

General Description

The 12N60M 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.

Features

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

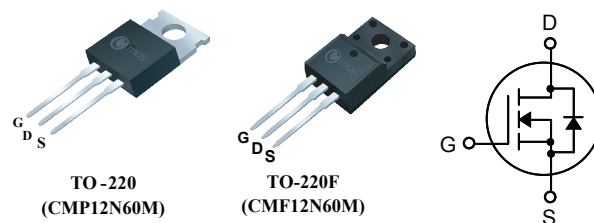
Product Summary

BVDSS	RDS(ON)	ID
600V	0.7 Ω	12A

Applications

- Charger
- Adaptor
- Power Supply

TO-220/220F Pin Configuration



Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	220	220F	Units
V_{DSS}	Drain-Source Voltage	600		V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	12	12*	A
		7.4	7.4*	A
I_{DM}	Drain Current - Pulsed ¹	48	48*	A
V_{GSS}	Gate-Source Voltage	± 30		V
E_{AS}	Single Pulsed Avalanche Energy ²	865		mJ
E_{AR}	Repetitive Avalanche Energy ¹	23		mJ
dv/dt	Peak Diode Recovery dv/dt ³	4.5		V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	230	54	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8 from case for 5 seconds	300		$^\circ\text{C}$

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	220	220F	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.54	2.33	$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	---	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristic (T_C=25°C 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	600	--	--	V
BV _{DSS} / T _J	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C	--	0.6	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600 V, V _{GS} = 0 V	--	--	1	μA
		V _{DS} = 480 V, T _C = 125°C	--	--	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 = 250 μA	3	--	5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 6A	--	0.53	0.7	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	1800	--	pF
C _{oss}	Output Capacitance		--	180	--	pF
C _{rss}	Reverse Transfer Capacitance		--	20	--	pF
Switching Characteristics ^{4 5}						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 300 V, I _D = 12A R _G = 25	--	30	--	ns
t _r	Turn-On Rise Time		--	90	--	ns
t _{d(off)}	Turn-Off Delay Time		--	140	--	ns
t _f	Turn-Off Fall Time		--	90	--	ns
Q _g	Total Gate Charge	V _{DS} = 480 V, I _D = 12A V _{GS} = 10 V	--	50	--	nC
Q _{gs}	Gate-Source Charge		--	8	--	nC
Q _{gd}	Gate-Drain Charge		--	20	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	12	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	48	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 12A	--	--	1.4	V
t _{rr}	Reverse Recovery Time ⁴	V _{GS} = 0 V, I _S = 12A	--	430	--	ns
Q _{rr}	Reverse Recovery Charge ⁴	dl _F / dt = 100 A/μs	--	5	--	μC

note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. L=11mH, I_{AS}=12A, V_{DD}=50V, R_G=25 Ω, Starting T_J=25 °C.
3. I_{SD}≤12A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.
4. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%.
5. 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.