CLASSIC CHIP

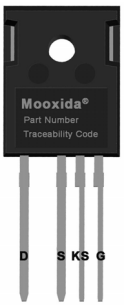
CC3M025080K

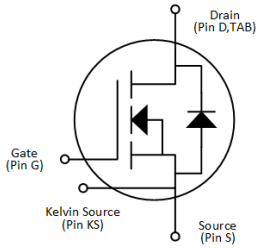
800V G1 Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

V_{DS}	=	800V
$R_{DS(ON)}$	=	25mΩ
$I_{D(MAX)@25^{\circ}C}$	=	91A

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitances
- Very low switching losses
- Temperature independent turn-off switching losses
- Halogen free, RoHS compliant
- Avalanche ruggedness
- Optimized package with separate kelvin source pin





Benefits

- Reduce switching losses and minimize gate ringing
- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

Applications

- EV motor drive
- On-board charger/PFC
- EV battery chargers
- High voltage DC/DC converters
- Switched mode power supplies

Part number	Package Type
CC3M02580K	TO-247-LP-4L

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	91	A	V_{GS} = 18V, T_C = 25˚C
		64		V_{GS} = 18V, T_C = 100˚C
$I_{D(pluse)}$	Pulsed Drain Current	277	A	Pulse width t_P limited by $T_{j,max}$
P_D	Power Dissipation	340	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
M	Mounting Torque	1 8.8	Nm lbf-in	M3 or 6-32 screw

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 = 10mA
		-	2.3	-		V_{DS} = V_{GS}, I_D = 10mA T_J = 175˚C
I_{DSS}	Zero Gate Voltage Drain Current	-	1	50	μA	V_{DS} = 750V, 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	-	25	35	mΩ	V_{GS} = 18V, I_D = 40A
		-	34	-		V_{GS} = 18V, I_D = 40A T_J = 175˚C
g_{fs}	Transconductance	-	13	-	S	V_{DS} = 10V, I_D = 40A
		-	11	-		V_{DS} = 10V, I_D = 40A T_J = 175˚C
C_{ISS}	Input Capacitance	-	2991	-	pF	V_{DS} = 500V, V_{GS} = 0V f = 1MHz
C_{OSS}	Output Capacitance	-	195	-		
C_{RSS}	Reverse Transfer Capacitance	-	12	-		
E_{ON}	Turn-On Switching Energy	-	208	-	μJ	V_{DS} = 500V V_{GS} = -5/+18V, I_D = 40A R_G = 15Ω
E_{OFF}	Turn-Off Switching Energy	-	293	-		
$t_{d(on)}$	Turn-On Delay Time	-	12	-	ns	
t_r	Rise Time	-	28	-		
$t_{d(off)}$	Turn-Off Delay Time	-	69	-		
t_f	Fall Time	-	22	-		
$R_{G(int)}$	Internal Gate Resistance	-	2	-	Ω	I_D = 0A, f = 1MHz
Q_{GS}	Gate to Source Charge	-	34	-	nC	V_{DS} = 500V, V_{GS} = -5/+18V I_D = 40A
Q_{GD}	Gate to Drain Charge	-	16	-		
Q_G	Total Gate Charge	-	120	-		

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

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	3.4	-	V	V_{GS} = -5V, I_{SD} = 20A
		3.1	-		V_{GS} = -5V, I_{SD} = 20A T_J = 175˚C
I_{SD}	Continuous Diode Forward Current	86	-	A	V_{GS} = -5V, T_C = 25˚C
t_{RR}	Reverse Recover Time	17	-	ns	V_{DS} = 500V, V_{GS} = -5V I_D = 40A di/dt = 1200A/μs
Q_{RR}	Reverse Recovery Charge	112	-	nC	
I_{RRM}	Peak Reverse Recovery Current	11	-	A	

Thermal/Package Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.44	˚C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	˚C/W

Typical Performance

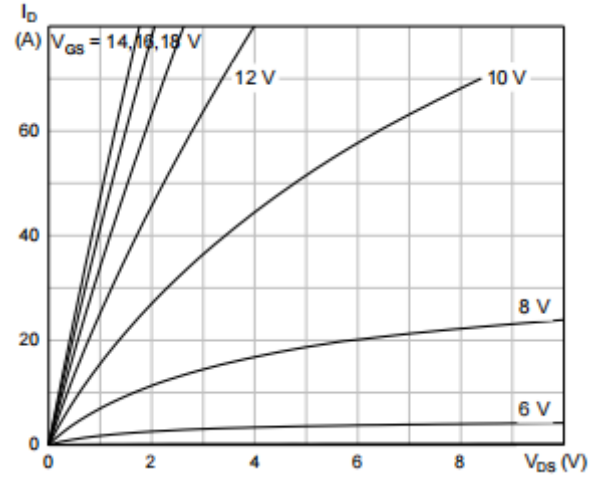


Figure 1. Output Characteristics T_J=25℃

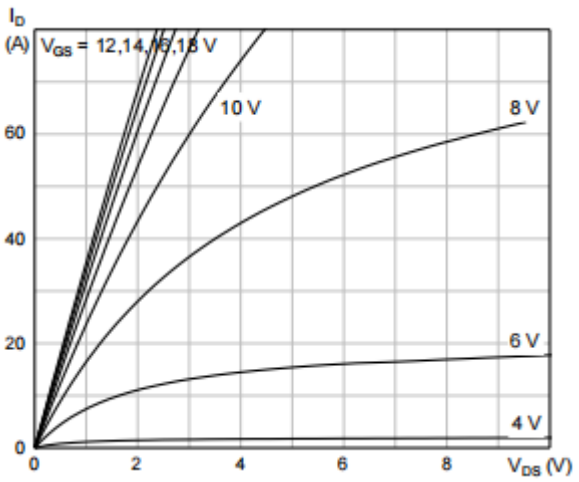


Figure 2. Output Characteristics T_J=175℃

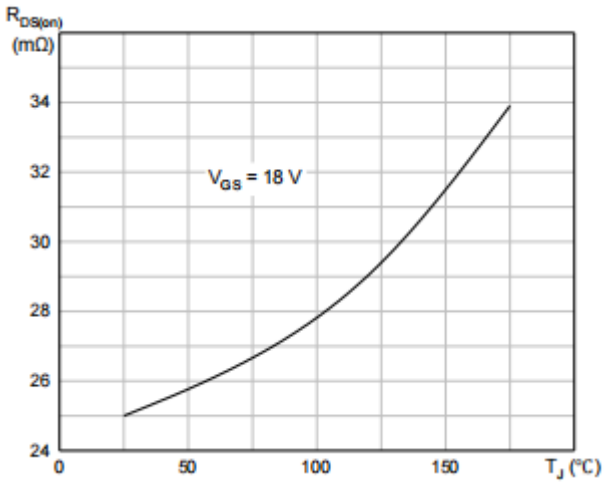


Figure 3. Normalized On Resistance vs. Temperature

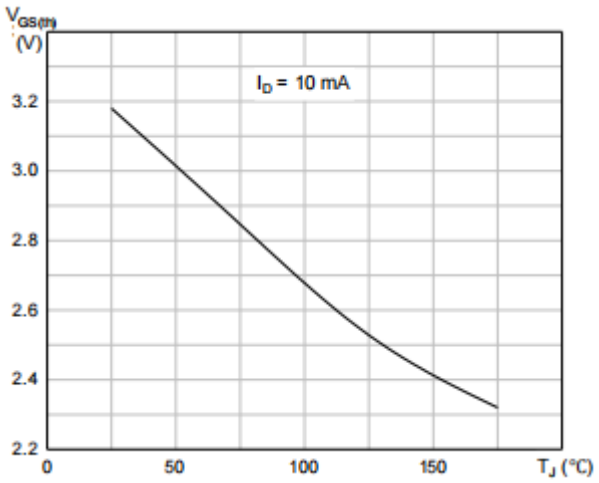


Figure 4. Threshold Voltage vs. Temperature

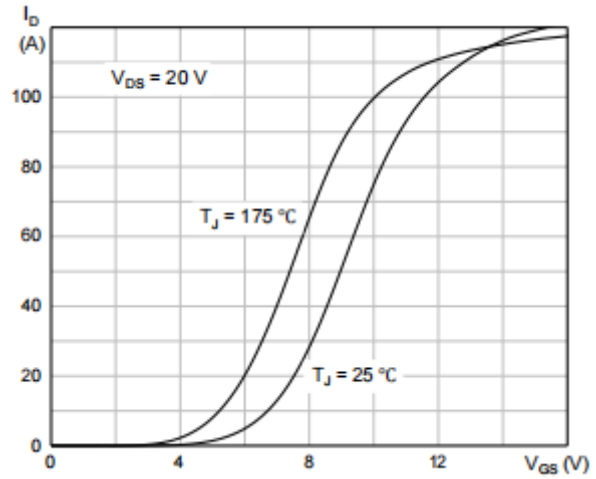


Figure 5. Transfer Characteristic for Various Junction Temperature

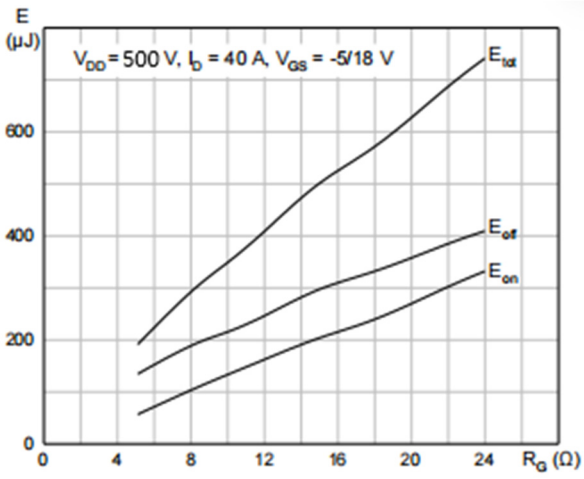


Figure 6. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

Typical Performance

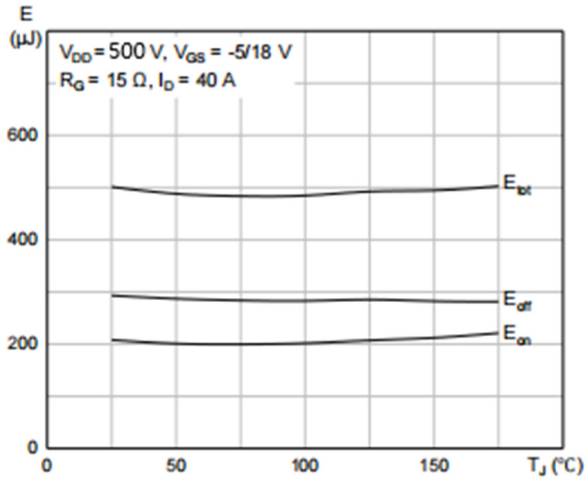


Figure 7. Clamped Inductive Switching Energy vs. Temperature

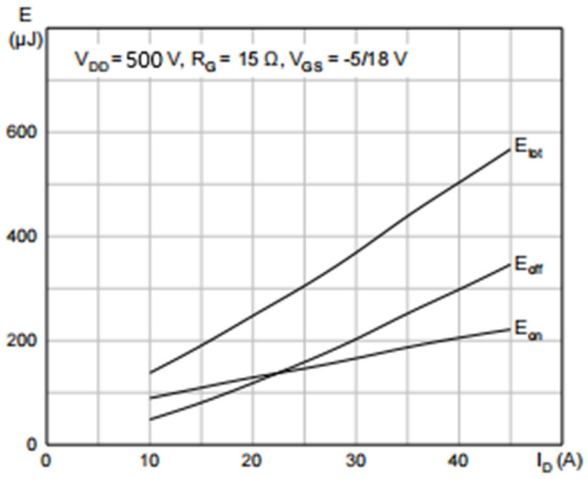


Figure 8. Clamped Inductive Switching Energy vs. Drain Current

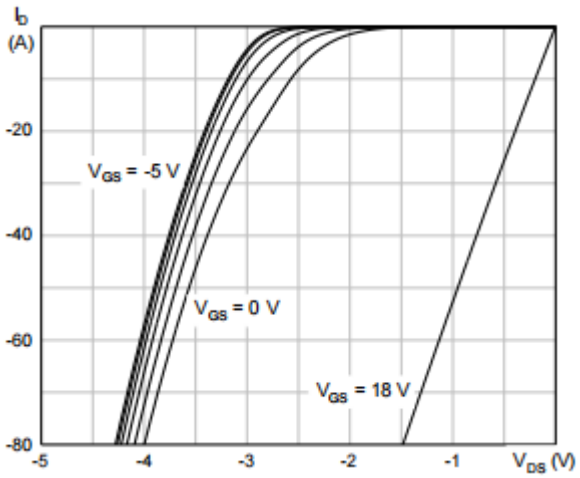


Figure 9. Body Diode Characteristic at T_J=25℃

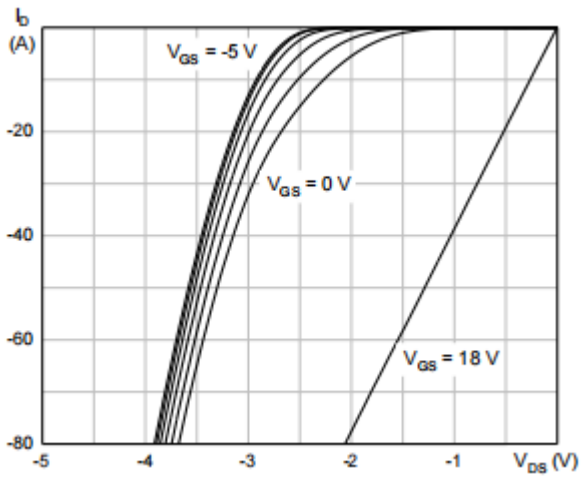


Figure 10. Body Diode Characteristic at T_J=175℃

Test conditions

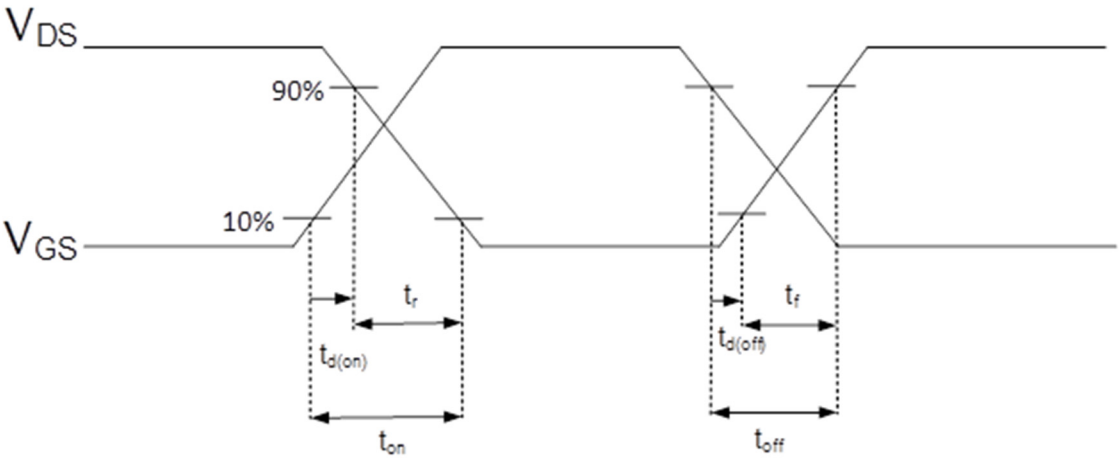


Figure 11. Definition of Switching Times

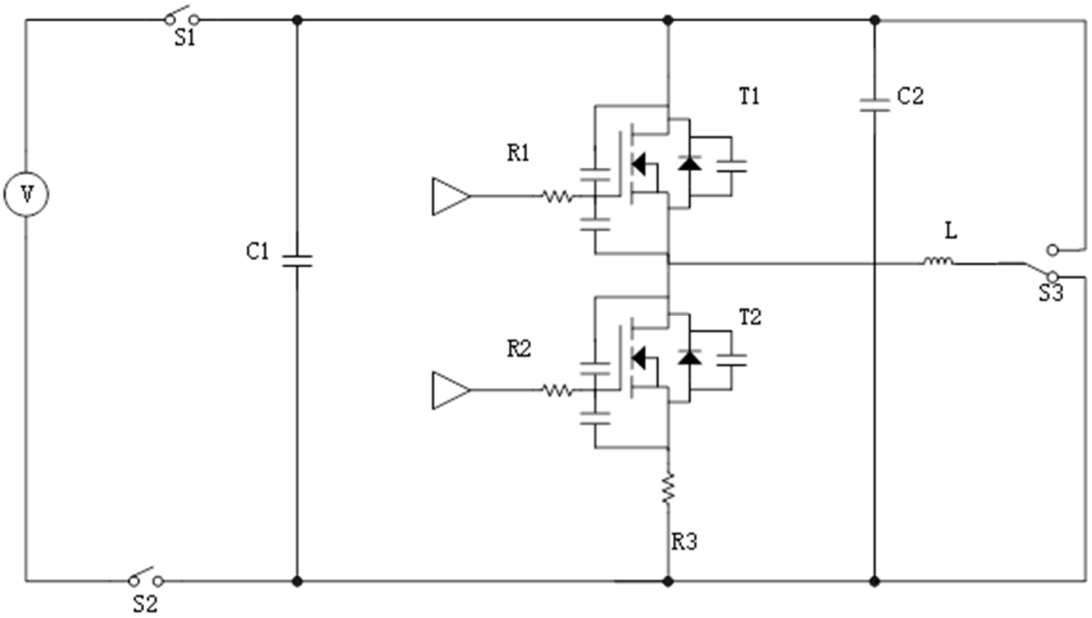
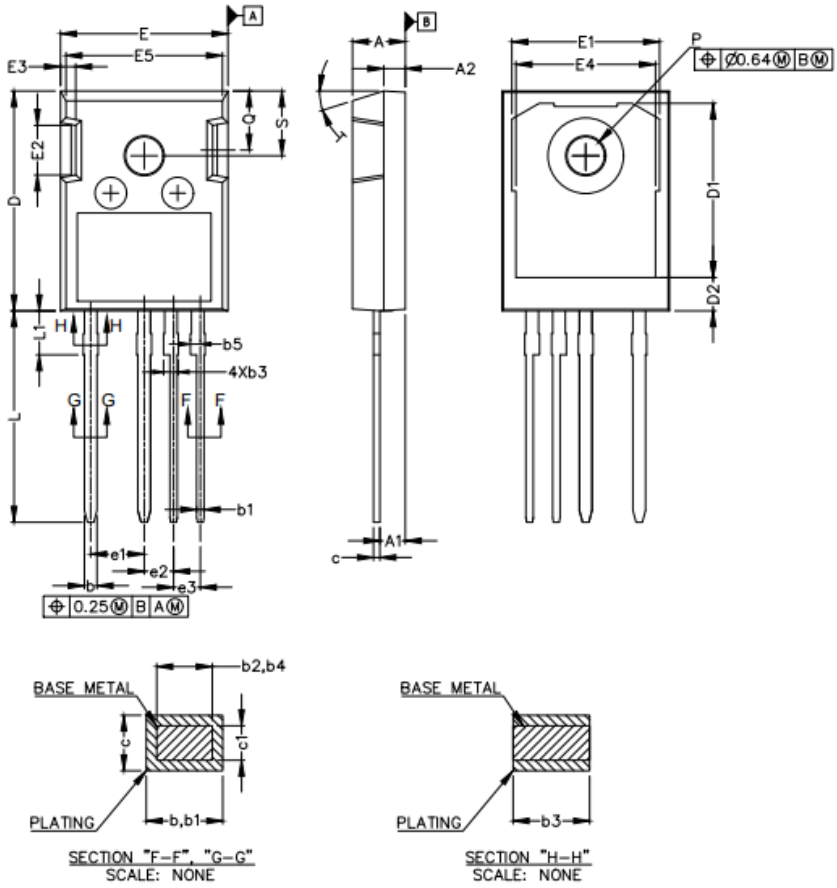


Figure 12. Dynamic Test Circuit

Package Dimensions

TO-247-LP-4L Package Outline



SYMBOL	MILLMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b	1.10	1.30
b1	0.65	0.79
b2	1.10	1.25
b3	1.34	1.44
b4	0.65	0.74
b5	0.74	1.14
c	0.55	0.68
c1	0.55	0.65
D	20.80	21.10
D1	16.25	17.65
D2	2.95	3.35
E	15.75	16.13
E1	13.10	14.15
E2	4.32	5.10
E3	1.00	1.90
E4	12.38	13.43
E5	14.65	15.05
e1	5.08BSC	
e2	2.79BSC	
e3	2.54BSC	
L	19.72	20.32
L1	3.97	4.37
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5°REF.	

Revision History

Document Version	Date of Release	Brief Summary
Rev.01	2025.03.21	Initial Release.
Rev.02	2026.05.09	2nd Release

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