

Features

- Qualified according to AEC Q101
- CRM G2 SiC MOSFET Technology
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness
- Fast Reverse Recovery

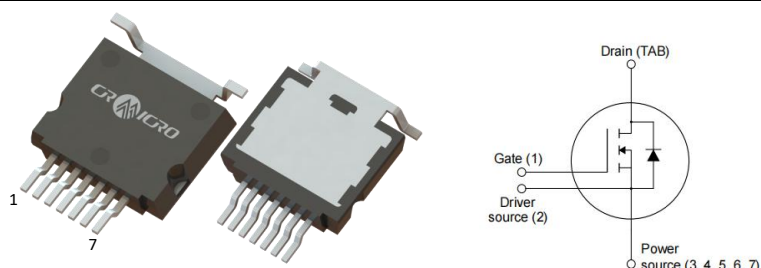
Applications

- Switching Mode Power Supply(SMPS)
- High Voltage DC/DC Converters
- On Board Charger(OBC)
- EV Charger

Product Summary

V _{DS}	650V
R _{DS(on)_typ}	60m Ω
I _D	37A

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Qty
CRXSH60M065G2Q	X60M065G2Q	T2PAK	Reel	700

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	650	V
Continuous drain current V _{GS} =15V, T _C = 25°C V _{GS} =15V, T _C = 100°C	I _D	37 26	A
Pulsed drain current (T _C = 25°C, t _p limited by T _{Jmax})	I _{D(pulse)}	93	A
Avalanche energy, single pulse (L=10mH, Rg=25 Ω)	E _{AS}	720	mJ
Gate-Source voltage (dynamic) ^{a1}	V _{GSmax}	-10/+22	V
Gate-Source voltage (static) ^{a2}	V _{GSop}	-5/+18	V
Power dissipation (T _C =25°C, T _J =175°C)	P _D	132	W
Operating Junction and Storage Temperature	T _j , T _{stg}	-55...175	°C

a1: When using MOSFET Body Diode V_{GSmax} = -5V/+22V

a2: MOSFET can also safely operate at 0/+18V

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	1.14	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	650	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.8	-	3.6	V	$V_{DS}=V_{GS}, I_D=5mA$
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	$V_{DS}=650V, V_{GS}=0V$ $T_j=25^\circ\text{C}$
		-	10	-		$T_j=175^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=-10/+22V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	60	79	mΩ	$V_{GS}=15V, I_D=13.2A,$ $T_j=25^\circ\text{C}$
		-	78	-		$T_j=175^\circ\text{C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	50	72	mΩ	$V_{GS}=18V, I_D=13.2A,$ $T_j=25^\circ\text{C}$
		-	65	-		$T_j=175^\circ\text{C}$
Transconductance	g_{fs}	-	12.8	-	S	$V_{DS}=20V, I_{DS}=13.2A$

Dynamic Characteristic

Internal Gate resistance	$R_{G(int)}$	-	2	-	Ω	f=1MHz
Input Capacitance	C_{iss}	-	1100	-	pF	$V_{GS}=0V, V_{DS}=600V,$ f=1MHz
Output Capacitance	C_{oss}	-	105	-		
Reverse Transfer Capacitance	C_{rss}	-	9.1	-		
Coss Stored Energy	E_{oss}	-	19	-	uJ	$V_{GS}=-5/18V$ $V_{DS}=400V$ $I_D=13.2A$
Gate Total Charge	Q_g	-	52	-	nC	
Gate-Source charge	Q_{gs}	-	13	-		
Gate-Drain charge	Q_{gd}	-	12	-		
Turn-on delay time	$t_{d(on)}$	-	27.3	-	ns	$V_{DD}=400V, I_D=13.2A$ $V_{GS}=-5V/15V,$ $R_G=2.5\Omega, L=200uH$
Rise time	t_r	-	3.9	-		
Turn-off delay time	$t_{d(off)}$	-	18	-		
Fall time	t_f	-	6.4	-		
Turn-On Switching Energy	$E_{(on)}$	-	25.3	-	uJ	
Turn Off Switching Energy	$E_{(off)}$	-	22.8	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.5	-	V	$V_{GS}=0V, I_F=6.6A$
		-	3	-	V	$V_{GS}=0V, I_F=6.6A, T_J=175^{\circ}C$
Continuous Diode Forward Current	I_S	-	-	37	A	$V_{GS}=0V$
Diode pulse Current	$I_{S,pulse}$	-	-	93	A	pulse width t_p limited by T_{Jmax}
Body Diode Reverse Recovery Time	t_{rr}	-	15	-	ns	$di/dt=1000A/us$ $I_F=13.2A$ $V_{dd}=400V$ $T_J=25^{\circ}C$
Body Diode Reverse Recovery Charge	Q_{rr}	-	57	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	6.2	-	A	
Body Diode Reverse Recovery Time	t_{rr}	-	18	-	ns	$di/dt=1000A/us$ $I_F=13.2A$ $V_{dd}=400V, T_J=175^{\circ}C$
Body Diode Reverse Recovery Charge	Q_{rr}	-	67	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	6	-	A	

Typical Performance Characteristics

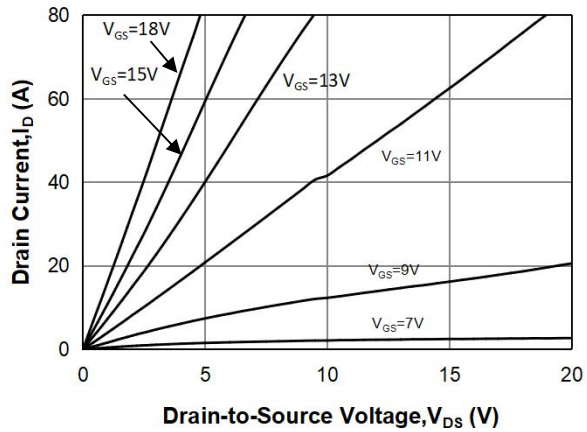
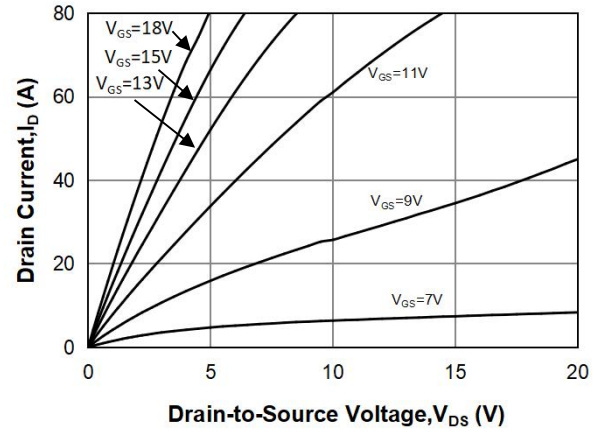
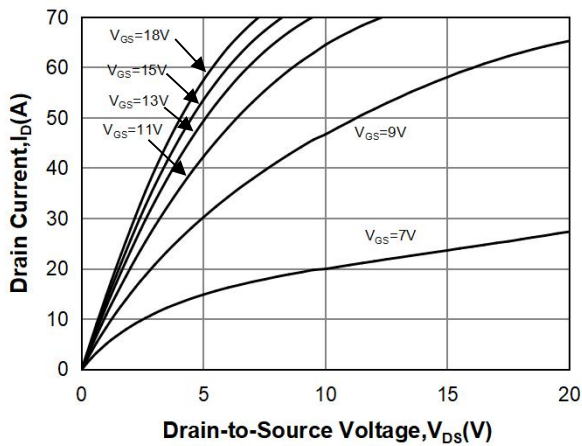
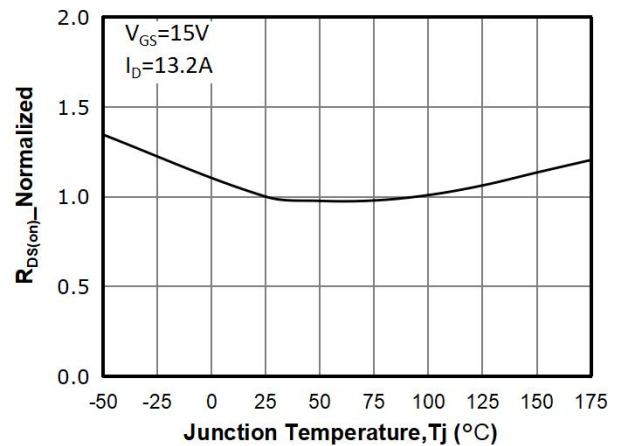
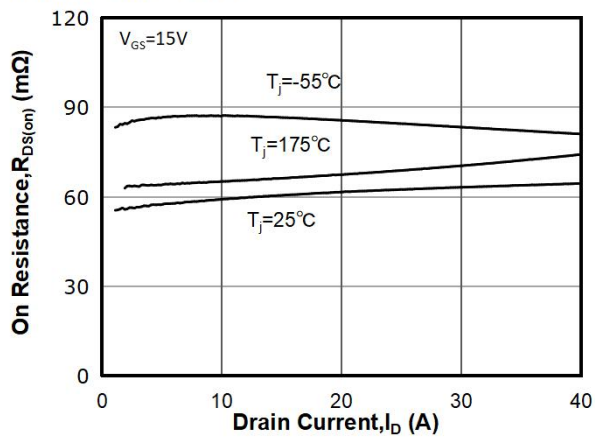
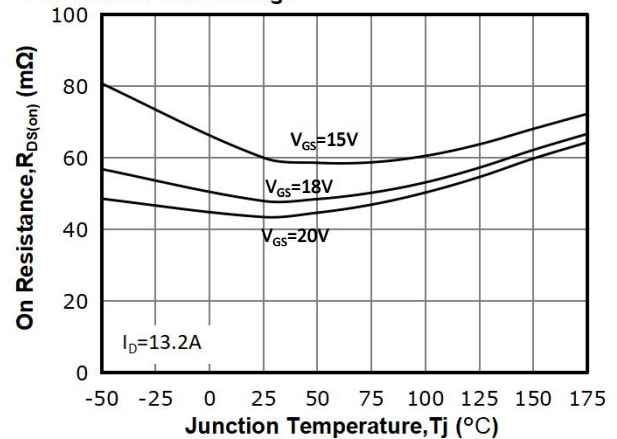
Fig 1. Output Characteristics ($T_J = -55^\circ\text{C}$)

Fig 2. Output Characteristics ($T_J = 25^\circ\text{C}$)

Fig 3. Output Characteristics ($T_J = 175^\circ\text{C}$)

Fig 4: $R_{DS(on)}$ vs. Temperature

Fig 5: On-Resistance vs. Drain Current For Various Temperatures

Fig 6: $R_{DS(on)}$ vs. Temperature For Various Gate Voltage


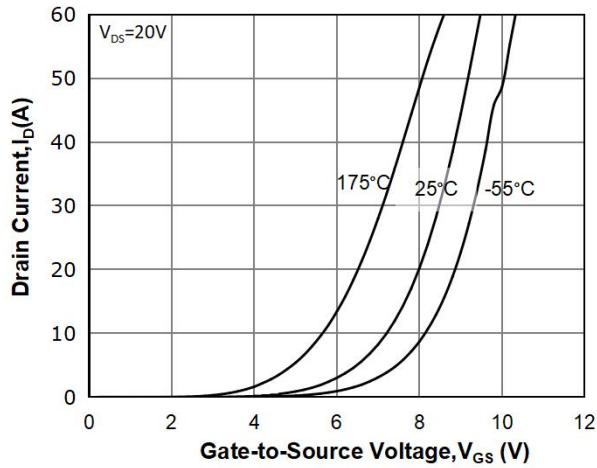
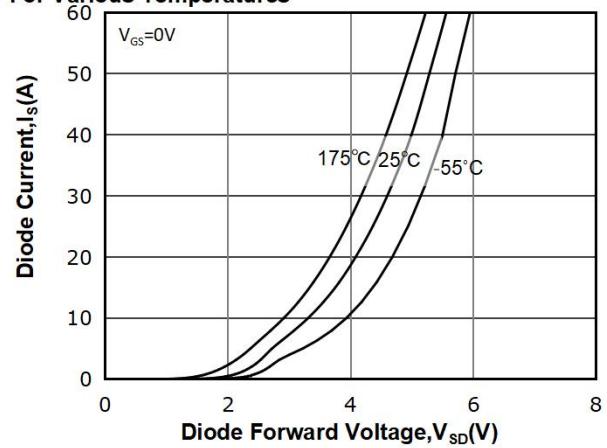
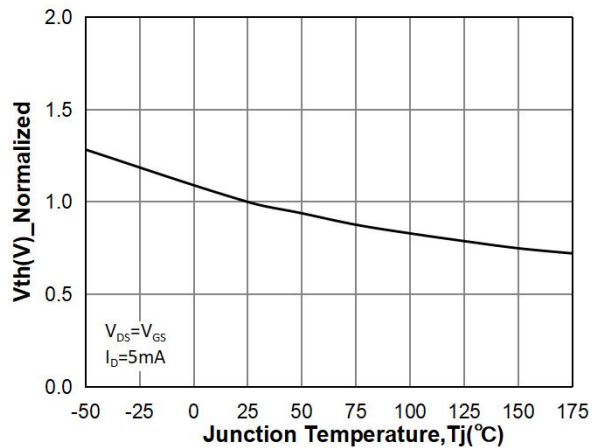
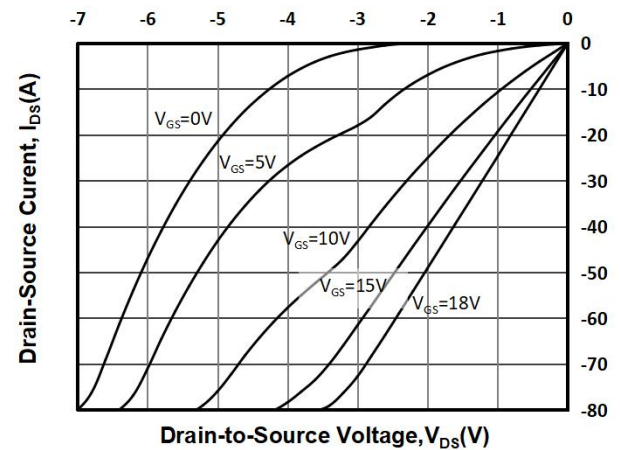
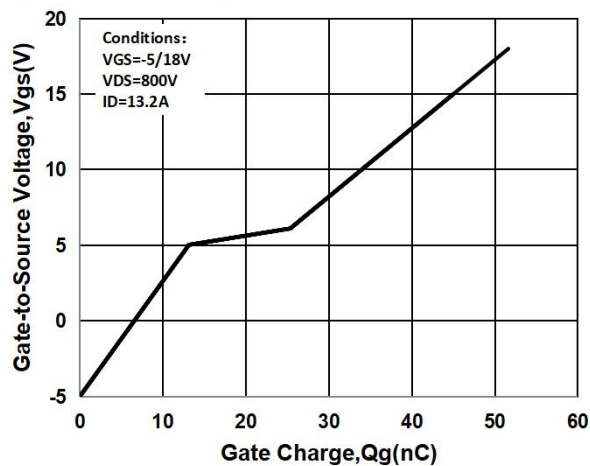
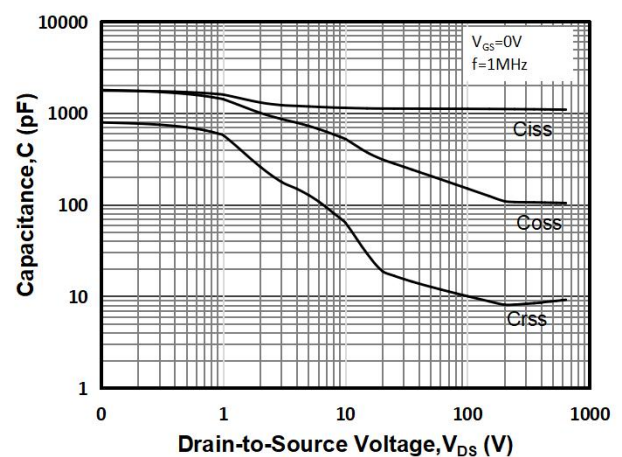
Fig 7: Transfer Characteristics

Fig 8: Body-diode Forward Characteristics For Various Temperatures

Fig 9: V_GS(th) Vs T_J Characteristics

Fig 10: 3rd Quadrant Characteristic at 25°C

Fig 11: Gate Charge Characteristics

Fig 12: Capacitance Characteristics


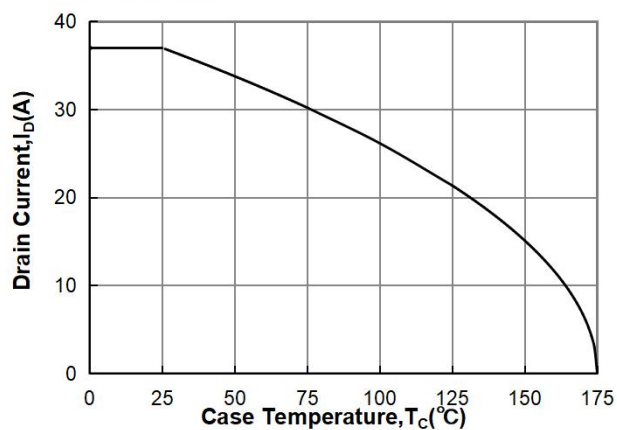
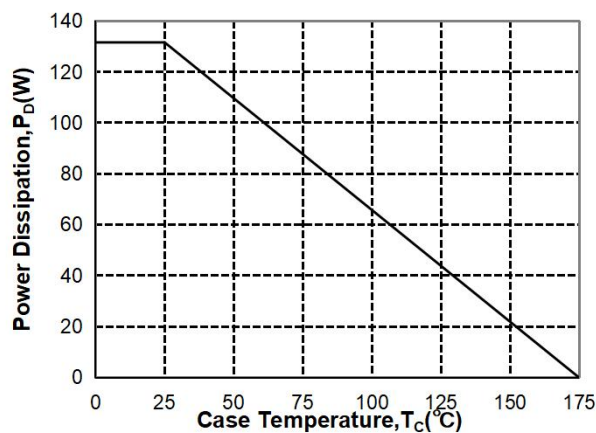
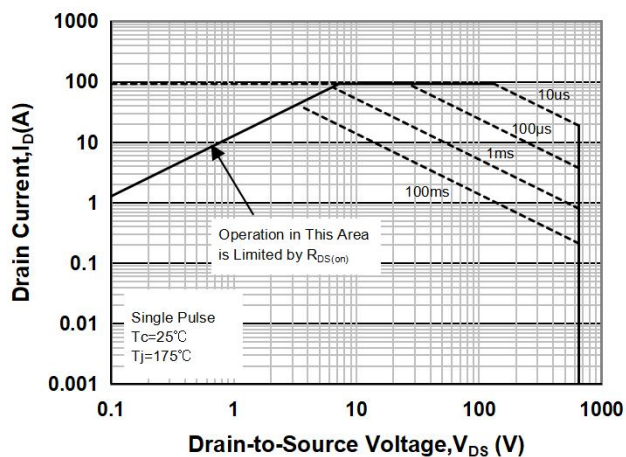
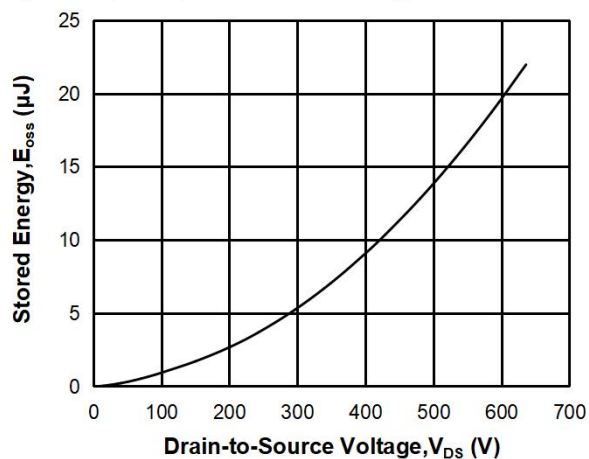
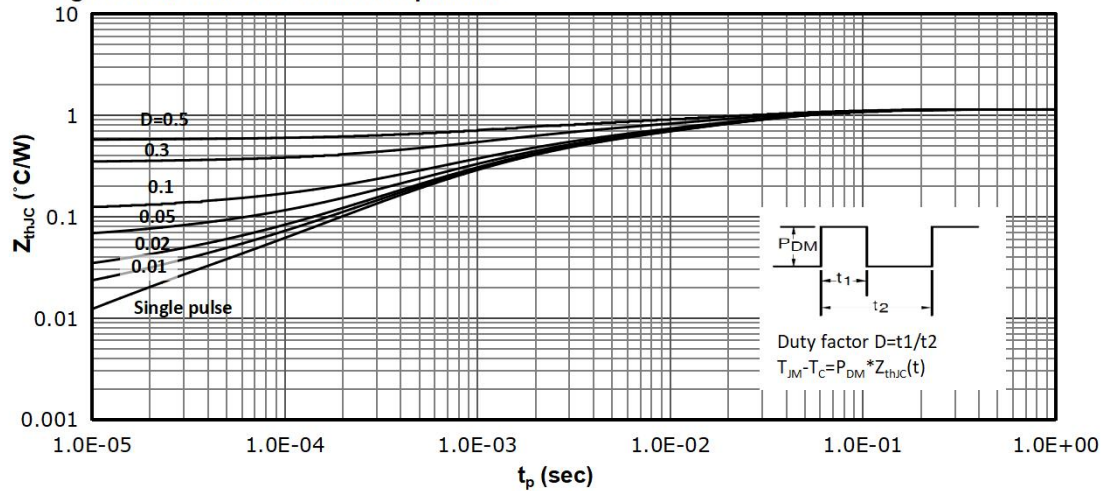
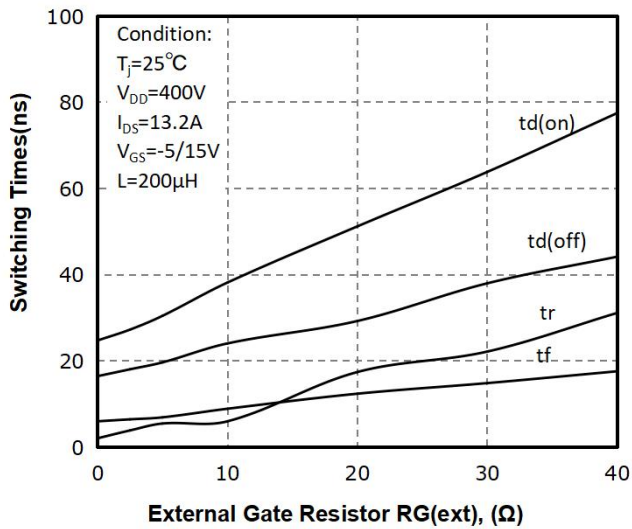
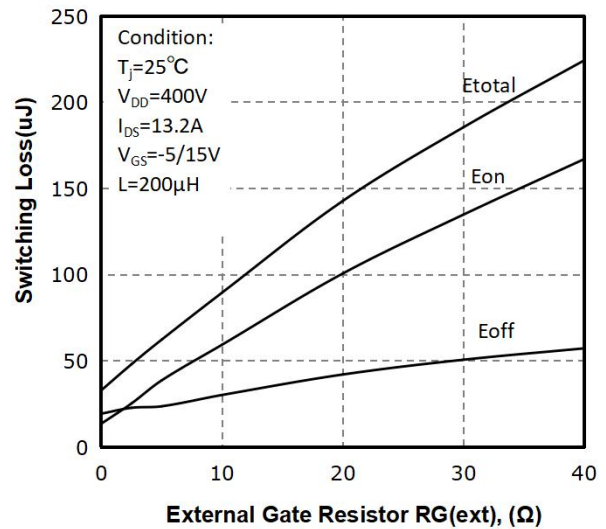
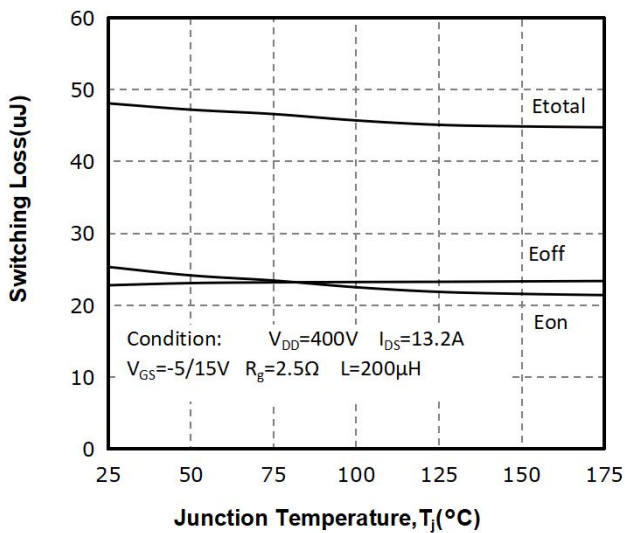
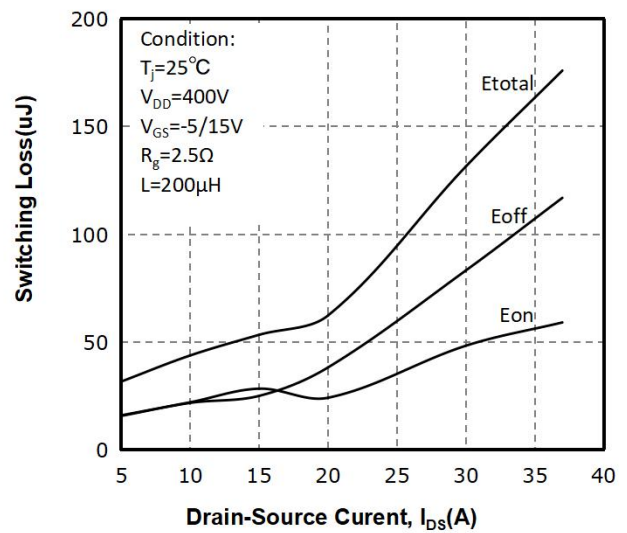
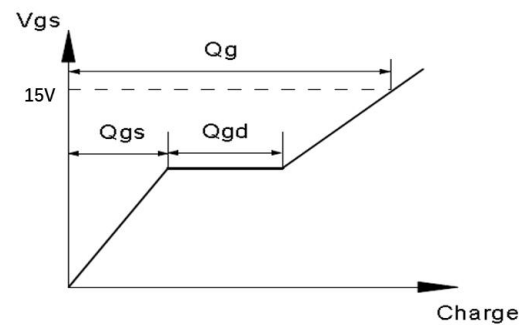
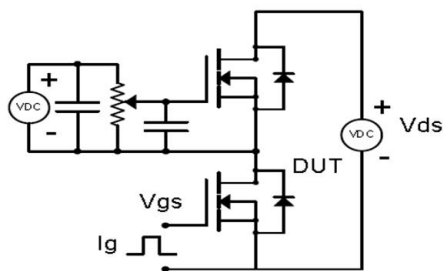
Fig 13: Continuous Drain Current vs. Case Temperature

Fig 14: Maximum Power Dissipation vs. Case Temperature

Fig 15: Safe Operating Area

Fig 16: Output Capacitor Stored Energy

Fig 17: Max. Transient Thermal Impedance


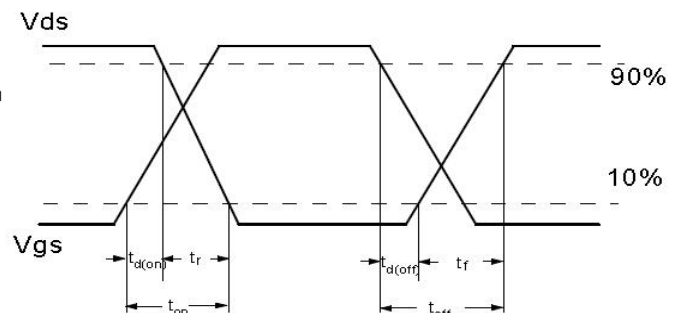
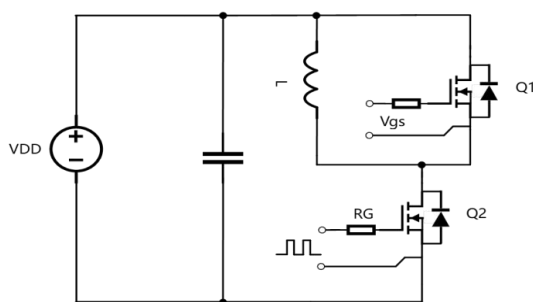
Fig 18: $R_g(\Omega)$ vs. Switching Times(us)

Fig 19: $R_g(\Omega)$ vs. Switching Loss(uJ)

Fig 20: Temperature($^\circ\text{C}$) vs. Switching Loss(uJ)

Fig 21: $I_{DS}(\text{A})$ vs. Switching Loss(uJ)


Test Circuit & Waveform

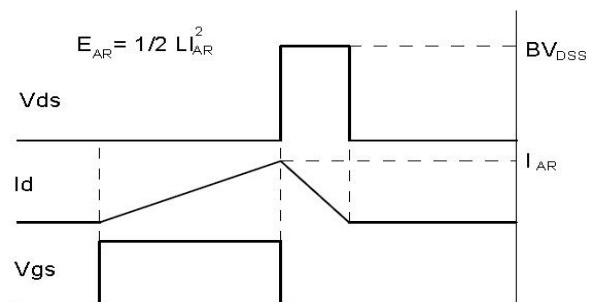
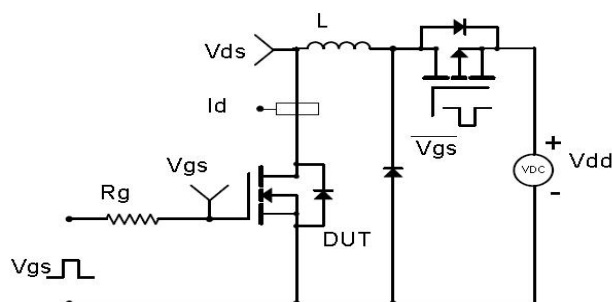
Gate Charge Test Circuit & Waveform



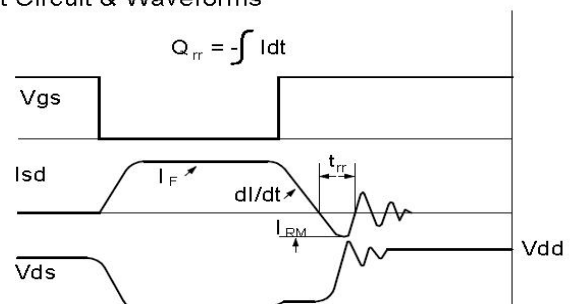
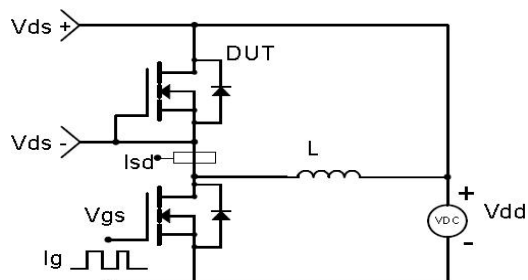
Resistive Switching Test Circuit & Waveforms

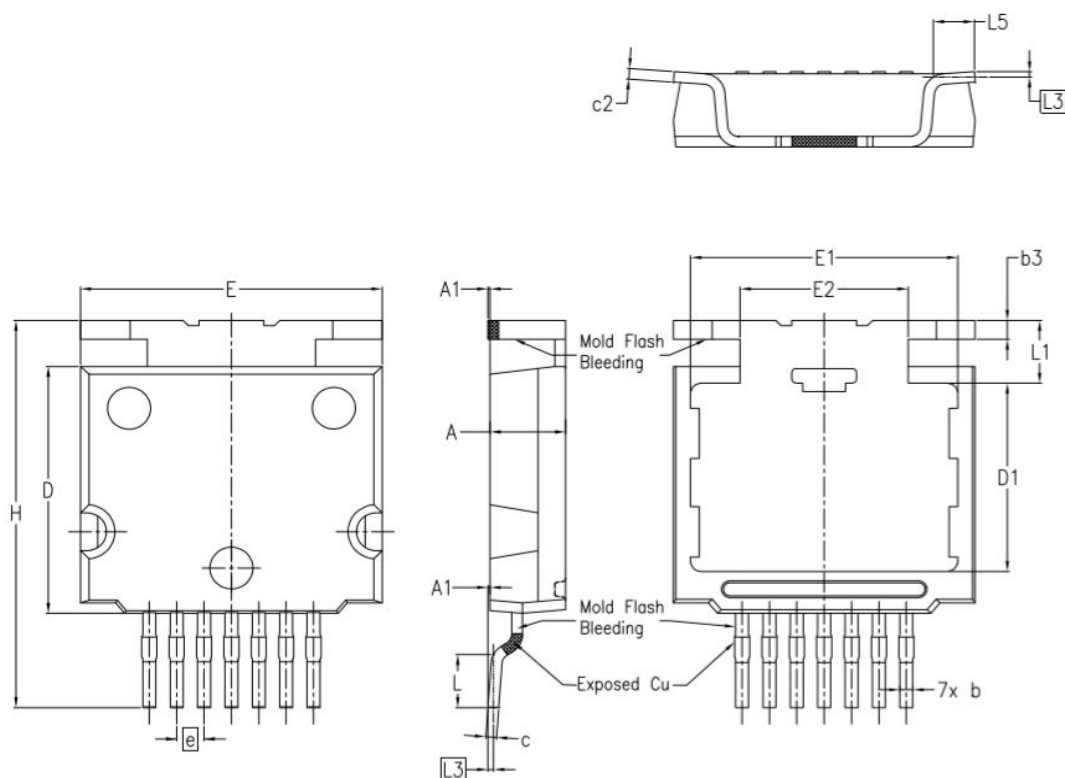


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: T2PAK


Items	Values(mm)	
	MIN	MAX
A	3.4	3.6
A1	0	0.25
b	0.5	0.7
b3	0.75	1.05
c	0.4	0.6
c2	0.4	0.6
D	11.65	11.95
D1	8.75	9.15
E	13.85	14.15
E1	12.25	12.55
E2	7.7	7.9
e	1.27 BSC	
H	17.9	19.1
L	2.25	2.8
L1	3.05BSC	
L3	0.26BSC	
L5	1.7	2.15

Revision History

Revision	Date	Major changes
1.0	2025/7/24	Release of formal version

Disclaimer

- CRM reserves the right to change any product or information in this Specification at any time without prior notice.
- The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics .The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.
- The product is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation/aerospace and life-support devices or systems.
- Any and all semiconductor 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.