CMP65R190/CMF65R190

650V, 0.173Ω typ., 20A N-Channel Super Junction Power MOSFET

General Description

65R190 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.

Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	0.19Ω	20A

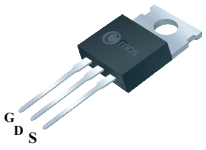
Applications

- Charger
- Adaptor
- Power Supply

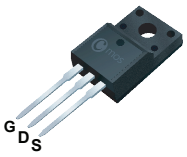
Features

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

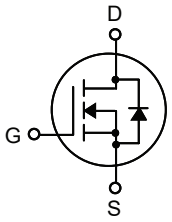
TO-220/220F Pin Configuration



TO-220
(CMP65R190)



TO-220F
(CMF65R190)



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

Symbol	Parameter	220	220F	Units
V_{DSS}	Drain-Source Voltage	650		V
I_D	Drain Current - Continuous (T_C = 25℃)	20	20*	A
	- Continuous (T_C = 100℃)	12.6	12.6*	A
I_{DM}	Drain Current - Pulsed	60	60*	A
V_{GSS}	Gate-Source Voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy [1]	240		mJ
dv/dt	Peak Diode Recovery dv/dt	15		V/ns
P_D	Power Dissipation (T_C = 25℃)	150	35	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	260		℃

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	220	220F	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.83	3.57	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	75	75	℃/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	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V	--	--	1	μA
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	2	--	4	V
$R_{DS(on)}$	Static Drain-Source on-Resistance	V_{GS} = 10 V, I_D = 10A	--	0.173	0.19	Ω
gfs	Forward Transconductance	V_{DS} = 15V , I_D = 9A	--	13.8	--	S
R_g	Gate Resistance	V_{DS} = 0V , V_{GS} = 0V , f=1MHz	--	8.4	--	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} =25V , V_{GS} = 0 V, f = 1.0 MHz	--	1470	--	pF
C_{oss}	Output Capacitance		--	1480	--	pF
C_{rss}	Reverse Transfer Capacitance		--	60	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 300V , I_D = 20A R_G =25Ω , V_{GS} =10V	--	24	--	ns
t_r	Turn-On Rise Time		--	89	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	212	--	ns
t_f	Turn-Off Fall Time		--	68	--	ns
Q_g	Total Gate Charge	V_{DS} = 480 V, I_D = 10A V_{GS} = 10 V	--	37	--	nC
Q_{gs}	Gate-Source Charge		--	9	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	20	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	60	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 20A	--	0.88	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, V_{DD}=100V dI_F / dt = 100 A/ μs , I_{SD} = 20A	--	347	--	ns
Q_{rr}	Reverse Recovery Charge		--	5.3	--	μC

note:

1. The EAS data shows Max. rating .The test condition is V_{DS}=80V , V_{GS}=10V , L=30mH , I_{AS}=4A.

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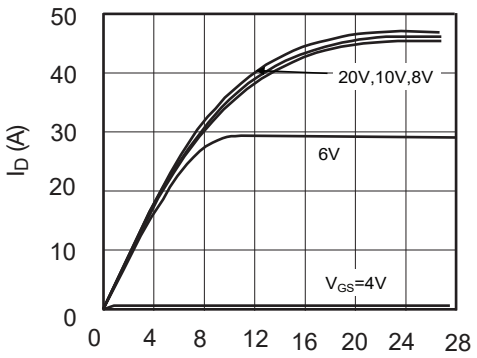
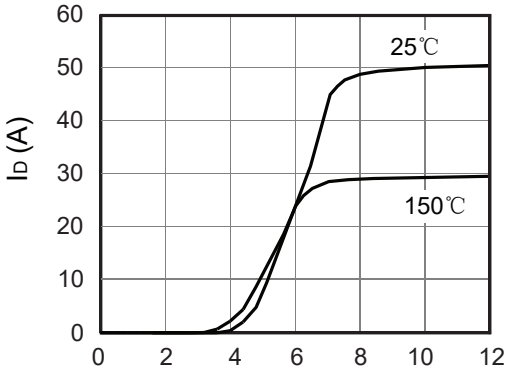
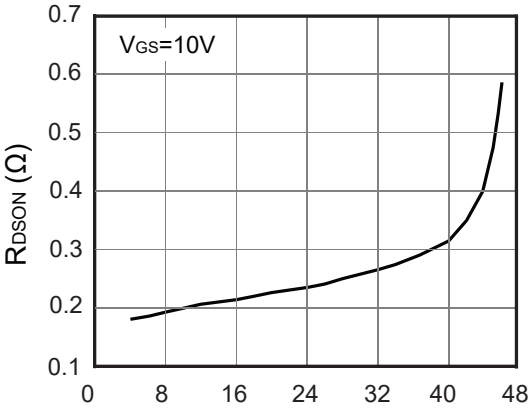
Typical Characteristics



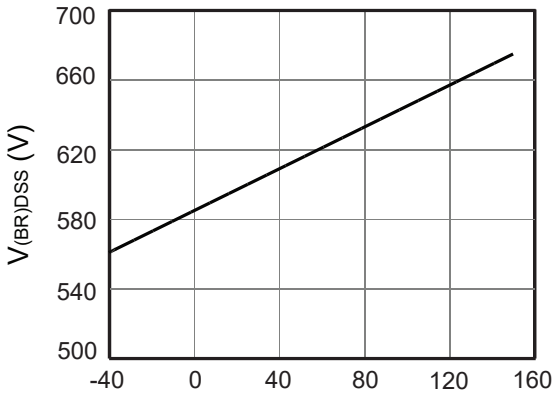
Output Characteristics



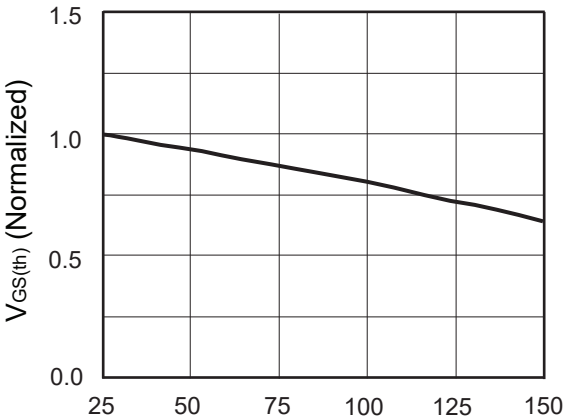
transfer characteristics



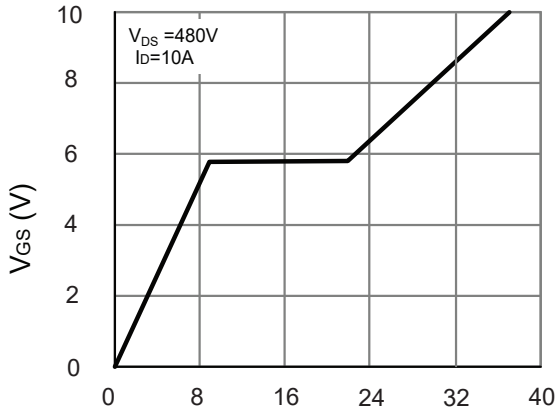
On-Resistance vs Drain Current



V(BR)DSS vs temperature

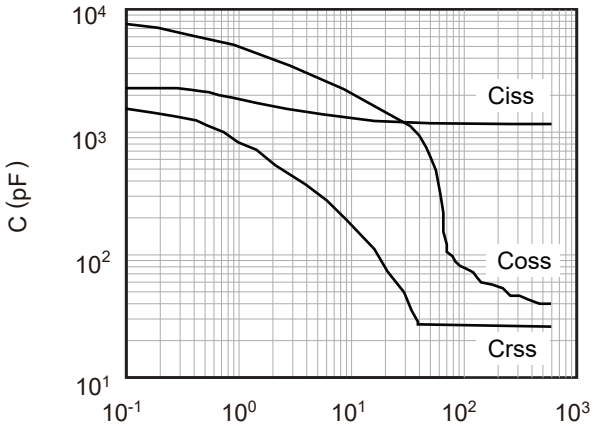


gate threshold voltage vs temperature

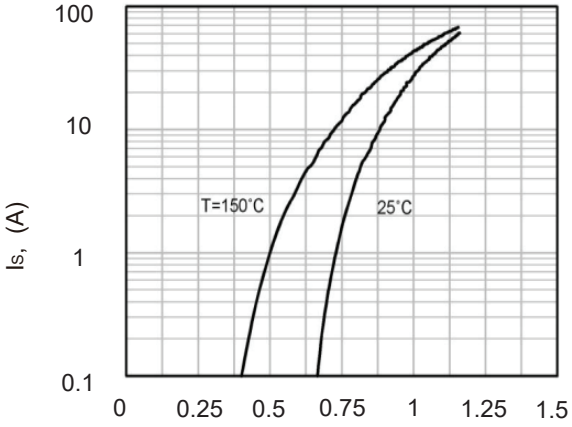


Gate charge vs gate-source voltage

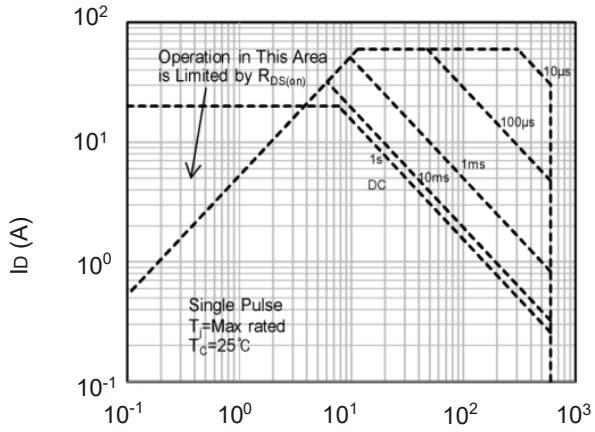
Typical Characteristics



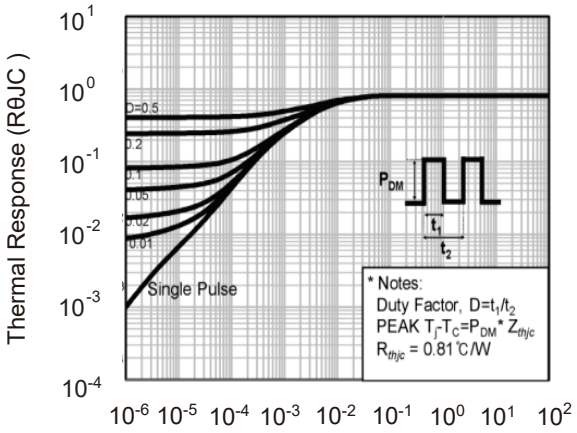
Capacitance Characteristics



Body-Diode Characteristics



Safe operating area



transient thermal response curve