华润微电子(重庆)有限公司

CRJMH43M65NMAQ

N-channel Half-bridge topology Power MOSFET 650V, 77mΩ, 32A

Features

- AQG 324 qualified
- Half bridge power module
- 650V blocking voltage
- Fast recovery body diode
- Very low switching energies
- Low package inductance
- Dice on direct bond copper(DBC) substrate
- Low thermal resistance

Applications

- Switching applications

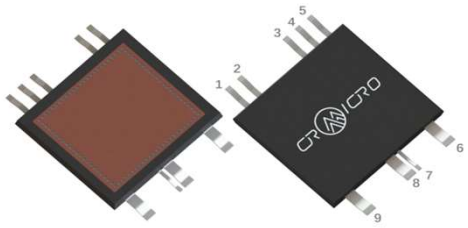
Product Summary

VDS	650V
$R_{DS(on)_typ}$	77mΩ
I_D	32A

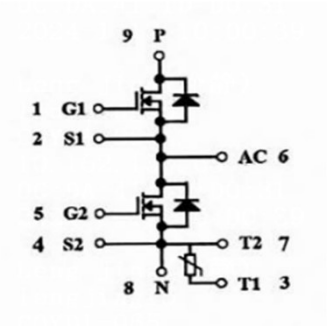
100% DVDS Tested

100% Avalanche Tested

RoHS HF



CRJMH43M65NMAQ



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJMH43M65NMAQ	CRJMH43M65NMAQ	MSOP9	Tape&Reel	N/A	N/A	200pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	650	V
Continuous drain current [1)] T_C = 25°C T_C = 100°C	I_D	 32 20	A
Pulsed drain current [2)] (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	127	A
Avalanche energy, single pulse (L=30mH, Rg=30Ω)	E_{AS}	750	mJ
MOSFET dv/dt ruggedness	dv/dt	50	V/ns
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_{tot}	240	W
Continuous diode forward current(T_C = 25°C)	I_S	32	A
Diode pulse current [2)] (T_C = 25°C)	$I_{S\ pulse}$	127	A
Recovery diode dv/dt [3)]	dv/dt	50	V/ns
Maximum diode commutation speed	di_F/dt	900	A/μs
Operating junction and storage temperature	T_j , T_{stg}	-40...+150	°C

1) Limited by Tj,max. Maximum Duty Cycle D = 0.50;
2) Pulse width tp limited by Tj,max
3) Identical low side and high side switch with identical RG

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Thermal Resistance

Parameter	Symbol	Value			Unit
		min.	typ.	max.	
Thermal resistance, junction – case	R_{thJC}		0.52	0.60	°C/W
Thermal resistance, junction – ambient	R_{thJA}		25.37	29.18	°C/W

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}	650	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	3	-	4.8	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- 1000	5 -	μA	V_{DS}=650V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±30V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	77 200	93 -	mΩ	V_{GS}=10V, I_D=21.5A, T_j=25°C T_j=150°C
Transconductance	g_{fs}	-	32	-	S	V_{DS}=20V,I_D=21.5A
Dynamic Characteristic						
Input Capacitance	C_{iss}		3445		pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}		134			
Reverse Transfer Capacitance	C_{rss}		0.6			
Gate Total Charge	Q_G		84		nC	V_{GS}=10V, V_{DS}=480V, I_D=21.5A
Gate-Source charge	Q_{gs}		28			
Gate plateau voltage	Q_{gd}		36			
Gate-Drain charge	$V_{plateau}$	-	7.4	-	V	
Turn-on delay time	$t_{d(on)}$	-	29	-	ns	V_{GS}=10V, I_D=21.5A, V_{DS}=400V, R_g=4.7Ω
Rise time	t_r	-	15	-		
Turn-off delay time	$t_{d(off)}$	-	65	-		
Fall time	t_f	-	7	-		
Gate resistance	R_G		0.9		Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.7	0.9	1.2	V	V_{GS}=0V,I_{SD}=21.5A
Body Diode Reverse Recovery Time	t_{rr}	-	115		ns	Isd=21.5A dI/dt=100A/us Vds=400V
Body Diode Reverse Recovery Charge	Q_{rr}	-	0.6		uC	
Body Diode Reverse Recovery Peak Current	I_{rrm}	-	10		A	

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Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

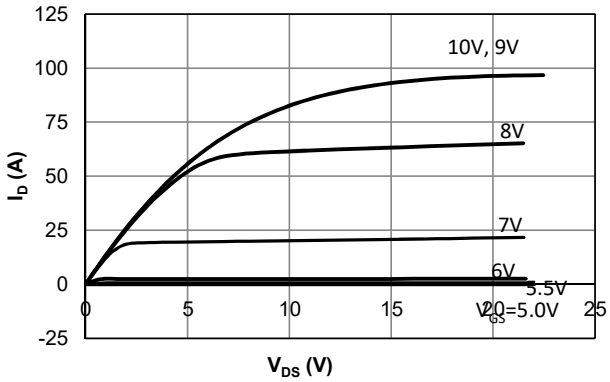


Fig 2. Output Characteristics (Tj=150℃)

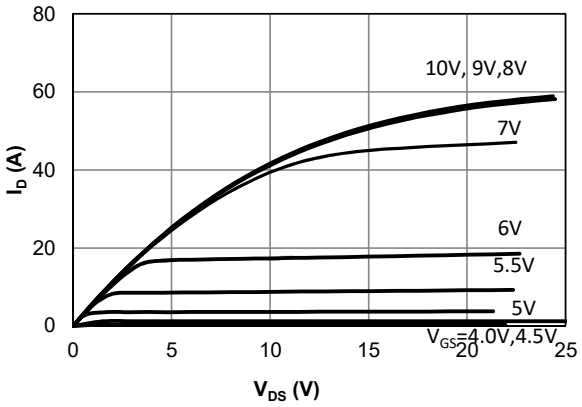


Fig 3: Transfer Characteristics

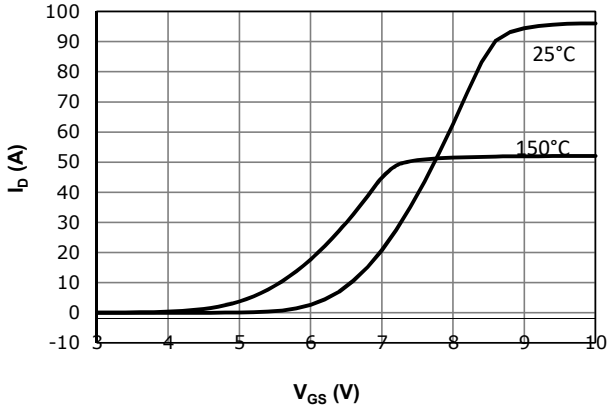


Fig 4: VGS(TH) Vs Tj Temperature Characteristics

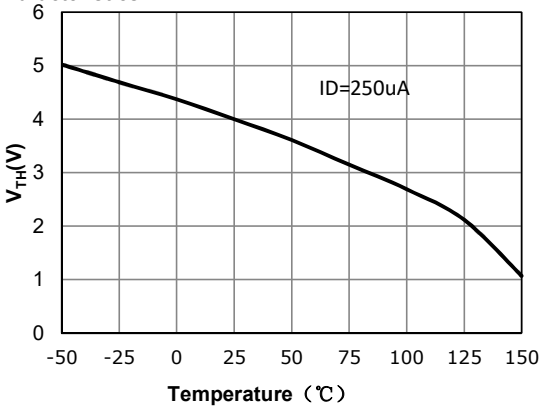


Fig 5: Rdson Vs Ids Characteristics(Tc=25℃)

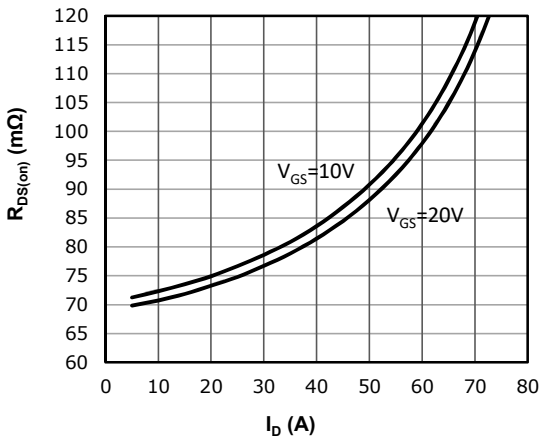
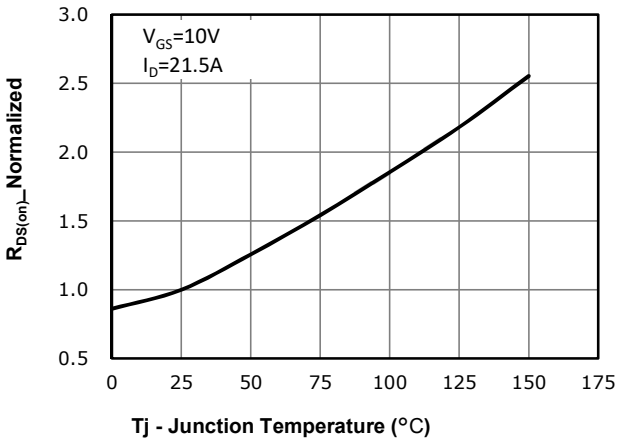


Fig 6: Rds(on) vs. Temperature



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Fig 7: BVDSS vs. Temperature

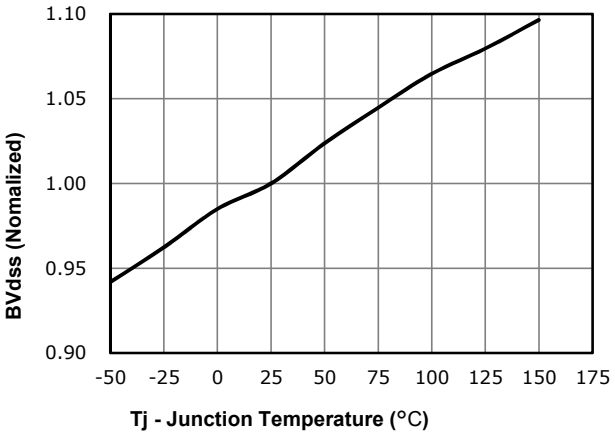


Fig 8: Rds(on) vs Gate Voltage

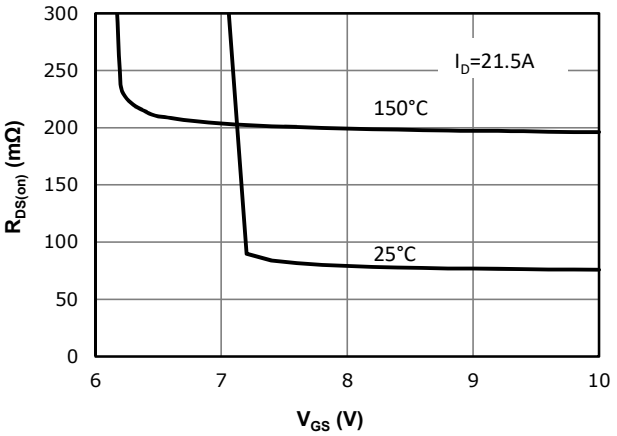


Fig 9: Body-diode Forward Characteristics

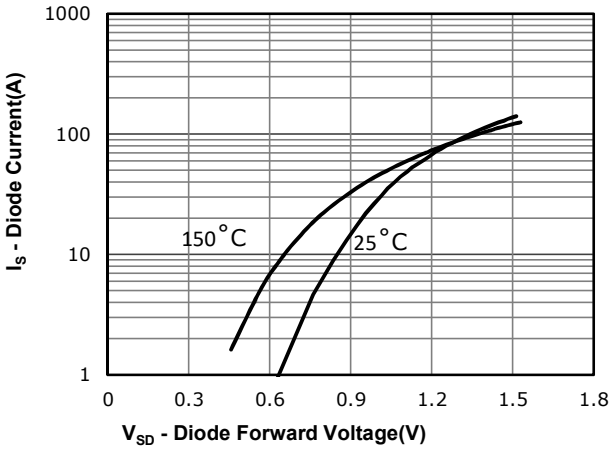


Fig 10: Gate Charge Characteristics

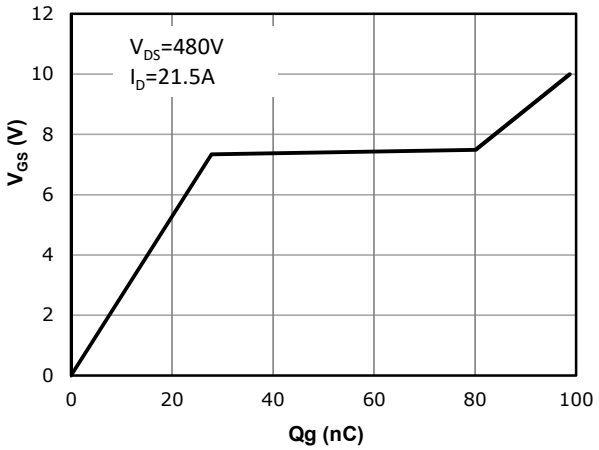


Fig 11: Capacitance Characteristics

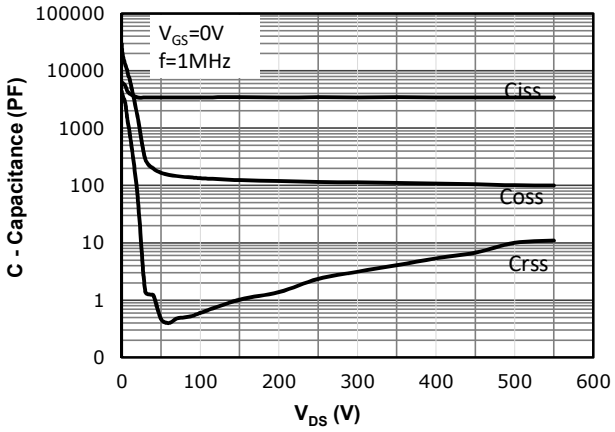
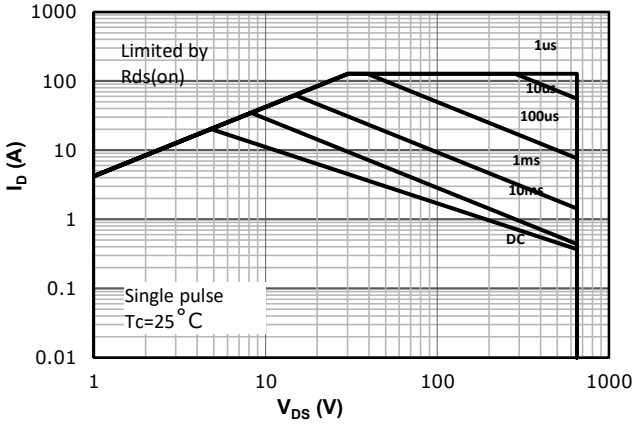


Fig 12: Safe Operating Area



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Fig 13: Continuous Drain Current vs. Case Temperature

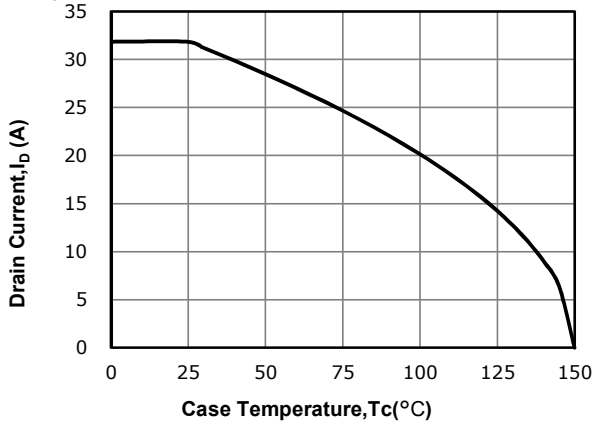


Fig 14: Maximun Power Dissipation vs. Case Temperature

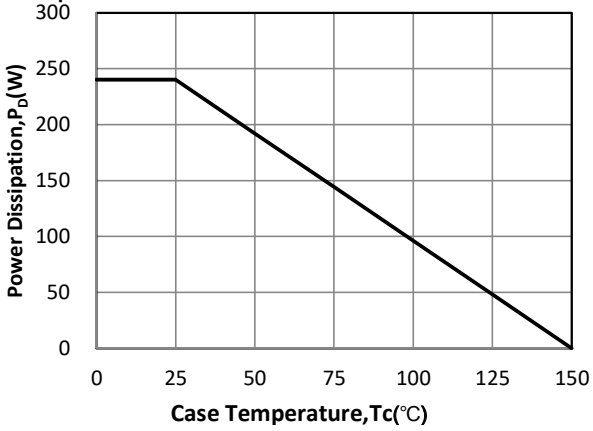
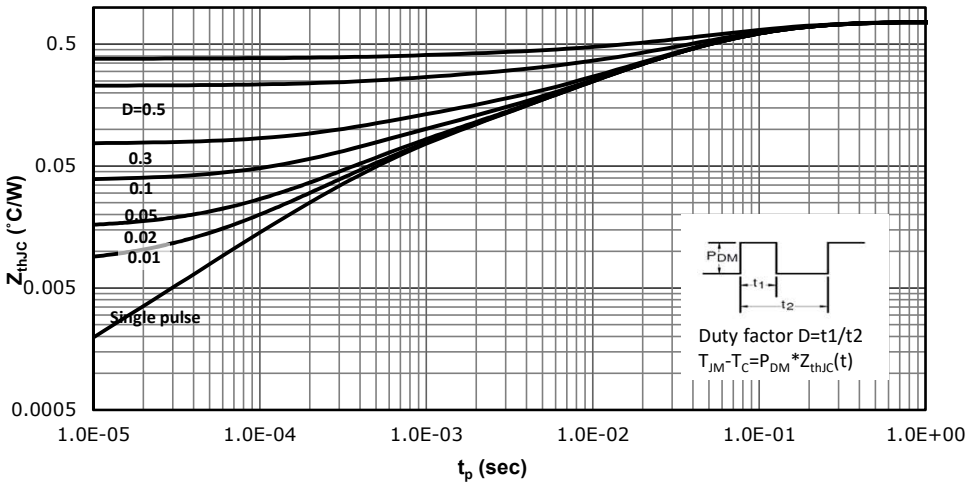


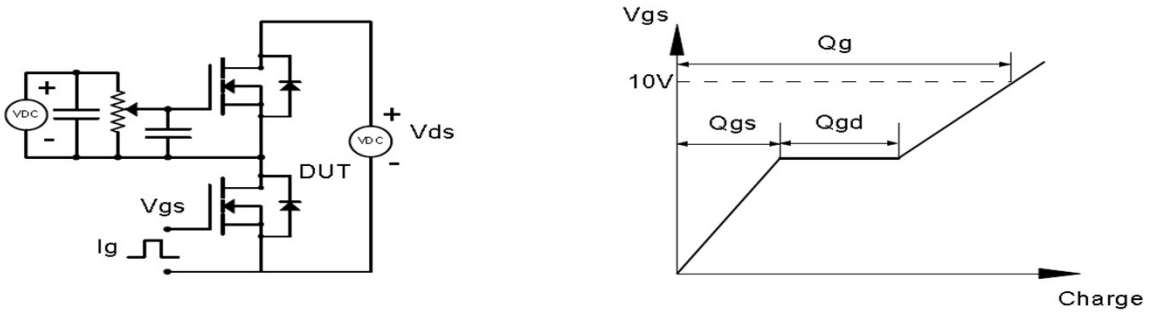
Fig 15: Max. Transient Thermal Impedance



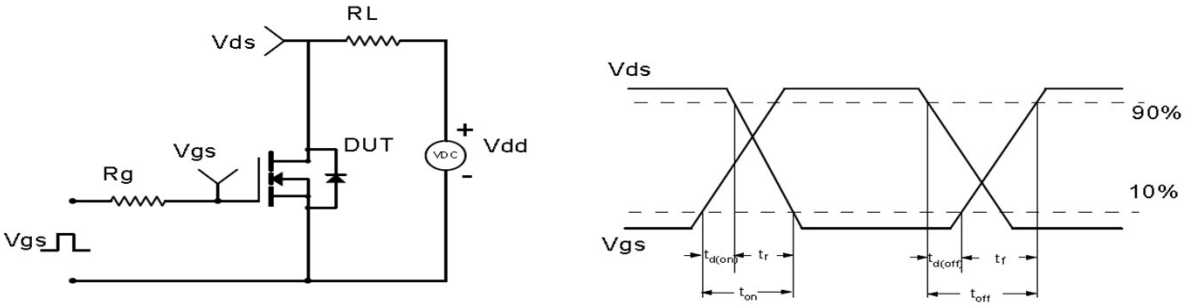
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Test Circuit & Waveform

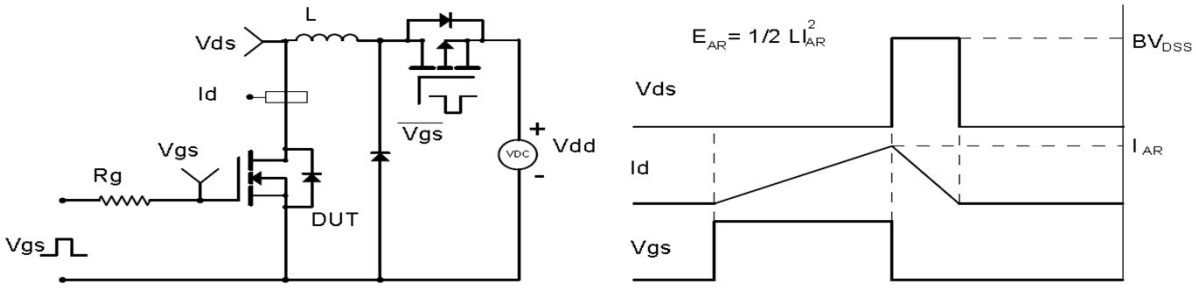
Gate Charge Test Circuit & Waveform



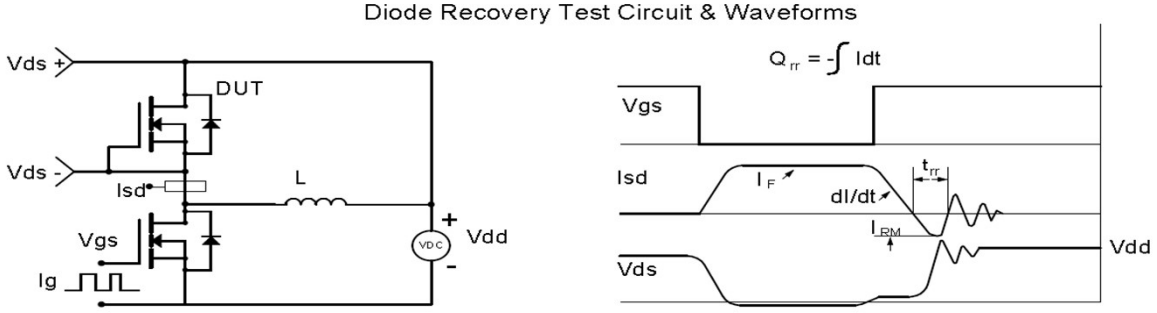
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

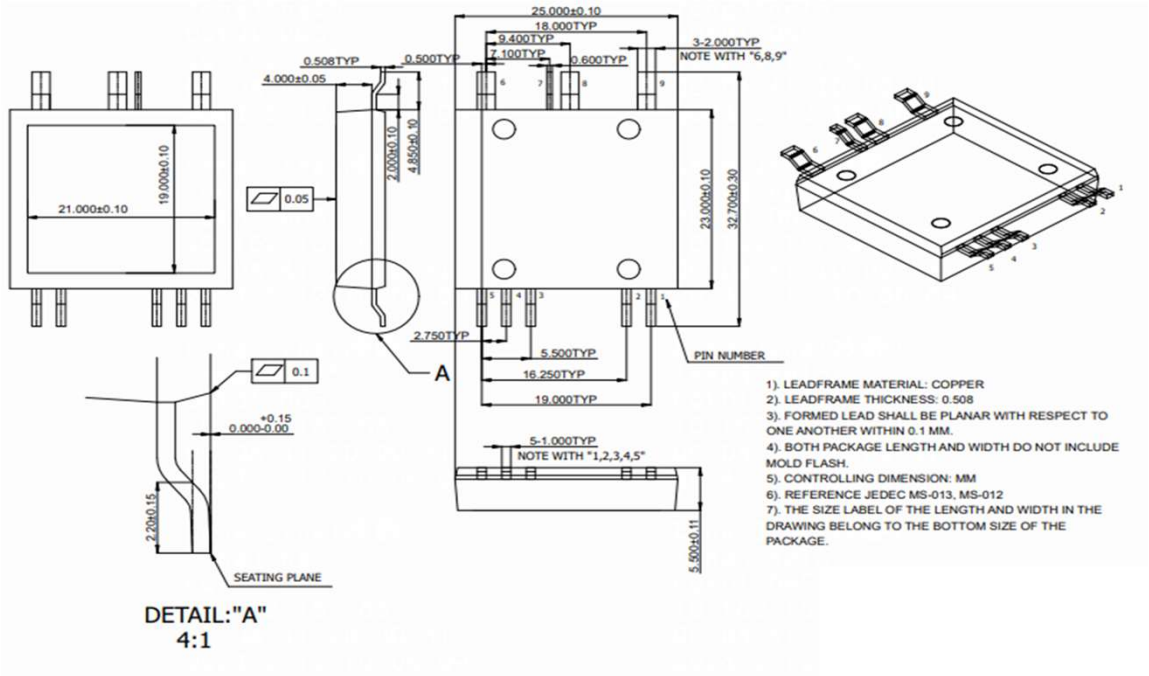


Diode Recovery Test Circuit & Waveforms



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Package Outline: MSOP9



Revision History

Revison	Date	Major changes
V1.0	Initial release	
V2.0	Final version	

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