CMH60R190Q/CMA60R190Q

N-Channel Super Junction Power MOSFET

General Description

The 60R190Q 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
600V	0.199Ω	20A

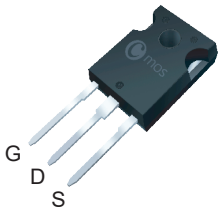
Applications

- Charger
- Adaptor
- Power Supply

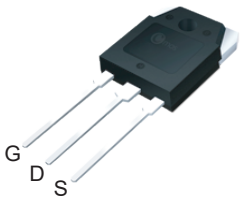
Features

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

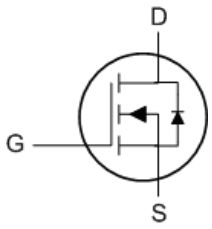
TO-3P/TO-247 Pin Configuration



TO-247
CMH60R190Q



TO-3P
CMA60R190Q



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	600	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)	633	mJ
P_D@T_C=25℃	Total Power Dissipation	250	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Note 3,4)	---	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	600	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=9.5A	---	---	0.199	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}=600V , V_{GS}=0V	---	---	1	uA
		V_{DS}=600V , T_C=150℃	---	10	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±30V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=15V, I_D =10A	---	15	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	8.4	---	Ω
Q_g	Total Gate Charge	I_D=20A V_{DS}=480V V_{GS}=10V	---	36	---	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=300V V_{GS}=10V I_D=20A R_G=25Ω	---	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		---	75	---	
C_{rss}	Reverse Transfer Capacitance		---	6.5	---	

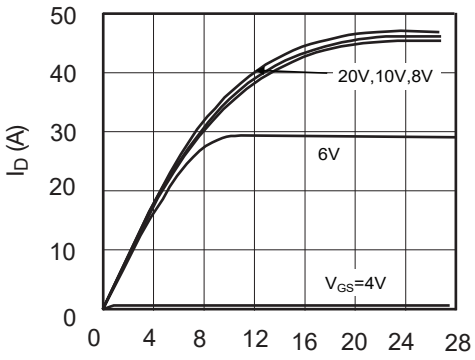
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	80	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=20A ,T_J=25℃	---	0.90	1.4	V
t_{rr}	Reverse Recovery Time	di/dt = 100A/μs V_{DD}=100V , I_{SD}=20A	---	347	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.3	---	μC

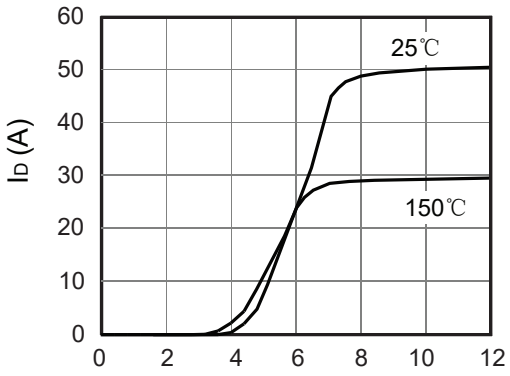
Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. L=30mH , I_{AS}=6.5A , V_D=100V , Starting T_J=25℃.
3. The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A=25℃.
4. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

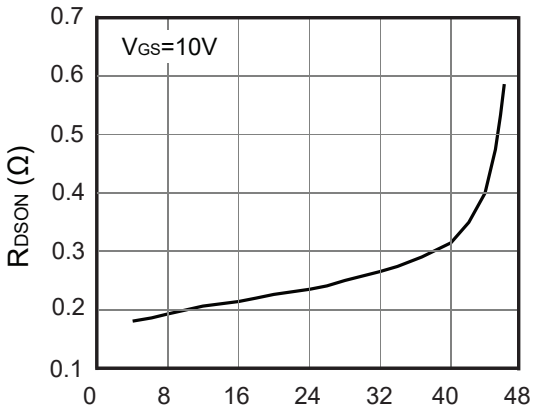
Typical Characteristics



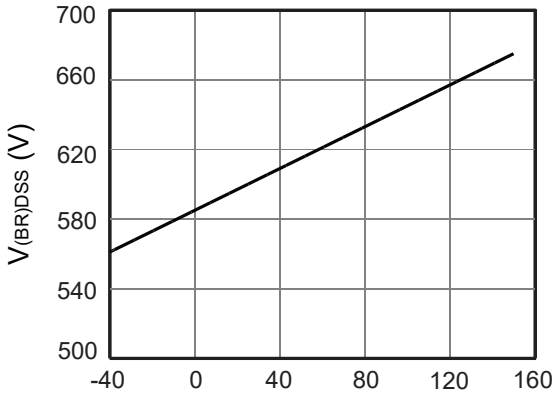
Output Characteristics



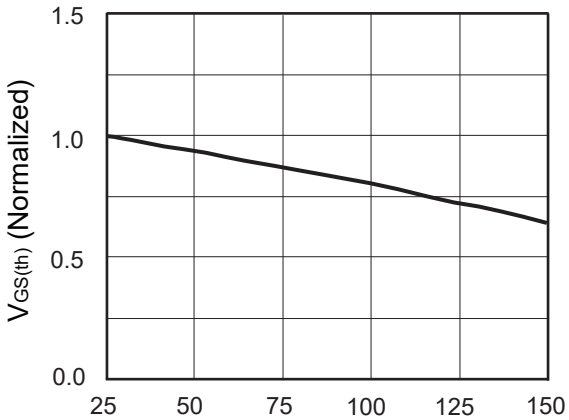
transfer characteristics



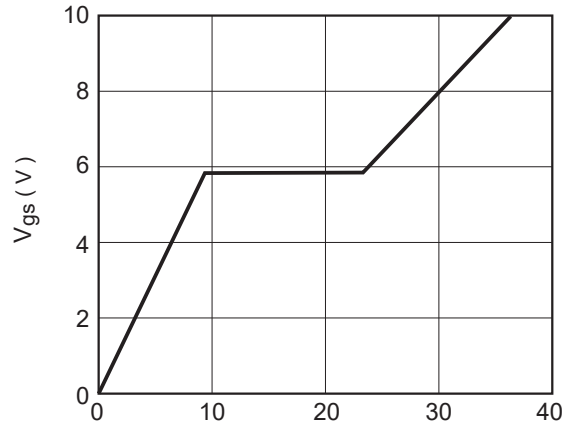
On-Resistance vs Drain Current



$V_{(BR)DSS}$ vs temperature

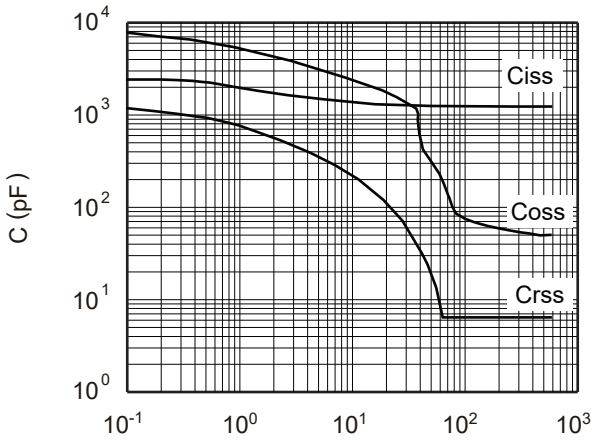


gate threshold voltage vs temperature

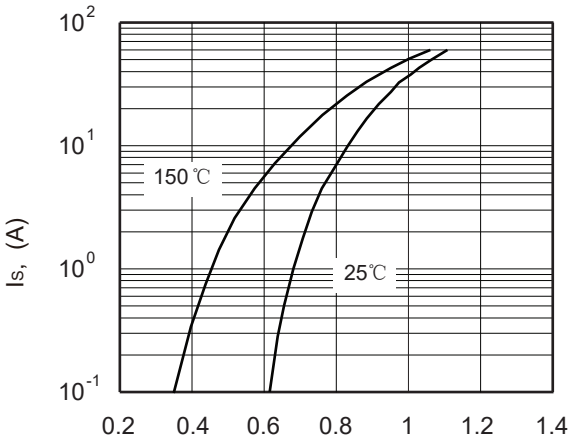


Gate-Charge Characteristics

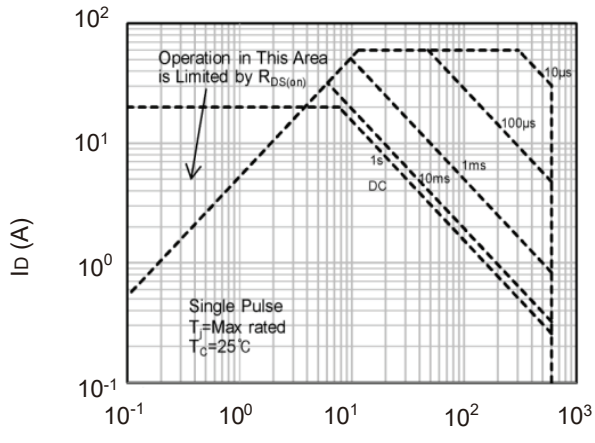
Typical Characteristics



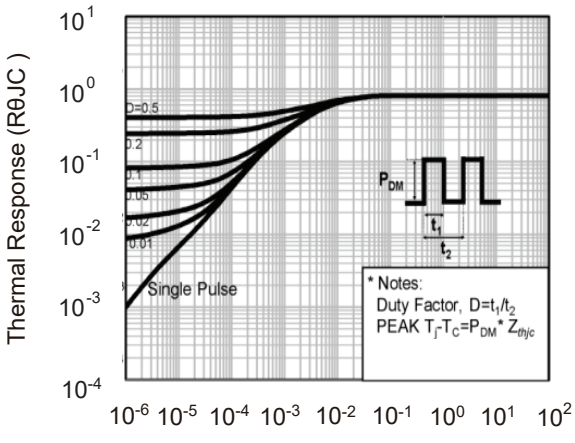
Capacitance Characteristics



Body-Diode Characteristics



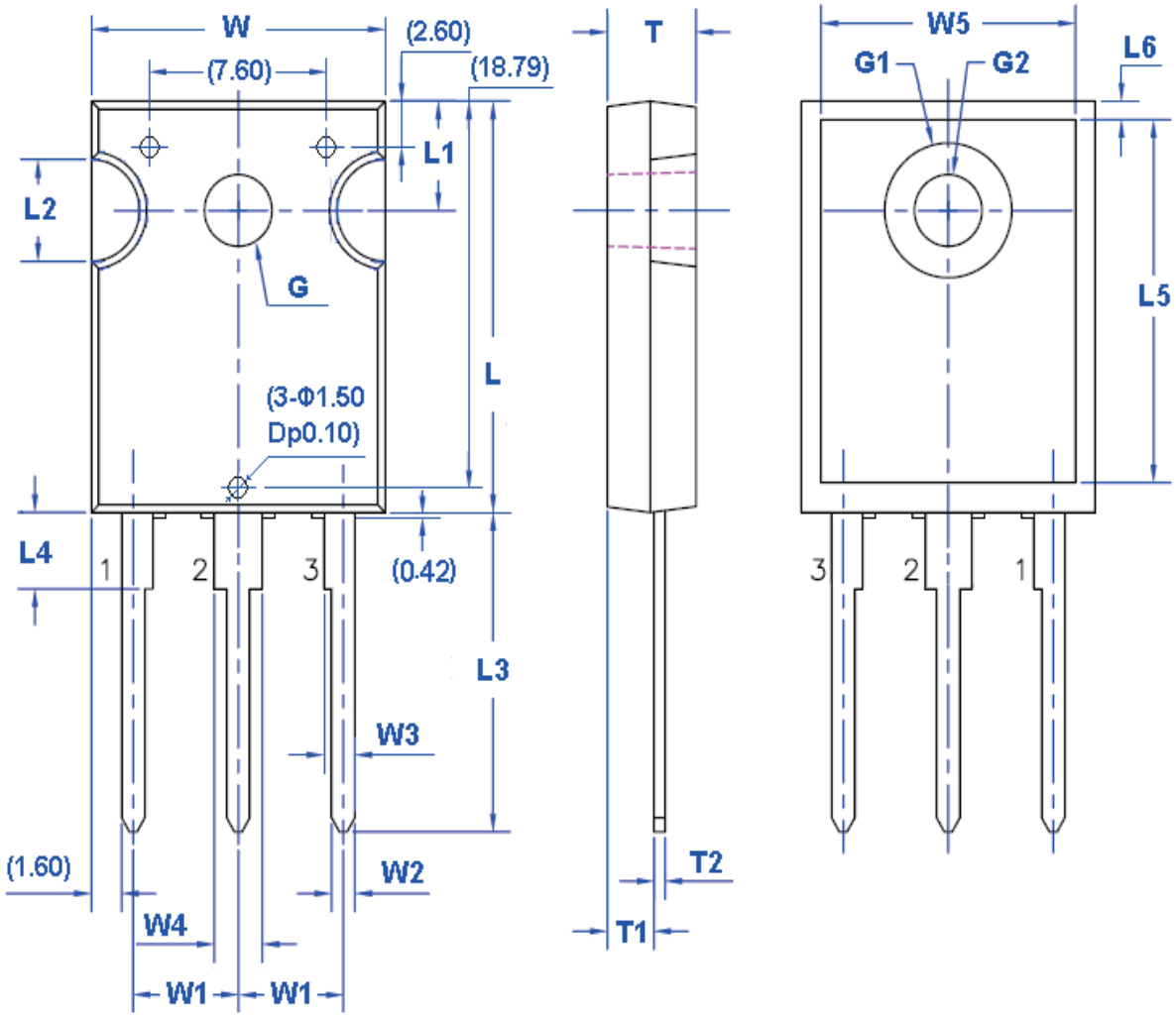
Safe operating area



transient thermal response curve

Package Dimensions

TO-247 Package Outline Drawing



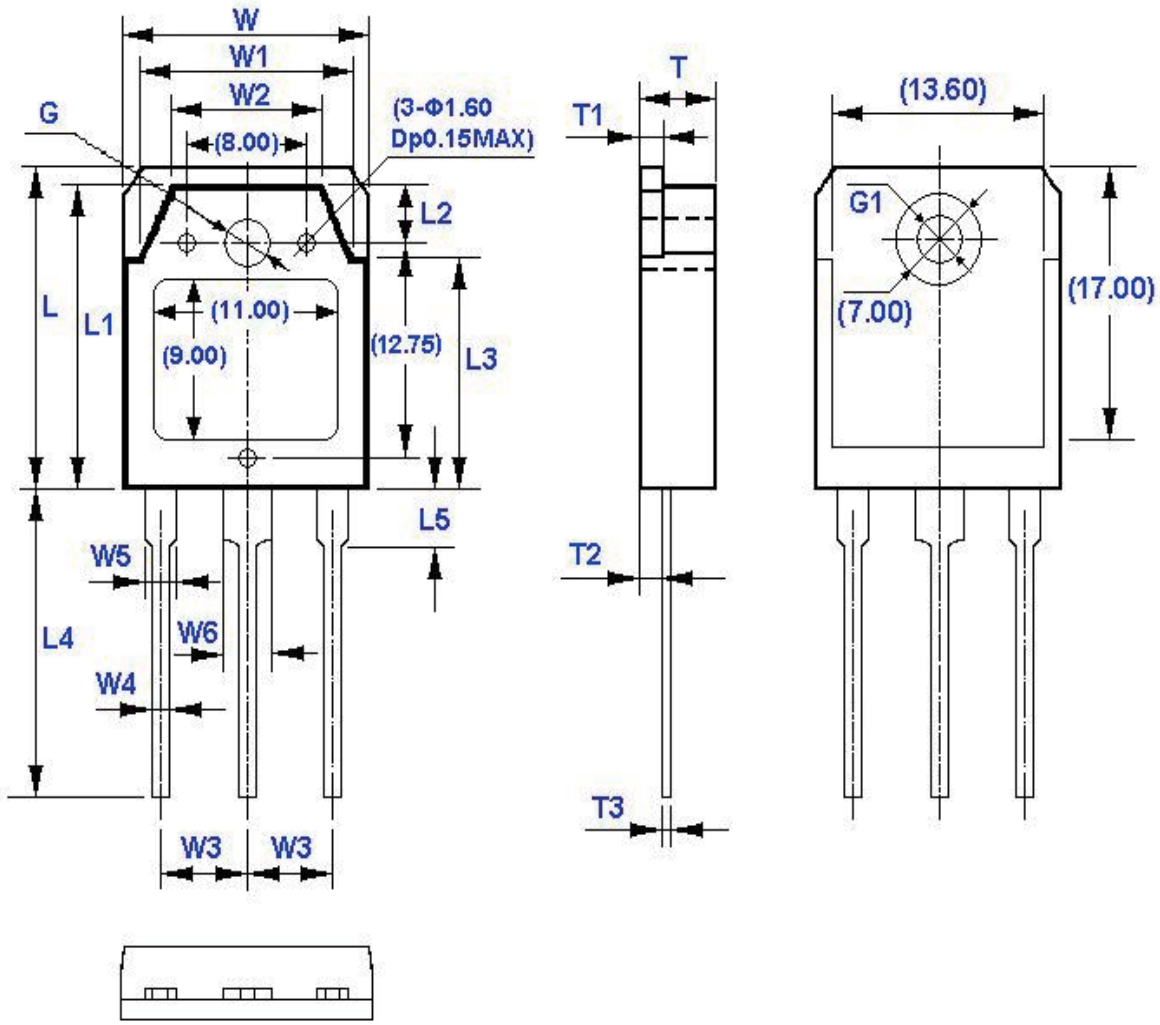
（Unit : mm）

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