

650V N-Channel Super Junction Power MOSFET

DESCRIPTION

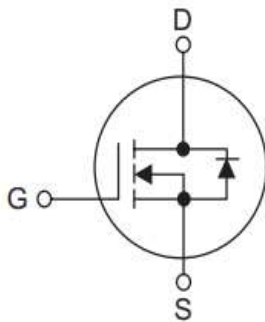
The **65R260F** use advanced super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This supper junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC-DC power conversion and industrial power applications.

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	Identification Code	Package
CMS65R260F	TO-220F	CMS65R260	F	Tube

CMS65R260F

(1) CMS65R260F: 650V 15A (2) F:TO-220F

ABSOLUTE MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous($T_c=25^\circ\text{C}$)	I_D	15.0	A
	Continuous($T_c=100^\circ\text{C}$)		10.0	A
Drain Current	Pulsed (Note1)	I_{DM}	45	A
Avalanche Energy	Single Pulsed (Note2)	E_{AS}	370	mJ
Avalanche Current(Note1)		I_{AR}	7.5	A
Repetitive Avalanche Energy (Note1)		E_{AR}	0.8	mJ
Drain Source voltage slope, $V_{DS} \leq 480\text{V}$		dv/dt	50	V/ns
Power Dissipation	$T_c=25^\circ\text{C}$ TO-220F	P_D	33.5	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~+150	$^\circ\text{C}$

Notes:

1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.

2、 $T_J = 25^\circ\text{C}$, $V_{DD} = 50\text{V}$, $V_G = 10\text{V}$, $R_G = 25 \Omega$

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-220F	3.73	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient	TO-220F	80	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	650			V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$			1	μA	
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA	
	Reverse						$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.5		3.5	V	
Static Drain-Source On- Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 8.0\text{A}$		230	260	$\text{m}\Omega$	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{ISS}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$		1360		pF	
Output Capacitance	C_{OSS}				115		pF
Reverse Transfer Capacitance	C_{RSS}				4.8		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge	Q_G	$V_{DS} = 480\text{V}, I_D = 15.0\text{A}, V_{GS} = 10\text{V}$		29		nC	
Gate-Source Charge	Q_{GS}			6.5		nC	
Gate-Drain Charge	Q_{GD}			12		nC	
Turn-On Delay Time	$t_{D(ON)}$	$V_{DS} = 380\text{V}, I_D = 8.0\text{A}, R_G = 5.5\Omega, V_{GS} = 10\text{V}$		10		ns	
Turn-On Rise Time	t_R			5.0		ns	
Turn-Off Delay Time	$t_{D(OFF)}$			55		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}				15	A	
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				45	A	
Drain-Source Diode Forward Voltage	V_{SD}	$T_J = 25^\circ\text{C}, V_{GS} = 0\text{ V}, I_{SD} = 8.0\text{A}$			1.2	V	
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 8.0\text{A}, dI_F/dt = 100\text{ A}/\mu\text{s}$		270		ns	
Reverse Recovery Charge	Q_{rr}				3.3		μC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure1. Safe operating area for TO-220F

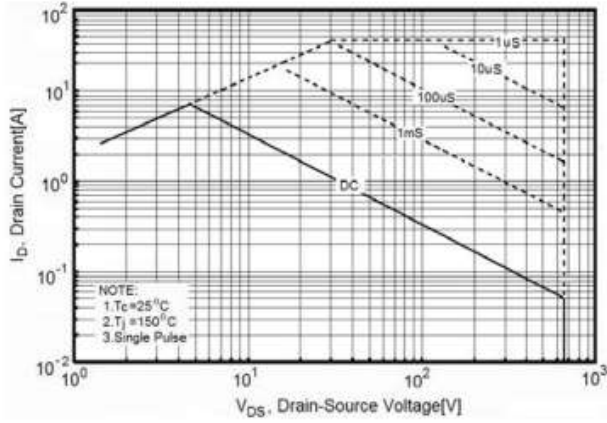


Figure2. Capacitance

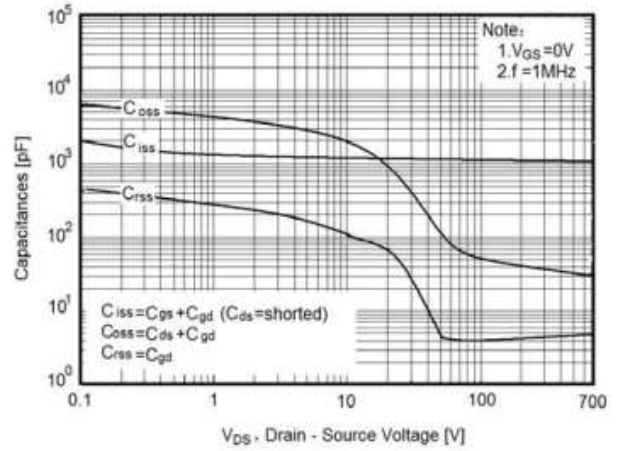


Figure3. Source-Drain Diode Forward Voltage

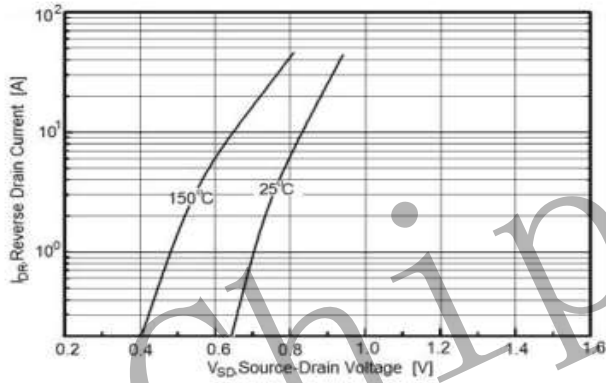


Figure4. Output characteristics

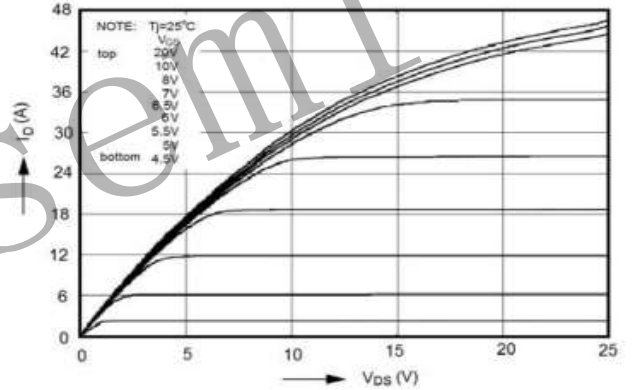


Figure5. Transfer characteristics

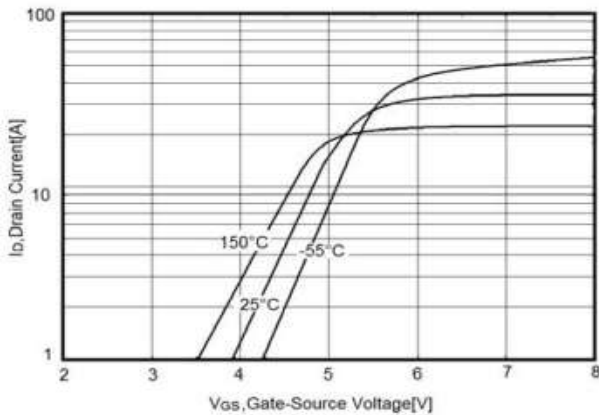
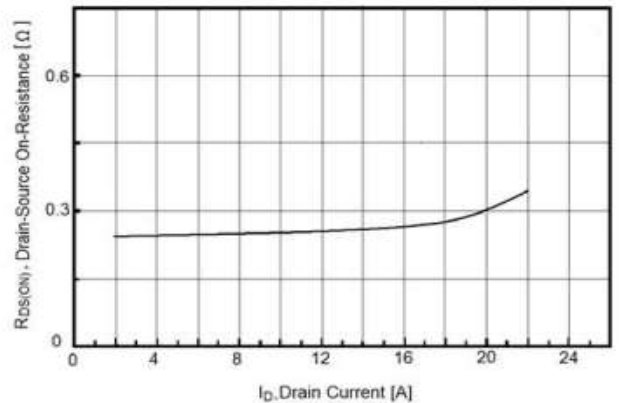


Figure6. Static drain-source on resistance



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS(Cont.)

Figure7. $R_{DS(ON)}$ vs Junction Temperature

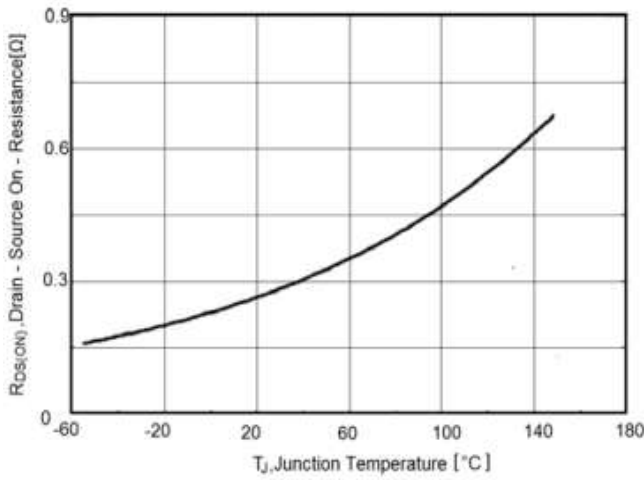


Figure8. BV_{DSS} vs Junction Temperature

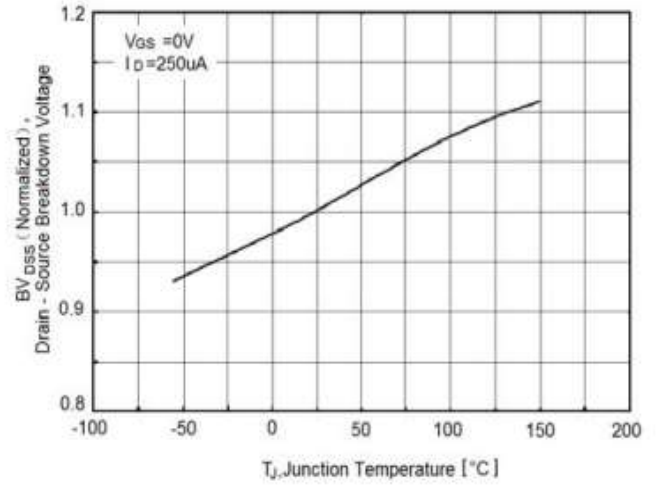


Figure9. Maximum I_D vs Junction Temperature

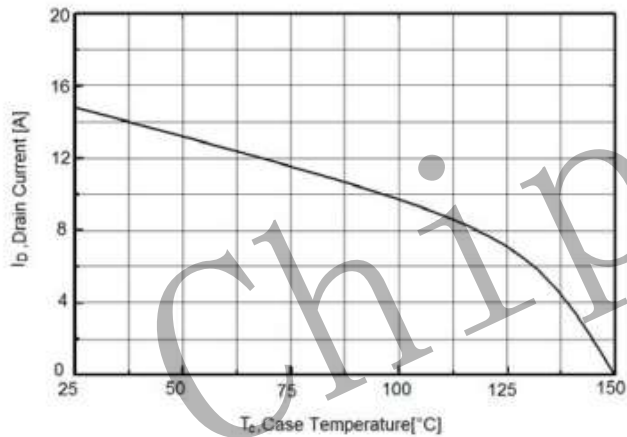


Figure10. Gate charge waveforms

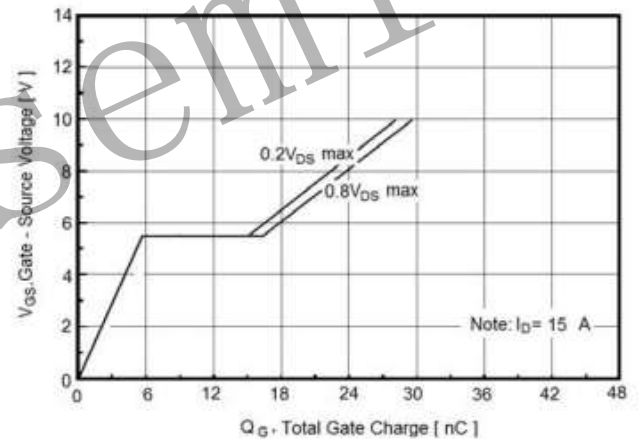
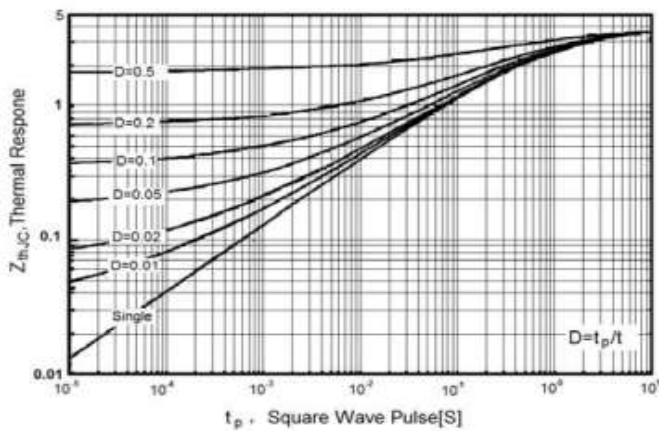
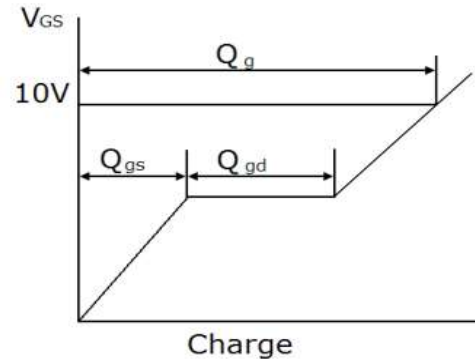
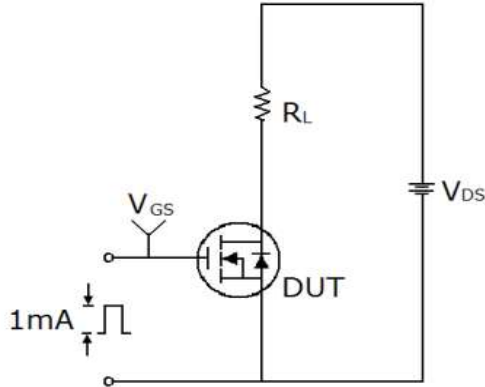


Figure11. Transient Thermal Impedance

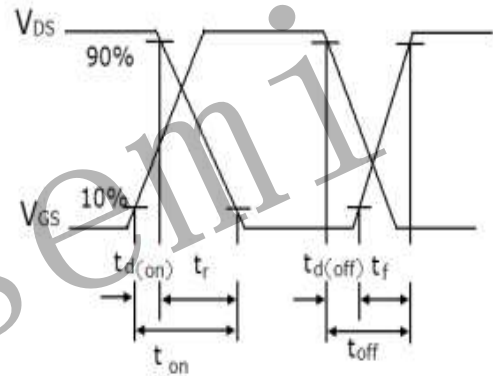
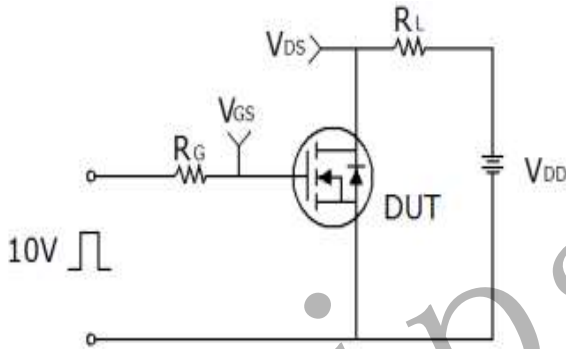


TEST CIRCUITS

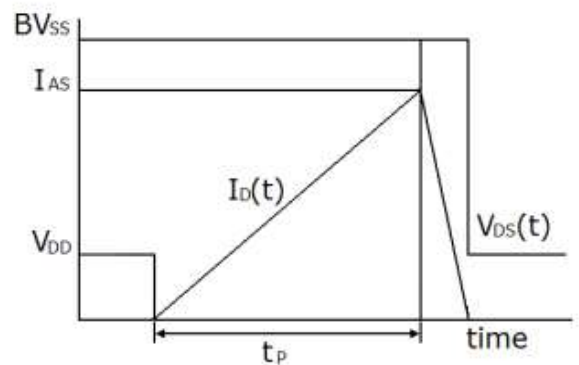
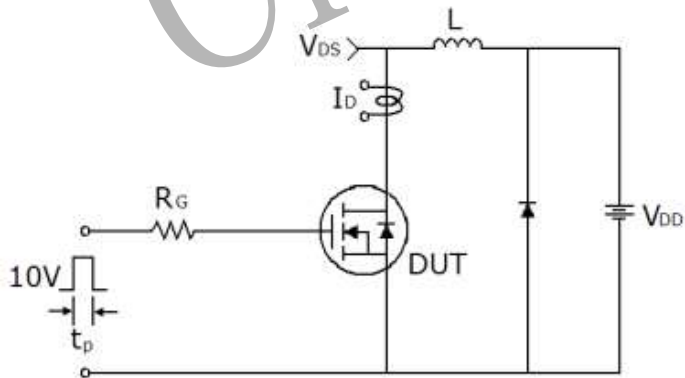
1) Gate charge test circuit & Waveform



2) Switch Time Test Circuit



3) 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

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