CMP16N50/CMF16N50

500V N-Channel MOSFET

General Description

The 16N50 uses advanced planar stripe DMOS technology to provide excellent $R_{DS(ON)}$ and superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies,active power factor correction based on half bridge topology.

Product Summary

BVDSS	RDSON	ID
500V	0.4Ω	16A

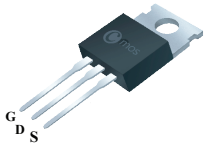
Applications

- Charger
- Adaptor
- Power Supply

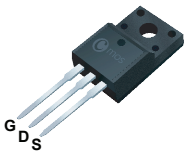
Features

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS Compliant

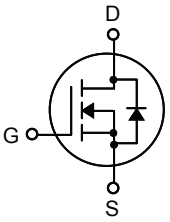
TO-220/220F Pin Configuration



TO-220
(CMP16N50)



TO-220F
(CMF16N50)



Absolute Maximum Ratings (Tc=25℃ unless otherwise noted)

Symbol	Parameter	220	220F	Units
V_{DSS}	Drain-Source Voltage	500		V
I_D	Drain Current - Continuous (T_C = 25℃)	16	16*	A
	Drain Current - Continuous (T_C = 100℃)	9.6	9.6*	A
I_{DM}	Drain Current - Pulsed [1]	64	64*	A
V_{GSS}	Gate-Source Voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy [2]	780		mJ
E_{AR}	Repetitive Avalanche Energy [1]	20		mJ
dv/dt	Peak Diode Recovery dv/dt [3]	4.5		V/ns
P_D	Power Dissipation (T_C = 25℃)	200	38	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		℃
T_L	Maximum lead temperature for soldering purposes, 1/8 from case for 5 seconds	300		℃

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	220	220F	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.63	3.3	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	---	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	℃/W

Electrical Characteristic (T_C=25℃ unless otherwise noted)

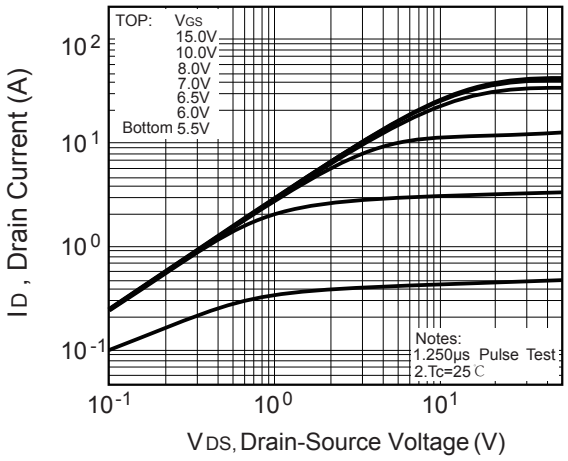
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	500	--	--	V
$\triangle BV_{DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA , Referenced to 25℃	--	0.5	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 400 V, T_C=125℃	--	--	10	
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2	--	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 8A	--	0.32	0.4	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	3000	--	pF
C_{oss}	Output Capacitance		--	200	--	pF
C_{rss}	Reverse Transfer Capacitance		--	30	--	pF
Switching Characteristics [4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250 V, I_D = 16A R_G = 25Ω	--	45	--	ns
t_r	Turn-On Rise Time		--	140	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	75	--	ns
t_f	Turn-Off Fall Time		--	70	--	ns
Q_g	Total Gate Charge	V_{DS} = 400 V, I_D = 16A V_{GS} = 10 V	--	38	--	nC
Q_{gs}	Gate-Source Charge		--	10	--	nC
Q_{gd}	Gate-Drain Charge		--	17	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	16	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	64	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 16A	--	--	1.4	V
t_{rr}	Reverse Recovery Time [4]	V_{GS} = 0 V, I_S = 16A dI_F / dt = 100 A/μA	--	490	--	ns
Q_{rr}	Reverse Recovery Charge		--	5	--	μC

note:

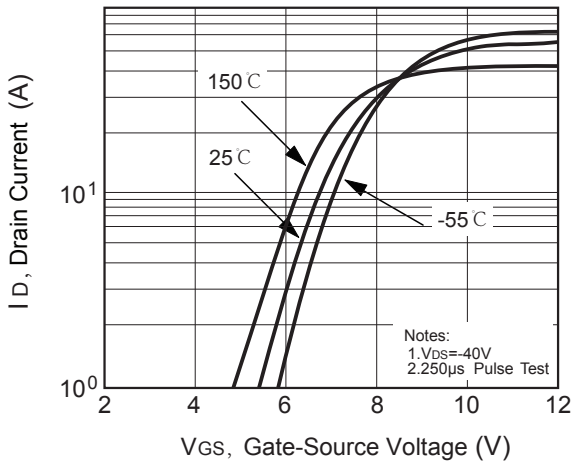
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. L=5.5mH , I_{AS}=16A , V_{DD}=50V , R_G=25Ω , Starting T_J=25 ℃.
3. I_{SD}≤16A, di/dt ≤ 200A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25℃.
4. Essentially Independent of Operating Temperature Typical Characteristics.

This product has been designed and qualified for the counsumer market.
Cmos assumes no liability for customers' product design or applications.
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.

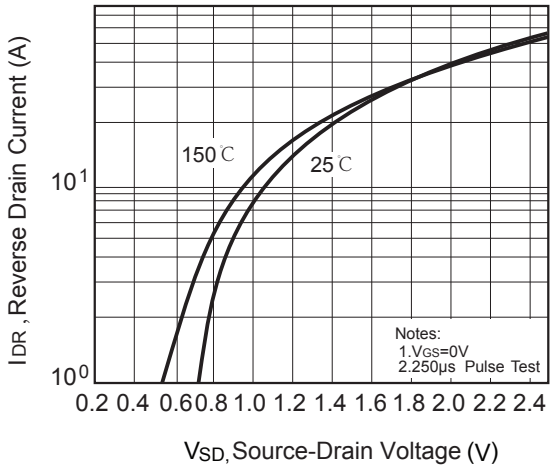
Typical Characteristics



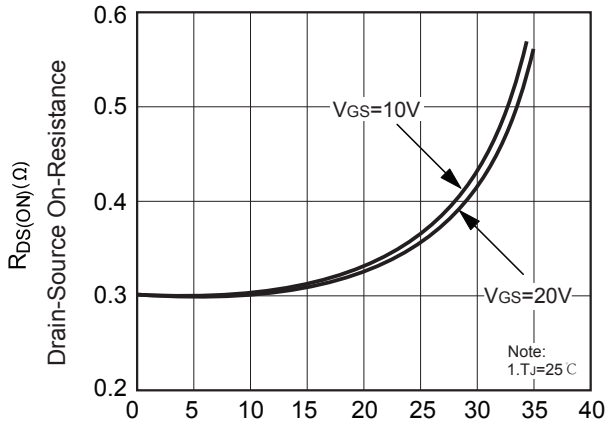
On-Region Characteristics



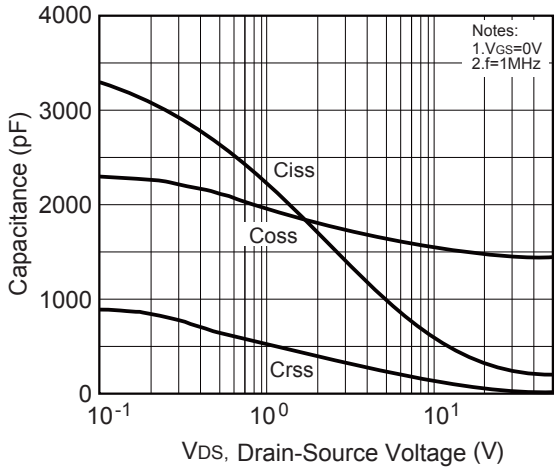
Transfer characteristics



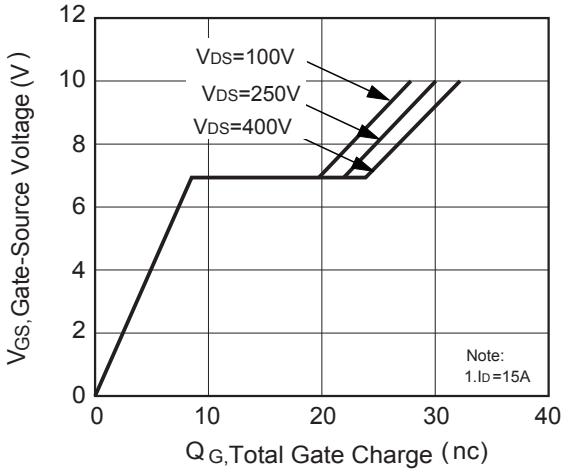
Body Diode Forward Voltage Variation vs. Source Current and Temperature



On-Resistance Variation vs. Drain Current and Gate Voltage

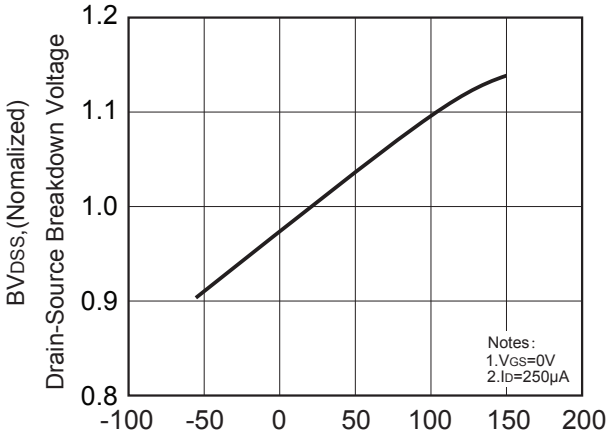


Capacitance Characteristics

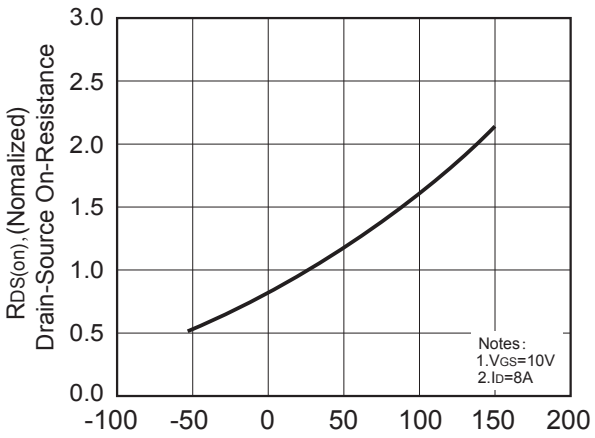


Gate Charge Characteristics

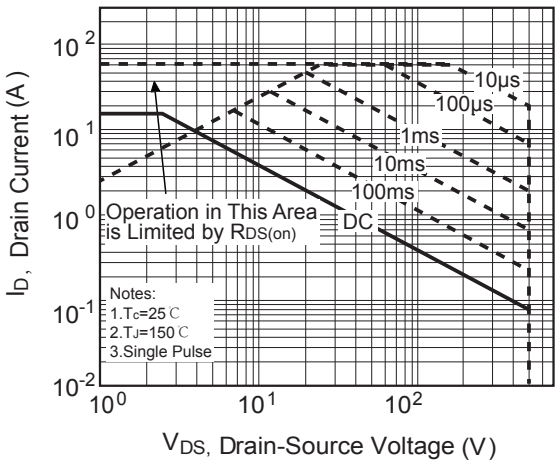
Typical Characteristics



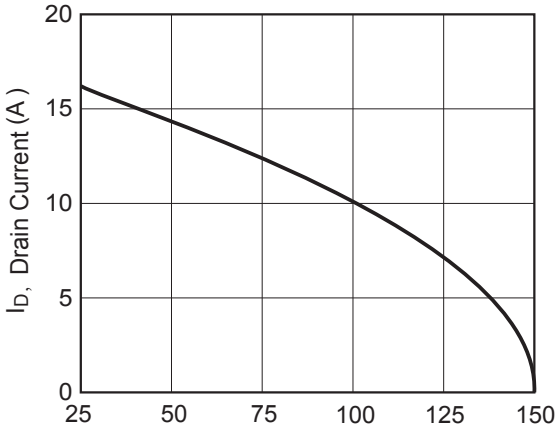
Breakdown Voltage Variation vs. Temperature



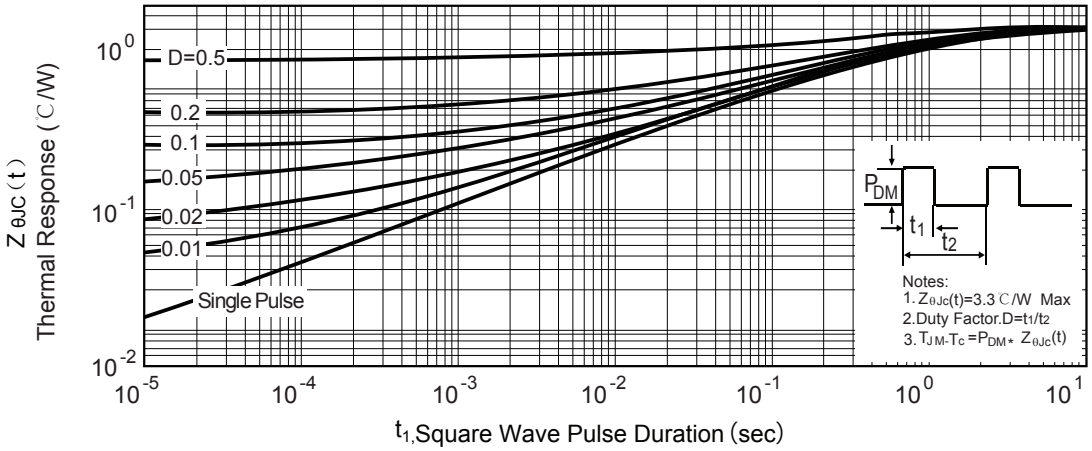
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Transient Thermal Response Curve