650V N-Channnel Super Junction Power MOSFET

DESCRIPTION

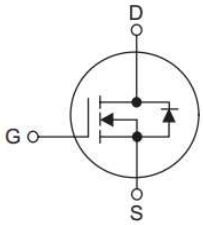
The **65R360F** use advanced super junction technology and design to provide excellent RDS(ON) with low gate charge. It has the low RDS(on),low gate charge,fast switching and excellent avalanche characteristics. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

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
CMS65R360F	TO-220F	CMS65R360	F	Tube

CMS65R360F

(2) Package type

(1) Chip name

(1) CMS65R360F: 650V 11A (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	11	A
	Continuous(Tc=100℃)			7	A
Drain Current	Pulsed (Note1)		I_{DM}	33	A
Avalanche Energy	Single Pulsed (Note2)		E_{AS}	280	mJ
Repetitive Avalanche Energy (Note1)			E_{AR}	0.5	mJ
Drain Source voltage slope, V_{DS}≤480V			dv/dt	50	V/ns
Power Dissipation	Tc=25°C	TO-220F	P_D	32.7	W
Junction Temperature			T_J	150	°C
Storage Temperature			T_{STG}	55~+150	°C

Notes:
1.Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
2.TJ = 25°C ,V_{DD} = 50V, V_G =10V, R_G = 25Ω

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-220F	3.82	℃/W
$R_{\theta JA}$	Junction-to-Ambient	TO-220F	80	℃/W

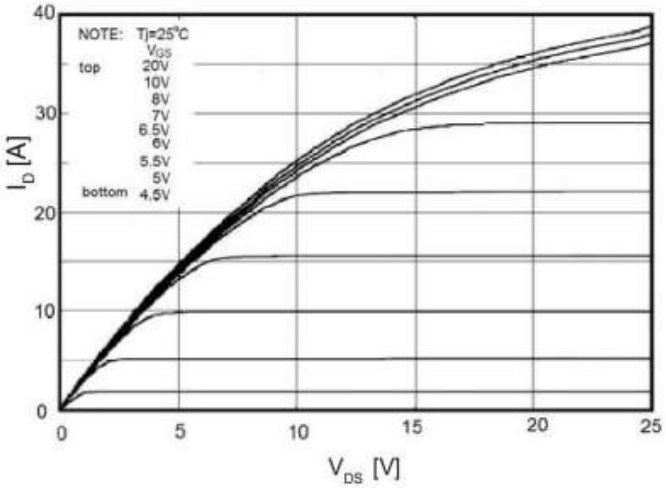
ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	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		4.0	V
Static Drain-Source On- Resistance		$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 7A		300	360	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =50 V, V_{GS} =0V , f =1.0MHz		1030		pF
Output Capacitance		C_{OSS}			87		pF
Reverse Transfer Capacitance		C_{RSS}			4.5		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}=480V, I_D= 11A, V_{GS}= 10V		23		nC
Gate-Source Charge		Q_{GS}			5.7		nC
Gate-Drain Charge		Q_{GD}			8		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DD}=380V, I_D = 5.5A, R_G =6.8Ω,V_{GS}=10V		9		ns
Turn-On Rise Time		t_R			4		ns
Turn-Off Delay Time		$t_{D(OFF)}$			40		ns
Turn-Off Fall Time		t_F			4.5		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		245		ns
Reverse Recovery Charge		Q_{rr}			2.4		μC

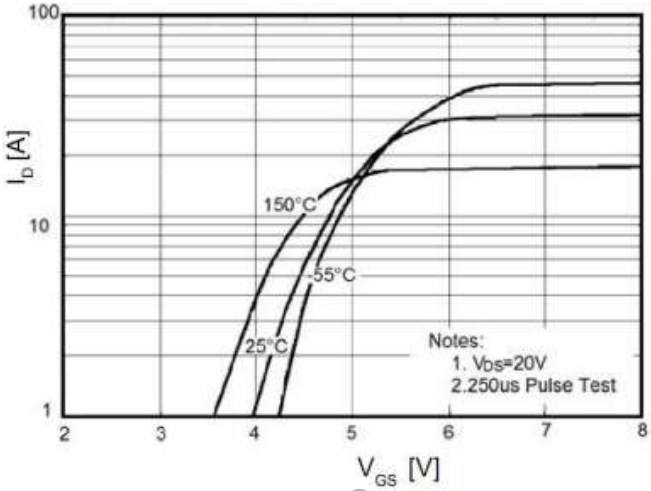
* Drain Current Limited by Maximum Junction Temperature.

TEST CIRCUITS AND WAVEFORMS

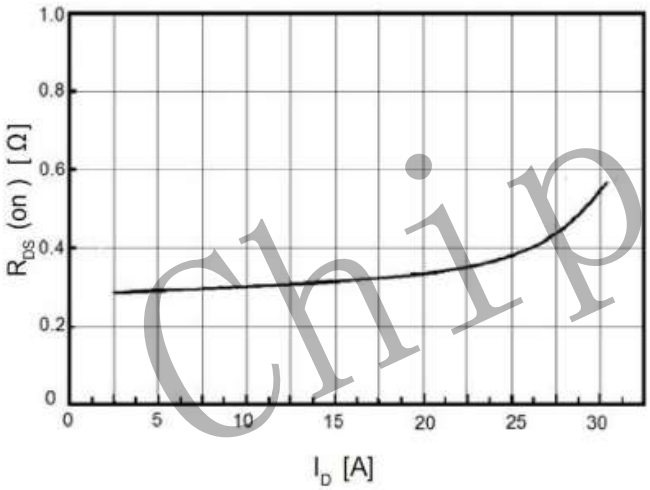
On-Regin Characteristics



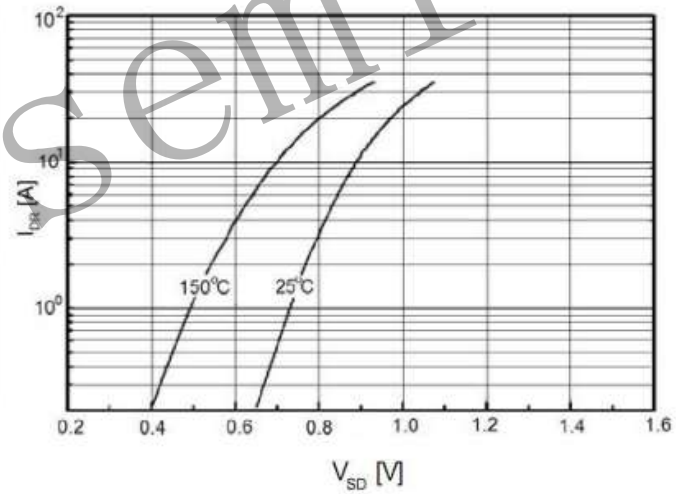
Transfer Characteristics



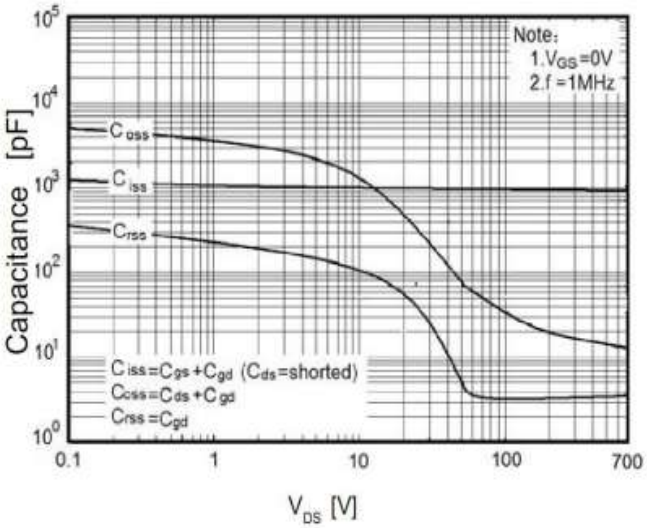
On-Resistance Variation vs. Drain Current and Gate Voltage



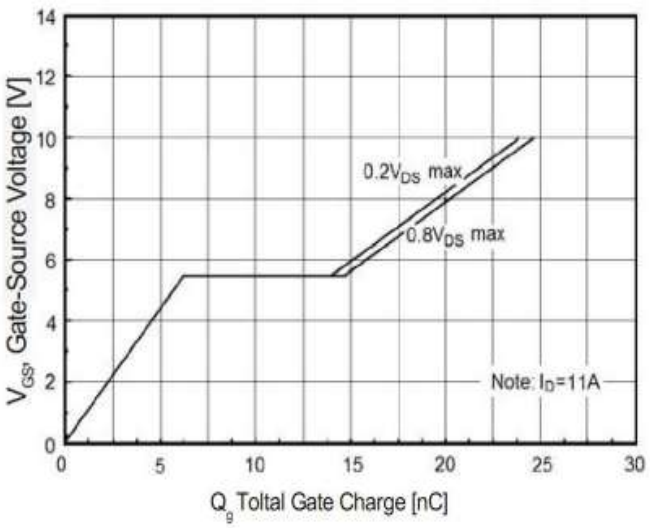
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

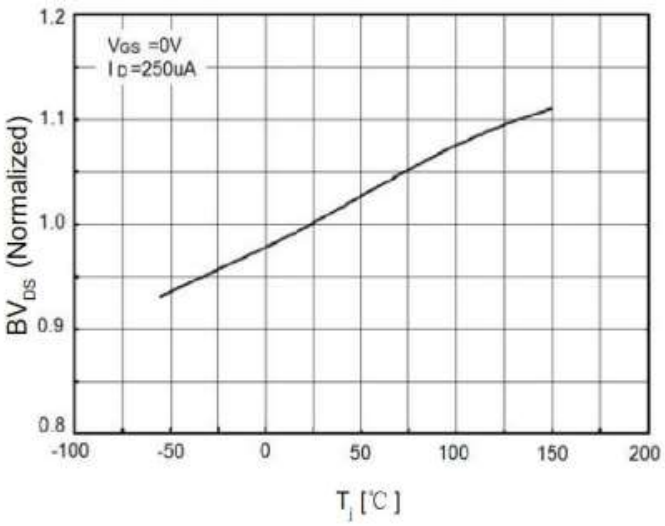


Gate Charge Characteristics

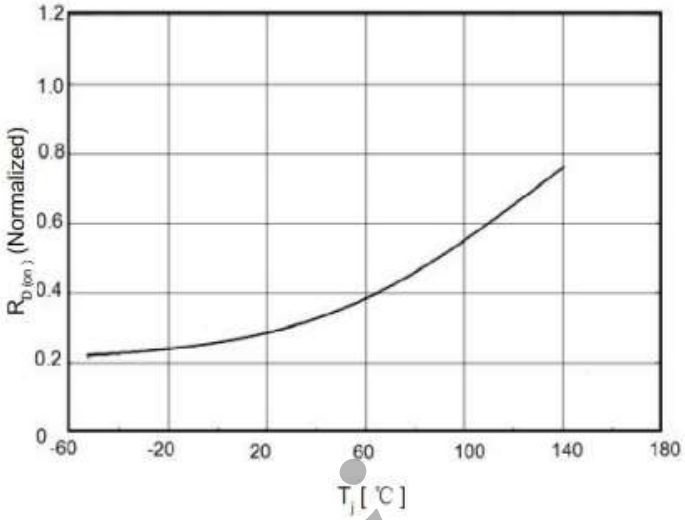


TEST CIRCUITS AND WAVEFORMS(Cont.)

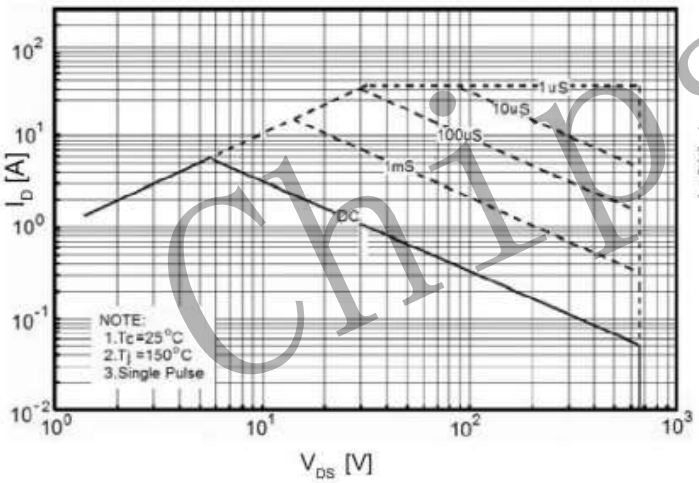
Breakdown Voltage Variation
vs. Temperature



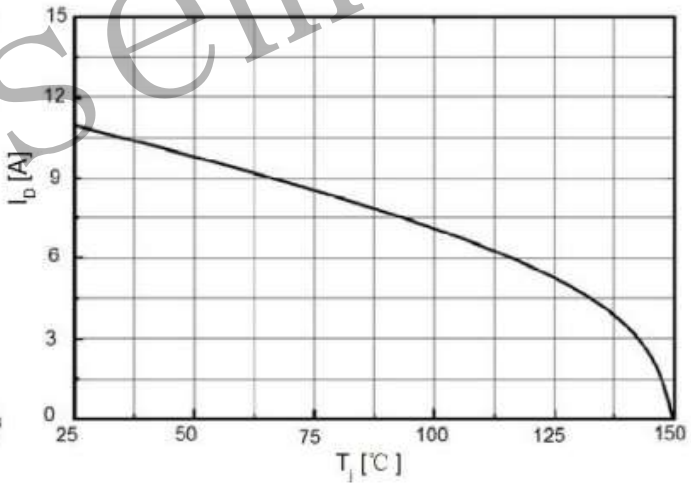
On-Resistance Variatio
vs. Temperature



Maximum Safe Operating Area



Maximum Drain Curre
Vs. Case Tempera



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