

**Features**

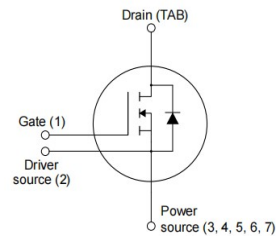
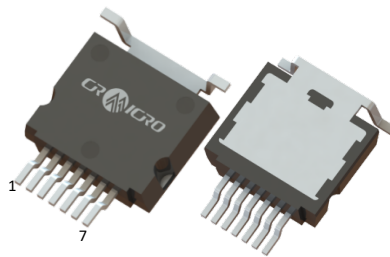
- Qualified according to AEC Q101
- CRM G2 SiC MOSFET Technology
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness
- Fast Reverse Recovery

**Applications**

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

**Product Summary**

V <sub>DS</sub>	650V
R <sub>DS(on)_typ</sub>	25mΩ
I <sub>D</sub>	97A

**100% Avalanche Tested**

**Package Marking and Ordering Information**

Part #	Marking	Package	Packing	Qty
CRXSH25M065G2Q	X25M065G2Q	T2PAK	Reel	700

**Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
Drain-source voltage	V <sub>DSmax</sub>	650	V
Continuous drain current V <sub>GS</sub> =15V, T <sub>C</sub> = 25° C V <sub>GS</sub> =15V, T <sub>C</sub> = 100° C	I <sub>D</sub>	97 69	A
Pulsed drain current (T <sub>C</sub> = 25° C, t <sub>p</sub> limited by T <sub>jmax</sub> )	I <sub>D(pulse)</sub>	243	A
Avalanche energy, single pulse (L=10mH, R <sub>g</sub> =25Ω)	E <sub>AS</sub>	731	mJ
Gate-Source voltage (dynamic) <sup>a1</sup>	V <sub>GSmax</sub>	-10/+22	V
Gate-Source voltage (static) <sup>a2</sup>	V <sub>GSop</sub>	-5/+18	V
Power dissipation (T <sub>C</sub> =25° C, T <sub>J</sub> =175° C)	P <sub>D</sub>	263	W
Operating Junction and Storage Temperature	T <sub>J</sub> , T <sub>stg</sub>	-55...175	° C

 a1: When using MOSFET Body Diode V<sub>GSmax</sub> = -5V/+22V

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

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	$R_{thJC}$	0.57	° 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	$V_{DS}=V_{GS}, I_D=15mA$
Zero gate voltage drain current	$I_{DSS}$	-	1	100	$\mu A$	$V_{DS}=650V, V_{GS}=0V$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$
Gate-source leakage current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=-10/+22V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	25	34	mΩ	$V_{GS}=15V, I_D=33.5A,$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	20	25	mΩ	$V_{GS}=18V, I_D=33.5A,$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$
Transconductance	$g_{fs}$	-	30	-	S	$V_{DS}=20V, I_{DS}=33.5A$

**Dynamic Characteristic**

Internal Gate resistance	$R_{G(int)}$	-	1.7	-	Ω	$f=1MHz$
Input Capacitance	$C_{iss}$	-	2775	-	pF	$V_{GS}=0V, V_{DS}=600V,$ $f=1MHz$
Output Capacitance	$C_{oss}$	-	231	-		
Reverse Transfer Capacitance	$C_{rss}$	-	16.3	-		
Coss Stored Energy	$E_{oss}$	-	45	-		
Gate Total Charge	$Q_g$	-	133	-	nC	$V_{GS}=-5/18V$ $V_{DS}=400V$ $I_D=33.5A$
Gate-Source charge	$Q_{gs}$	-	41.5	-		
Gate-Drain charge	$Q_{gd}$	-	26	-		
Turn-on delay time	$t_{d(on)}$	-	49.8	-	ns	$V_{DD}=400V, I_D=33.5A$ $V_{GS}=-5V/15V,$ $R_G=2.5\Omega, L=200\mu H$
Rise time	$t_r$	-	6.4	-		
Turn-off delay time	$t_{d(off)}$	-	34	-		
Fall time	$t_f$	-	8.8	-		
Turn-On Switching Energy	$E_{(on)}$	-	115	-	μJ	
Turn Off Switching Energy	$E_{(off)}$	-	97	-		

**Body Diode Characteristic**

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	$V_{SD}$	-	3.5	-	V	$V_{GS}=0V, I_F=16.7A$
		-	3	-	V	$V_{GS}=0V, I_F=16.7A, T_j=175^\circ C$
Continuous Diode Forward Current	$I_S$	-	-	97	A	$V_{GS}=0V$
Diode pulse Current	$I_{S,pulse}$	-	-	243	A	pulse width $t_p$ limited by $T_{jmax}$
Body Diode Reverse Recovery Time	$t_{rr}$	-	21.3	-	ns	$di/dt=1000A/us$ $I_F=33.5A$ $V_{dd}=400V$ $T_j=25^\circ C$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	138	-	nC	
Body Diode Peak Reverse Recovery Current	$I_{rrm}$	-	11	-	A	
Body Diode Reverse Recovery Time	$t_{rr}$	-	27.7	-	ns	$di/dt=1000A/us$ $I_F=33.5A$ $V_{dd}=400V$ $T_j=175^\circ C$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	242	-	nC	
Body Diode Peak Reverse Recovery Current	$I_{rrm}$	-	15.2	-	A	

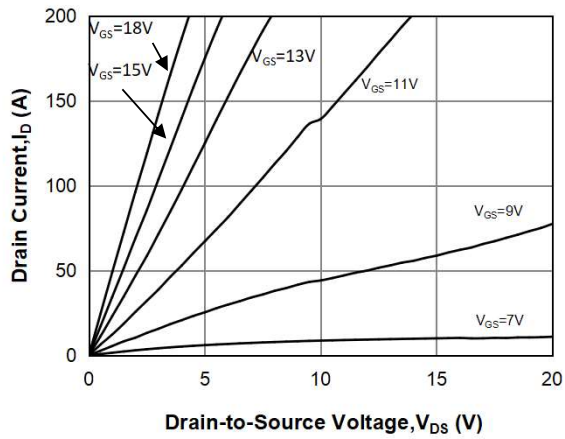
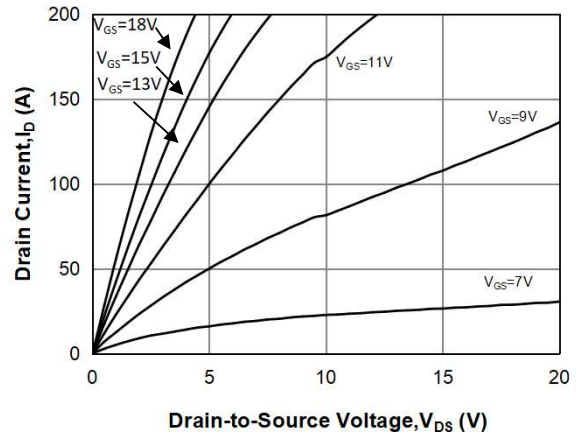
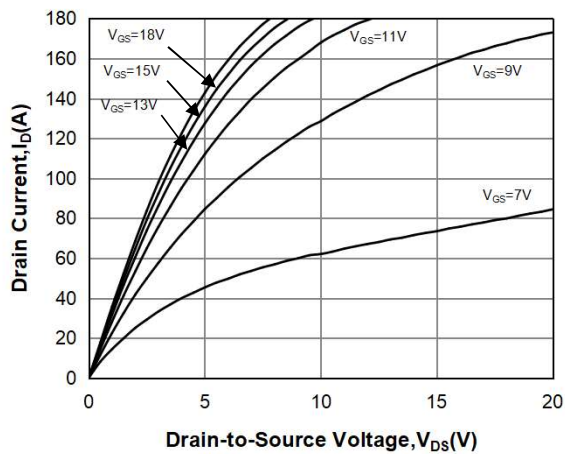
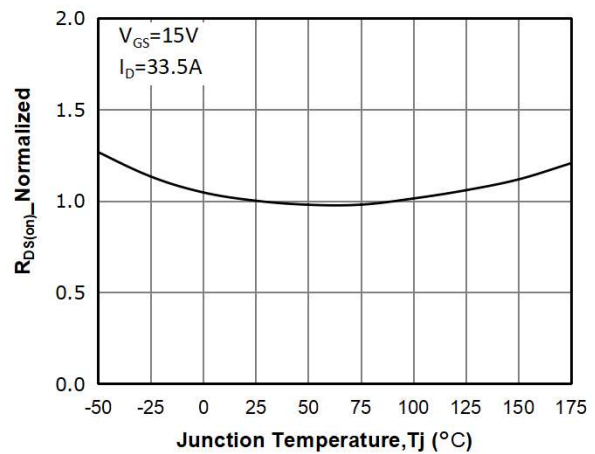
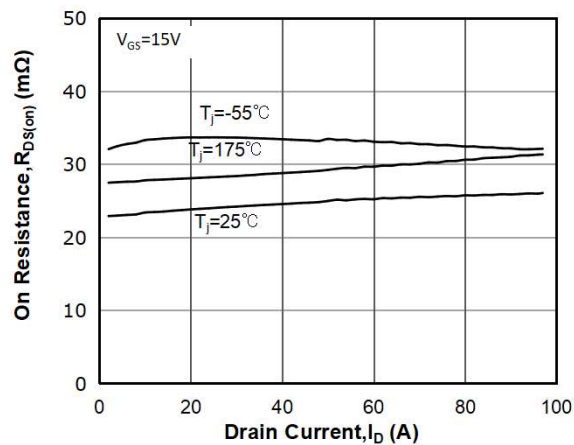
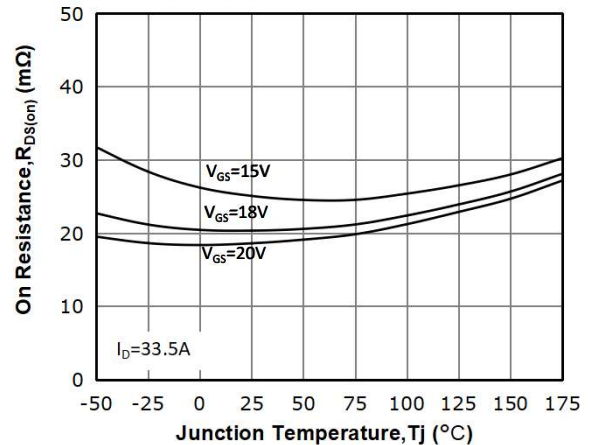
**Typical Performance Characteristics**
**Fig 1. Output Characteristics (T<sub>J</sub>=-55°C)**

**Fig 2. Output Characteristics (T<sub>J</sub>=25°C)**

**Fig 3. Output Characteristics (T<sub>J</sub>=175°C)**

**Fig 4: R<sub>DS(on)</sub> vs. Temperature**

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

**Fig 6: R<sub>DS(on)</sub> vs. Temperature For Various Gate Voltage**


Fig 7: Transfer Characteristics

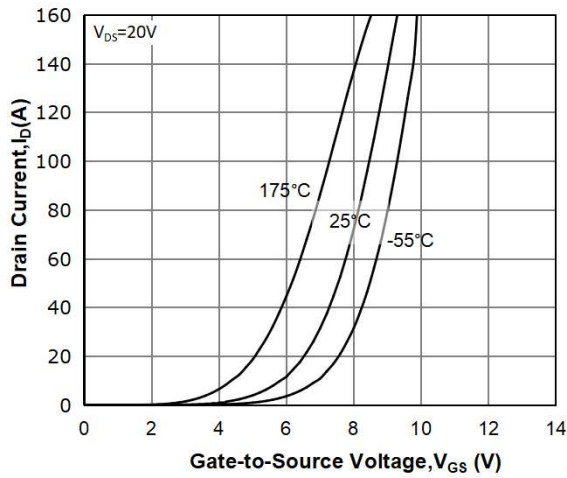


Fig 8: Body-diode Forward Characteristics For Various Temperatures

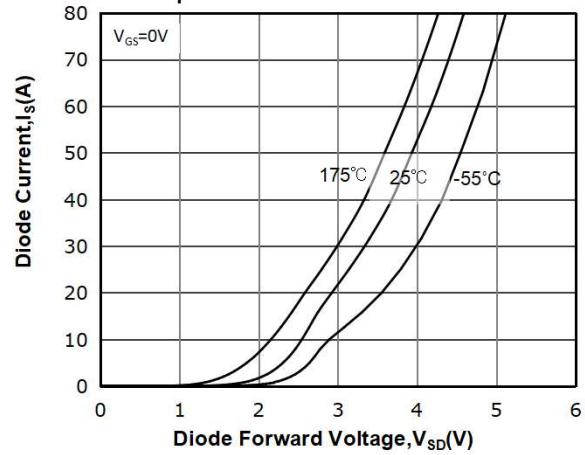


Fig 9: VGS(th) Vs Tj Characteristics

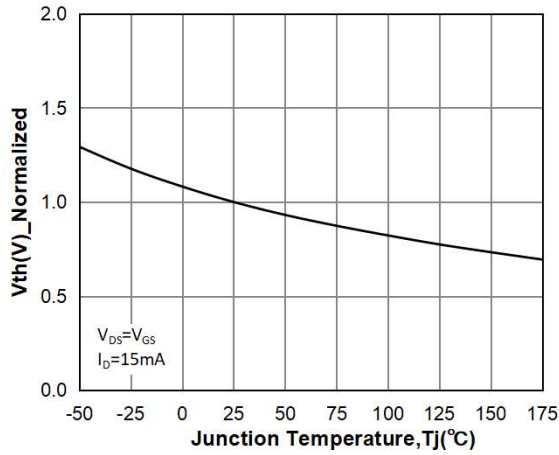


Fig 10: 3rd Quadrant Characteristic at 25°C

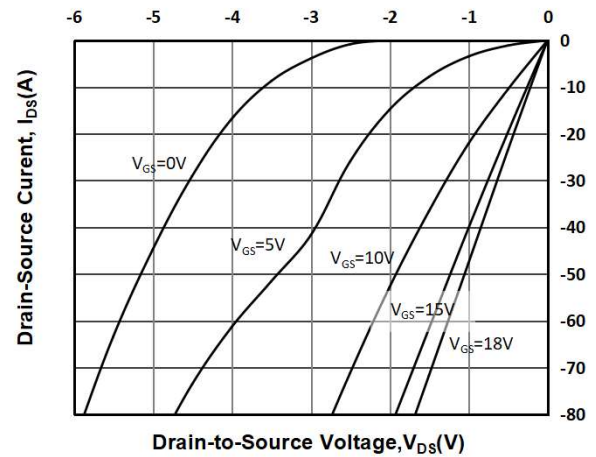


Fig 11: Gate Charge Characteristics

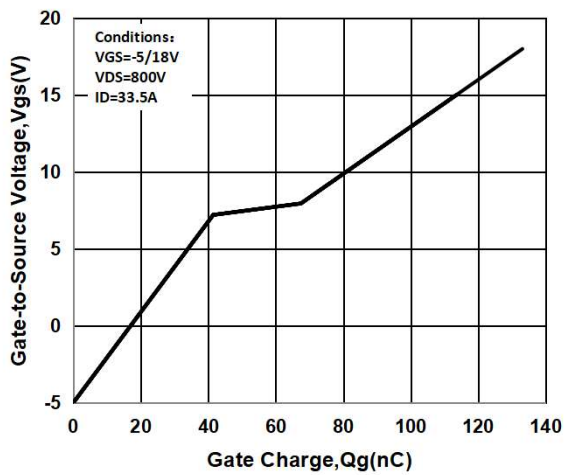


Fig 12: Capacitance Characteristics

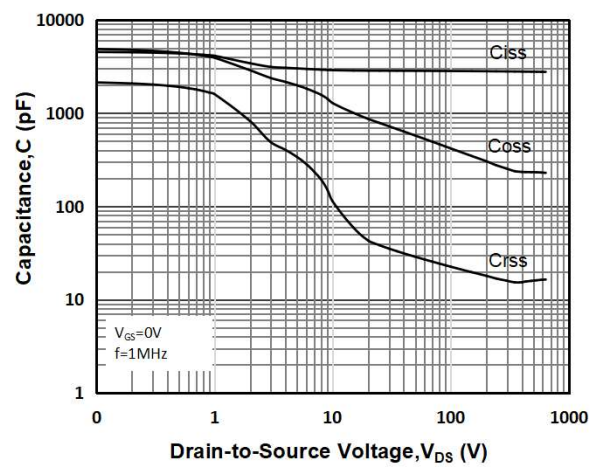


Fig 13: Continuous Drain Current vs. Case Temperature

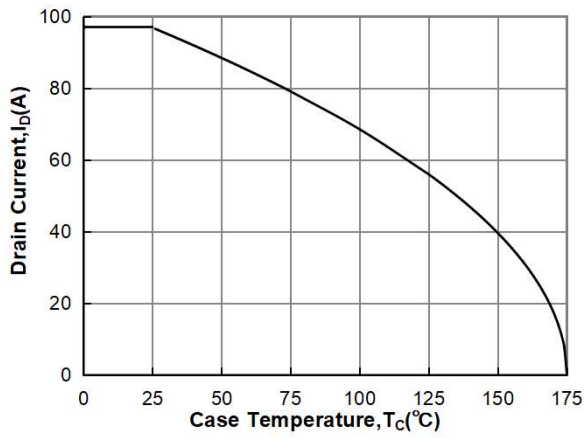


Fig 14: Maximum Power Dissipation vs. Case Temperature

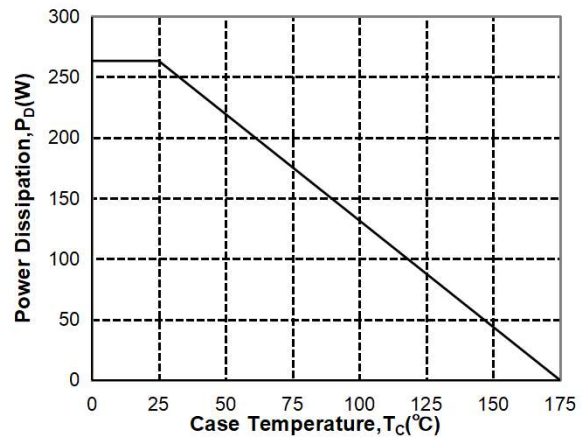


Fig 15: Safe Operating Area

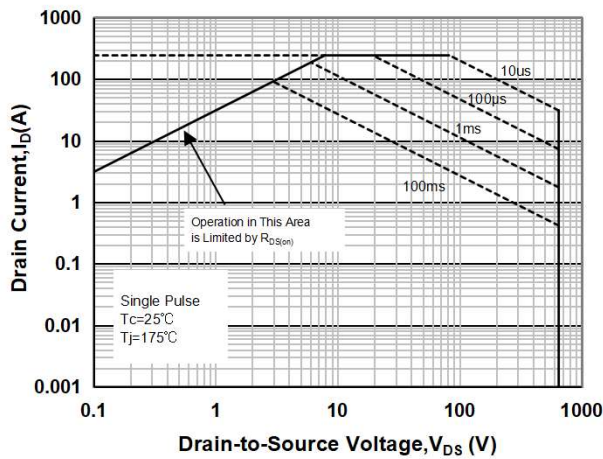


Fig 16: Output Capacitor Stored Energy

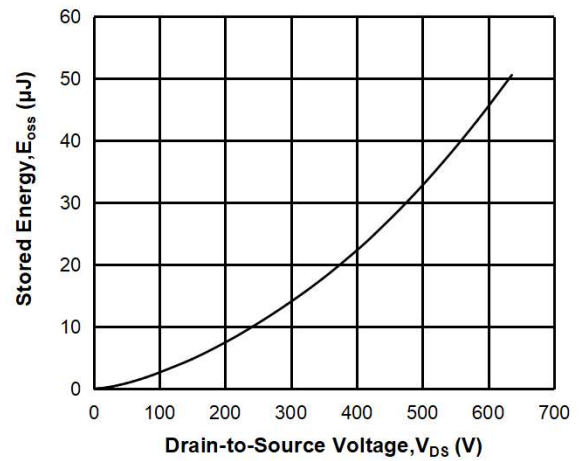
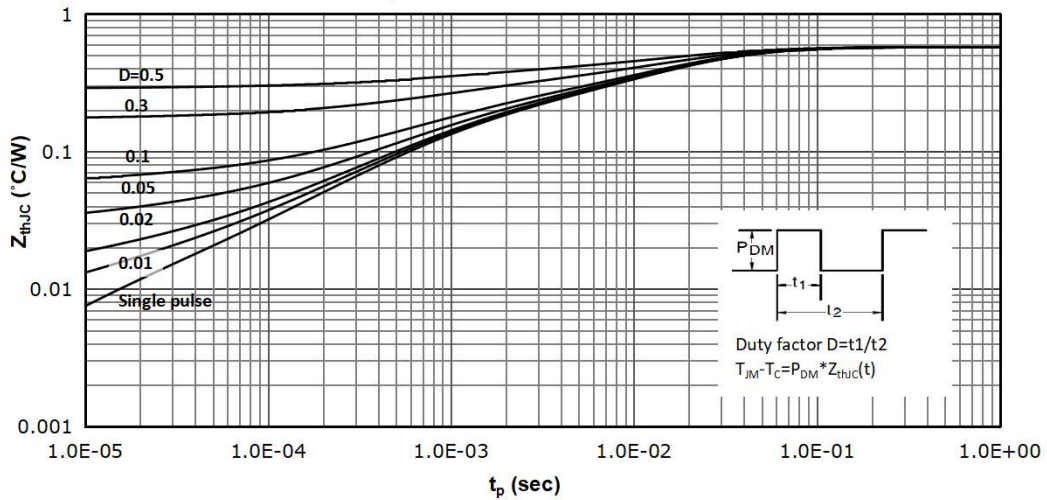
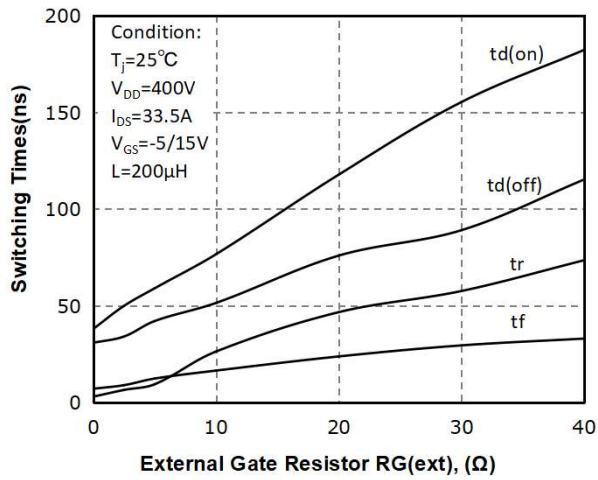
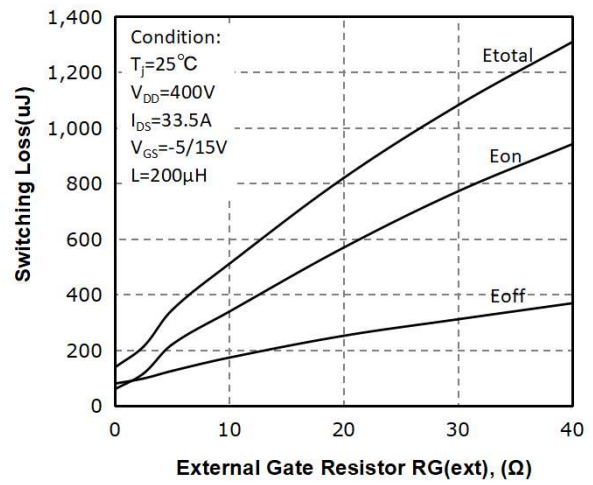
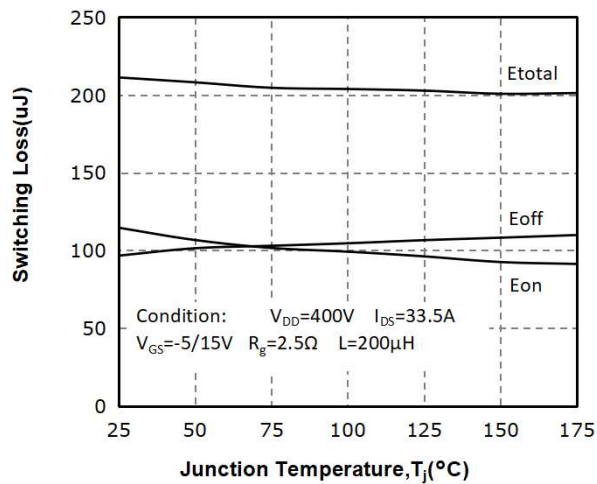
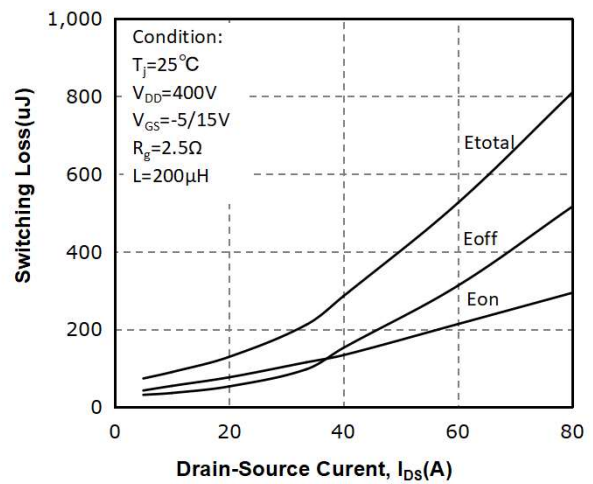


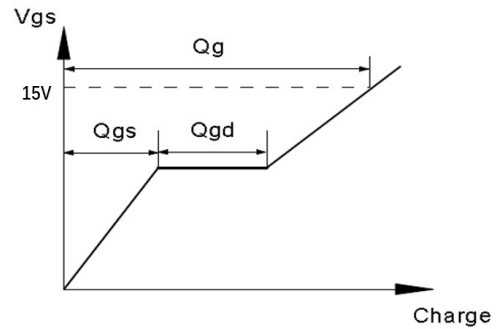
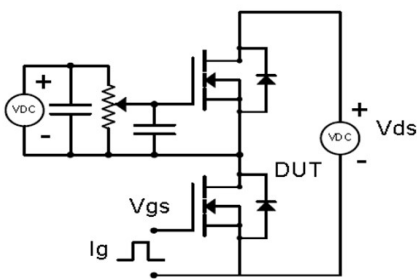
Fig 17: Max. Transient Thermal Impedance



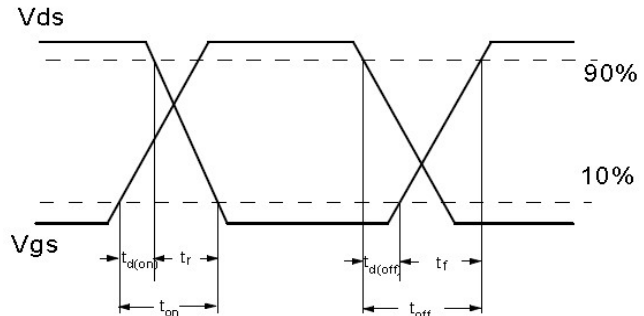
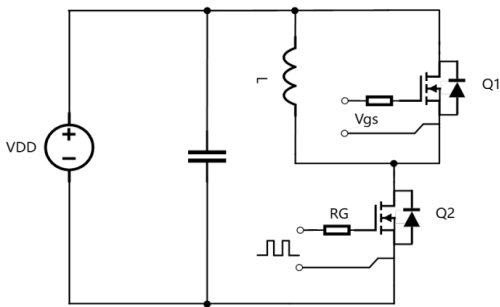
**Fig 18: Rg(Ω) vs. Switching Times(us)**

**Fig 19: Rg(Ω) vs. Switching Loss(uJ)**

**Fig 20: Temperature(°C) vs. Switching Loss(uJ)**

**Fig 21: Ids(A) vs. Switching Loss(uJ)**


**Test Circuit & Waveform**

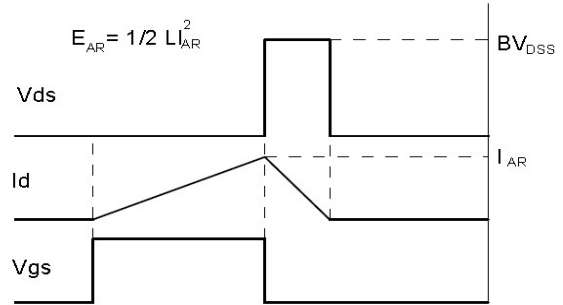
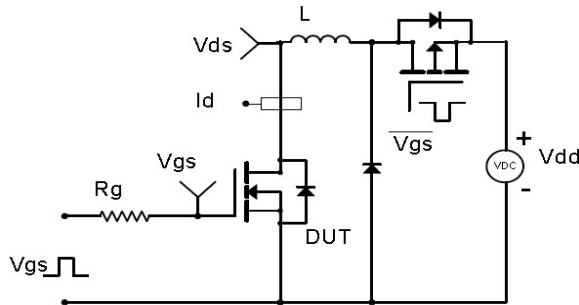
Gate Charge Test Circuit &amp; Waveform



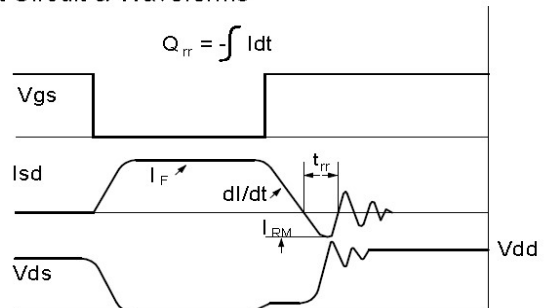
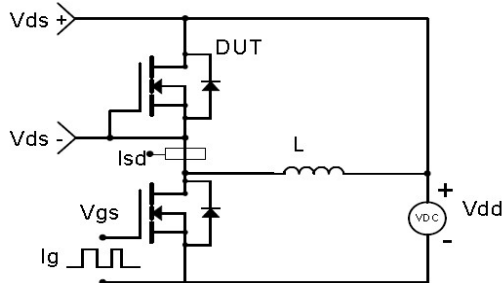
Resistive Switching Test Circuit &amp; Waveforms

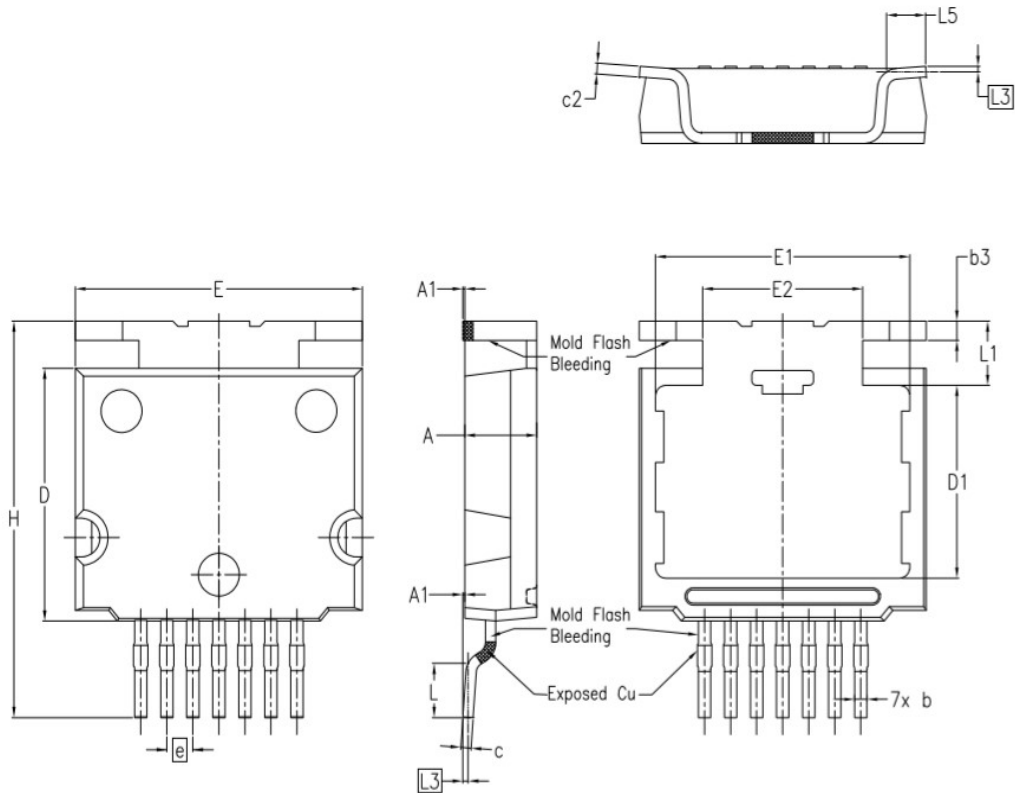


Unclamped Inductive Switching (UIS) Test Circuit &amp; Waveforms



Diode Recovery Test Circuit &amp; 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	2025/5/26	Release of formal version

**Disclaimer**

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