650V N-Channnel Super Junction Power MOSFET

DESCRIPTION

The **65R360D** use advanced super junction technology and design to provide excellent RDS(ON) with low gate charge. It has the low RDS(on),low gate charge,fast switching and excellent avalanche characteristics. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

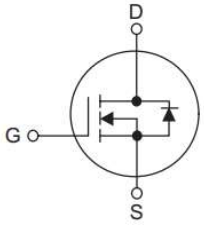
TO-252

FEATURES

* low RDS(on)
*SuperJunction Technology
*Low on-resistance and low conduction losses
*Ultra Low Gate Charge cause lower driving requirements

SYMBOL

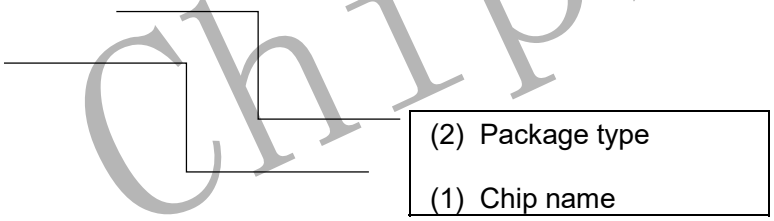
1. Gate
2. Drain
3. Source



Package Description

Product Model	Package Type	Mark Name	Indentification Code	Package
CMS65R360D	TO-252	CMS65R360	D	Tape Reel

CMS65R360D



(1) CMS65R360D: 650V 11A (2) D:TO-252

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ABSOLUTE MAXIMUM RATINGS (T_C = 25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	650	V
Gate-Source Voltage			V_{GSS}	±30	V
Drain Current	Continuous(Tc=25℃)		I_D	11	A
	Continuous(Tc=100℃)			7	A
Drain Current	Pulsed (Note1)		I_{DM}	33	A
Avalanche Energy	Single Pulsed (Note2)		E_{AS}	80	mJ
Repetitive Avalanche Energy (Note2)			E_{AR}	0.32	mJ
Power Dissipation	Tc=25°C	TO-252	P_D	125	W
Junction Temperature			T_J	+150	°C
Storage Temperature			T_{STG}	-55~+150	°C

Notes:
1.Limited by maximum junction temperature, maximum duty cycle is 0.75.
2. I_{AS} = 4A, L=10mH,V_{DD} = 50V, Starting Tj= 25°C.
3.The value of RthJA is measured by placing the device in a still air box which is one cubic foot.

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-252	1	℃/W
$R_{\theta JA}$	Junction-to-Ambient	TO-252	120	℃/W

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ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS} = 0 V, I_D = 250μA	650			V
Zero Gate Voltage Drain Current		I_{DSS}	VDS = 650 V, VGS = 0 V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
	Reverse		V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5	3.4	4.5	V
Static Drain-Source On- Resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 5.5A		310	360	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =100 V, V_{GS} =0V , f =0. 25MHz		861		pF
Output Capacitance		C_{OSS}			37.5		pF
Reverse Transfer Capacitance		C_{RSS}			0.6		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}= 560V, I_D= 5.5A, V_{GS}= 10V		24		nC
Gate-Source Charge		Q_{GS}			4.5		nC
Gate-Drain Charge		Q_{GD}			11.7		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DD}=400V, I_D = 5.5A, R_G =10Ω,V_{GS}=15V		44.3		ns
Turn-On Rise Time		t_R			12.4		ns
Turn-Off Delay Time		$t_{D(OFF)}$			46.3		ns
Turn-Off Fall Time		t_F			9.2		ns
Drain-Source Diode Characteristics and Maximum Ratings							
Maximum Continuous Drain-Source Diode Forward Current		I_{SD}				11	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				33	A
Diode Forward Voltage		V_{SD}	V_{GS} = 0 V, I_{SD}=5.5A			1.2	V
Reverse Recovery Time		t_{rr}	V_R=400V ,I_F=5.5A, diF/dt = 100A/μs		275		ns
Reverse Recovery Charge		Q_{rr}			2.7		μC

Notes:
1.limited by maximum junction temperature, maximum duty cycle is 0.75.
2. I_{AS} = 4A, L=10mH,V_{DD} = 50V, Starting Tj= 25°C.
3.The value of RthJA is measured by placing the device in a still air box which is one cubic foot.

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YPICAL CHARACTERISTICS

Figure 1. Typ. Output Characteristics

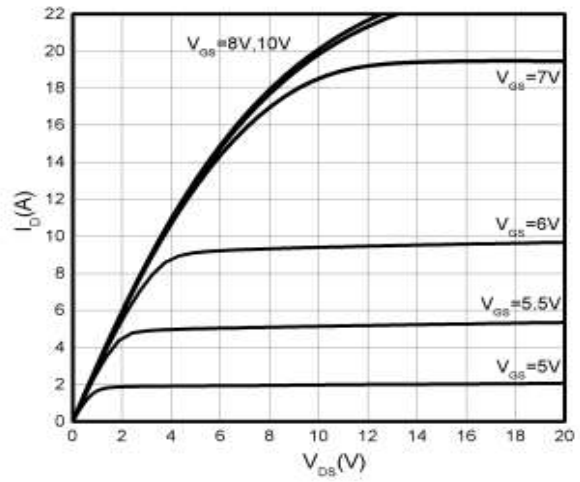


Figure 2. Transfer Characteristics

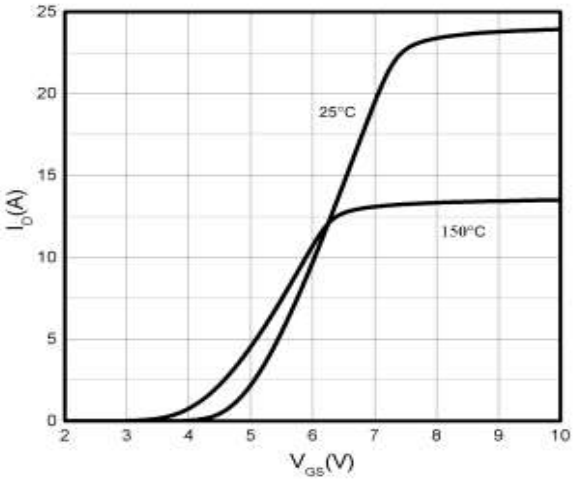


Figure 3. On-Resistance vs. Drain Current

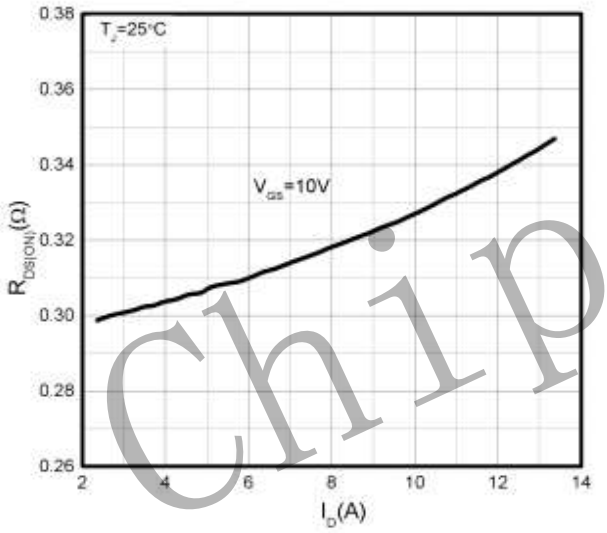


Figure 4.On-Resistance vs.Temperature

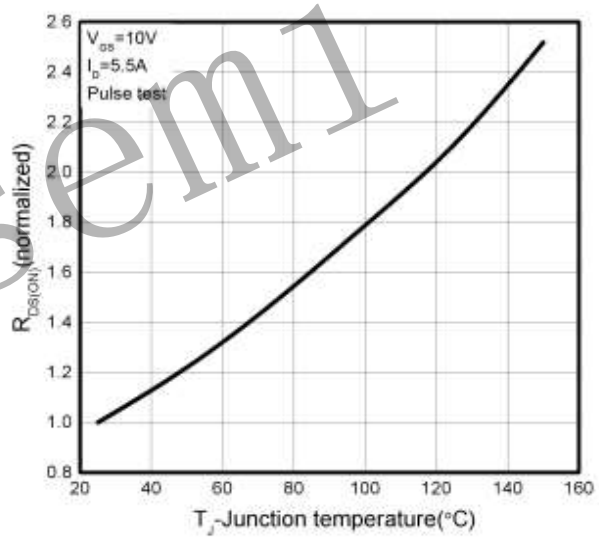


Figure 5.Breakdown Voltage vs.Temperature

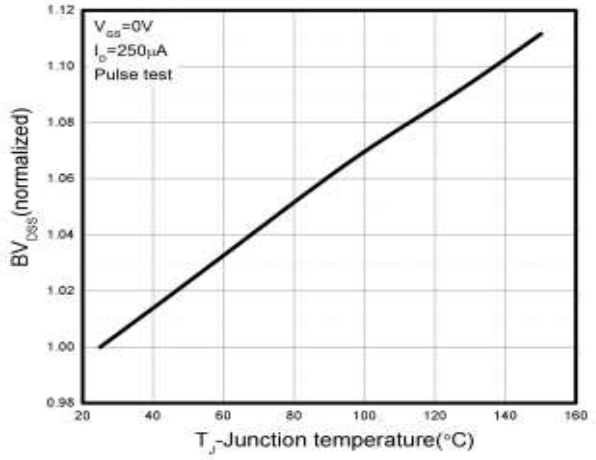
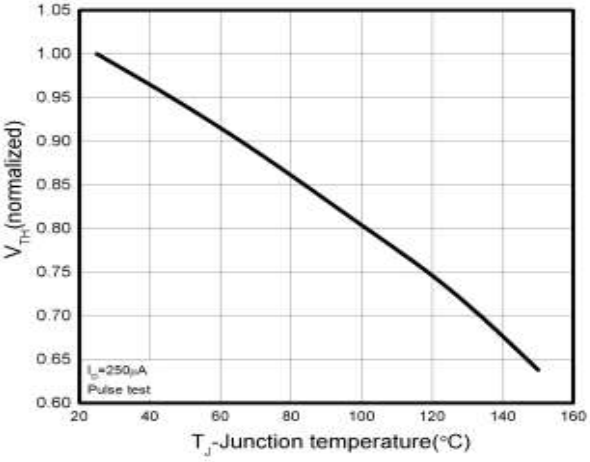


Figure 6.Threshold Voltage vs.Temperature



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YPICAL CHARACTERISTICS (Cont.)

Figure 7.Body-Diode Characteristics

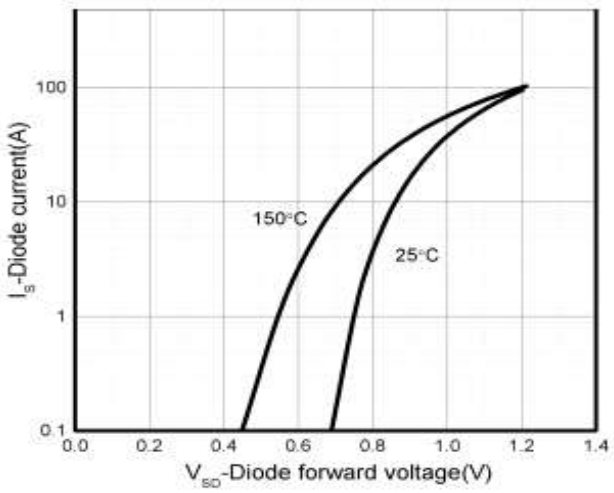


Figure 8.Capacitance Characteristics

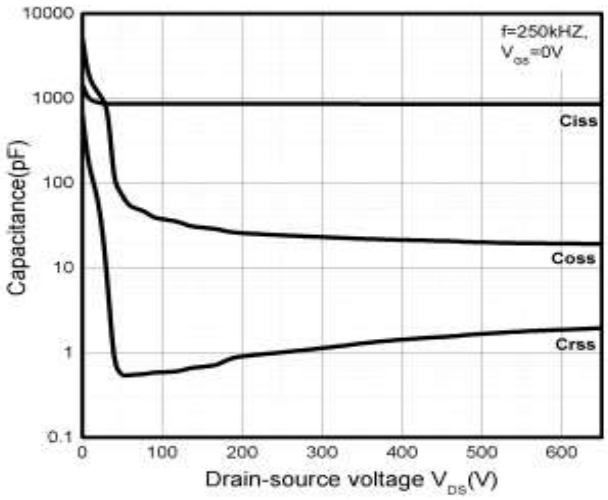


Figure 9.Gate Charge Characteristics

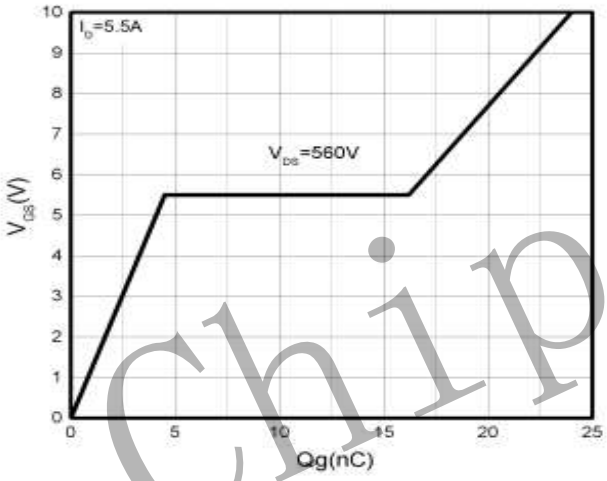


Figure 10.Drain Current Derating

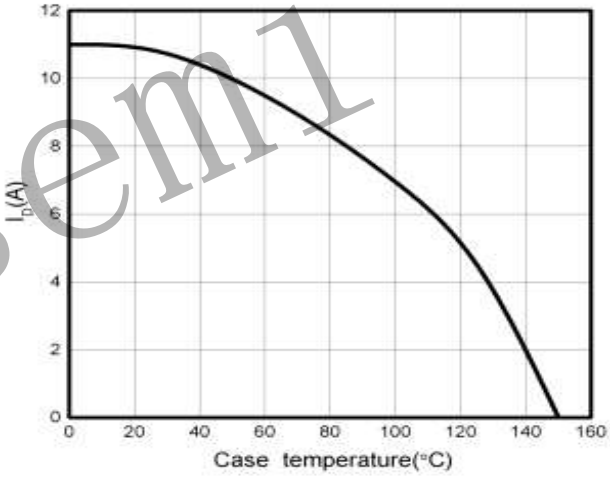


Figure 11.Power Dissipation vs.Temperature

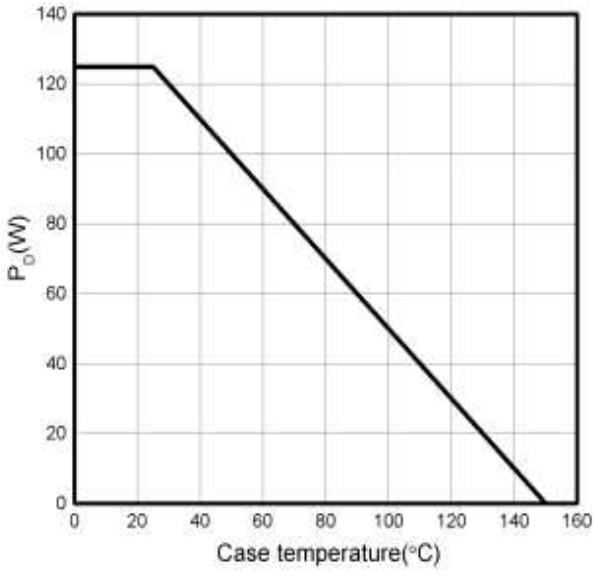
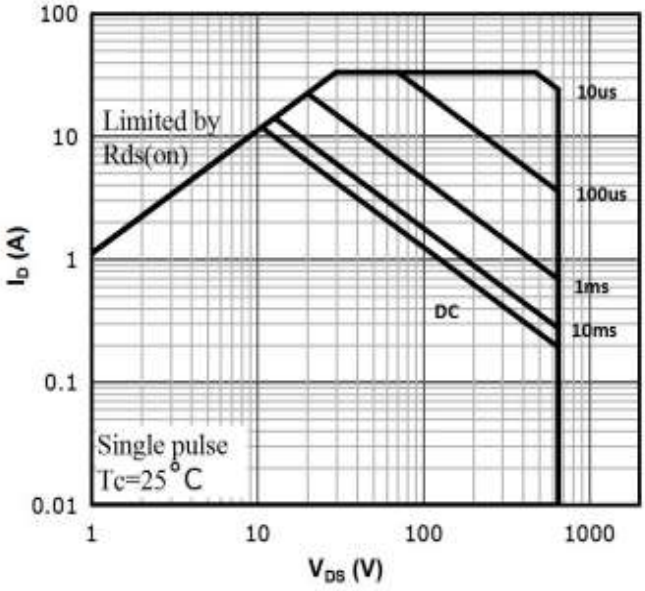


Figure 12: Safe Operating Area



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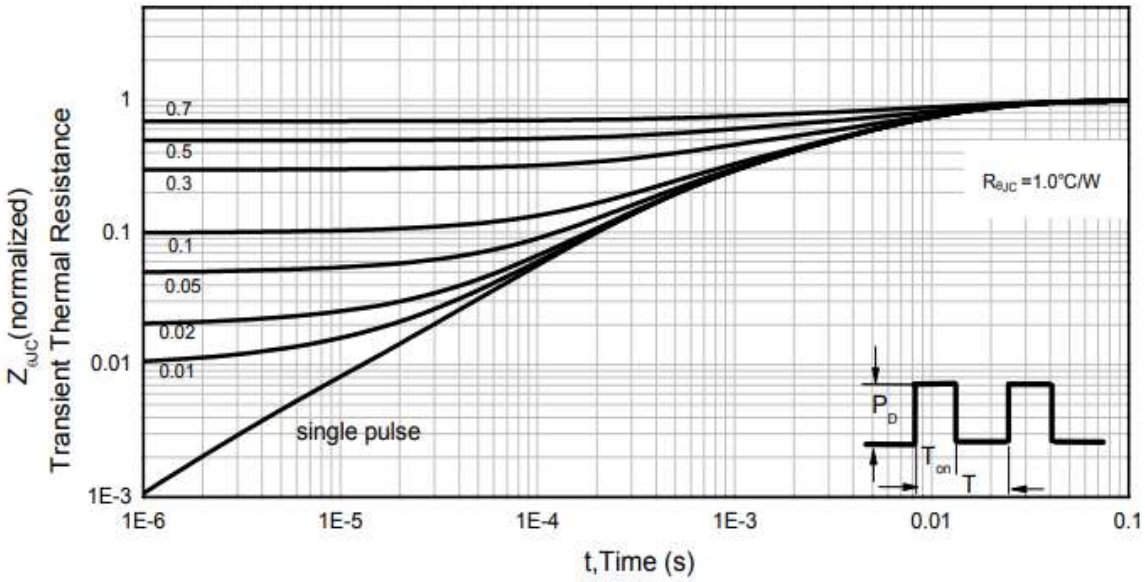
YPICAL CHARACTERISTICS (Cont.)



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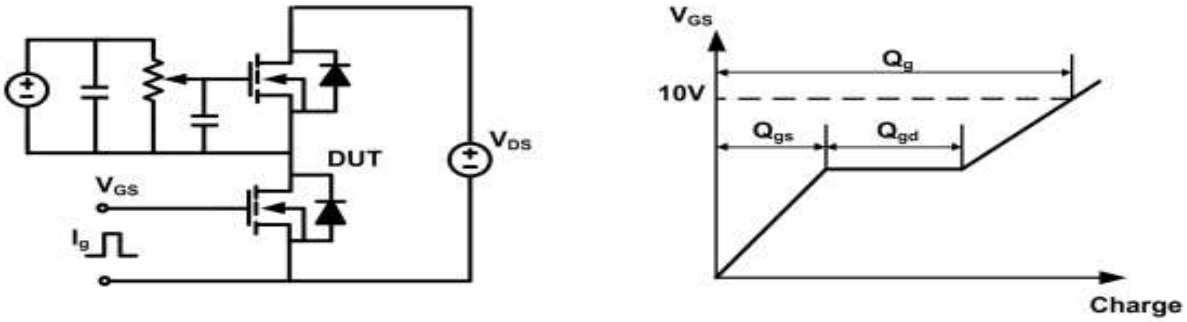
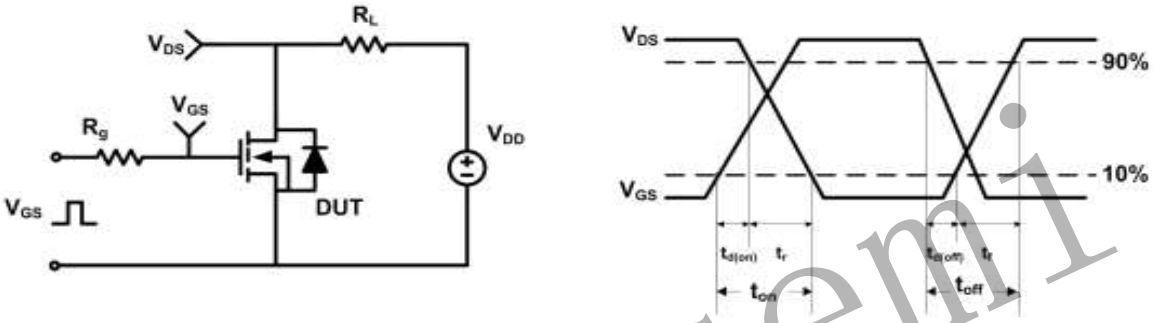
TEST CIRCUITS AND WAVEFORMS

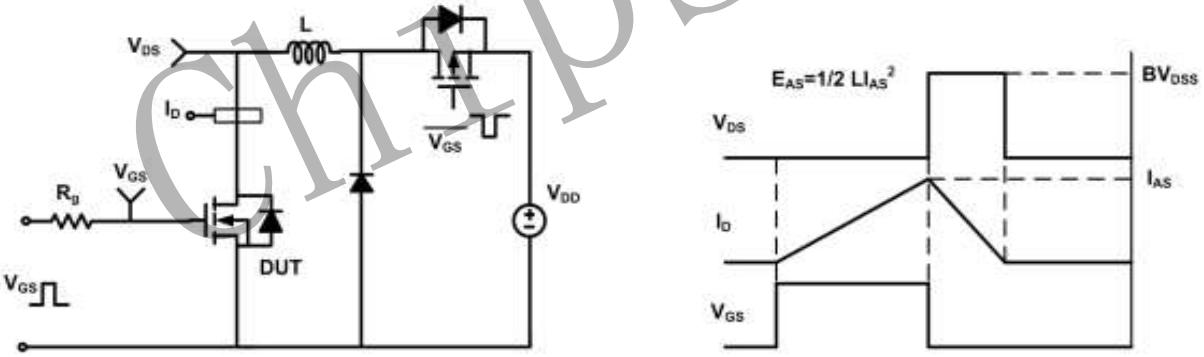
Gate Charge Test Circuit & Waveform



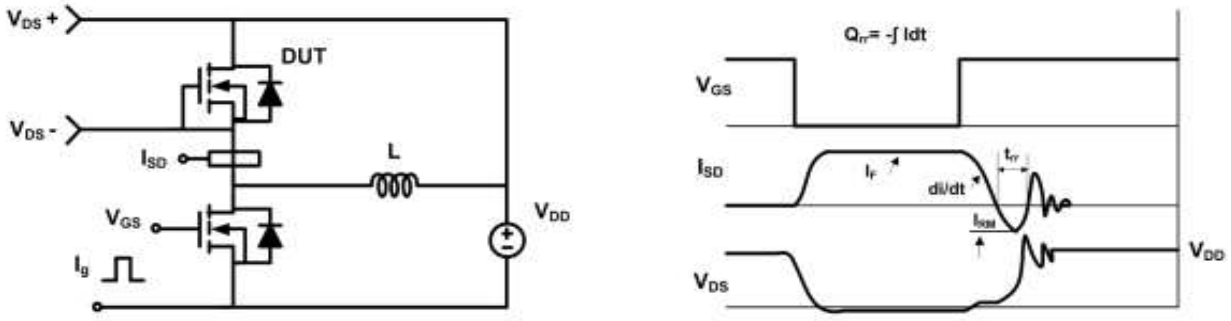
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



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Attentions

- Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
- When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
- MOSFET is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
- Chipsemi reserves the right to make changes in this specification sheet and is subject to change without prior notice.

Appendix

Revision history:

Date	REV.	Description	Page
2023.3	1.0	Original	8

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