

General Description

The series of devices use advanced super junction technology and design to provide excellent $R_{DS(ON)}$ 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 Compliant

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current	20	A
$I_D@T_C=100^\circ\text{C}$	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
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	250	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	150	$^\circ\text{C}$

Thermal Data

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

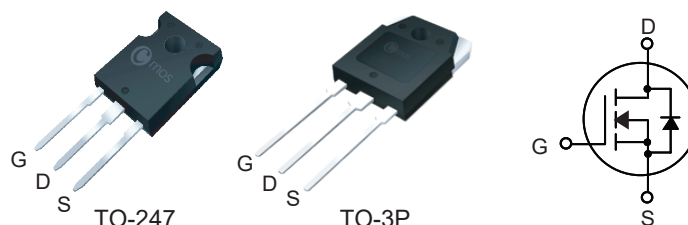
Product Summary

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

Applications

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

TO-247/3P Pin Configuration



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

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	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	$V_{GS}=V_{DS}$, $I_D=250\mu A$	2	---	4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V$, $V_{GS}=0V$	---	---	1	μA
		$V_{DS}=650V$, $V_{GS}=0V$, $T_C=125^{\circ}\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	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	$V_{DS}=300V$ $I_D=20A$ $R_G=25\Omega$ $V_{GS}=10V$ (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	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	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	$V_{GS}=0V$, $I_F=20A$, $T_J=25^{\circ}\text{C}$	---	0.89	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V$, $V_{DS}=100V$, $I_S=20A$, $di/dt=100A/\mu s$	---	347	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.3	---	μC

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. $I_{SD}\leq I_D$, $di/dt\leq 200A/\mu s$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$.
4. Essentially Independent of Operating Temperature Typical Characteristics

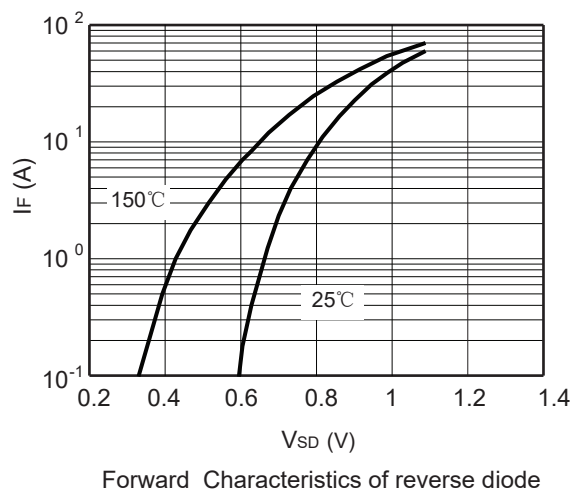
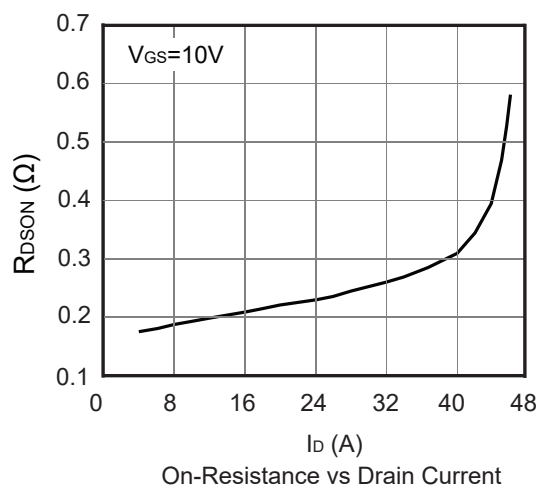
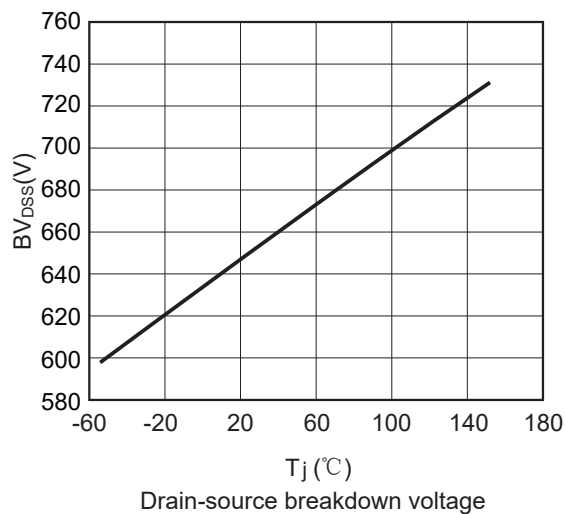
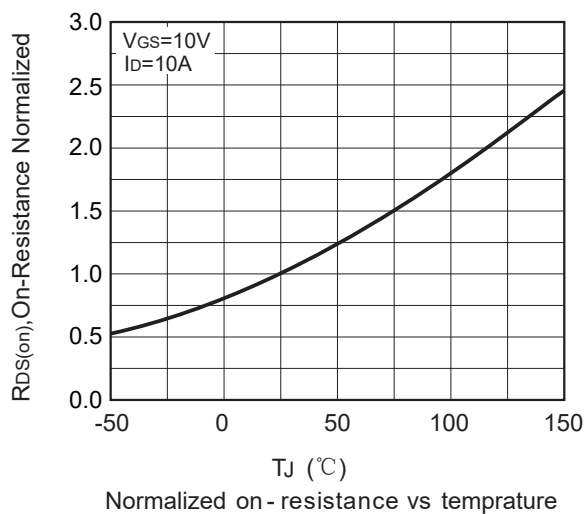
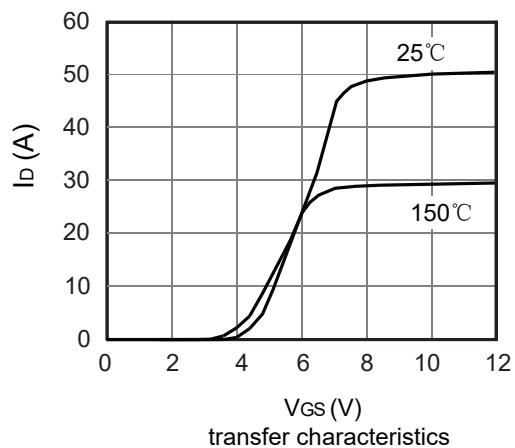
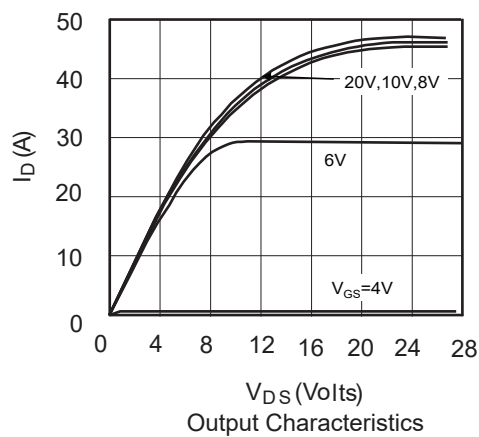
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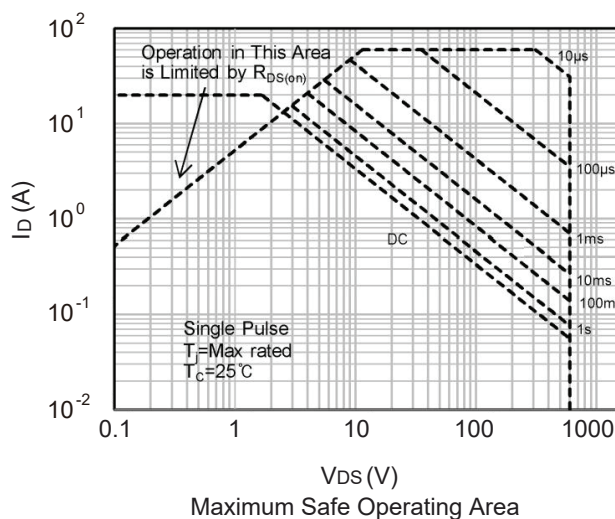
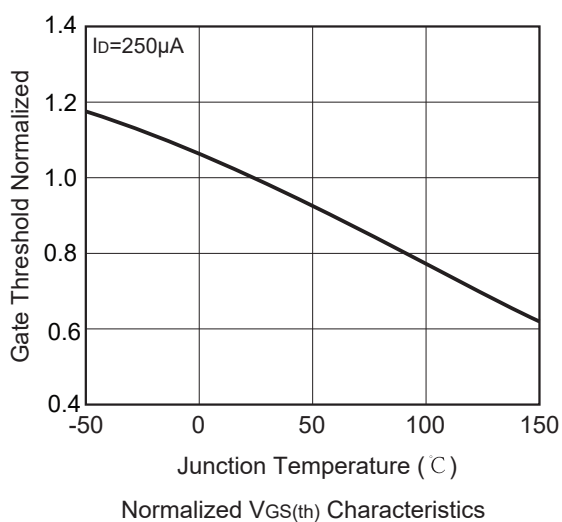
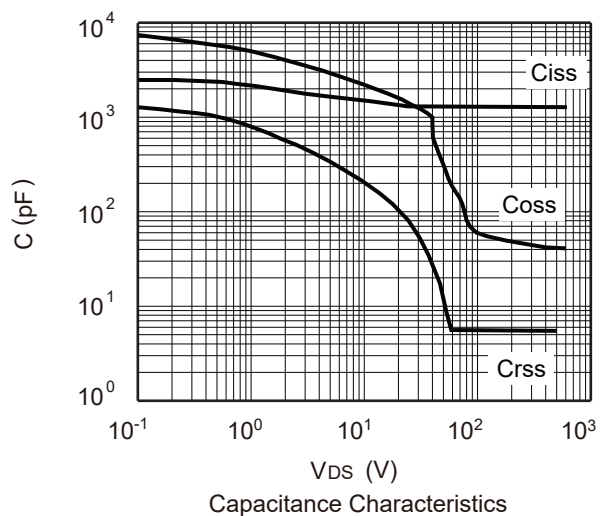
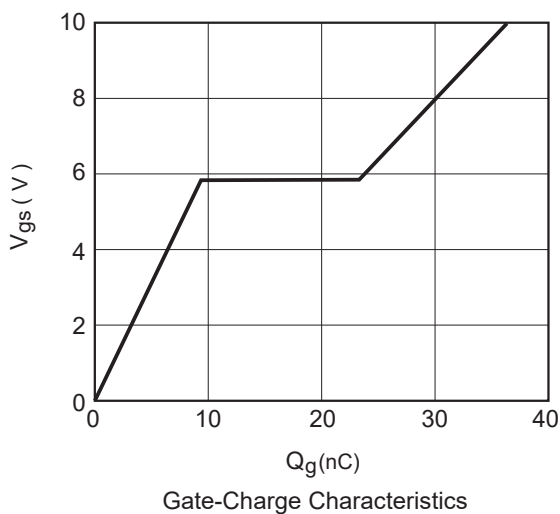
Typical Characteristics

N-Channel Super Junction Power MOSFET



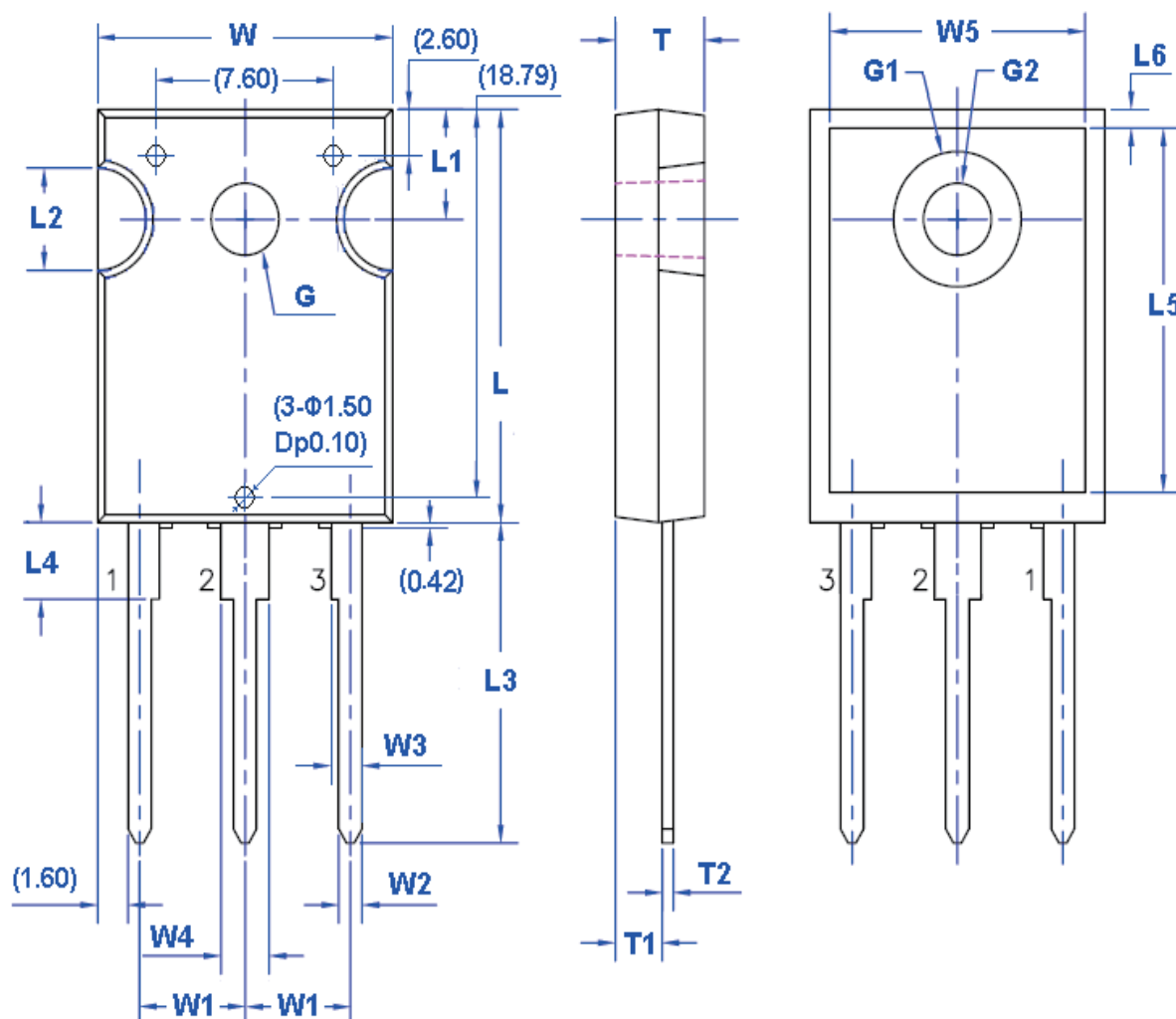
Typical Characteristics

N-Channel Super Junction Power MOSFET



Package Dimensions

TO-247 Package Outline Drawing



(Unit : mm)

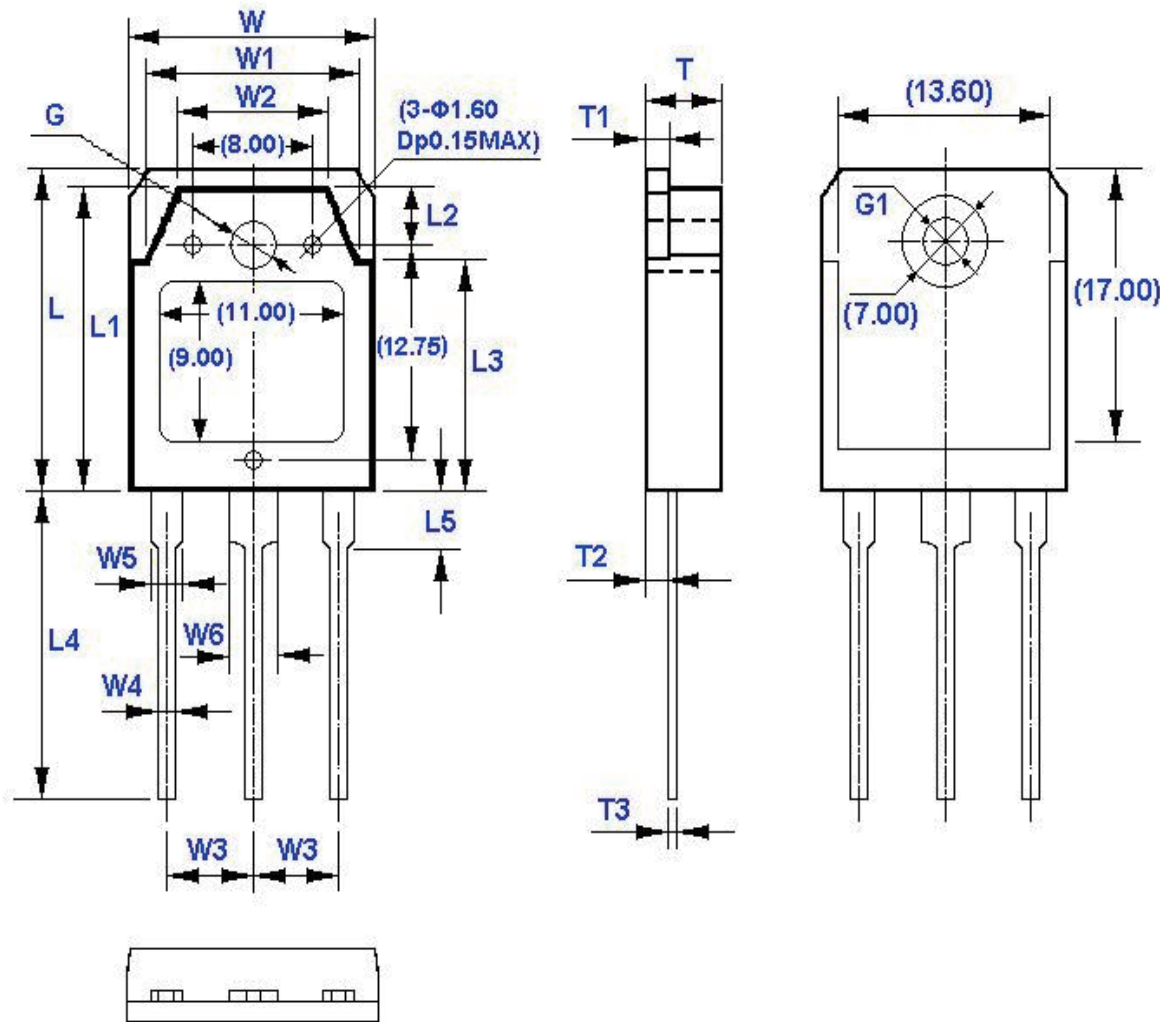
Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	15.37	15.87	W5	12.70	13.00	L4	3.69	3.93	T2	0.51	0.71
W1	5.56 (TYP)		L	20.32	20.82	L5	16.00	17.00	G(Φ)	3.51	3.65
W2	1.17	1.35	L1	5.34	5.58	L6	0.51	1.35	G1(Φ)	6.61	6.85
W3	1.53	1.77	L2	4.96	5.20	T	4.58	4.82	G2(Φ)	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

N-Channel Super Junction Power MOSFET

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