

# CMF60R290Q

600V, 0.25Ω typ., 13A N-Channel Super Junction Power MOSFET

## General Description

CMF60R290Q is power MOSFET using Cmos's advanced super junction technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of Low EMI to designers as well as low switching loss.

## Features

- Multi-layer Epitaxial Chip Technology
- Low On-Resistance
- 100% Avalanche Tested
- RoHS Compliant

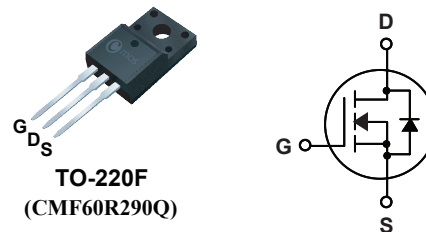
## Product Summary

BVDSS	R <sub>DS(on)</sub> max.	ID
600V	0.31Ω	13A

## Applications

- Charger
- Adaptor
- Power Supply
- Electrodeless lamp

## TO-220F Pin Configuration



## Absolute Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted

Symbol	Parameter	CMF60R290Q	Units
V <sub>DSS</sub>	Drain-Source Voltage	600	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> = 25°C) - Continuous (T <sub>C</sub> = 100°C)	13	A
		8.3	A
I <sub>DM</sub>	Drain Current - Pulsed	52	A
V <sub>GSS</sub>	Gate-Source Voltage	±30	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy	40	mJ
dv/dt	Peak Diode Recovery dv/dt	15	V/ns
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> = 25°C)	35	W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to +150	°C
T <sub>L</sub>	Maximum lead temperature for soldering purposes, 1/8" from Case for 5 Seconds	150	°C

## Thermal Characteristics

Symbol	Parameter	CMF60R290Q	Units
R <sub>θC</sub>	Thermal Resistance, Junction-to-Case Max.	3.57	°C/W
R <sub>θA</sub>	Thermal Resistance, Junction-to-Ambient Max.	62.5	°C/W

### Electrical Characteristic

$T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### Off Characteristics

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	600	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
$I_{GSSR}$	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

### On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	--	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 6.5\text{A}$	--	0.25	0.31	$\Omega$

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 100\text{V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	930	--	pF
$C_{oss}$	Output Capacitance		--	41	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	9	--	pF

### Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 300\text{ V}, I_D = 13\text{A}$ $R_G = 25\ \Omega, V_{GS} = 10\text{V}$	--	20	--	ns
$t_r$	Turn-On Rise Time		--	45	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	212	--	ns
$t_f$	Turn-Off Fall Time		--	40	--	ns
$Q_g$	Total Gate Charge	$V_{DS} = 480\text{ V}, I_D = 13\text{A}$ $V_{GS} = 10\text{ V}$	--	35	--	nC
$Q_{gs}$	Gate-Source Charge		--	6.5	--	nC
$Q_{gd}$	Gate-Drain Charge		--	14	--	nC

### Drain-Source Diode Characteristics and Maximum Ratings

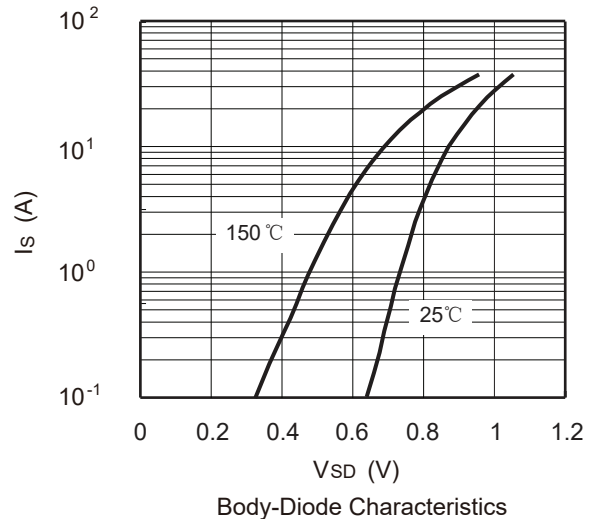
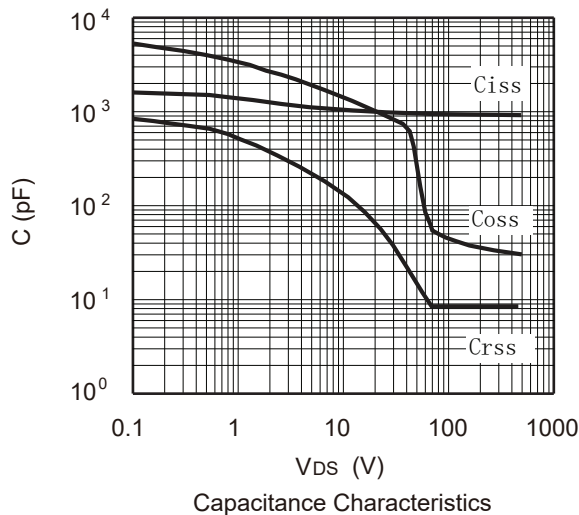
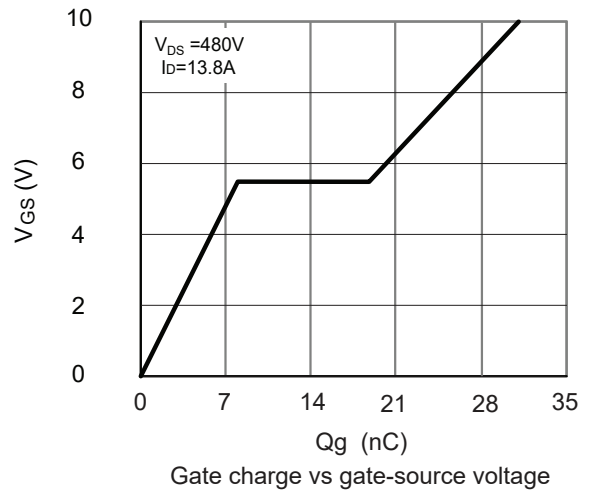
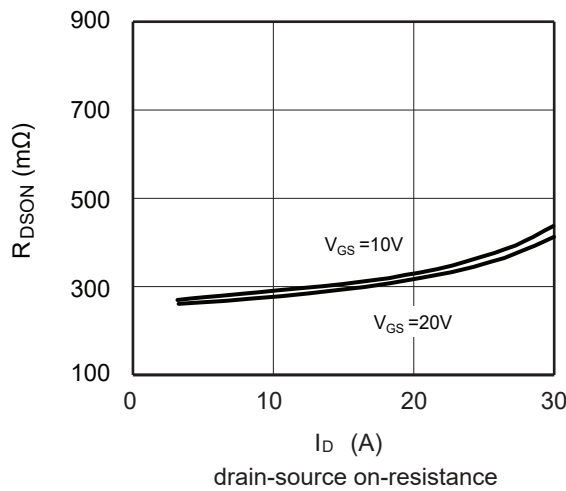
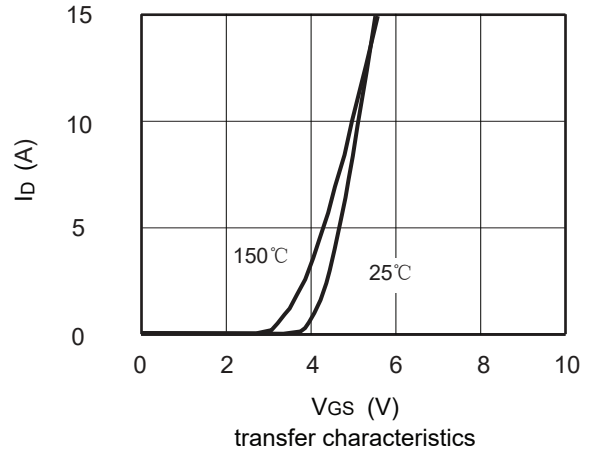
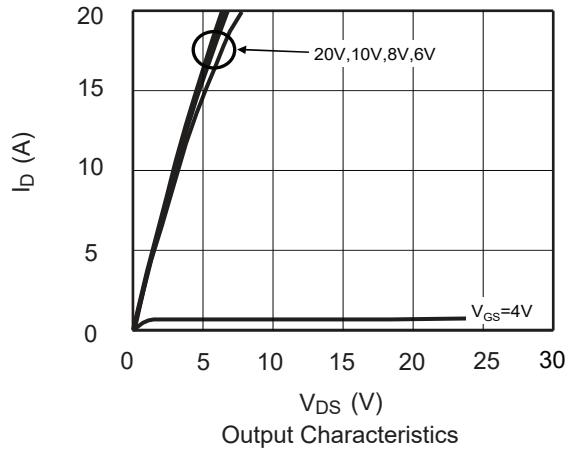
$I_S$	Maximum Continuous Drain-Source Diode Forward Current	--	--	13	A	
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current	--	--	52	A	
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 13\text{A}$	--	--	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_{DD} = 100\text{V}, I_S = 13\text{A}$	--	353	--	ns
$Q_{rr}$	Reverse Recovery Charge	$dI_F / dt = 100\text{ A}/\mu\text{s}$	--	4.6	--	$\mu\text{C}$

This product has been designed and qualified for the consumer market.

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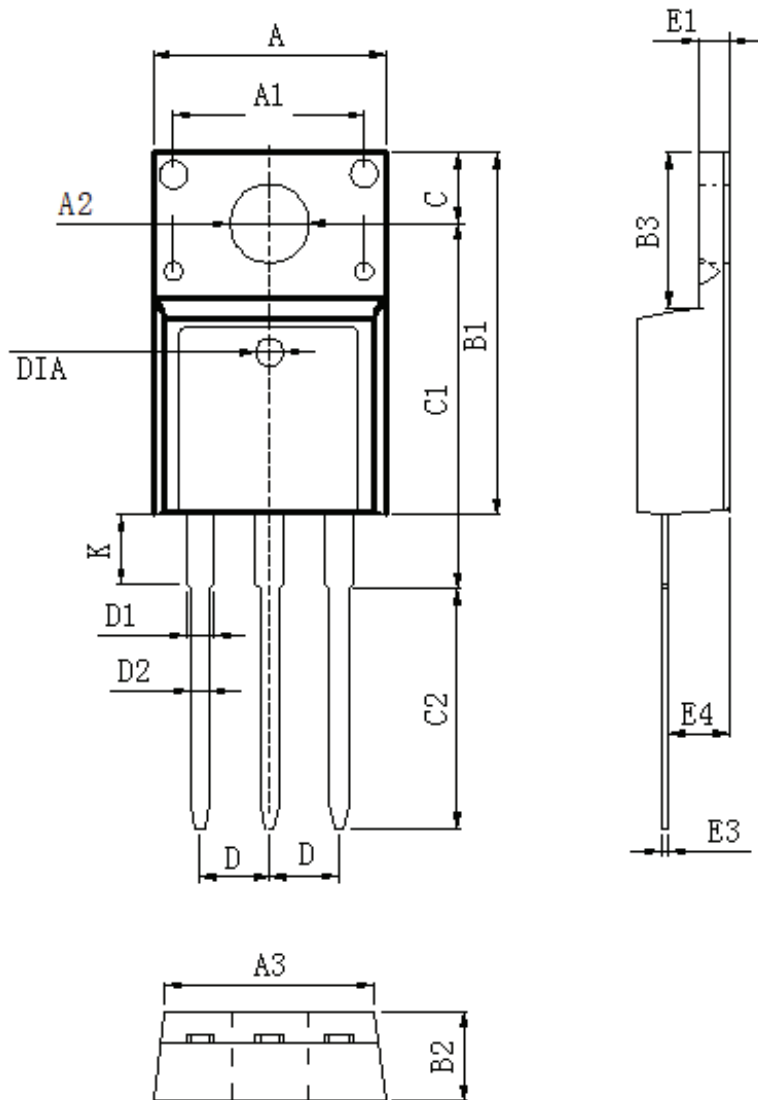
Typical Characteristics



Package Dimension

TO-220F

Unit :mm



DIM	MILLIMETERS
A	10.16±0.3
A1	7.00±0.1
A2	3.3±0.2
A3	9.5±0.2
B1	15.87±0.3
B2	4.7±0.2
B3	6.68±0.4
C	3.3±0.2
C1	12.57±0.3
C2	10.02±0.5
D	2.54±0.05
D1	1.28±0.2
D2	0.8±0.1
K	3.1±0.3
E1	2.54±0.1
E3	0.5±0.1
E4	2.76±0.2
DIA	⊙1.5 (deep 0.2)