CMH65R190Q/CMA65R190Q

N-Channel Super Junction Power MOSFET

General Description

The series of devices use advanced super junction technology and design to provide excellent RDS(ON) with low gate charge. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

Features

- Multi-layer Epitaxial Chip Technology
- Low On-Resistance
- 100% avalanche tested
- RoHS Complian

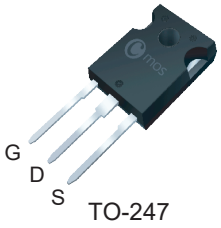
Product Summary

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

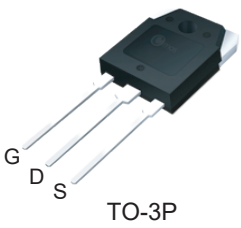
Applications

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）

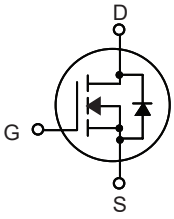
TO-247/3P Pin Configuration



TO-247



TO-3P



Type	Package	Marking
CMH65R190Q	TO-247	CMH65R190Q
CMA65R190Q	TO-3P	CMA65R190Q

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current	20	A
I_D@T_C=100℃	Continuous Drain Current	14	A
I_{DM}	Pulsed Drain Current (Note 1)	80	A
EAS	Single Pulse Avalanche Energy (Note 2)	303	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	15	V/ns
P_D@T_C=25℃	Total Power Dissipation	250	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	75	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.50	℃/W

Electrical Characteristics (T_J=25℃ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	650	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	---	0.19	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V, V_{GS}=0V	---	---	1	uA
		V_{DS}=650V , V_{GS}=0V , T_C=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS} =±30V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance [3]	V_{DS}=10V , I_D=10A	---	15	---	S
Q_g	Total Gate Charge	I_D =20A V_{DS} =480V V_{GS} =10V (Note 4)	---	36	---	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS} =300V I_D =20A R_G=25Ω V_{GS} =10V (Note 4)	---	24	---	ns
T_r	Rise Time		---	89	---	
$T_{d(off)}$	Turn-Off Delay Time		---	212	---	
T_f	Fall Time		---	68	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	1430	---	pF
C_{oss}	Output Capacitance		---	70	---	
C_{rss}	Reverse Transfer Capacitance		---	5.5	---	

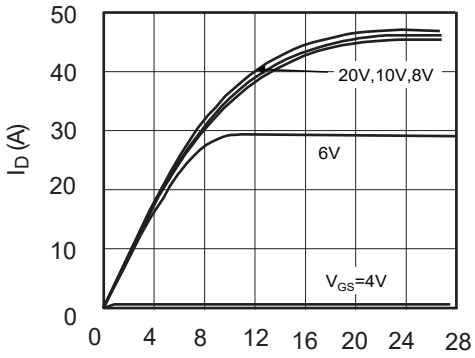
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_{GS}=V_{DS} =0V , Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	80	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=20A , T_j =25℃	---	0.89	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS}= 0V, V_{DS} = 100V, Is=20A, di_F/dt=100A/μs	---	347	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.3	---	uC

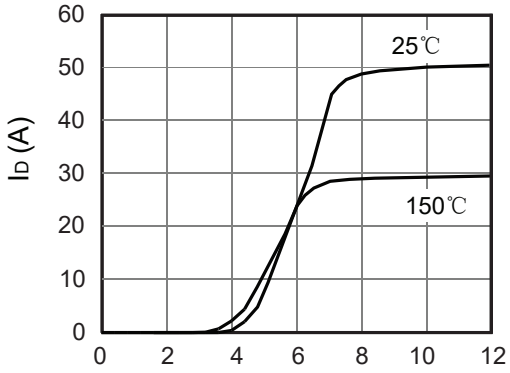
Note :

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=30mH , I_{AS}=4.5A.
3. I_{SD}≤I_D, di/dt≤ 200A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25℃.
4. Essentially Independent of Operating Temperature Typical Characteristics

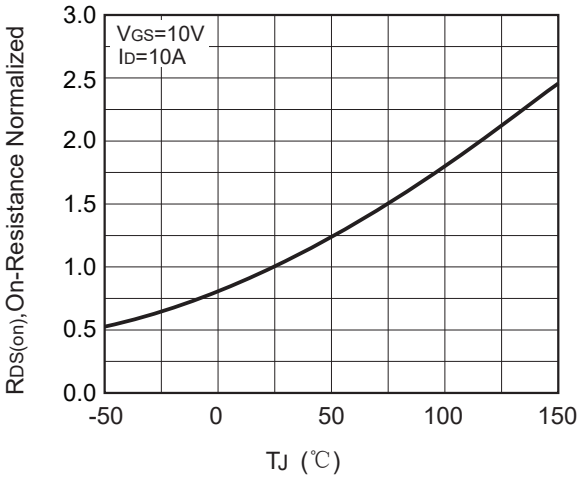
Typical Characteristics



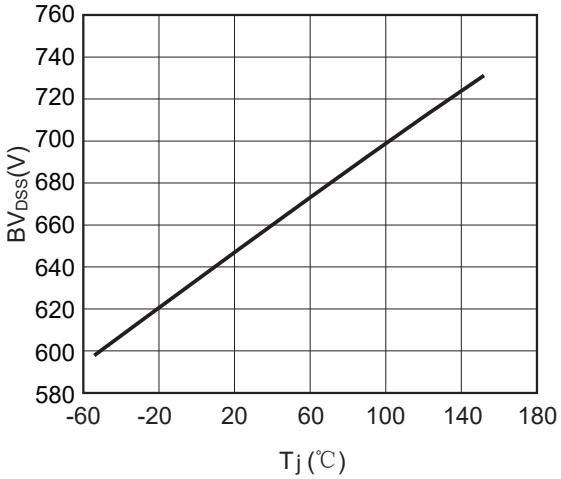
Output Characteristics



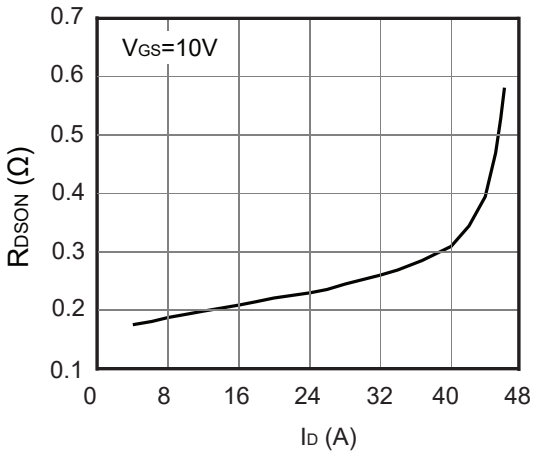
transfer characteristics



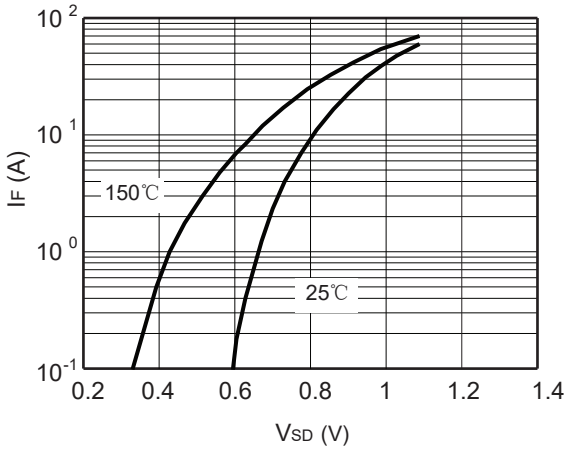
Normalized on - resistance vs temprature



Drain-source breakdown voltage

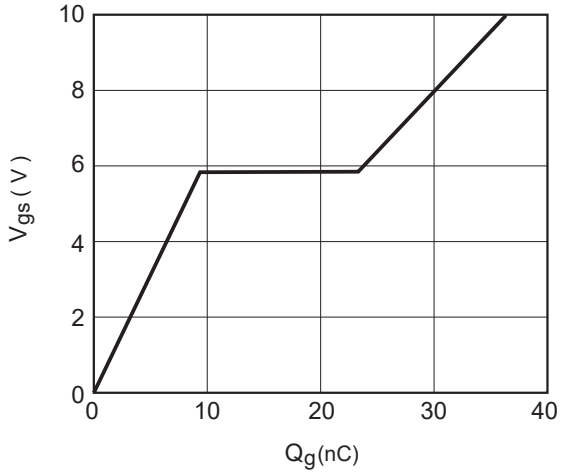


On-Resistance vs Drain Current

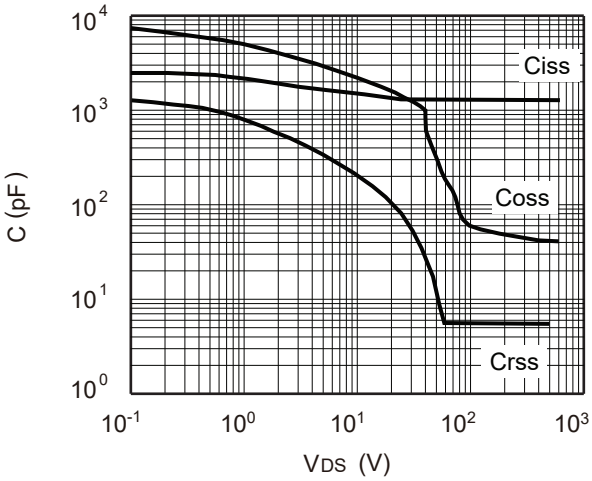


Forward Characteristics of reverse diode

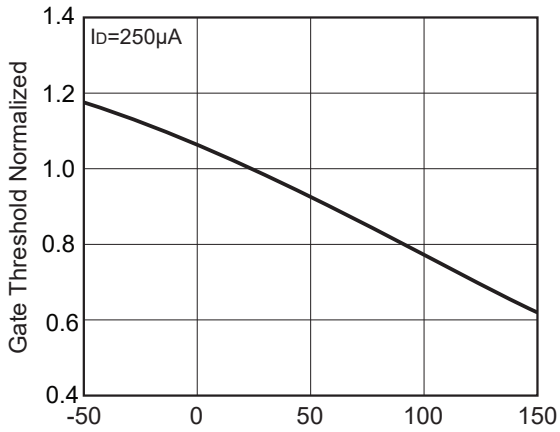
Typical Characteristics



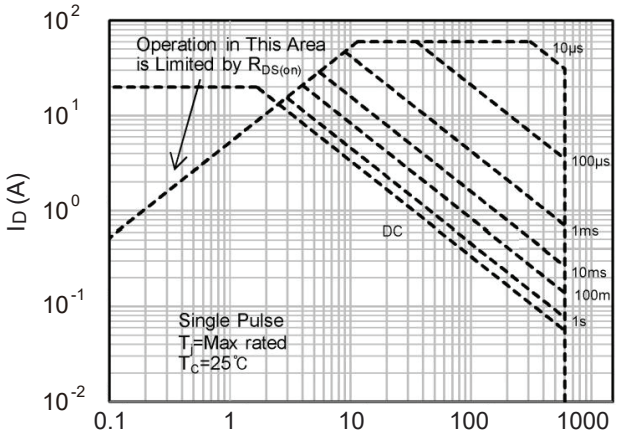
Gate-Charge Characteristics



Capacitance Characteristics



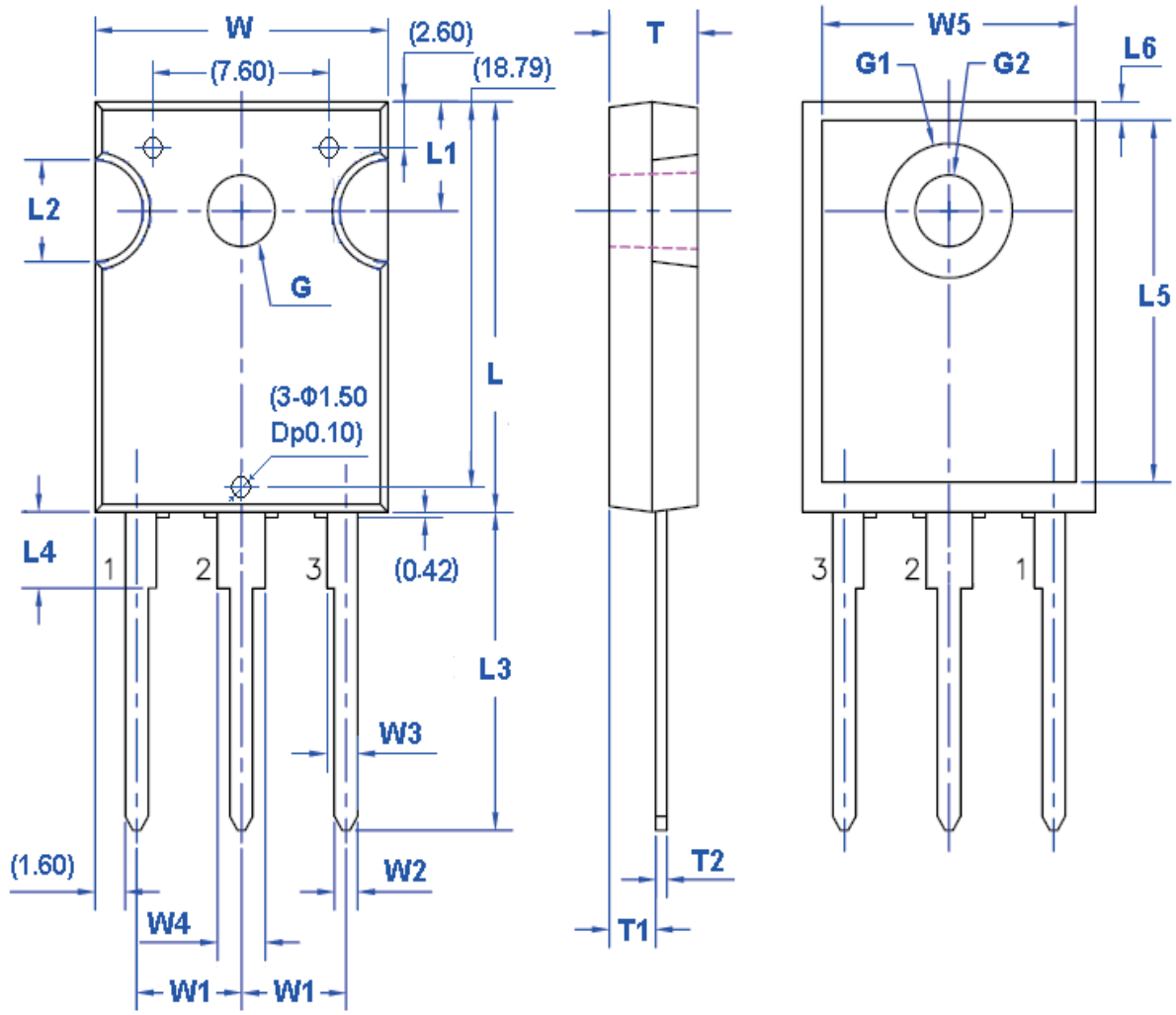
Normalized $V_{GS(th)}$ Characteristics



Maximum Safe Operating Area

Package Dimensions

TO-247 Package Outline Drawing



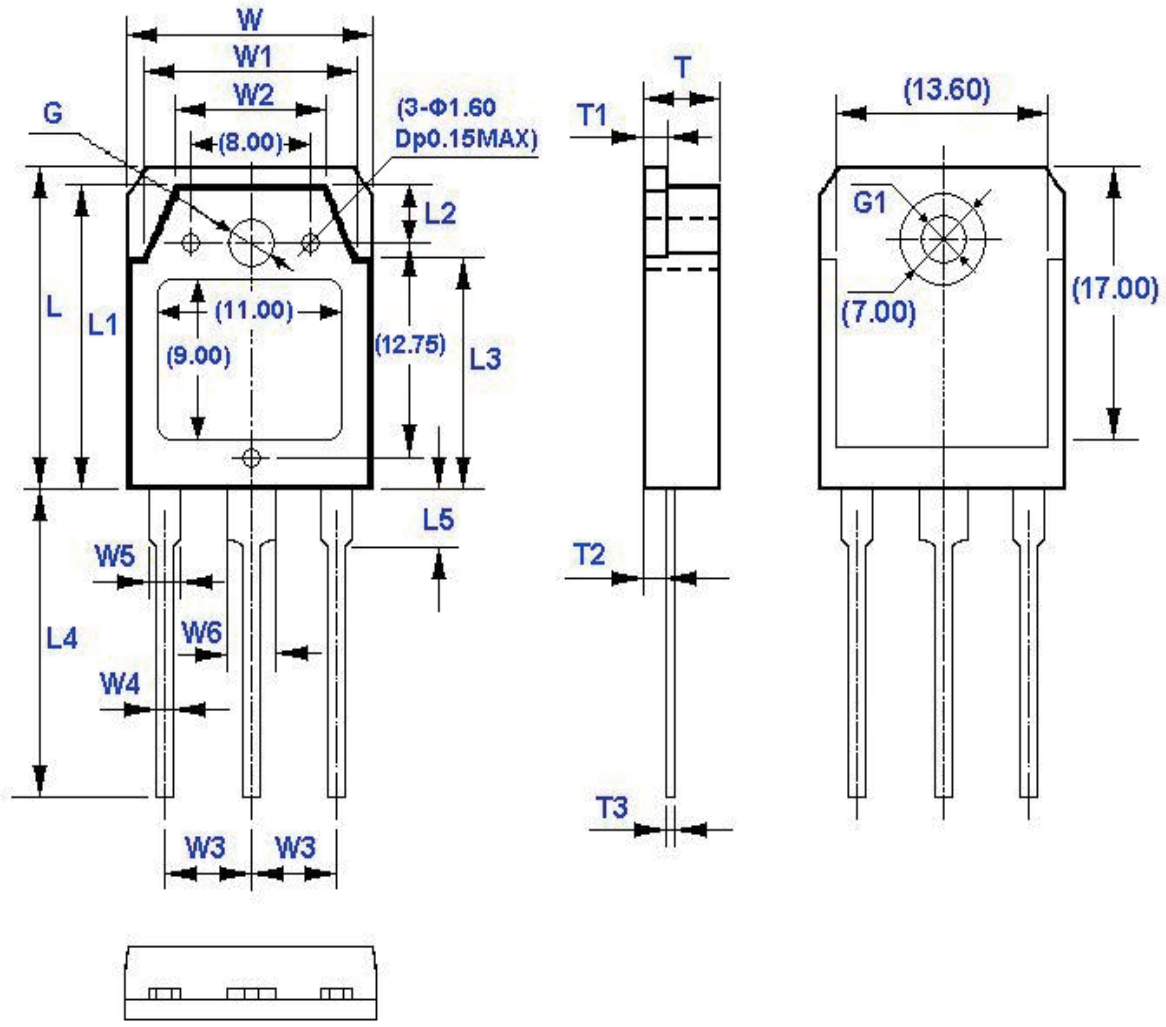
（Unit : mm）

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	15.37	15.87	W5	**12. 70**	**13. 00**	L4	3.69	3.93	T2	0.51	0.71
W1	5.56 (TYP)		L	20.32	20.82	L5	**16. 00**	**17. 00**	G(Φ)	3.51	3.65
W2	1.17	1.35	L1	5.34	5.58	L6	0.51	1.35	G1(Φ)	6.61	6.85
W3	1.53	1.77	L2	4.96	5.20	T	4.58	4.82	G2(Φ)	3.51	3.65
W4	2.42	2.66	L3	15.75	16.25	T1	2.29	2.66			

Note: The values in () are reference values. Size does not include burrs and mold flash

Package Dimensions

TO-3P Package Outline Drawing



(Unit : mm)

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	15.40	15.80	W5	1.80	2.20	L3	13.70	14.10	T2	1.20	1.60
W1	13.40	13.80	W6	2.80	3.20	L4	19.70	20.30	T3	0.55	0.75
W2	9.40	9.80	L	19.70	20.10	L5	3.30	3.70	G (Φ) (front)	3.30	3.50
W3	5.45 (TYP)		L1	18.50	18.90	T	4.60	5.00	G1(Φ) (back)	3.10	3.30
W4	0.80	1.20	L2	3.60	4.00	T1	1.45	1.65			

Note: The values in () are reference values. Size does not include burrs and mold flash