650V N-Channnel Super Junction Power MOSFET

DESCRIPTION

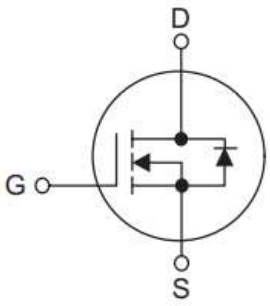
The **65R099F** use advanced super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge, which leads to extremely communication and conduction losses .So it is very suitable for AC/DC power conversion, Laptop adapter Lighting, and industrial power applications.

FEATURES

*New technology for high voltage device
*Ultra low Gate Charge
*Ultra low Crss
*Low gate charge

SYMBOL

1. Gate
2. Drain
3. Source



Package Description

Product Model	Package Type	Mark Name	Indentification Code	Package
CMS65R099F	TO-220F	CMS65R099	F	Tube

CMS65R099F

(2) Package type

(1) Chip name

(1) CMS65R260D: 650V 40A (2) F:TO-220F

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	40	A
Drain Current	Pulsed (Note1)		I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note2)		E_{AS}	1000	mJ
Power Dissipation	Tc=25°C	TO-220F	P_D	35	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. IAS = 8A, VDD =60V, Starting Tj= 25°C.

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-220F	3.6	℃/W
$R_{\theta JA}$	Junction-to-Ambient	TO-220F	62.5	℃/W

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		B_{VDSS}	V_{GS} = 0 V, I_D = 250μA	650			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS} = 650 V, V_{GS} = 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	2.0	3.0	4.0	V
Static Drain-Source On- Resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D =20A		86	99	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =25 V, V_{GS} =0V f = 1.0MHz		3000		pF
Output Capacitance		C_{OSS}			2500		pF
Reverse Transfer Capacitance		C_{RSS}			10		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}= 400V, I_D= 20A, V_{GS}= 10V		66		nC
Gate-Source Charge		Q_{GS}			17.8		nC
Gate-Drain Charge		Q_{GD}			25		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DS} = 400V, I_D =20A, R_G =10Ω, V_{GS}= 10V		31.2		ns
Turn-On Rise Time		t_R			43.8		ns
Turn-Off Delay Time		$t_{D(OFF)}$			151.4		ns
Turn-Off Fall Time		t_F			12.3		ns
Drain-Source Diode Characteristics and Maximum Ratings							
Maximum Continuous Drain-Source Diode Forward Current		I_{SD}				40	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				120	A
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS} = 0 V, I_F = 20A			1.2	V
Reverse Recovery Time		t_{rr}	V_R=50V, I_F = 20A dI$_F$/dt = 100 A/μs		198		ns
Reverse Recovery Charge		Q_{rr}			3.1		μC

ELECTRCAL CHARACTERISTICS DIAGRAMS

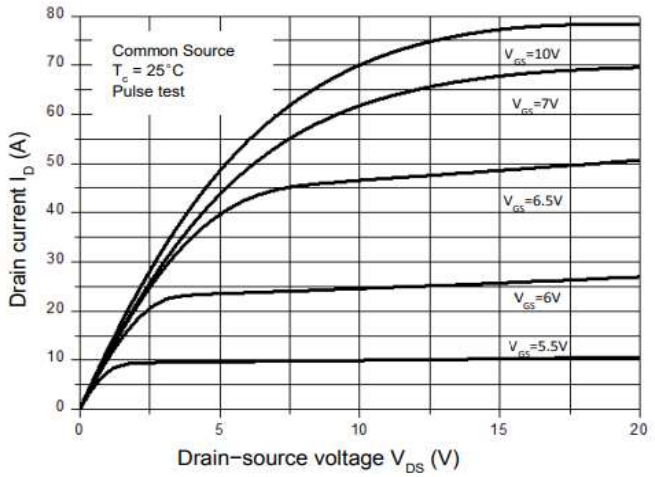


Figure 1. On-Region Characteristics

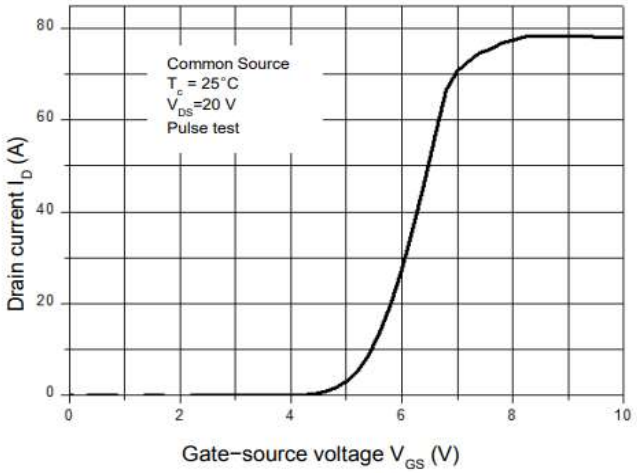


Figure 2. Transfer Characteristics

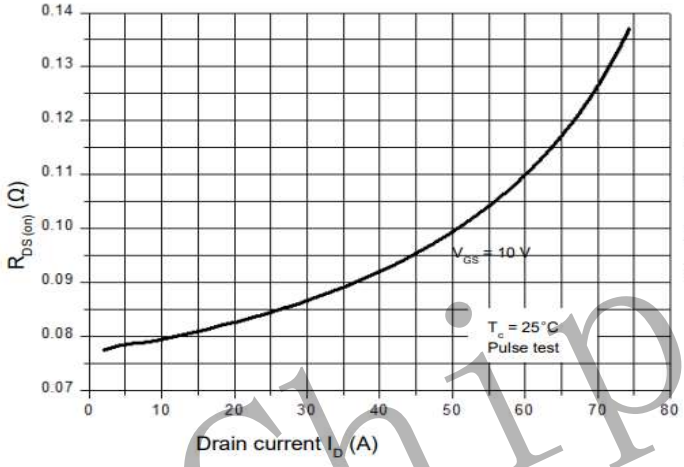


Figure 3. On-Resistance Variation vs. Drain Current

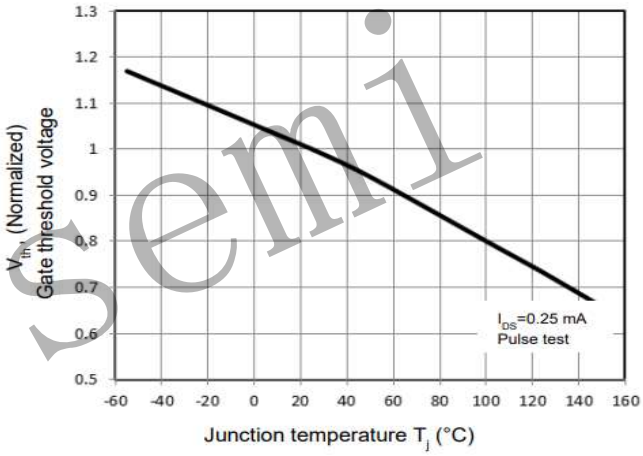


Figure 4. Threshold Voltage vs. Temperature

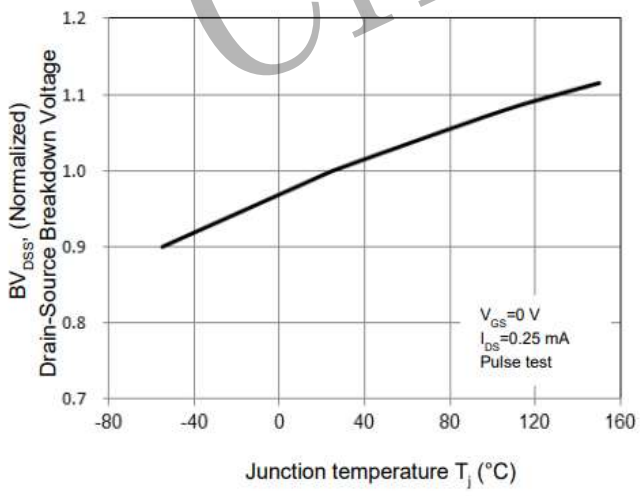


Figure 5. Breakdown Voltage vs. Temperature

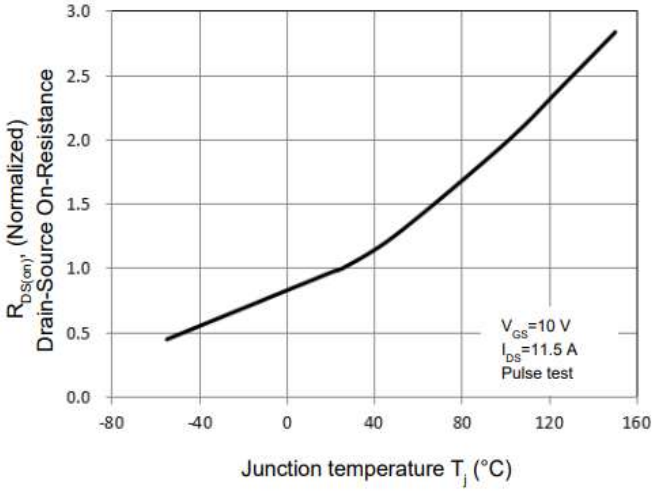


Figure 6. On-Resistance vs. Temperature

ELECTRCAL CHARACTERISTICS DIAGRAMS (Cont.)

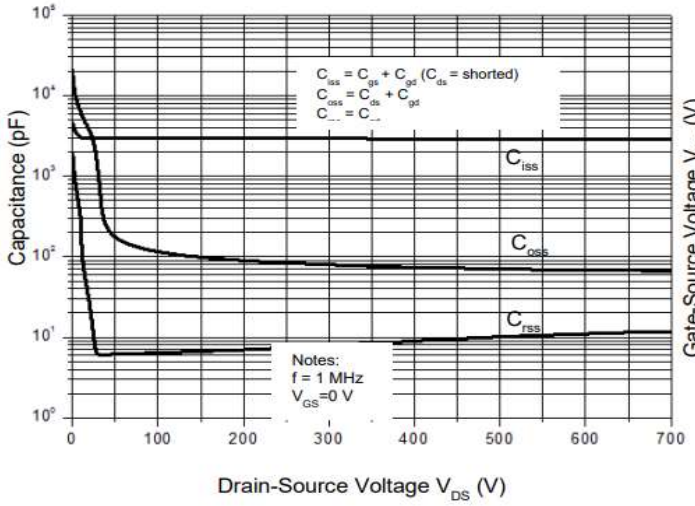


Figure 7. Capacitance Characteristics

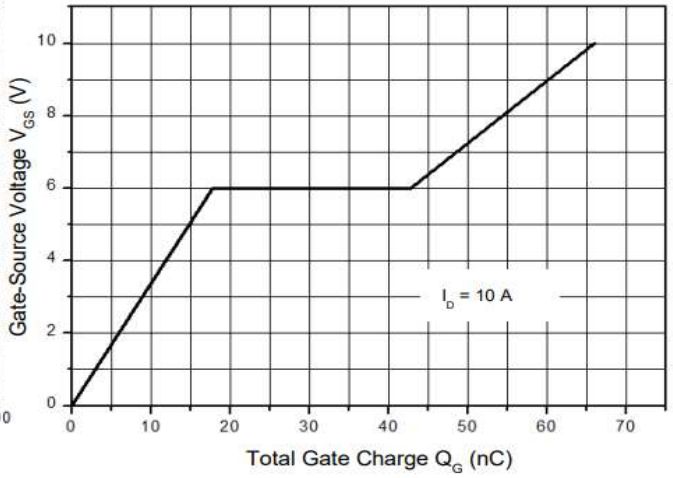


Figure 8. Gate Charge Characterist

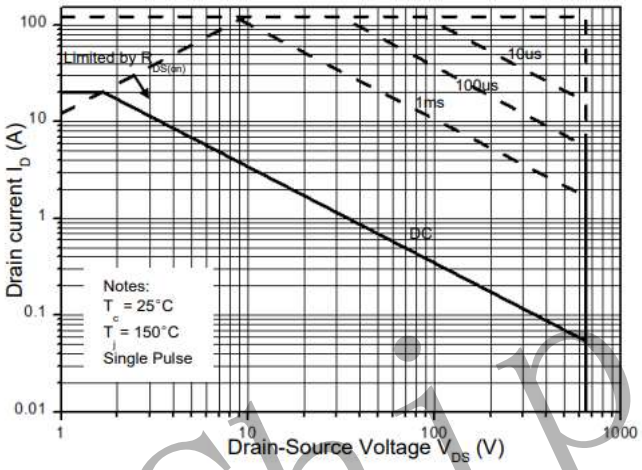


Figure 9. Maximum Safe Operating Area

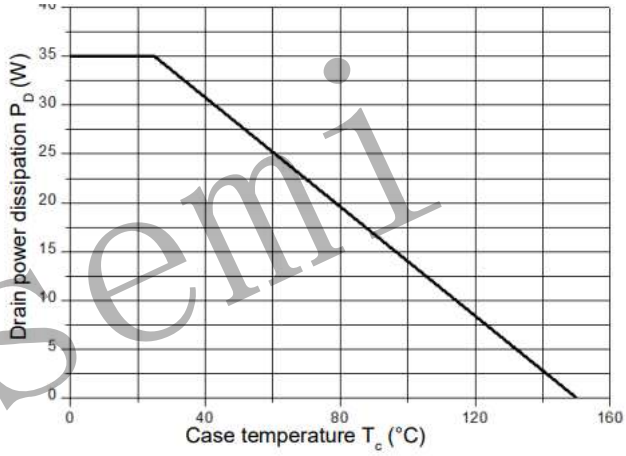
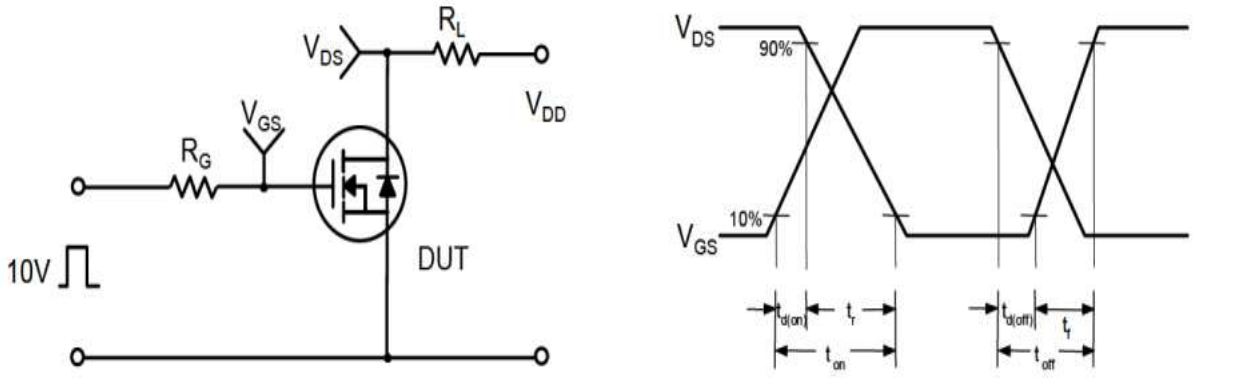
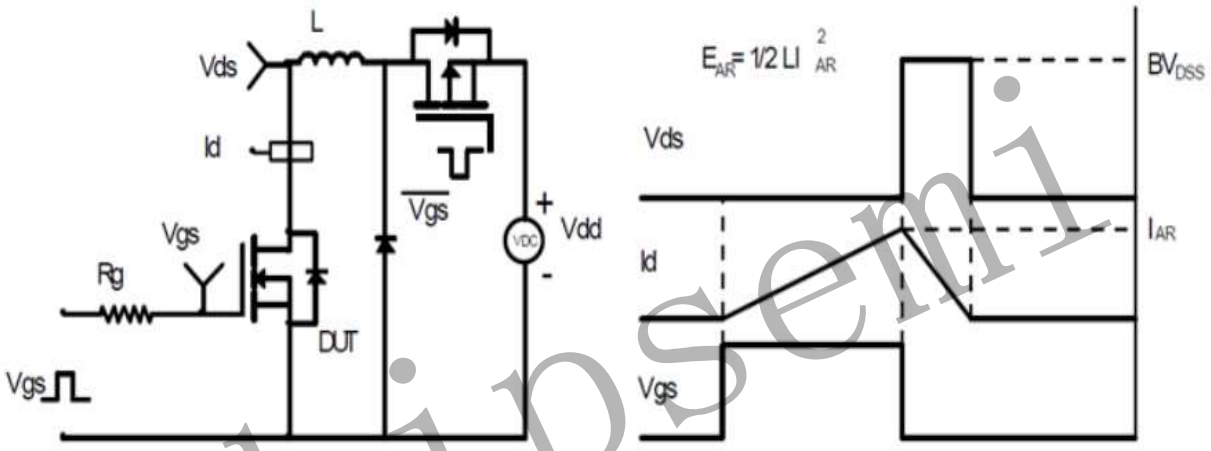


Figure 10. Power Dissipation vs. Temperature

TEST CIRCUITS



Unclamped Inductive Switching Test Circuit & Waveforms



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	7