

General Description

These N-Channel enhancement mode power field effect transistor are produced using advanced technology which has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficient switched mode power supplies and active power factor correction.

Features

- 100% avalanche tested
- Fast Switching
- Improved dv/dt capability

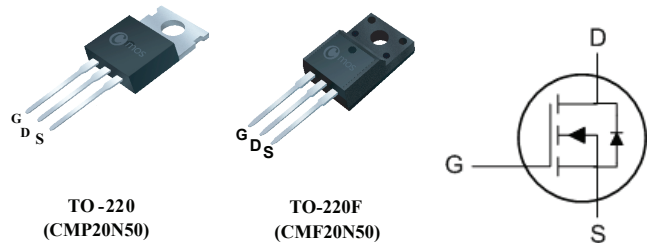
Product Summary

BVDSS	RDSON	ID
500V	0.26Ω	20A

Applications

- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

TO-220/220F Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	CMP20N50/CMF20N50		Units
V_{DS}	Drain-Source Voltage	500		V
V_{GS}	Gate-Source Voltage	±30		V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current	20	20*	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current	12	12*	A
I_{DM}	Pulsed Drain Current ¹	60	60*	A
EAS	Single Pulse Avalanche Energy ²	512		mJ
$P_D@T_C=25^\circ\text{C}$	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

Thermal Data

Symbol	Parameter	CMP20N50	CMF20N50	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	62.5	62.5	/W
$R_{\theta JC}$	Thermal Resistance Junction-case	0.5	3.3	/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	$V_{GS}=10V, I_D=10A$	---	---	0.26	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=500V, V_{GS}=0V$	---	---	1	μA
		$V_{DS}=400V, V_{GS}=0V, TC=125^\circ\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance ³	$V_{DS}=10V, I_D=20A$	---	21	---	S
Q_g	Total Gate Charge	$I_D=20A$	---	52	69	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=400V$	---	18	---	
Q_{gd}	Gate-Drain Charge	$V_{GS}=10V$ (Note 3, 4)	---	26	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=250V$ $I_D=20A$ $R_G=25\Omega$ (Note 3, 4)	---	88	---	ns
T_r	Rise Time		---	270	---	
$T_{d(off)}$	Turn-Off Delay Time		---	105	---	
T_f	Fall Time		---	117	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	4800	---	pF
C_{oss}	Output Capacitance		---	380	---	
C_{rss}	Reverse Transfer Capacitance		---	35	---	

Diode Characteristics

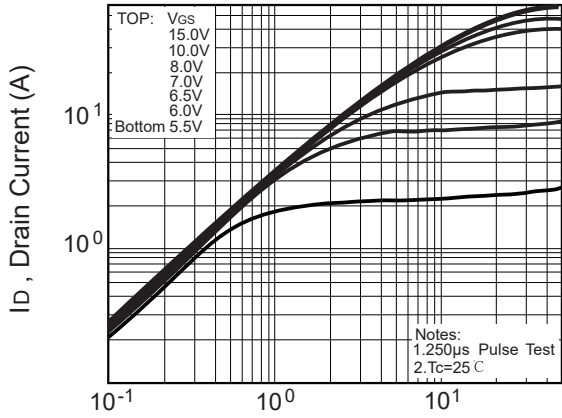
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	60	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=20A, T_J=25^\circ\text{C}$	---	---	1.4	V

Note :

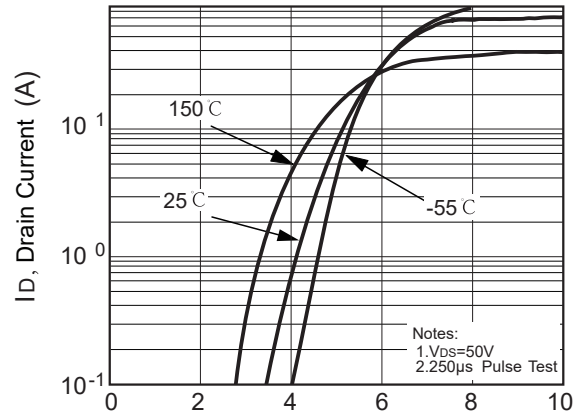
- 1.Repetitive Rating: Pulse width limited by maximum junction temperature
- 2.L = 1.0mH , $I_{AS} = 32A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- 3.Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 4.Essentially Independent of Operating Temperature Typical Characteristics

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.

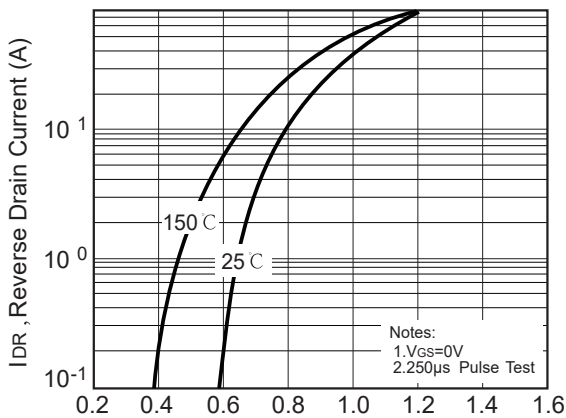
Typical Characteristics



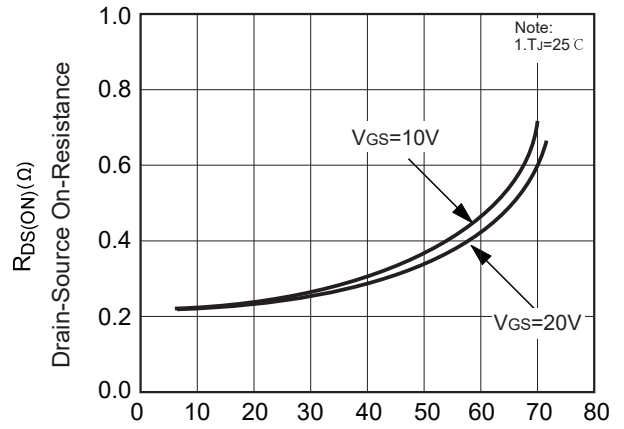
V_{DS}, Drain-Source Voltage (V)
On-Region Characteristics



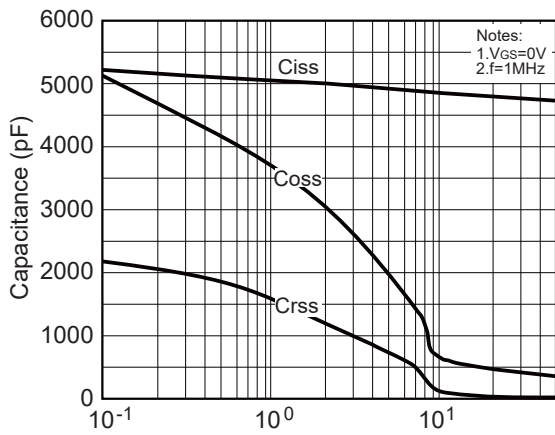
V_{GS}, Gate-Source Voltage (V)
Transfer characteristics



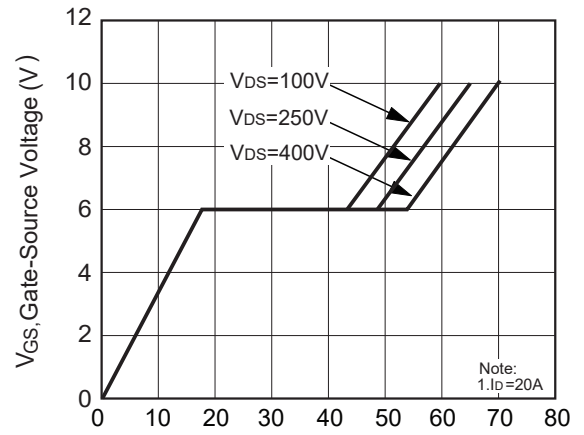
V_{SD}, Source-Drain Voltage (V)
Body Diode Forward Voltage



On-Resistance Variation vs. Drain Current and Gate Voltage

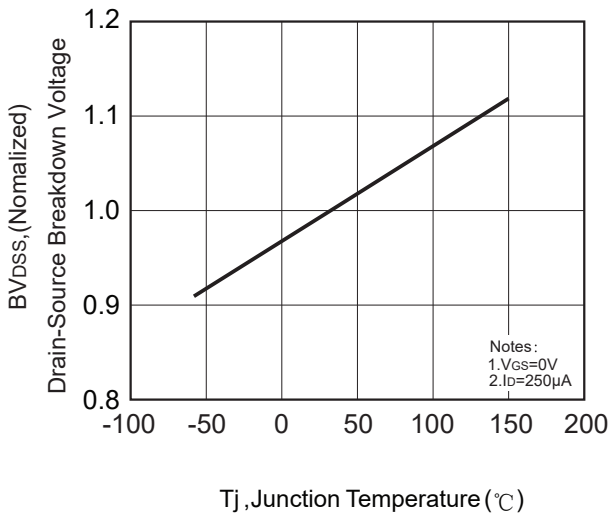


V_{DS}, Drain-Source Voltage (V)
Capacitance Characteristics

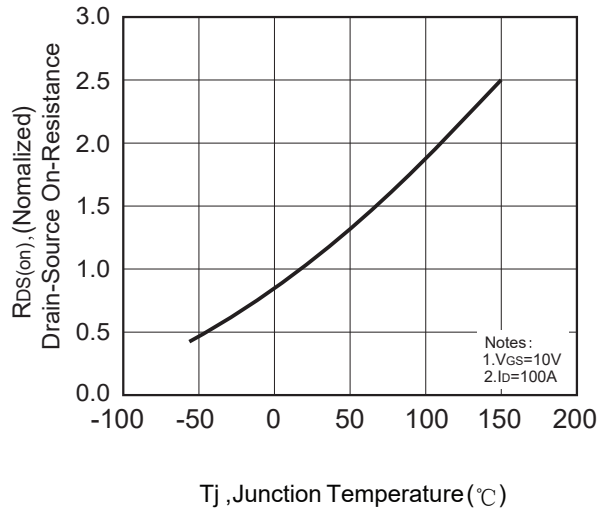


Gate Charge Characteristics

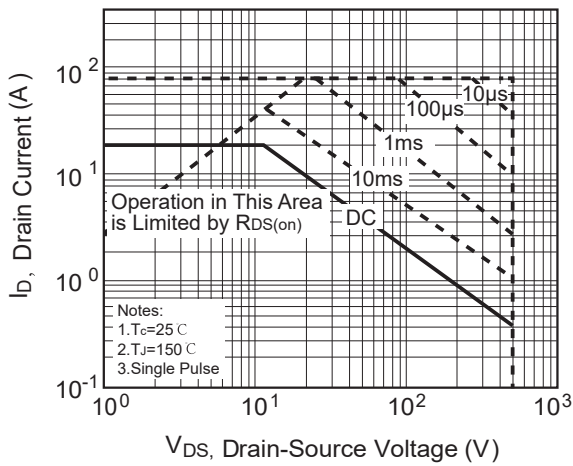
Typical Characteristics



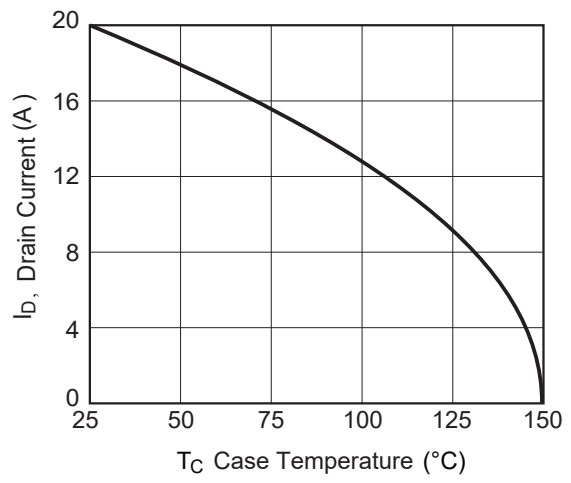
Breakdown Voltage Variation



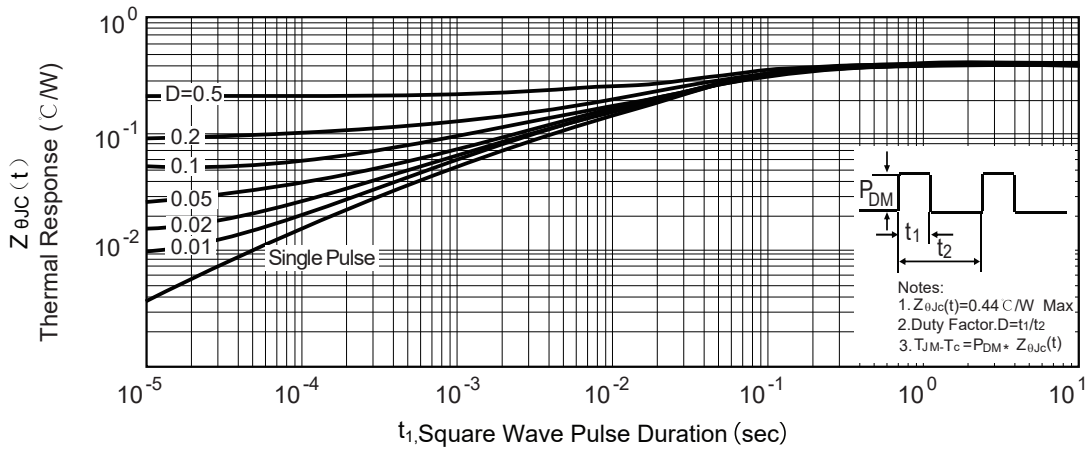
On-Resistance Variation



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve