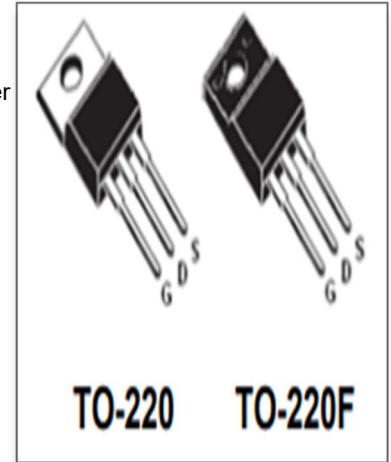


10A, 650V N-CHANNEL POWER MOSFET

DESCRIPTION

The **10N65** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics.

This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

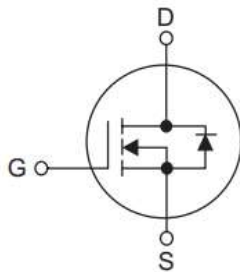


FEATURES

- * RDS(ON) <math><1.0\Omega@V_{GS} = 10V</math>
- * Fast Switching Capability
- * Low gate charge
- * 100% single pulse avalanche energy test
- * Improved dv/dt Capability

SYMBOL

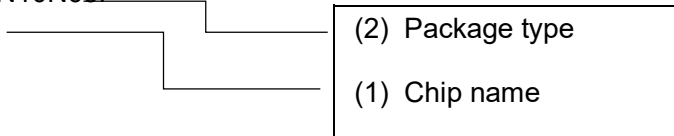
1. Gate
2. Drain
3. Source



Package Description

Product Model	Package Type	Mark Name	Identification Code	Package
CMN10N65F	TO-220F	CMN10N65	F	Tube
CMN10N65P	TO-220	CMN10N65	P	Tube

CMN10N65F



(1) CMN10N65: 650V 10A (2) F:TO-220F P:TO-220

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	10	A
Drain Current	Continuous ($T_C=25^\circ\text{C}$)	I_D	10	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	80	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.8	V/ns
Power Dissipation	$T_C=25^\circ\text{C}$	TO-220	156	W
		TO-220F		50
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating Temperature		T_{OPR}	-55 ~ +150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. $L = 10\text{mH}$, $I_{AS} = 4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
4. $I_{SD} \leq 10\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, Starting $T_J = 25^\circ\text{C}$

THERMAL CHARACTERISTICS

Symbol	Parameter	PACKAGE	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-220	0.8	$^\circ\text{C}/\text{W}$
		TO-220F	2.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient	TO-220F	62.5	$^\circ\text{C}/\text{W}$

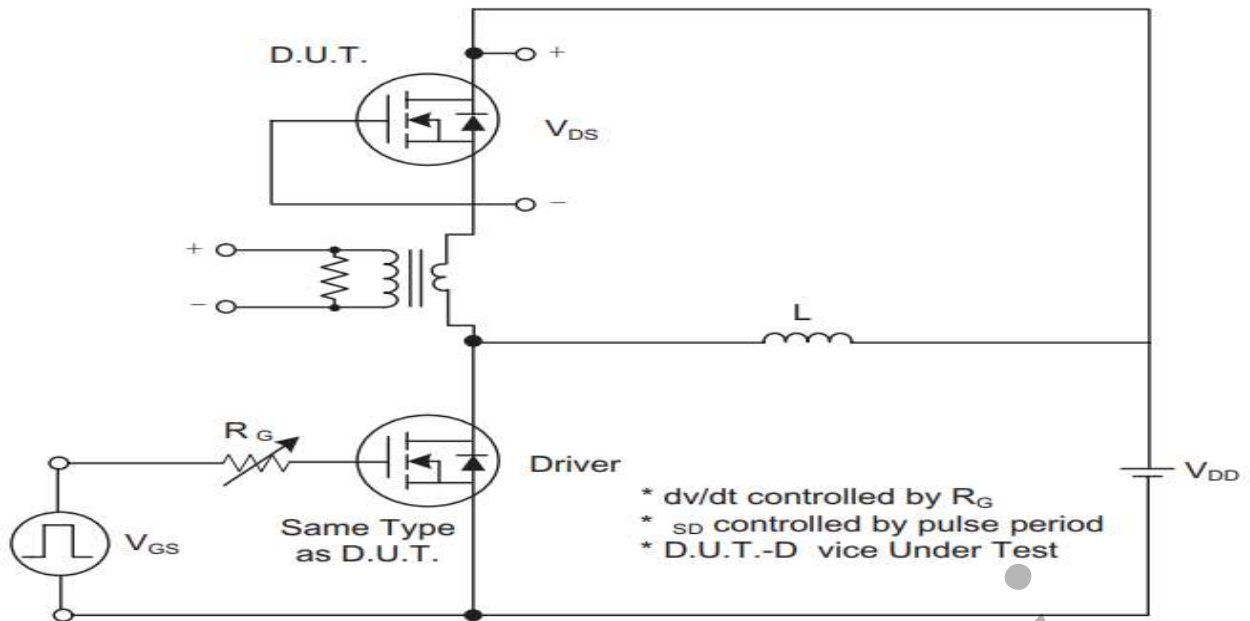
ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650		900	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			120	nA
Gate- Source Leakage Current	Forward	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	Reverse	$V_{GS} = -30V, V_{DS} = 0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.3		3.8	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.0A$	0.5		0.9	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$	1484	1499	1516	pF
Output Capacitance	C_{OSS}		128			pF
Reverse Transfer Capacitance	C_{RSS}		10			pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$T_{d(ON)}$	$V_{DD} = 30V, V_{GS} = 10V, I_D = 0.5A, R_G = 25\Omega$ (Note 1, 2)		69		ns
Turn-On Rise Time	t_R			41		ns
Turn-Off Delay Time	$t_{D(OFF)}$			287		ns
Turn-Off Fall Time	t_F			47		ns
Total Gate Charge	Q_G	$V_{DS} = 50V, I_D = 1.3A, V_{GS} = 10V, I_G = 100\mu A$ (Note 1, 2)		90		nC
Gate-Source Charge	Q_{GS}		7			nC
Gate-Drain Charge	Q_{GD}		7.5			nC
SOURCE- DRAIN DIODE RATING AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 10A$	0.7		1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				10	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40	A
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_S = 10A, dI_F / dt = 100A/\mu s$ (Note 1)		350		ns
Reverse Recovery Charge	Q_{RR}			3.6		μC

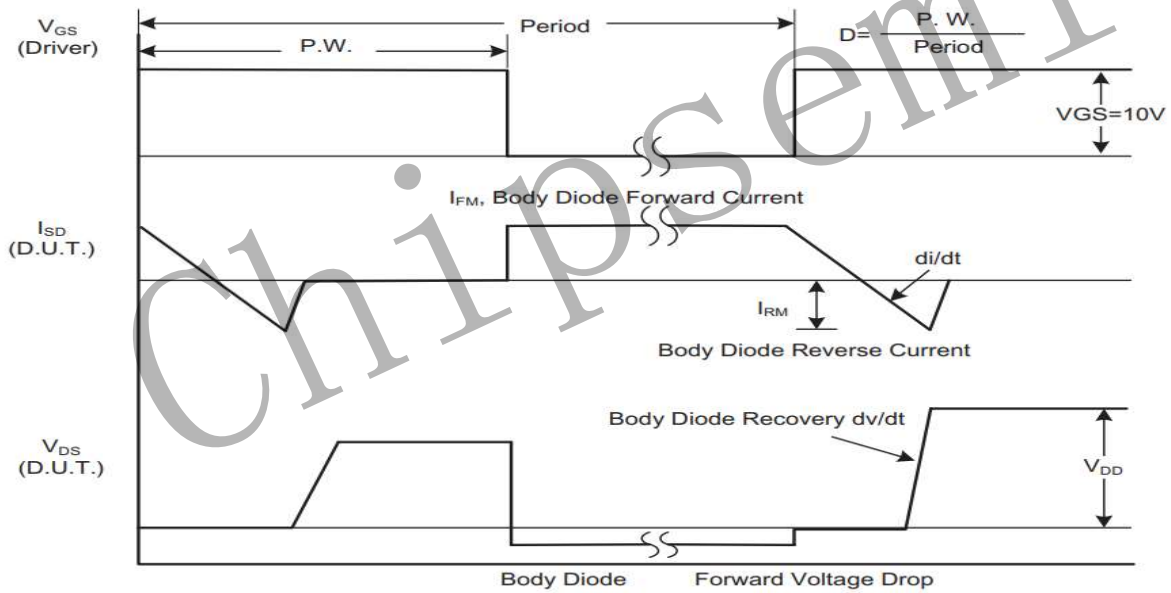
Note:

1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature

TEST CIRCUITS AND WAVEFORMS

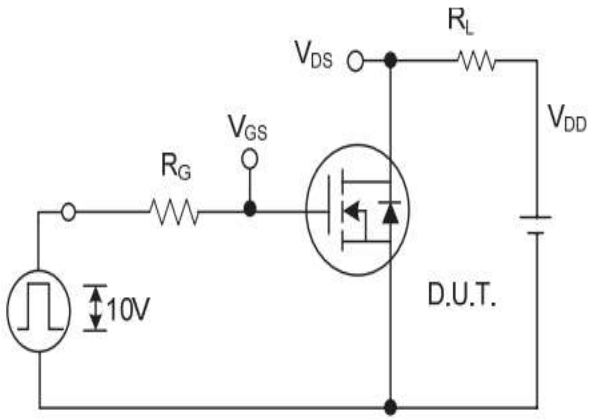


Peak Diode Recovery dv/dt Test Circuit

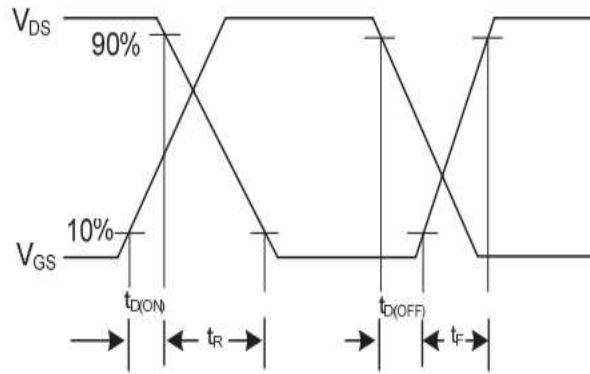


Peak Diode Recovery dv/dt Waveforms

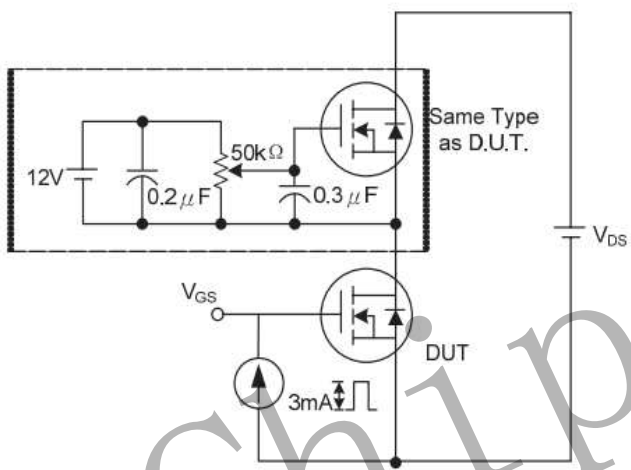
TEST CIRCUITS AND WAVEFORMS(Cont.)



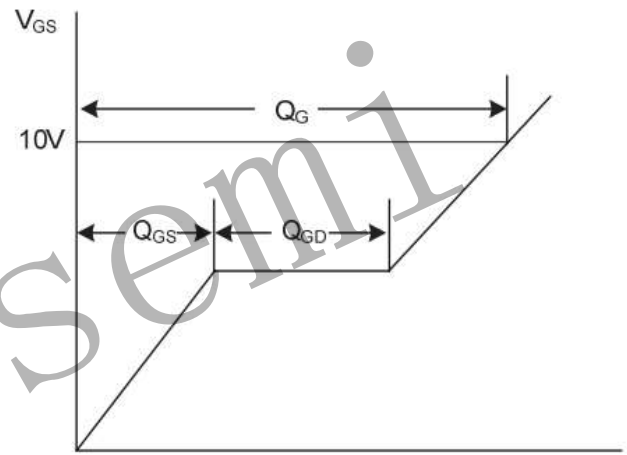
Switching Test Circuit



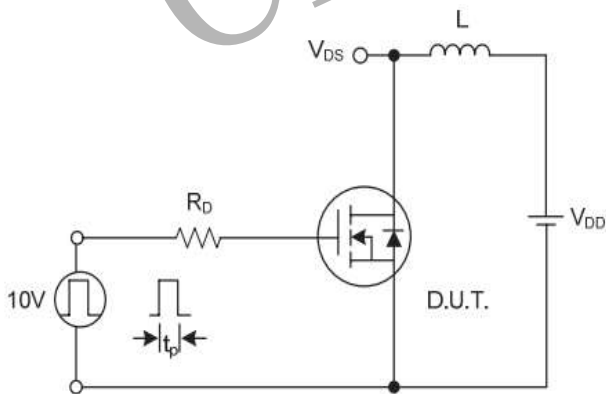
Switching Waveforms



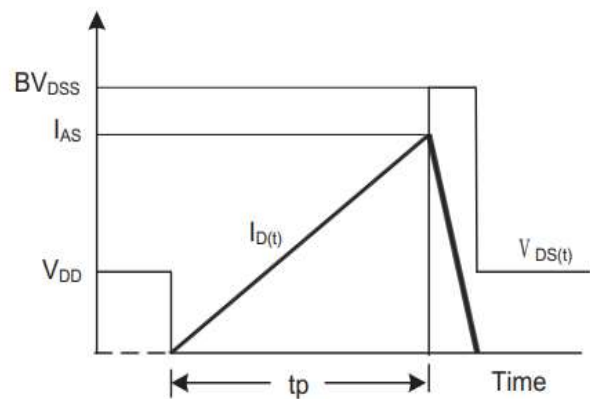
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching 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	6

Chipsemi