650V N-Channnel Super Junction Power MOSFET

DESCRIPTION

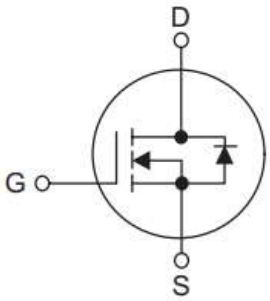
The **65R130F** use advanced super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This supper junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC-DC power conversion and industrial power applications.

FEATURES

*New technology for high voltage device
*Ultra Low Gate Charge
*Ultra Low Crss
*Fast Switching
*Improved dv/dt Capability

SYMBOL

1. Gate
2. Drain
3. Source



Package Description

Product Model	Package Type	Mark Name	Indentification Code	Package
CMS65R130F	TO-220F	CMS65R130	F	Tube

CMS65R130F

(2) Package type

(1) Chip name

(1) CMS65R260F: 650V 25A (2) F:TO-220F

ABSOLUTE MAXIMUM RATINGS (Tc = 25℃, 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℃)(Note1)		I_D	25.0	A
	Continuous(Tc=100℃)(Note1)			15.8	A
Drain Current	Pulsed (Note2)		I_{DM}	75	A
Avalanche Energy	Single Pulsed (Note4)		E_{AS}	454	mJ
Avalanche Current(Note1)			I_{AS}	3.1	A
Drain Source voltage slope, V_{DS}≤480V			dv/dt	50	V/ns
Power Dissipation	Tc=25°C	TO-220F	P_D	34	W
Junction Temperature			T_J	+150	°C
Storage Temperature			T_{STG}	-55~+150	°C

Notes:
1.Limited by Tj.Maximum Duty Cycle D=0.5
2.Pulse width T_p limited by Tj,Max
3.Identical low side and high side switch with identical R_G
4.V_{DD}=100V,R_G=25Ω， I_{AS}=3.1A

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-220F	3.65	℃/W
$R_{\theta JA}$	Junction-to-Ambient	TO-220F	80	℃/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 = 1000μA	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} = 20 V, V_{DS} = 0 V			1	μA
	Reverse		V_{GS} = -20 V, V_{DS} = 0 V			-1	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 1.1mA	2.0		4.0	V
Static Drain-Source On- Resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D =10.2A		100	130	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =400 V, V_{GS} =0V , f = 1.0MHz		2240		pF
Output Capacitance		C_{OSS}			60		pF
Reverse Transfer Capacitance		C_{RSS}			3.8		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}= 520V, I_D= 14.3A, V_{GS}= 10V		55		nC
Gate-Source Charge		Q_{GS}			12		nC
Gate-Drain Charge		Q_{GD}			19		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DS} = 325V, I_D =14.3A, R_G =25Ω,		56		ns
Turn-On Rise Time		t_R			31		ns
Turn-Off Delay Time		$t_{D(OFF)}$			250		ns
Turn-Off Fall Time		t_F			20		ns
Drain-Source Diode Characteristics and Maximum Ratings							
Maximum Continuous Drain-Source Diode Forward Current		I_{SD}				25	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				75	A
Drain-Source Diode Forward Voltage		V_{SD}	T_J=25℃ ,V_{GS} = 0 V, I_{SD}=14.3A			1.3	V
Reverse Recovery Time		t_{rr}	T_J=25℃, I_F = 14.3A, V_R=400V, dI_F/dt = 100 A/μs		450		ns
Reverse Recovery Charge		Q_{rr}			7.8		μC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

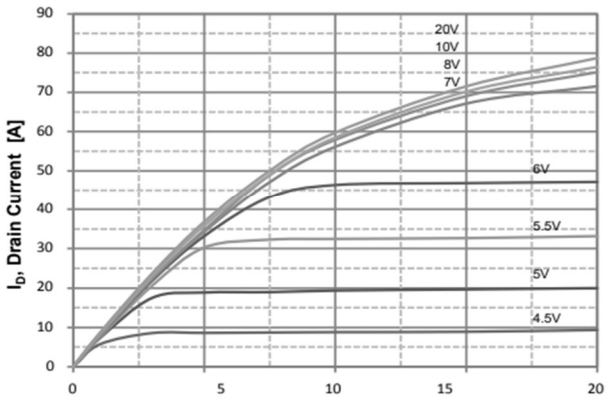


Figure 1. On Region Characteristics

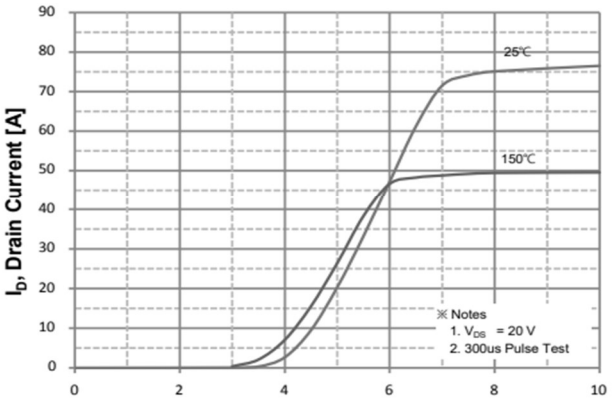


Figure 2. Transfer Characteristics

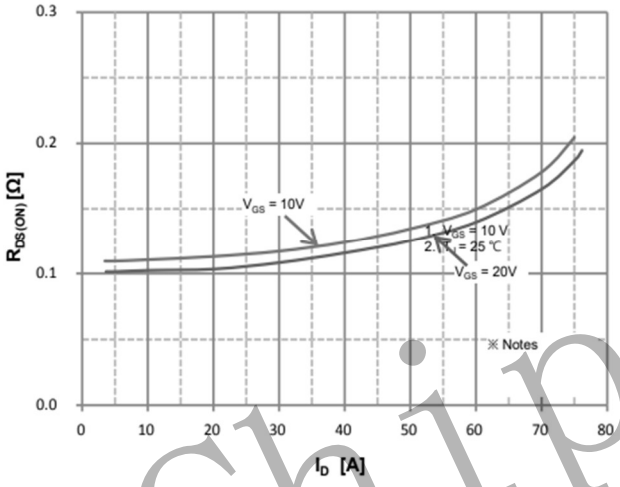


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

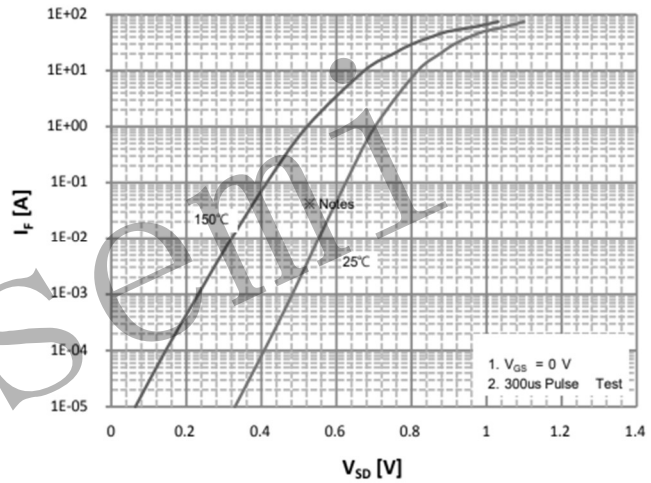


Figure 4. Body Diode Forward Voltag Variation with Source Current and Temperature

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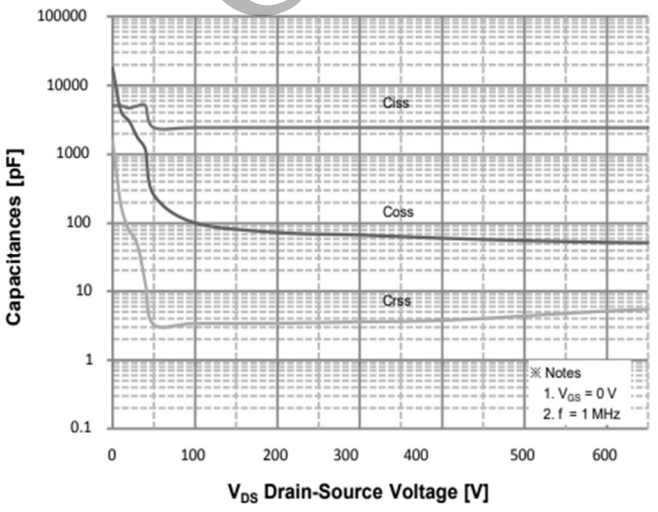

Figure 5. Capacitance Characteristics

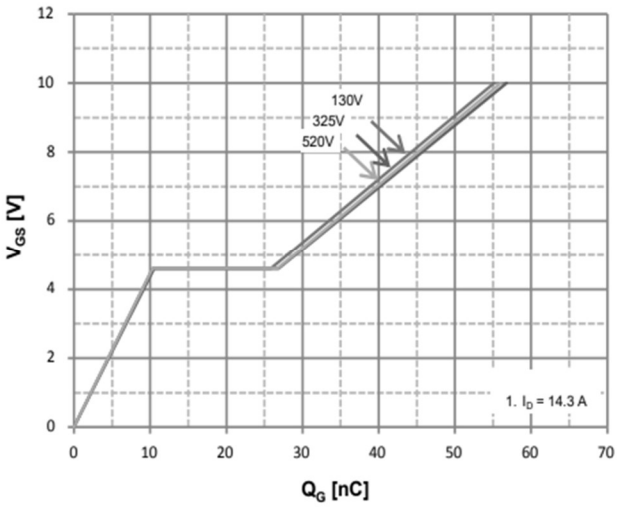

Figure 6. Gate Charge Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Cont.)

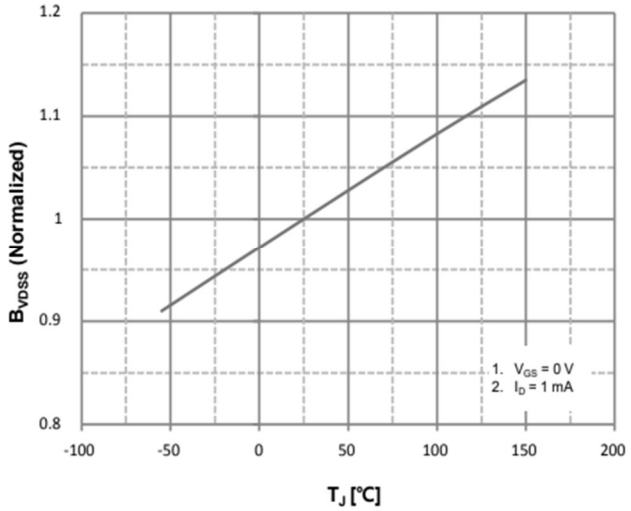

Figure 7. Breakdown Voltage Variation vs. Temperature

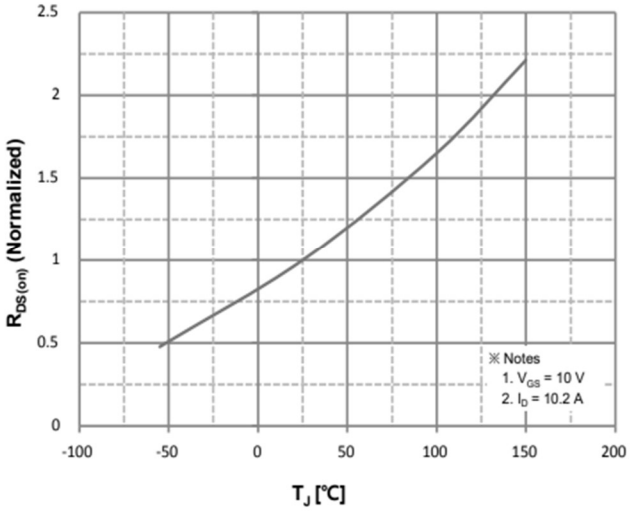

Figure 8. On-Resistance Variation vs. Temperature

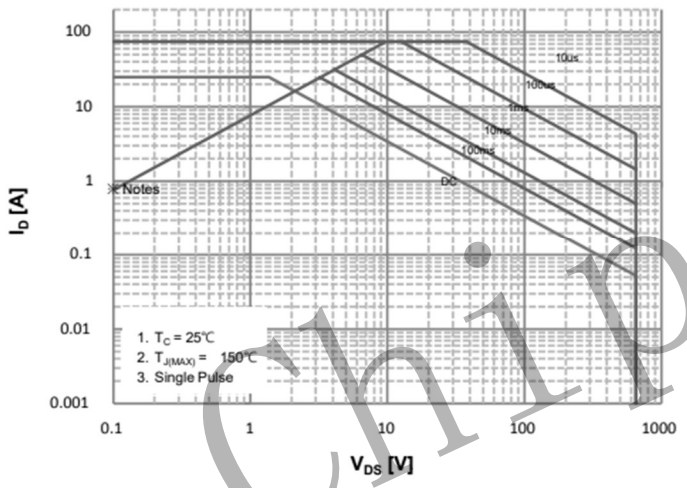

Figure 9. Maximum Safe Operating Area

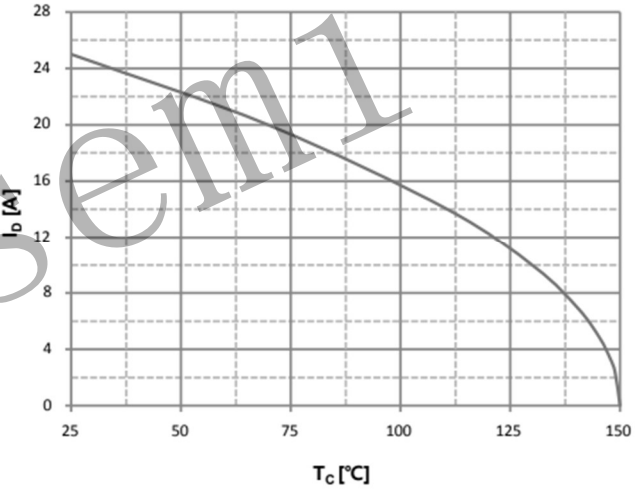

Figure 10. Maximum Drain Current vs. Case Temperature

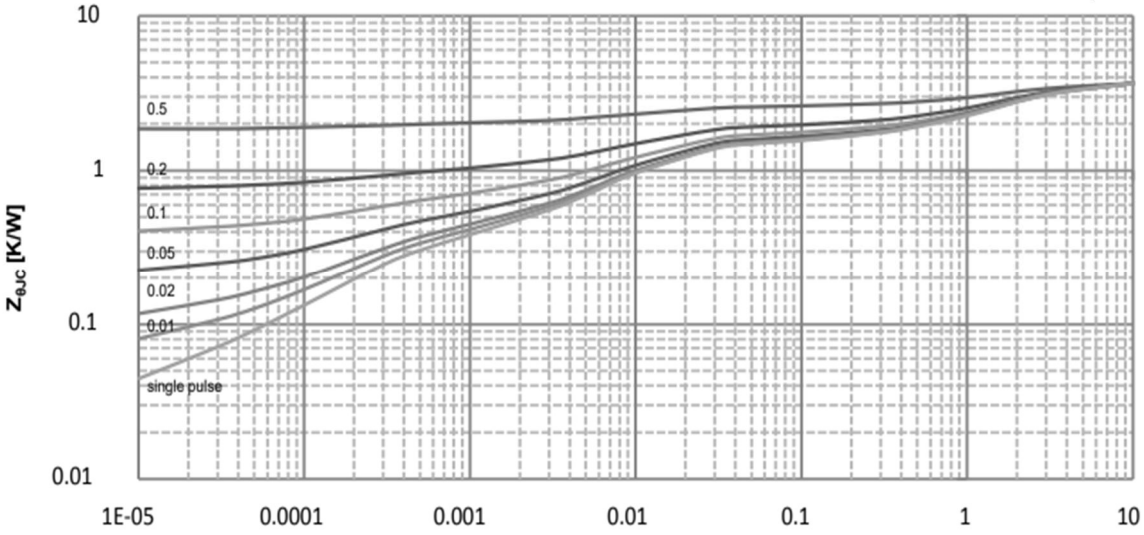

Figure 11. Transient Thermal Response Curve

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	6