Features

- Uses CRM(CQ) advanced Split Gate technology
- Extremely low on-resistance $R_{DS(on)}$
- 3-Phase Full Bridge N-Channel MOSFET Module
- Electrically Isolated DBC Substrate for Low Thermal Resistance

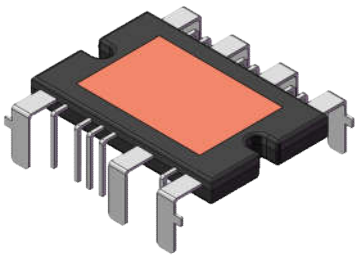
Product Summary

V_{DS}	100V
$R_{DS(on)\ Typ.}$	1.9mΩ
I_D	80A

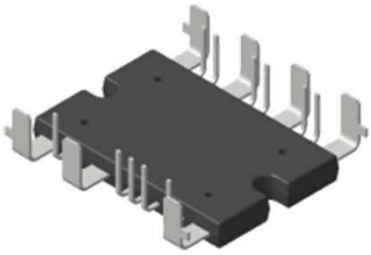
Applications

- Motor drive

MDIP18



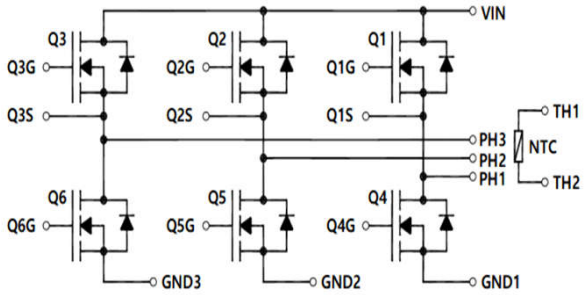
Top View

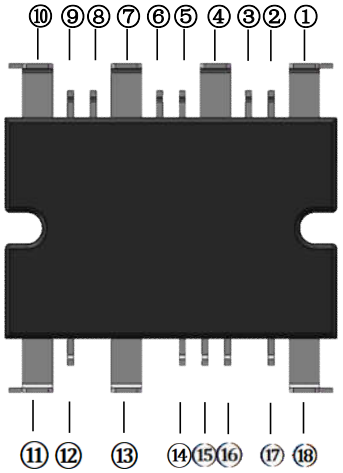


Bottom View

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRM10QM80F	CRM10QM80F	MDIP18	Tube	N/A	N/A	12pcs





#1	PH1
#2	Q1G
#3	Q1S
#4	PH2
#5	Q2G
#6	Q2S
#7	PH3
#8	Q3G
#9	Q3S
#10	VIN
#11	GND3
#12	Q6G
#13	GND2
#14	Q5G
#15	TH1
#16	TH2
#17	Q4G
#18	GND1

Absolute Maximum Ratings

Parameter	Symbol	Maximum	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Package Limit)	I_D	80	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	320	A
Avalanche energy, single pulse (L=0.5mH, V_{DS}=80V)	E_{AS}	2000	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	73	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

Thermal Mechanical Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal resistance, junction – heatsink.	R_{thJh}	0.8	1.7	°C/W
Weight	-	12.0	12.5	g

N-Channel Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	-	3.4	-	V	V_{DS}=V_{GS}, I_D=500uA,T_C=-55℃
		2	2.9	4		T_C=25℃
		-	2.1	-		T_C=125℃
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=100V, V_{GS}=0V T_j=25°C
		-	-	20		T_j=125°C
Gate-source leakage current	I_{GSS}	-	±10	±100	nA	V_{GS}=±20V, V_{DS}=0V
Drain-source on-state resistance	R_{DS}(on)	-	1.9	2.3		V_{GS}=10V, I_D=80A
Transconductance	g_{fs}	-	187	-	S	V_{DS}=5V, I_D=80A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	11435	-	pF	V_{GS}=0V, V_{DS}=70V, f=1MHz
Output Capacitance	C_{oss}	-	1627	-		
Reverse Transfer Capacitance	C_{rss}	-	23	-		
Gate Total Charge	Q_G	-	230	-	nC	V_{GS}=15V, V_{DS}=70V, I_D=80A
Gate-Source charge	Q_{gs}	-	64	-		
Gate-Drain charge	Q_{gd}	-	18	-		
Turn-on delay time	$t_{d(on)}$	-	39	-	ns	V_{GS}=10V, V_{DD}=70V, R_{G_ext}=3Ω, ID=80A
Rise time	t_r	-	124	-		
Turn-off delay time	$t_{d(off)}$	-	103	-		
Fall time	t_f	-	132	-		
Gate resistance	R_G	-	1.8	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.9	1.2	V	V_{GS}=0V, I_{SD}=80A
Peak reverse recovery current	I_{rrm}	-	9.5		A	V_{GS}=0V, I_{SD}=80A
Body Diode Reverse Recovery Time	t_{rr}	-	83	-	ns	
Body Diode Reverse Recovery Charge	Q_{rr}	-	460	-	nC	

NTC-Thermistor Characteristics

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Rated resistance	R_{25}	-	10	-	KΩ	T_{NTC}=25℃
Deviation of R100	△R/R	-3	-	3	%	
Power dissipation	P_{NTC}	-	-	180	mW	
B-Value	$B_{25/50}$	-	3590	-	K	
B-Value	$B_{25/85}$	-	3635	-	K	
B-Value	$B_{25/100}$	-	3650	-	K	

N-Channel Typical Performance Characteristics

Fig 1: Output Characteristics

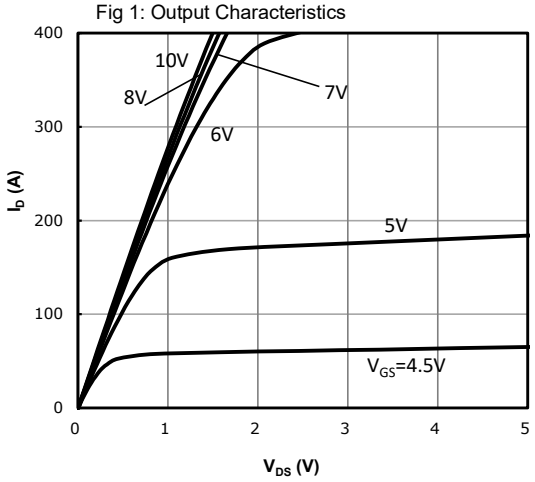


Fig 2: Transfer Characteristics

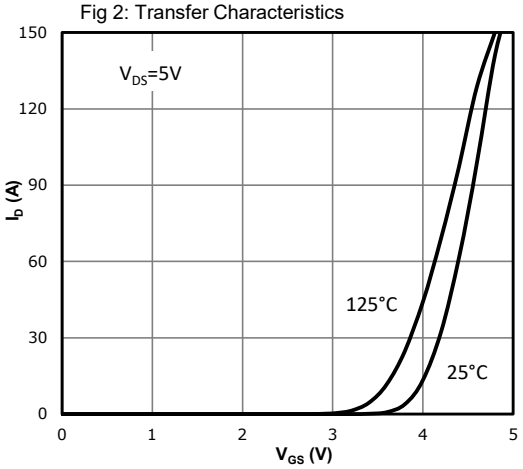


Fig 3: Rds(on) vs Drain Current

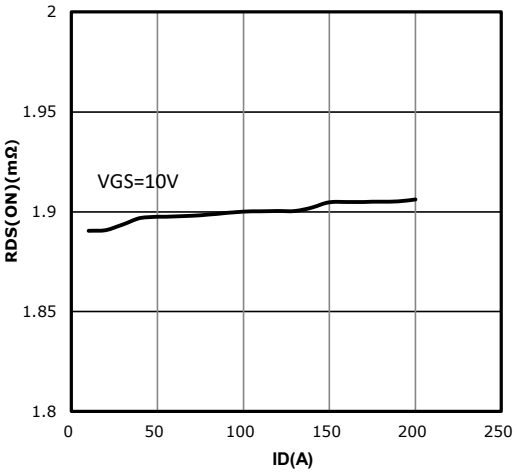


Fig 4: Rds(on) vs Gate Voltage

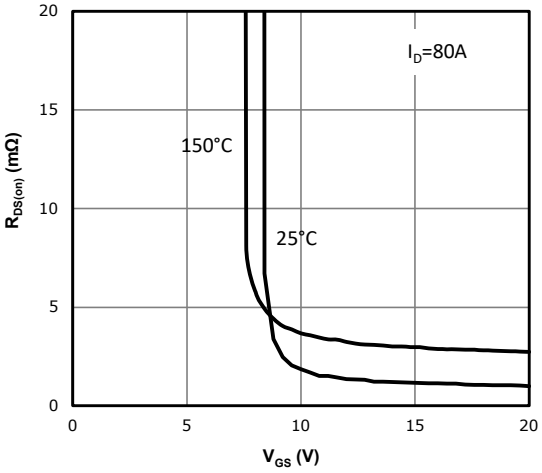


Fig 5: Rds(on) vs. Temperature

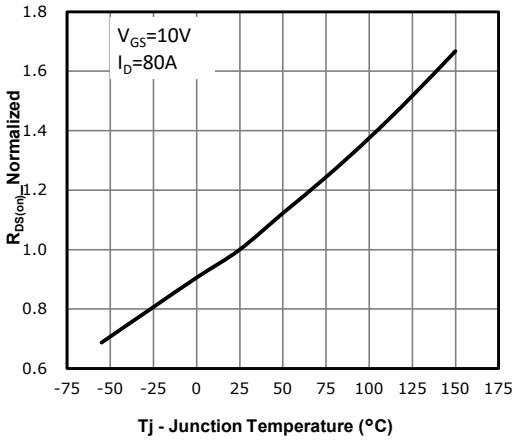


Fig 6: Capacitance Characteristics

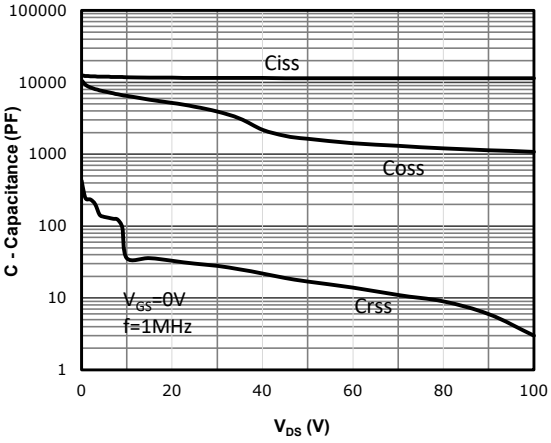


Fig 7: Gate Charge Characteristics

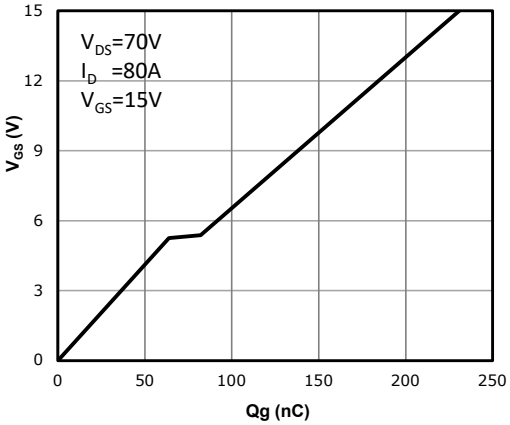


Fig 8: Body-diode Forward Characteristics

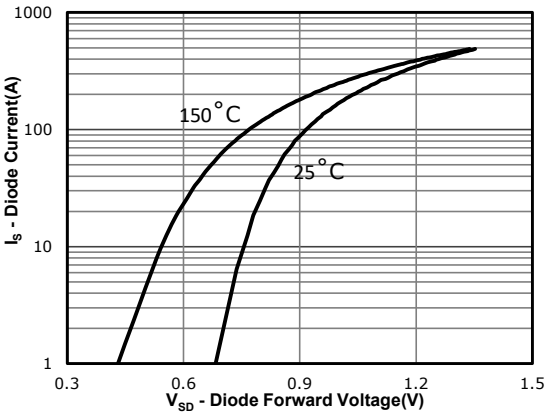


Fig 9: Bvdss vs Temperature

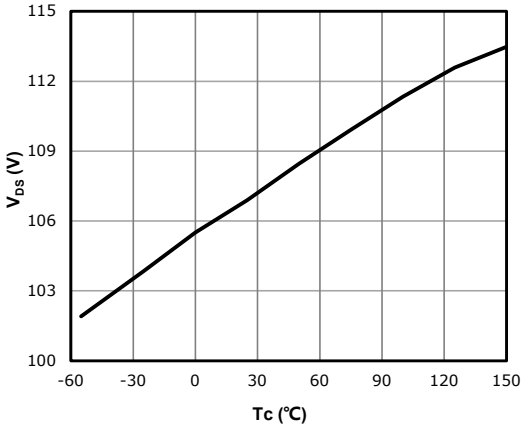


Fig 10:Vth vs Temperature

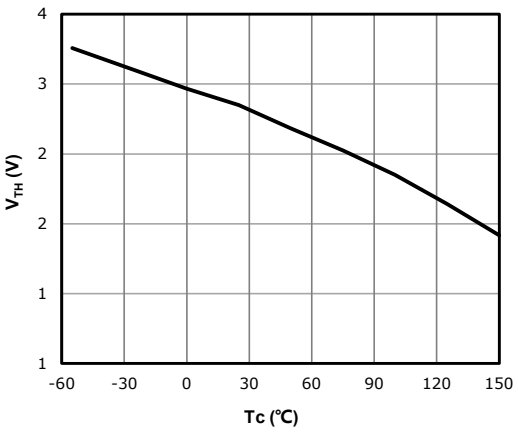


Fig 11. Safe Operating Area

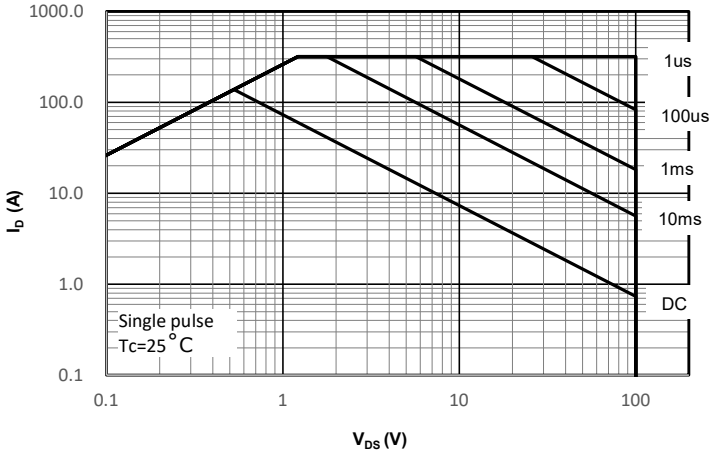
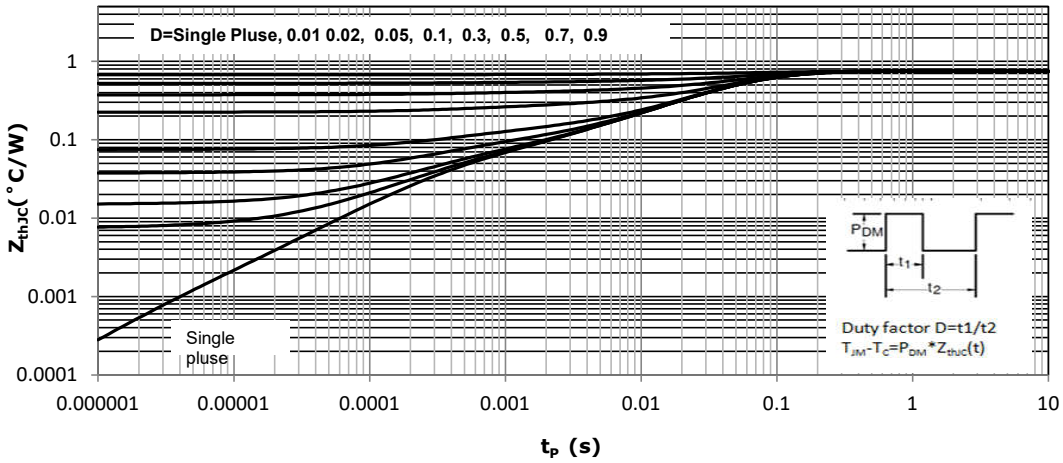
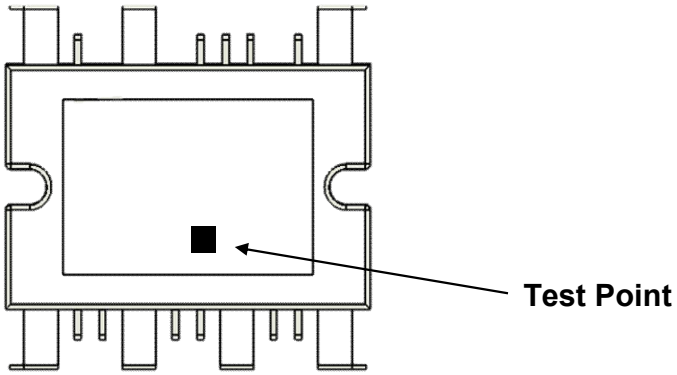
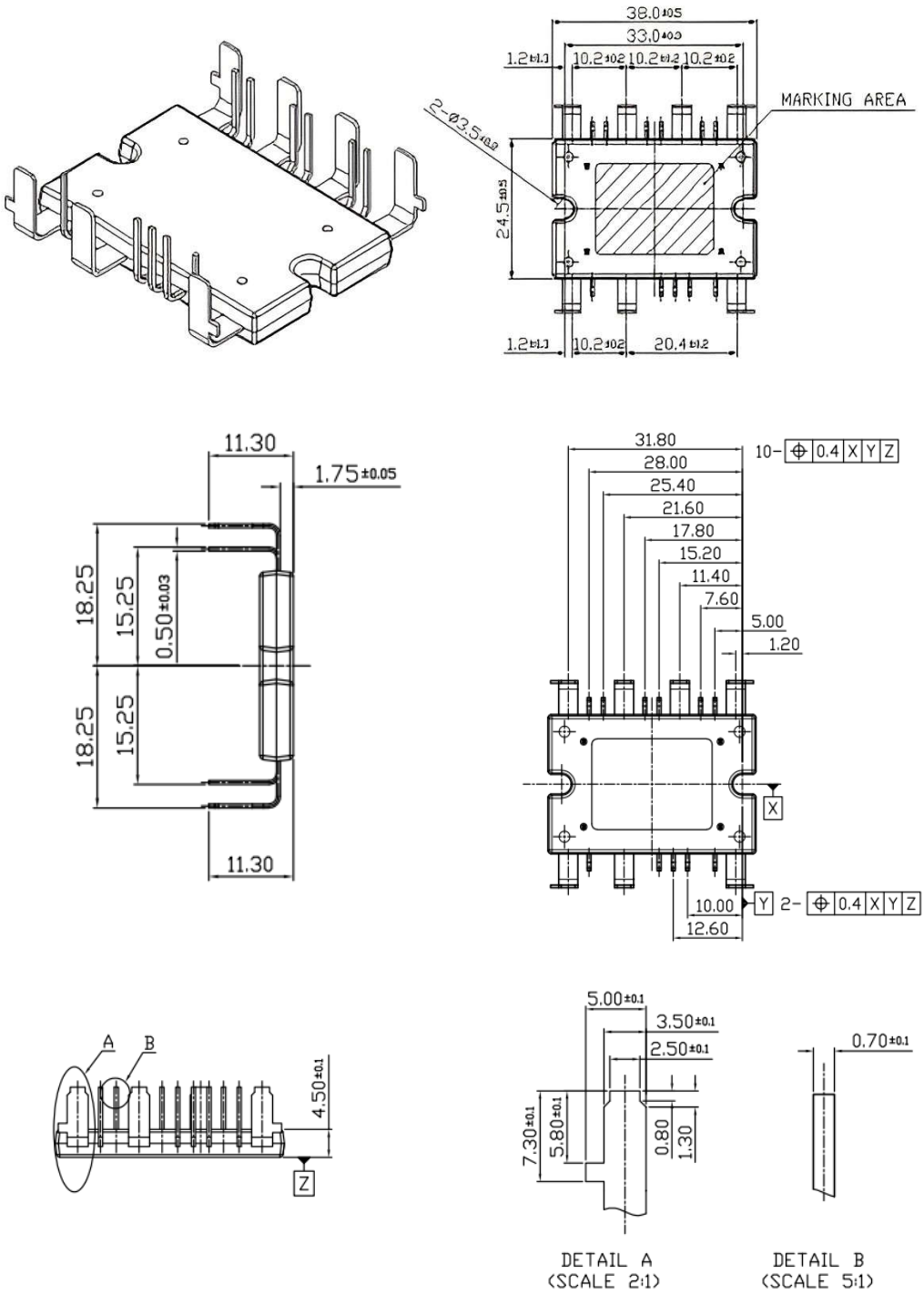


Fig 12: Max. Transient Thermal Impedance





Package Outline: MDIP18



Revision History

Revison	Date	Major changes
1.0	2023/4/21	Modify some test conditions and add charts

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semicondutor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

This product is suitable for wave soldering.
The reliability of this product is not guaranteed under specific conditions when accepted by customers.
CRM(CQ) reserves the right to improve product design, function and reliability without notice.