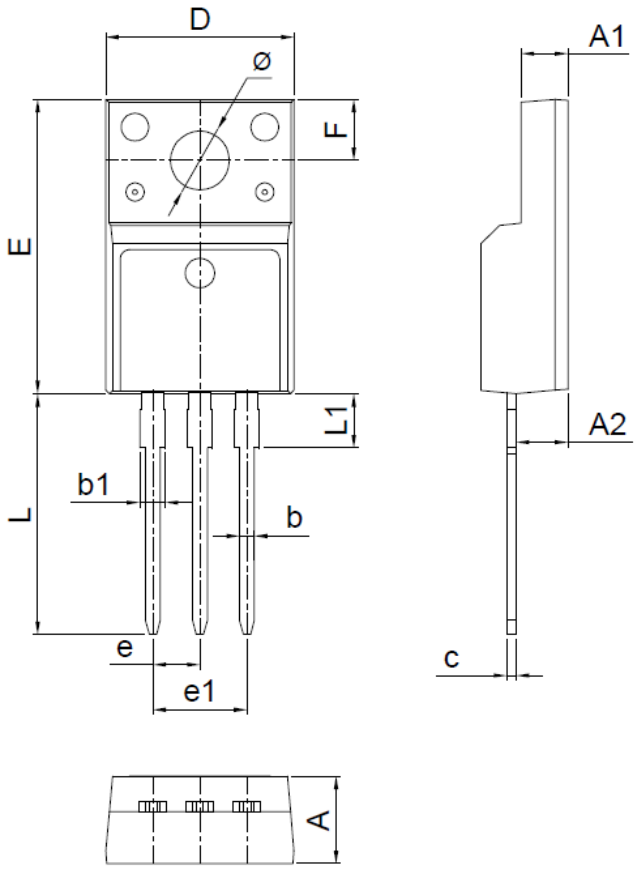


Figure 15. Total Power Dissipation

Package Dimensions

TO-220FH-3L Package Outline



SYMBOL	MIN.	TYP	MAX.
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	2.66	2.76	2.86
b	0.75	0.80	0.85
b1	1.24	1.34	1.44
c	0.40	0.50	0.60
D	10.00	10.16	10.32
E	15.75	15.90	16.05
e	2.44	2.54	2.64
e1	4.88	5.08	5.26
F	3.10	3.30	3.50
L	12.90	13.20	13.50
L1	2.90	3.10	3.30
Φ	3.10	3.20	3.30

Revision History

Document Version	Date of Release	Brief Summary
Rev.01	2026-04-20	Initial Release.

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