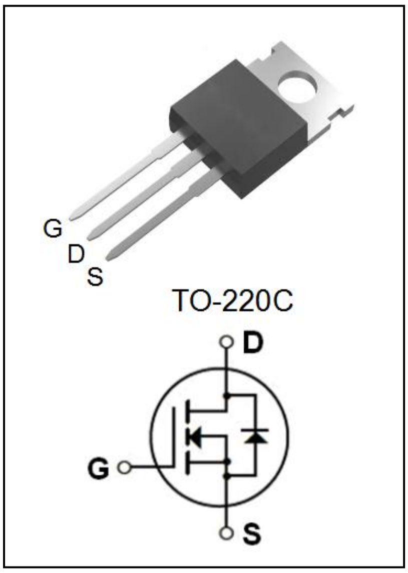
HCT65R190-S2

650V N-Channel Super Junction Power MOSFET



● Features:

- 20.0A, 650V, $R_{DS(on)(Typ)}$ =180mΩ@V_{GS}=10V
- Low Gate Charge
- Low C_{rss}
- 100% Avalanche Tested
- Fast Switching
- Improved dv/dt Capability

● Application:

- High Frequency Switching Mode Power Supply
- Active Power Factor Correction

Absolute Maximum Ratings(Tc=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
I_D	Drain Current - Continuous(Tc=25°C)	20.0*	A
	- Continuous(Tc=100°C)	12.6*	A
I_{DM}	Drain Current -Pulsed (Note1)	80*	A
V_{GSS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy （Limit Reference Value） (Note2)	176	mJ
I_{AR}	Avalanche Current (Note1)	4.0	A
E_{AR}	Repetitive Avalanche Energy (Note1)	4.1	mJ
dv/dt	Peak Diode Recovery dv/dt (Note3)	8.5	V/ns
P_D	Power Dissipation(T_C =25°C)	185	W
	-Derate above 25°C	1.48	W/°C
Tj	Operating Junction Temperature	150	°C
Tstg	Storage Temperature Range	-55 to+150	°C

* Drain Current Limited by Maximum Junction Temperature.

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{θJC}$	Thermal Resistance,Junction to Case	0.68	°C /W
$R_{θJA}$	Thermal Resistance,Junction to Ambient	62.5	°C /W

Electrical Characteristics(Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditons	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-source Breakdown Voltage	V_{GS}=0V ,I_D=250μA	650	--	--	V
$\triangle BV_{DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	I_D=250μA (Referenced to 25°C)	--	0.64	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V,V_{GS}=0V	--	--	1	μA
		V_{DS}=520V,Tc=125°C	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current,Forward	V_{GS}=+30V, V_{DS}=0V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current,Reverse	V_{GS}=-30V, V_{DS}=0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS}=10 V, I_D=10A	--	180	210	mΩ
g_{FS}	Forward Transconductance	V_{DS}=20 V, I_D=10A (Note4)	--	10.6	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=100V,V_{GS}=0V, f=1.0MHz	--	1150	--	pF
C_{oss}	Output Capacitance		--	51	--	pF
C_{rss}	Reverse Transfer Capacitance		--	1.1	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 325 V, I_D = 20 A, R_G = 25 Ω (Note4,5)	--	22	--	ns
t_r	Turn-On Rise Time		--	54	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	82	--	ns
t_f	Turn-Off Fall Time		--	42	--	ns
Q_g	Total Gate Charge	V_{DS} = 520 V, I_D =20 A, V_{GS} = 10 V (Note4,5)	--	31	--	nC
Q_{gs}	Gate-Source Charge		--	9.2	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	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		--	--	80	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} =0V,I_S=20.0A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} =0V, I_S=20A, d I_F /dt=100A/μs (Note4)	--	294	--	ns
Q_{rr}	Reverse Recovery Charge		--	4.3	--	μC

Notes:

1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.

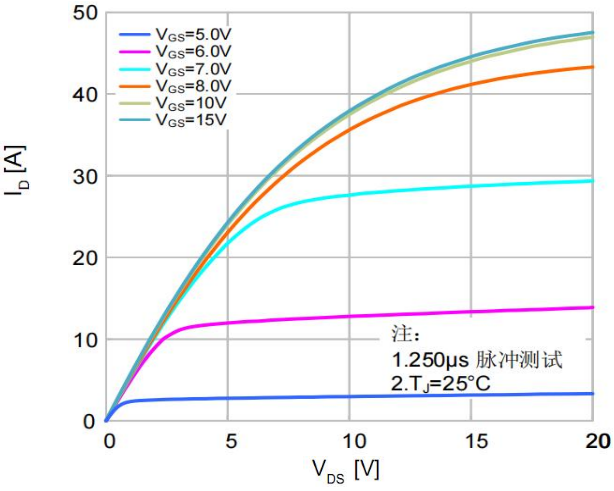
2、L = 20mH, I_{AS} =4.0A, V_{DD} = 100V, R_G = 25 Ω, Starting T_J = 25°C.

3、I_{SD}≤20.0A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_J = 25°C.

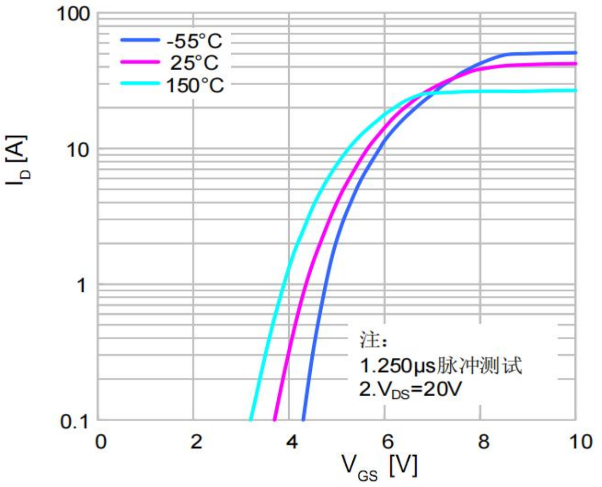
4、Pulse Test : Pulse Width ≤300 μ s, Duty Cycle≤2%.

5、Essentially Independent of Operating Temperature.

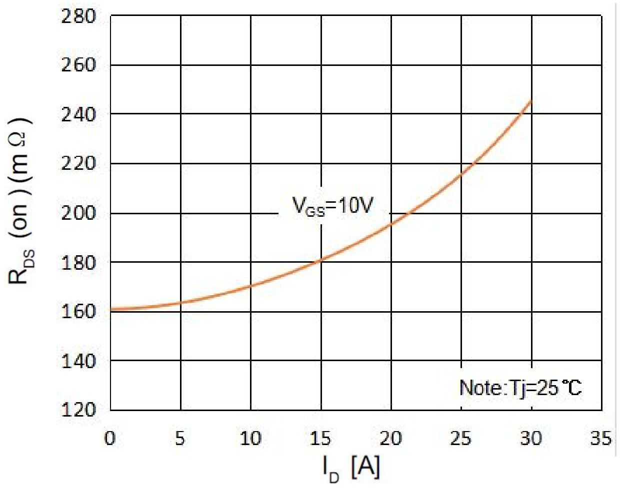
On-Regin Characteristics



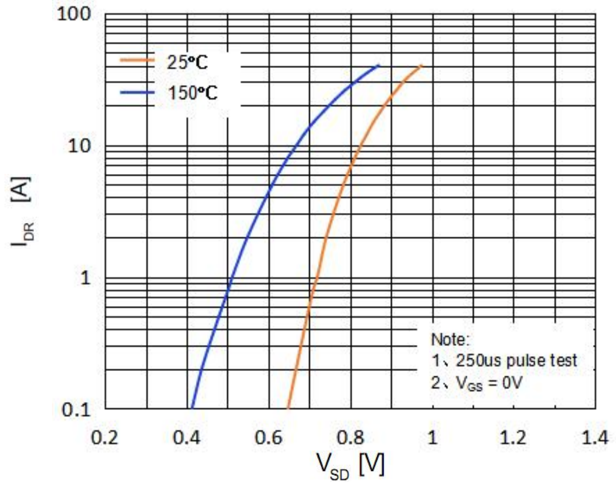
Transfer Characteristics



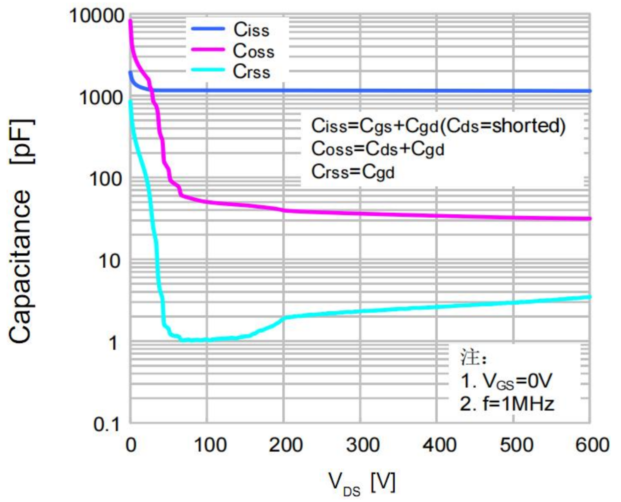
On-Resistance Variation vs. Drain Current and Gate Voltage



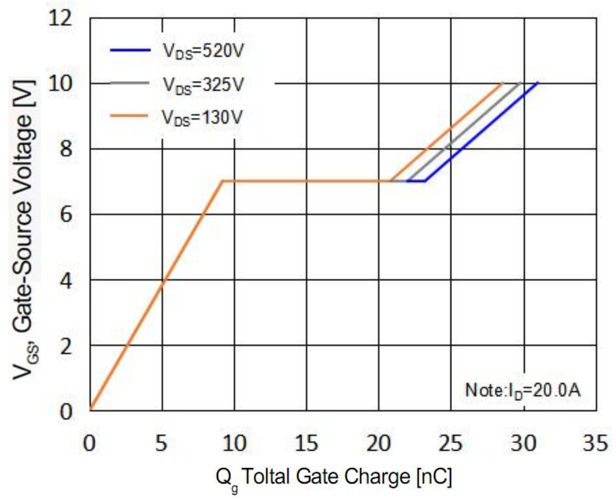
Body Diode Forward Voltage Variation vs. Source Current and Temperature



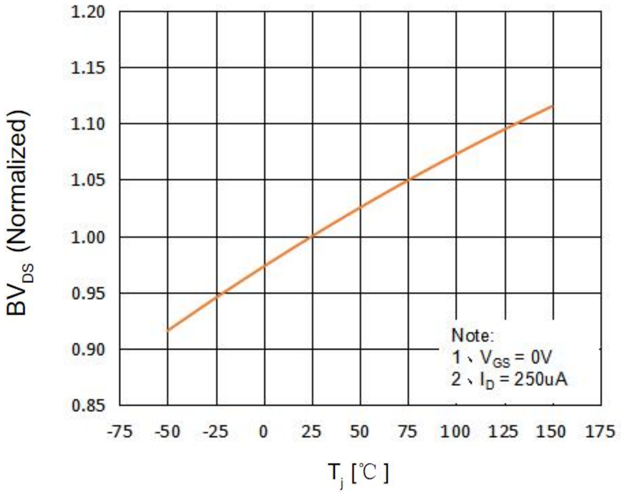
Capacitance Characteristics



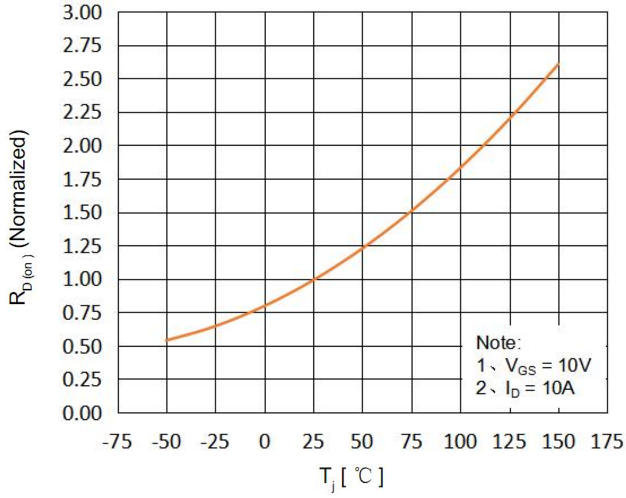
Gate Charge Characteristics



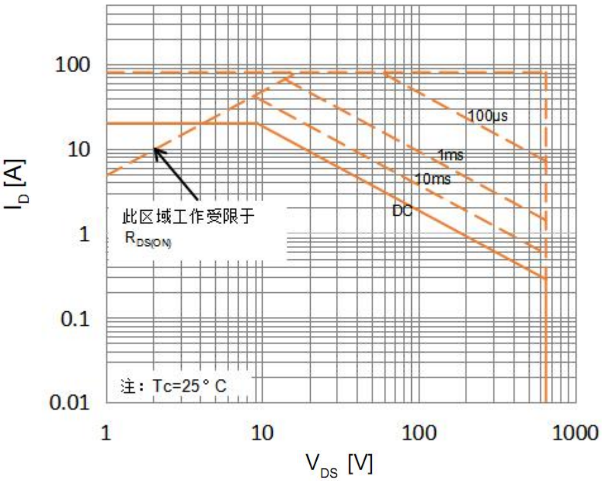
Breakdown Voltage Variation vs. Temperature



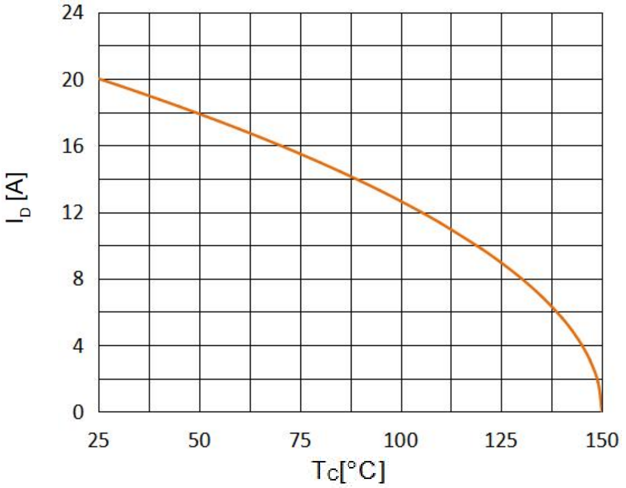
On-Resistance Variation vs. Temperature



Maximum Safe Operating Area



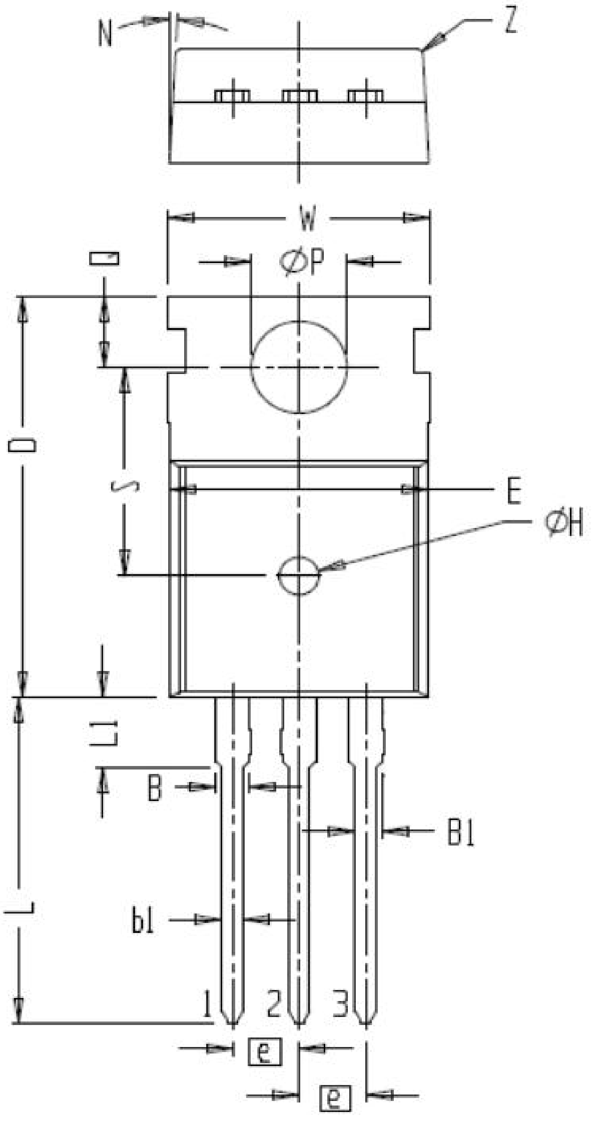
Maximum Drain Current Vs. Case Temperature

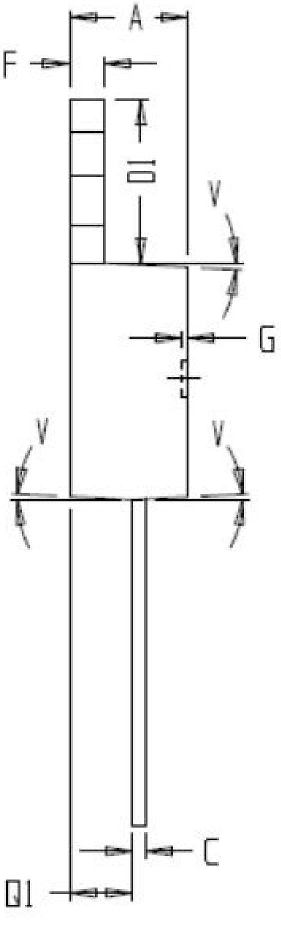


TO-220C Package Dimensions

UNIT：mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.00	4.40	4.80	E	9.40	9.90	10.40
B	1.17	1.32	1.47	e		2.54	
B1	0.91	1.06	1.21	F	1.15	1.30	1.45
b1	0.65	0.80	0.95	L	12.00	13.00	14.00
c	0.40	0.50	0.60	L1	2.50	3.00	3.50
D	14.90	15.90	16.90	Q	2.30	2.80	3.30
D1	6.10	6.60	7.10	Q1	1.90	2.40	2.90
W	9.50	10.00	10.50	ϕP	3.40	3.65	3.90
S		8.30		Z	0		0.20
ϕH		1.50		N		3 °	
G		0.10		V		3 °	





注意事项：

1、在电路设计时请不要超过器件的最大额定值，否则会影响整机的可靠性。

2、MOSFET产品为静电敏感型器件，使用时应注意采取防静电保护措施，如佩戴防静电手环、设备接地等。

3、如需安装散热片，请注意控制扭力大小及散热片的平整度。

4、该规格书由华科公司制作，并可能不定期更改，恕不另行通知。

5、如有疑问，请及时联系我司销售代表。

版本履历表：

序号	版本号	修改时间	修改记录
1	V1.0	2023-3-28	首次发行