

General Description

These N-Channel enhancement mode power field effect transistors are produced using Cmos's proprietary, planar stripe, DMOS technology.

These devices are well suited for high efficient switched mode power supplies and active power factor correction.

Features

- 100% avalanche tested
- Fast Switching
- RoHS Compliant

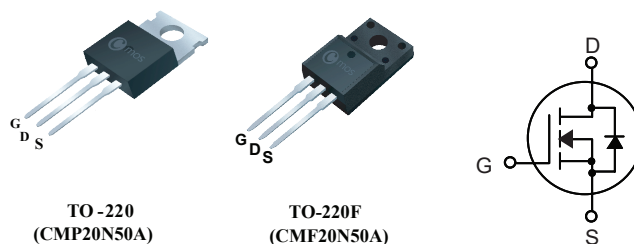
Product Summary

BVDSS	RDSON	ID
500V	0.28Ω	20A

Applications

- PFC
- SMPS
- High Current, High Speed Switching

TO-220/220F Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	CMP20N50A/CMF20N50A		Units
V_{DS}	Drain-Source Voltage	500		V
V_{GS}	Gate-Source Voltage	±30		V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	20	20*	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	12	12*	A
I_{DM}	Pulsed Drain Current ¹	80	80*	A
EAS	Single Pulse Avalanche Energy ²	1620		mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	250	38.5	W
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		°C

* Drain current limited by maximum junction temperature.

Thermal Data

Symbol	Parameter	CMP20N50A	CMF20N50A	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	62.5	62.5	/W
$R_{\theta JC}$	Thermal Resistance Junction-case	0.5	3.25	/W

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	500	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=10A$	---	0.25	0.28	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	3	---	5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=500V$, $V_{GS}=0V$	---	---	1	μA
		$V_{DS}=400V$, $V_{GS}=0V$, $T_C=125^{\circ}\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=15V$, $I_D=10A$	---	14	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	2	---	Ω
Q_g	Total Gate Charge	$I_D=20A$	---	52	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=400V$	---	14	---	
Q_{gd}	Gate-Drain Charge	$V_{GS}=10V$ (Note 3)	---	20	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=250V$ $I_D=20A$ $R_G=25\Omega$ (Note 3)	---	28	---	ns
T_r	Rise Time		---	54	---	
$T_{d(off)}$	Turn-Off Delay Time		---	68	---	
T_f	Fall Time		---	37	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	2700	---	pF
C_{oss}	Output Capacitance		---	260	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	

Diode Characteristics

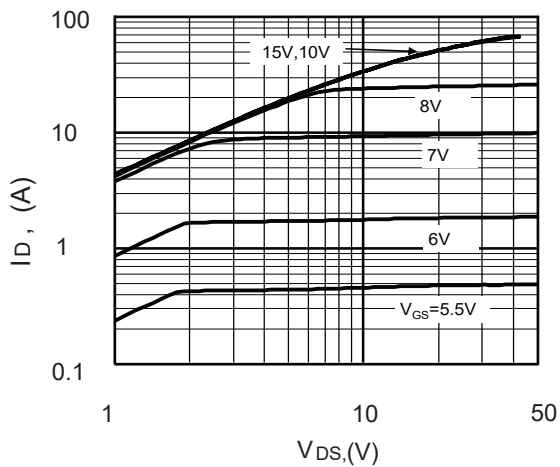
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_{GS}=V_{DS}=0V$, Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	80	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V$, $I_F=10A$, $T_J=25^{\circ}\text{C}$	---	0.82	1.5	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	520	---	ns
Q_{rr}	Reverse Recovery Charge	$I_F=20A$, $dI/dt=100A/\mu s$ (Note 3)	---	5.2	---	μC

Note :

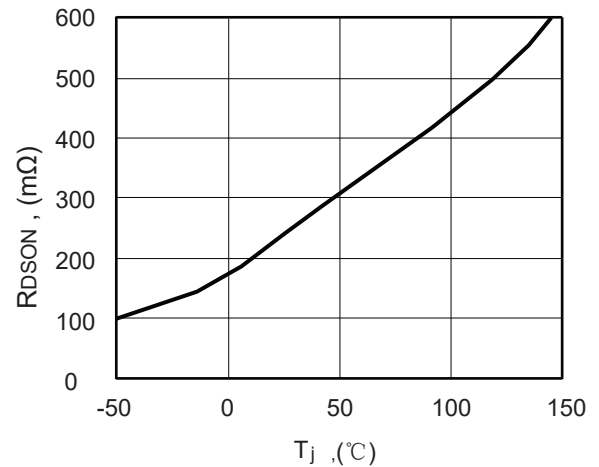
- 1.Repetitive rating: Pulse width limited by maximum junction temperature
- 2.The EAS data shows Max. rating .The test condition is $V_{DS}=80V$, $V_{GS}=10V$, $L=10\text{mH}$, $I_{AS}=18A$.
- 3.Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycles $\leq 2\%$

This product has been designed and qualified for the consumer market.
Cmos assumes no liability for customers' product design or applications.
Cmos reserves the right to improve product design ,functions and reliability without notice.

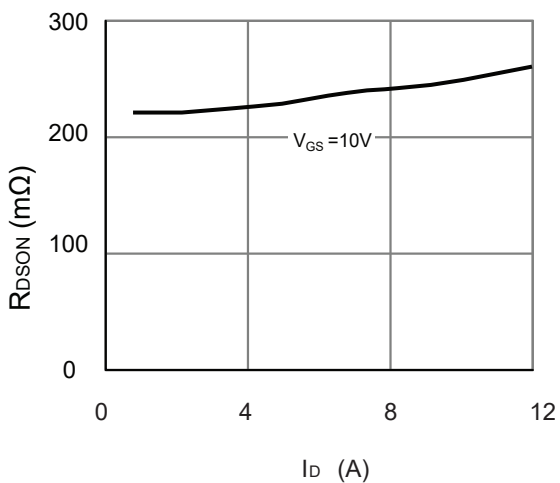
Typical Characteristics



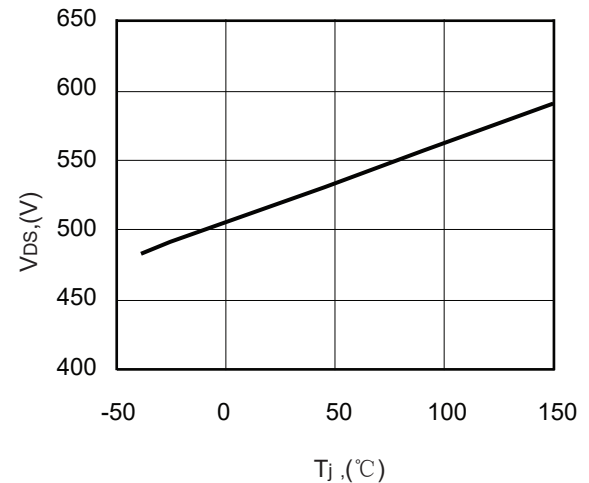
On-Region Characteristics



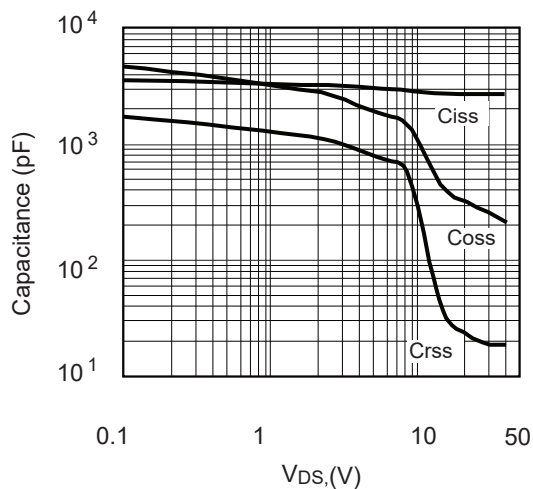
On-Resistance Vs. Temperature



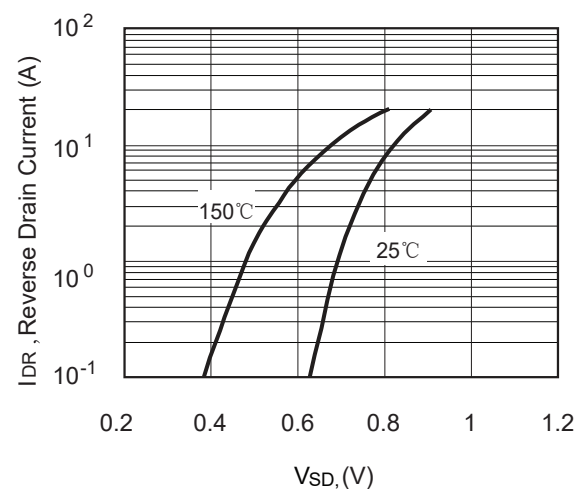
drain-source on-resistance



Breakdown Voltage Variation



Capacitance Characteristics



Body Diode Forward Voltage