

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

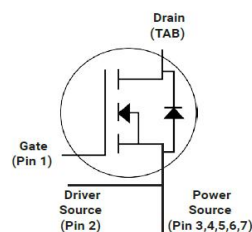
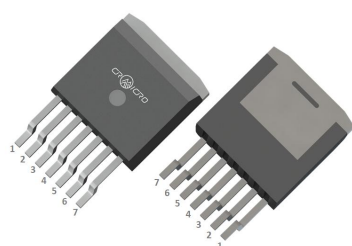
Applications

- 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}	25m Ω
I _D	97A

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Qty
CRXSP25M065G2Q	X25M065G2Q	TO-263-7	Reel	800pcs

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	97 69	A
Pulsed drain current (T _C = 25°C, t _p limited by T _{Jmax})	I _{D(pulse)}	243	A
Avalanche energy, single pulse (L=10mH, R _g =25 Ω)	E _{AS}	731	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	263	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}	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	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	$R_{DS(on)}$	-	25	34	mΩ	$V_{GS}=15V, I_D=33.5A,$ $T_j=25^\circ\text{C}$
		-	32.5	-		$T_j=175^\circ\text{C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	20	25	mΩ	$V_{GS}=18V, I_D=33.5A,$ $T_j=25^\circ\text{C}$
		-	28	-		$T_j=175^\circ\text{C}$
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	VGS=-5/18V VDS=400V ID=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	VDD=400V,ID=33.5A VGS=-5V/15V, RG=2.5Ω, L=200uH
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	-	uJ	
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

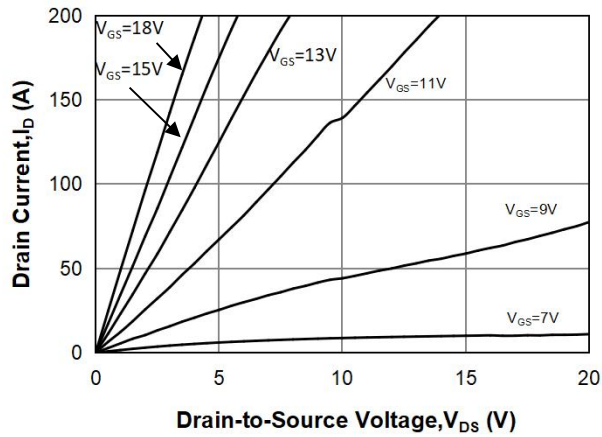
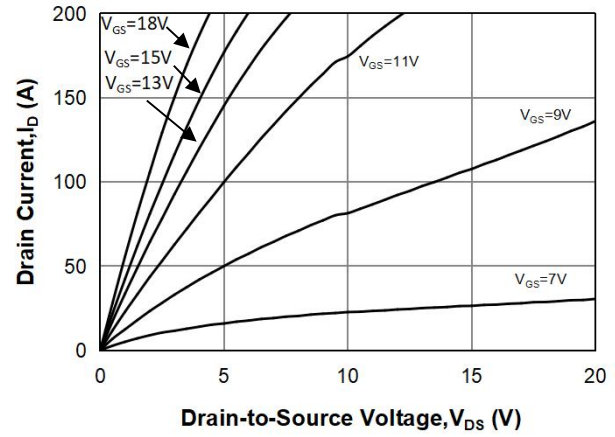
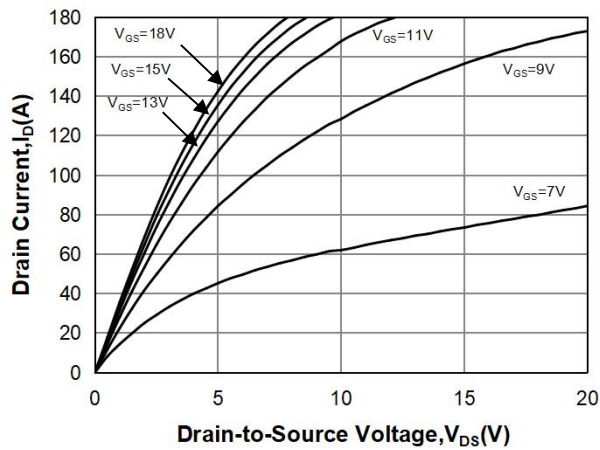
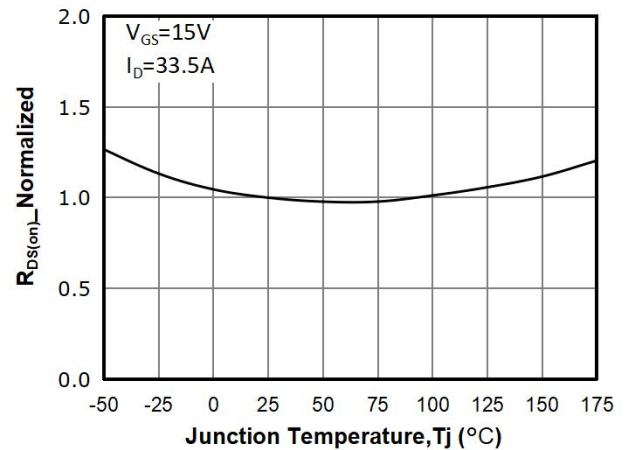
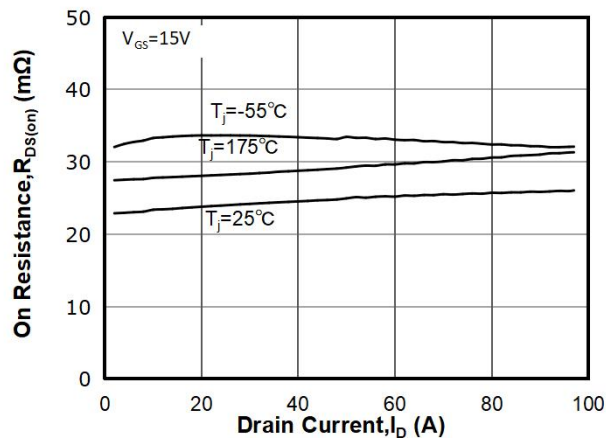
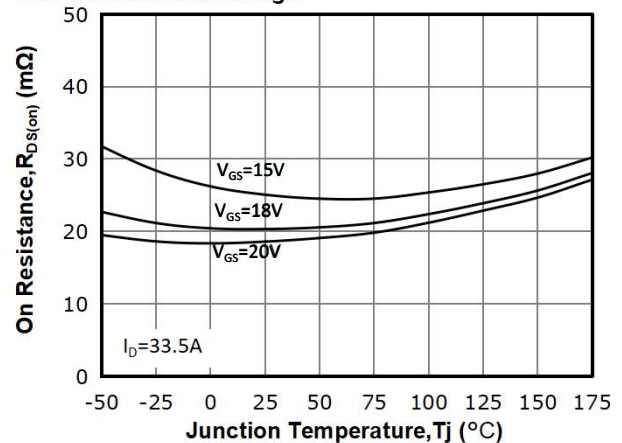
Fig 1. Output Characteristics ($T_J = -55^\circ\text{C}$)

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


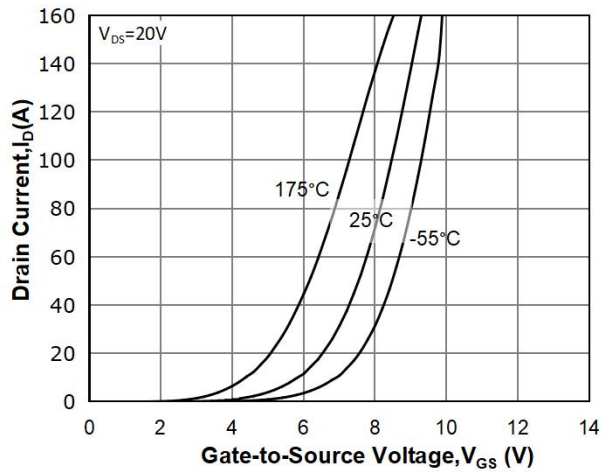
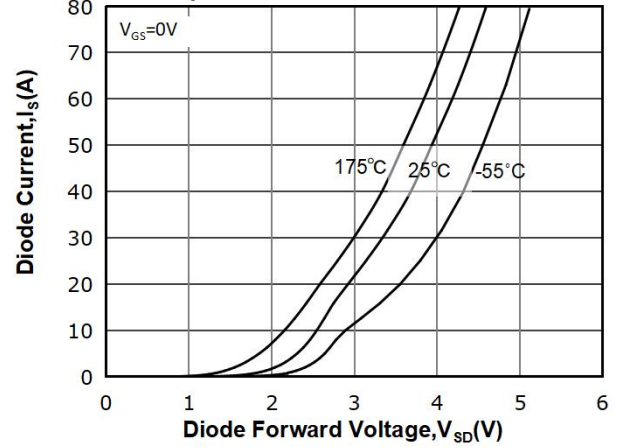
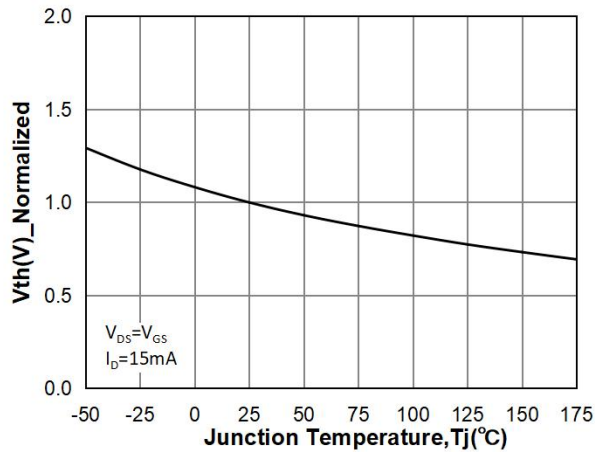
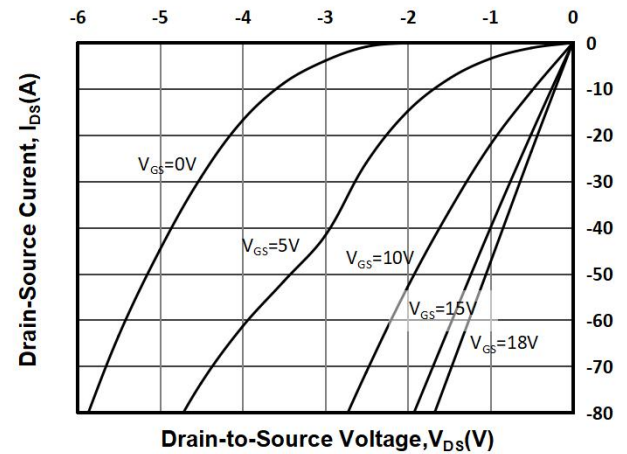
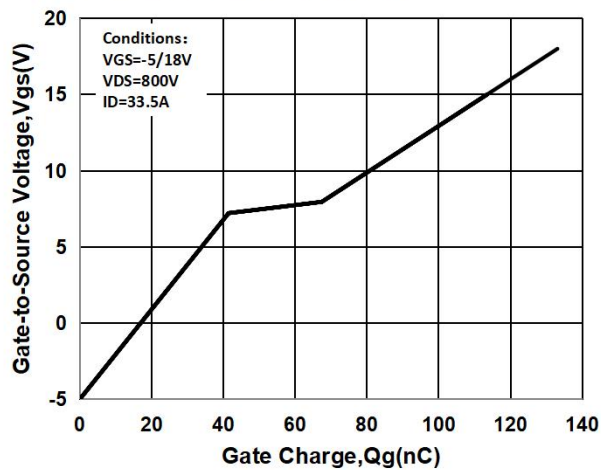
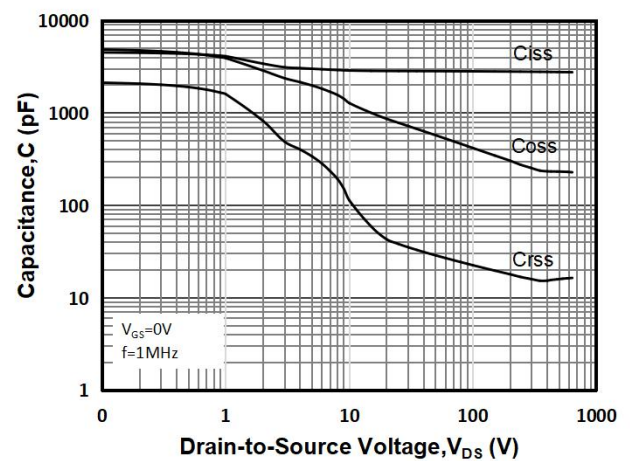
Fig 7: Transfer Characteristics

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


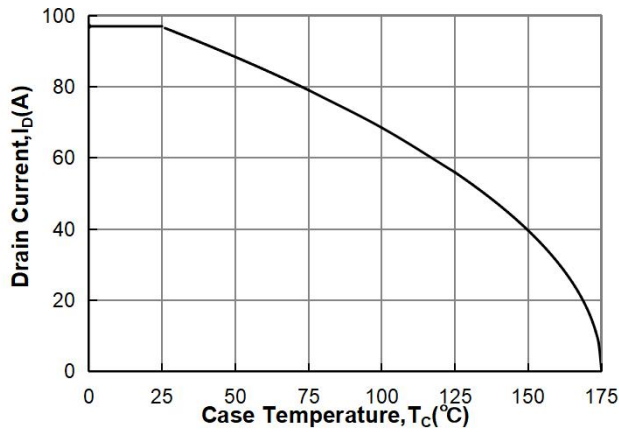
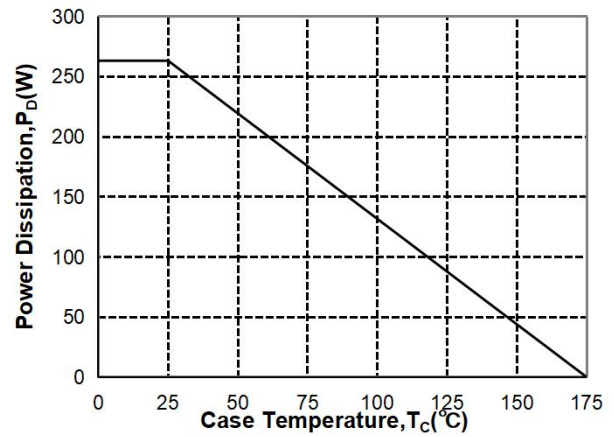
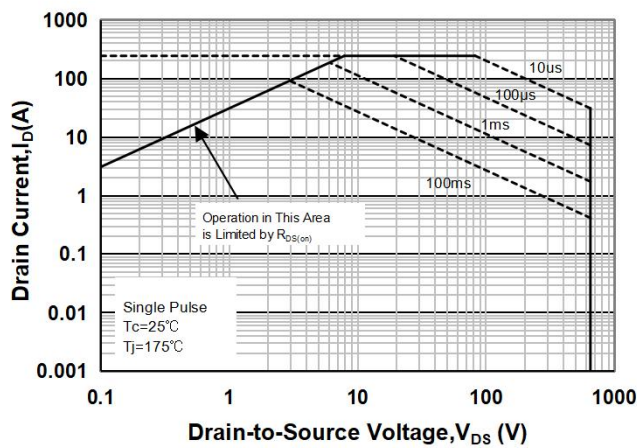
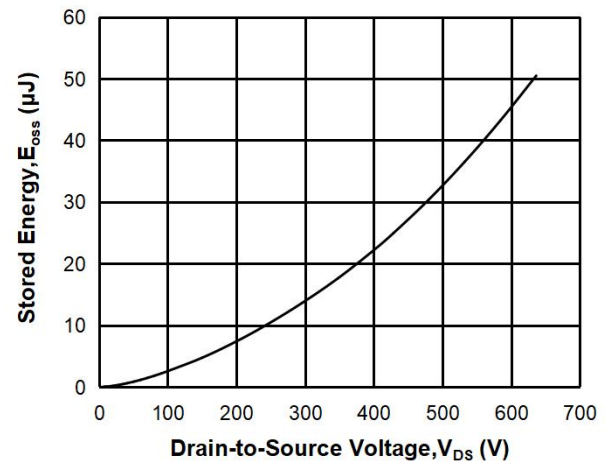
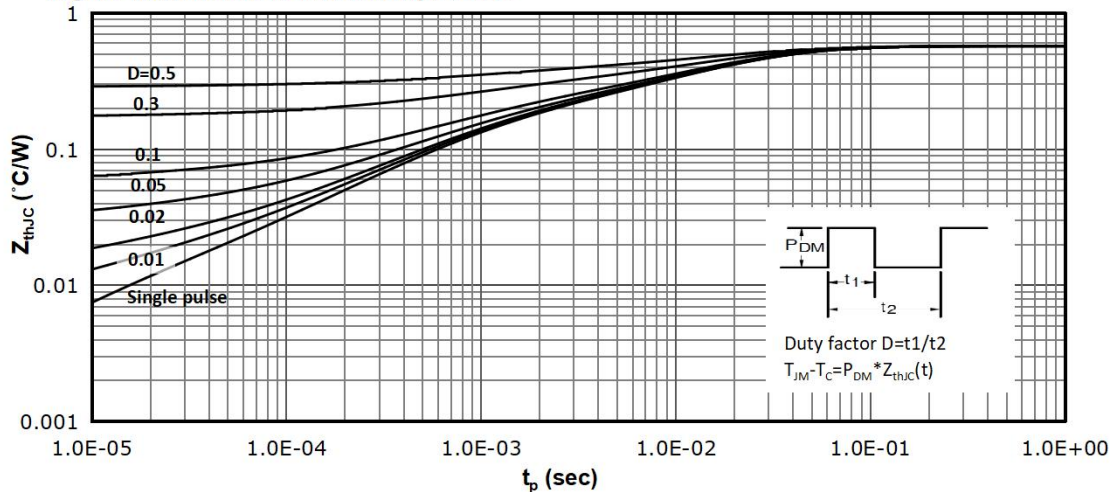
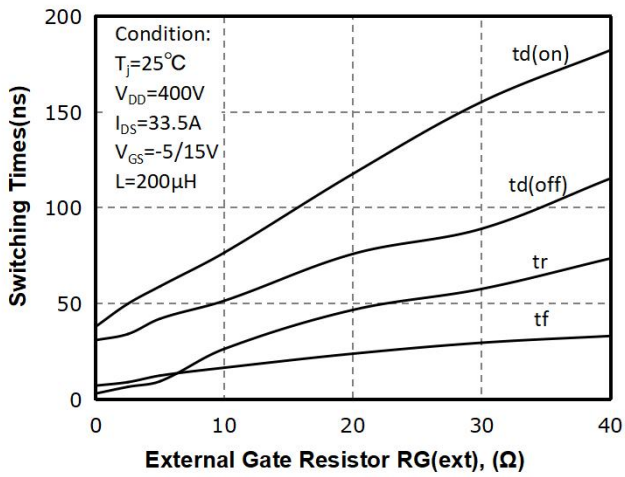
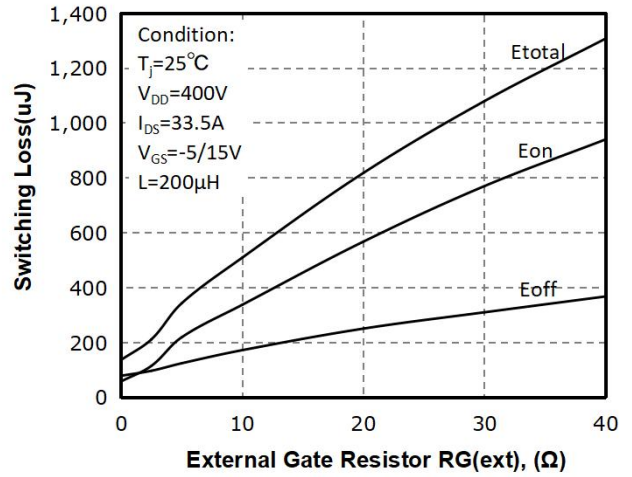
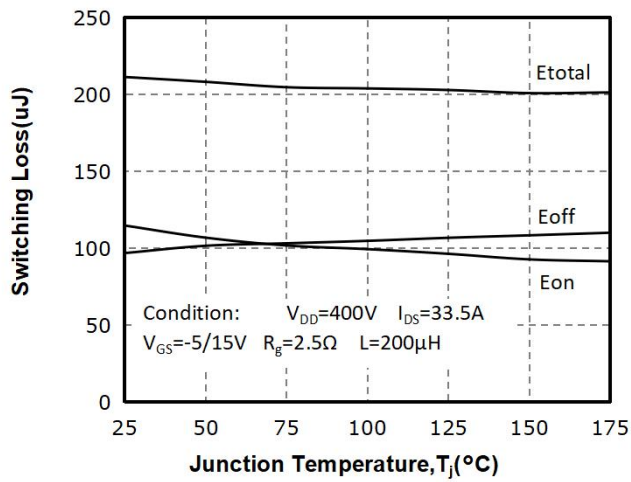
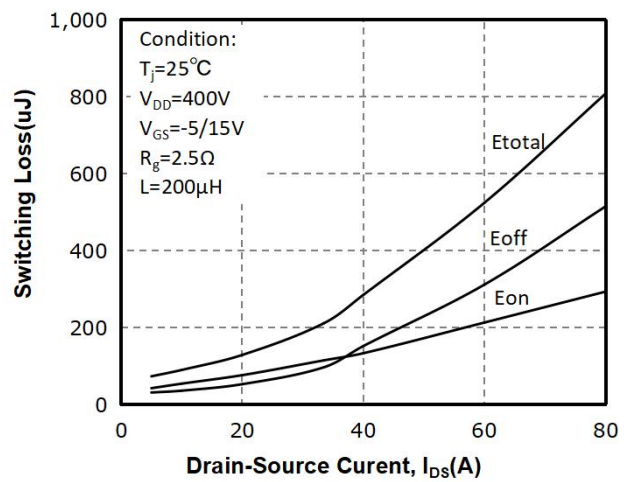
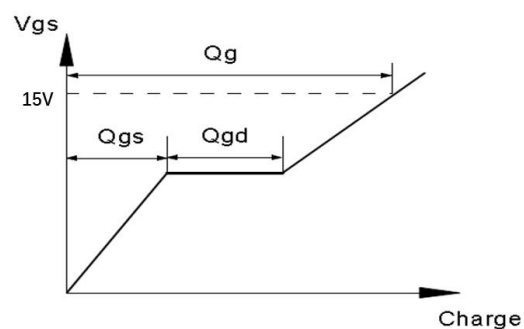
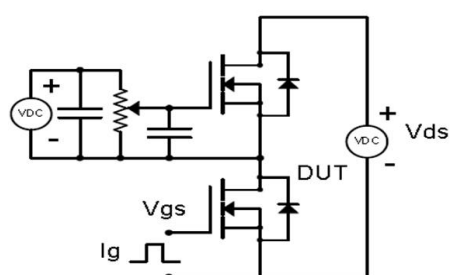
Fig 13: Continuous Drain Current vs. Case Temperature

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


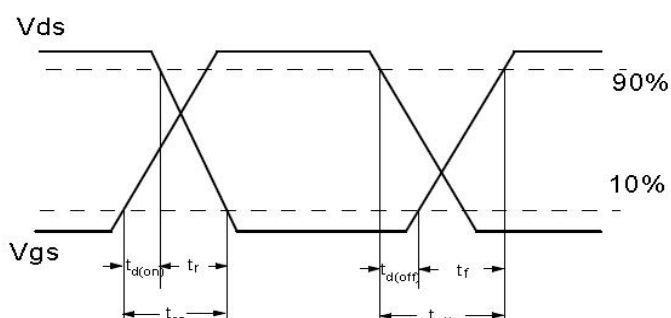
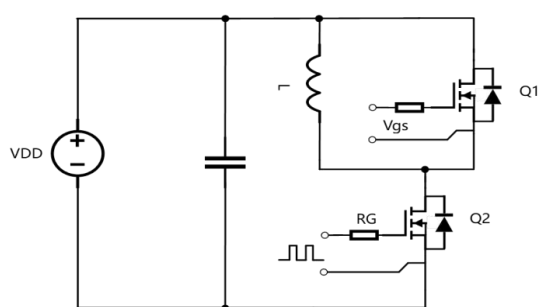
Fig 18: $R_g(\Omega)$ vs. Switching Times(us)

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

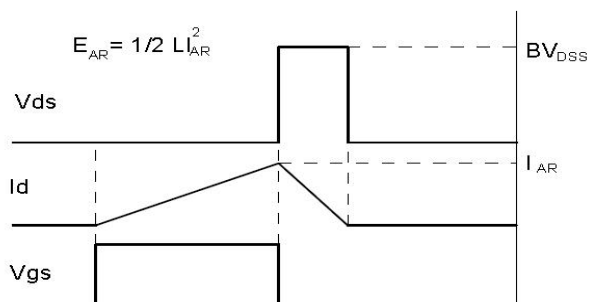
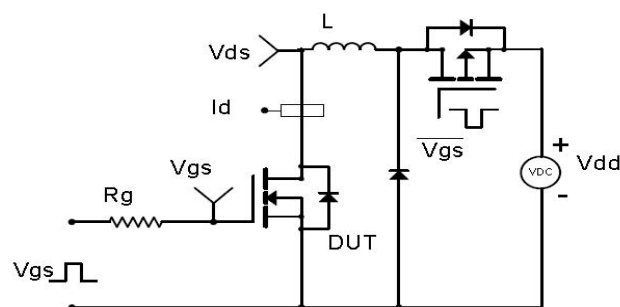
Gate Charge Test Circuit & Waveform



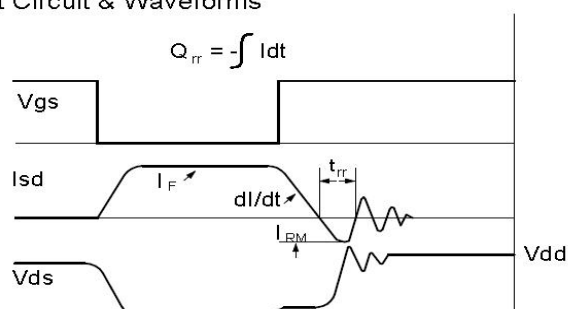
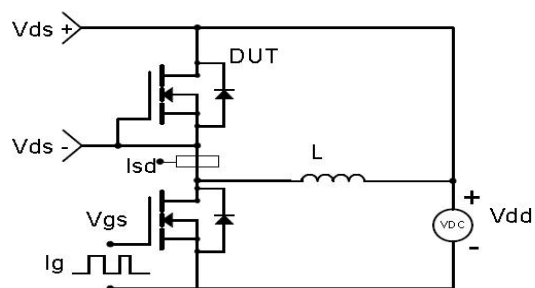
Resistive Switching Test Circuit & Waveforms

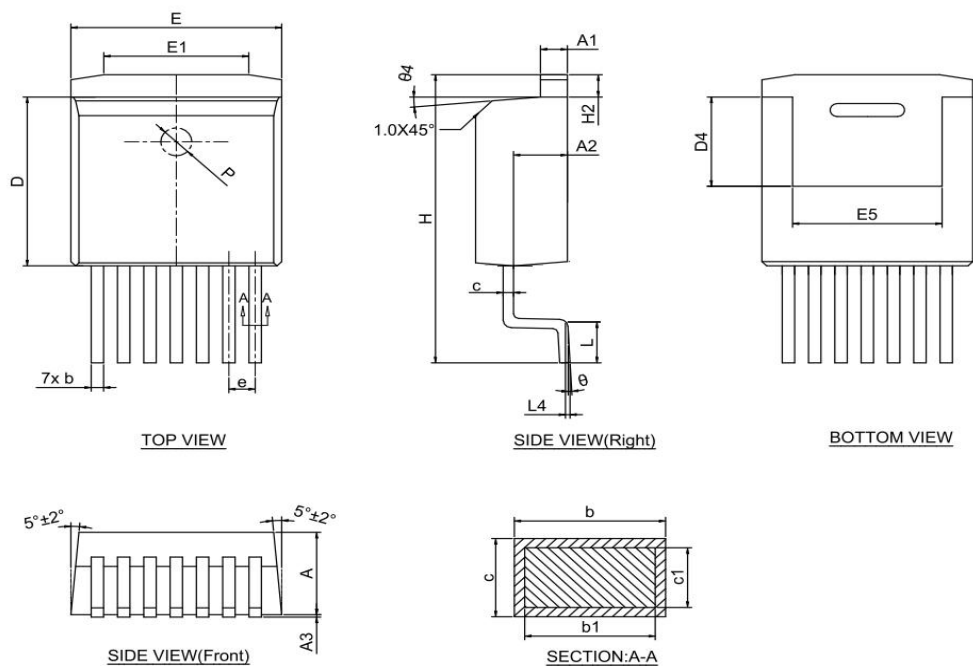


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-263-7


Items	Values(mm)	
	MIN	MAX
A	4.2	4.66
A1	1.15	1.45
A2	2.35	2.85
A3	0	0.3
b	0.5	0.78
b1	0.45	0.75
c	0.49	0.64
c1	0.4	0.6
D	8.83	9.33
D4	4.6	5
e	1.27 BSC.	
E	9.08	10.38
E1	6.4	7.6
E5	6.72	7.72
H	14.9	16.1
H2	0.9	1.45
L	1.8	2.6
L4	0.25 BCS.	
P	1.4	1.6
θ	0°	7°

Revision History

Revision	Date	Major changes
1.0	2024/6/4	Release of formal version
2.0	2025/2/15	Updating Switching Data
3.0	2025/4/18	Updating Thermal resistance related data

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