



# HST502

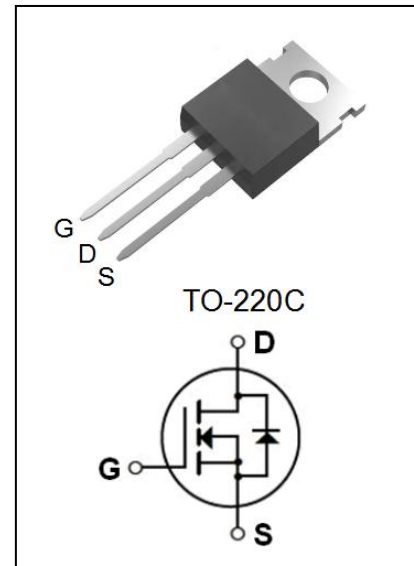
## 100V N-Channel MOSFET

### ● Features:

- 120A, 100V,  $R_{DS(on)(Typ)} = 4.9m\Omega @ V_{GS}=10V$
- 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 ( $T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-Source Voltage	100	V
$I_D$	Drain Current - Continuous ( $T_c=25^\circ C$ , Silicon limit)	138	A
	Drain Current - Continuous ( $T_c=25^\circ C$ , Package limit)	120	A
	Drain Current - Continuous ( $T_c=100^\circ C$ , Silicon limit)	87	A
$I_{DM}$	Drain Current - Pulsed	480	A
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Limit Reference Value) (Note5)	231	mJ
$P_D$	Power Dissipation ( $T_c = 25^\circ C$ ) -Derate above $25^\circ C$	172	W
		1.38	W/ $^\circ C$
$T_j$	Operating Junction Temperature	150	$^\circ C$
$T_{stg}$	Storage Temperature Range	-55 to +150	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note2)	0.73	$^\circ C / W$



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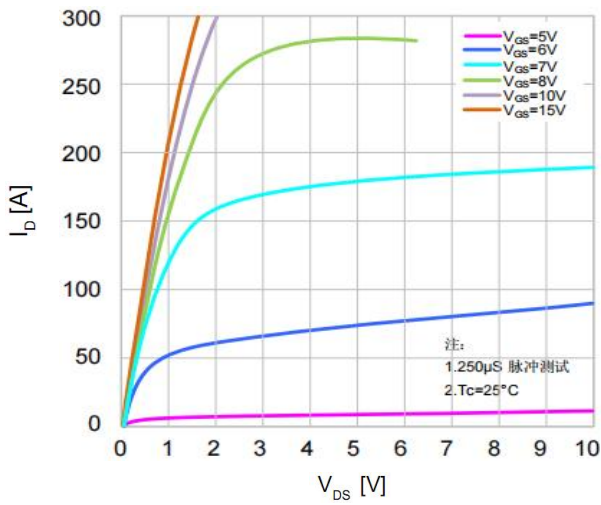
### Electrical Characteristics(Tc=25°C unless otherwise noted)

Symbol	Parameter	Test Conditons	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-source Breakdown Voltage	V <sub>GS</sub> =0V ,I <sub>D</sub> =250μA	100	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V,V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSSF</sub>	Gate-Body Leakage Current,Forward	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V	--	--	100	nA
I <sub>GSSR</sub>	Gate-Body Leakage Current,Reverse	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	--	--	-100	nA
<b>On Characteristics (Note3)</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10 V, I <sub>D</sub> =50A	--	4.9	5.4	mΩ
<b>Dynamic Characteristics (Note4)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =40V,V <sub>GS</sub> =0V, f=1.0MHz	--	3810	--	pF
C <sub>oss</sub>	Output Capacitance		--	649	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	25.7	--	pF
<b>Switching Characteristics (Note4)</b>						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 40 V, I <sub>D</sub> =13.3 A, R <sub>G</sub> =24 Ω, V <sub>GS</sub> =10V	--	48	--	ns
t <sub>r</sub>	Turn-On Rise Time		--	74	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	155	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	86	--	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 80 V, I <sub>D</sub> =50A, V <sub>GS</sub> = 10 V	--	64	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	23	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	17	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current (Note2)		--	--	120	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current		--	--	480	A
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V,I <sub>S</sub> =50A (Note3)	--	--	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =20A, d I <sub>F</sub> /dt=100A/μs (Note3)	--	65	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	148	--	nC

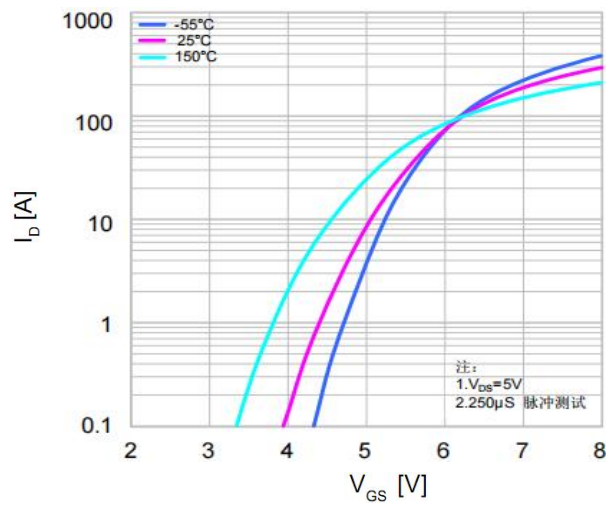
#### Notes:

- 1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
- 2、Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3、Pulse Test : Pulse Width ≤300 μ s, Duty Cycle≤2%.
- 4、Guaranteed by design, not subject to production.
- 5、EAS condition: L = 0.5mH, I<sub>AS</sub> =23A, V<sub>DD</sub> = 50V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C.

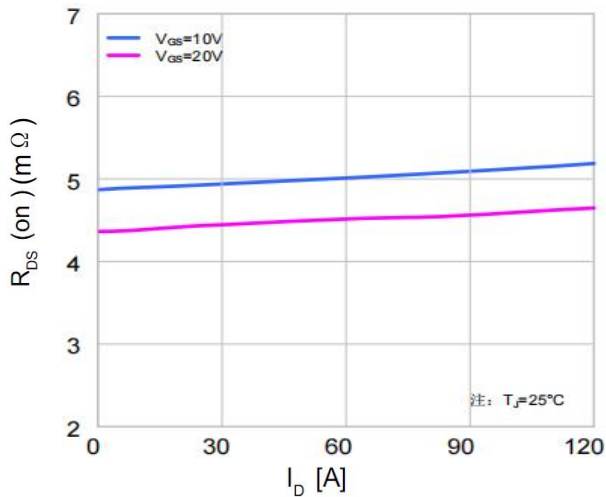
### On-Regin Characteristics



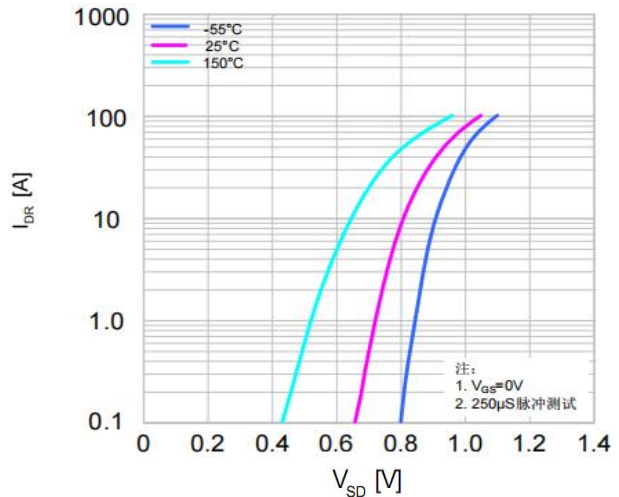
### Transfer Characteristics



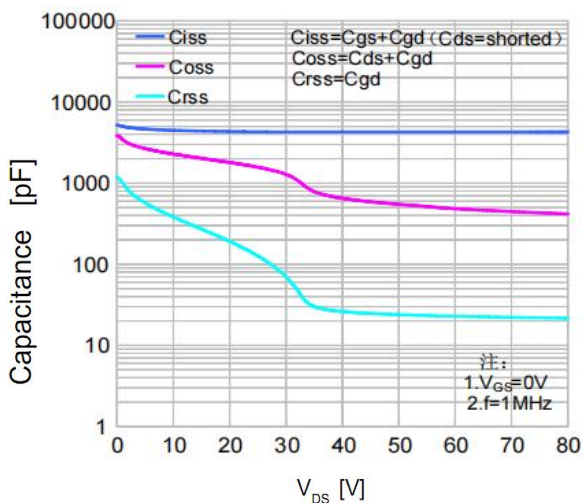
### On-Resistance Variation vs. Drain Current and Gate Voltage



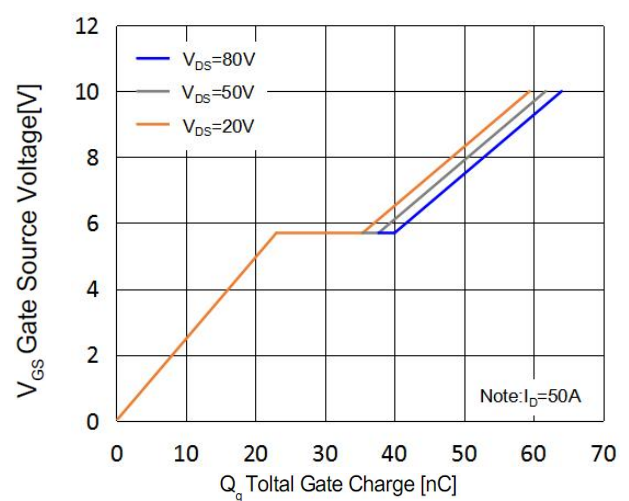
### Body Diode Forward Voltage Variation vs. Source Current and Temperature



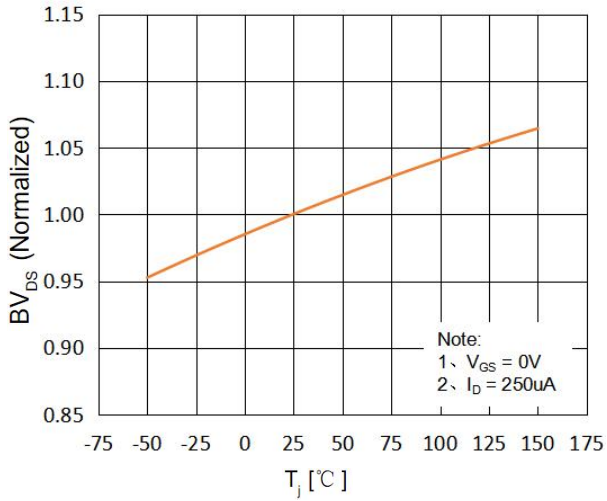
### Capacitance Characteristics



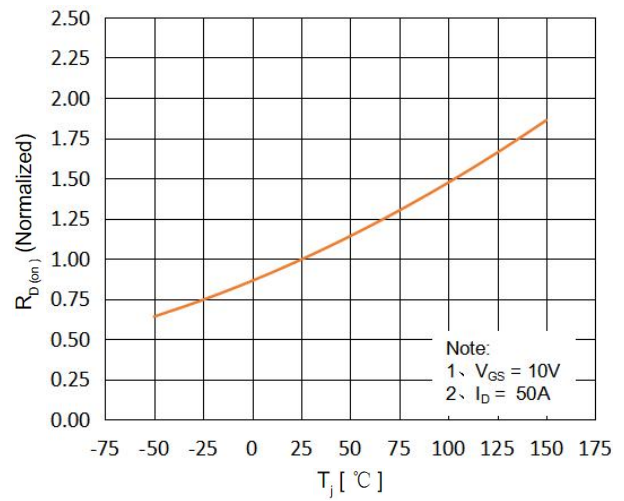
### Gate Charge Characteristics



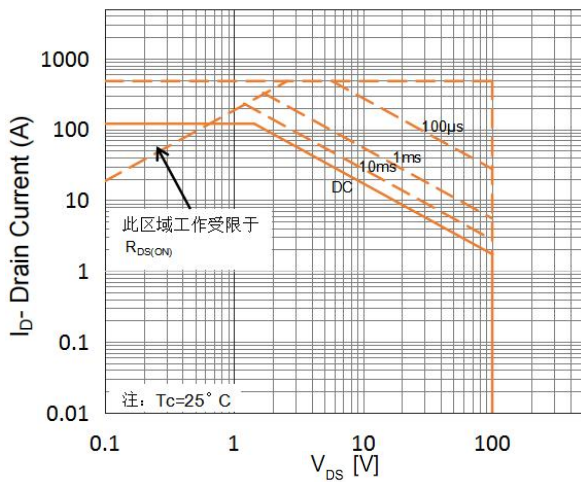
### Breakdown Voltage Variation vs. Temperature



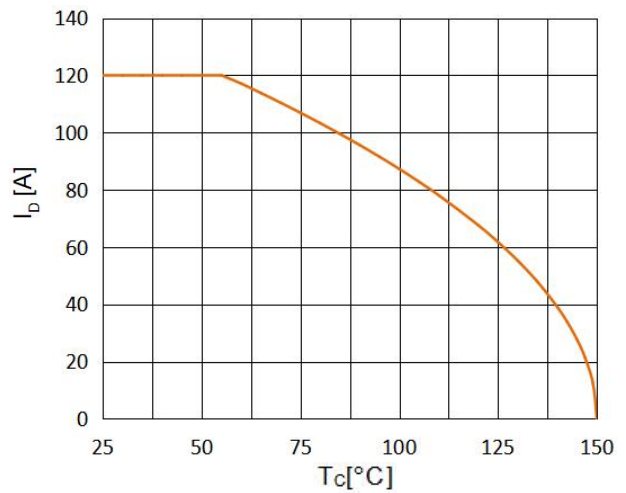
### On-Resistance Variation vs. Temperature



### Maximum Safe Operating Area



### Maximum Drain Current Vs. Case Temperature





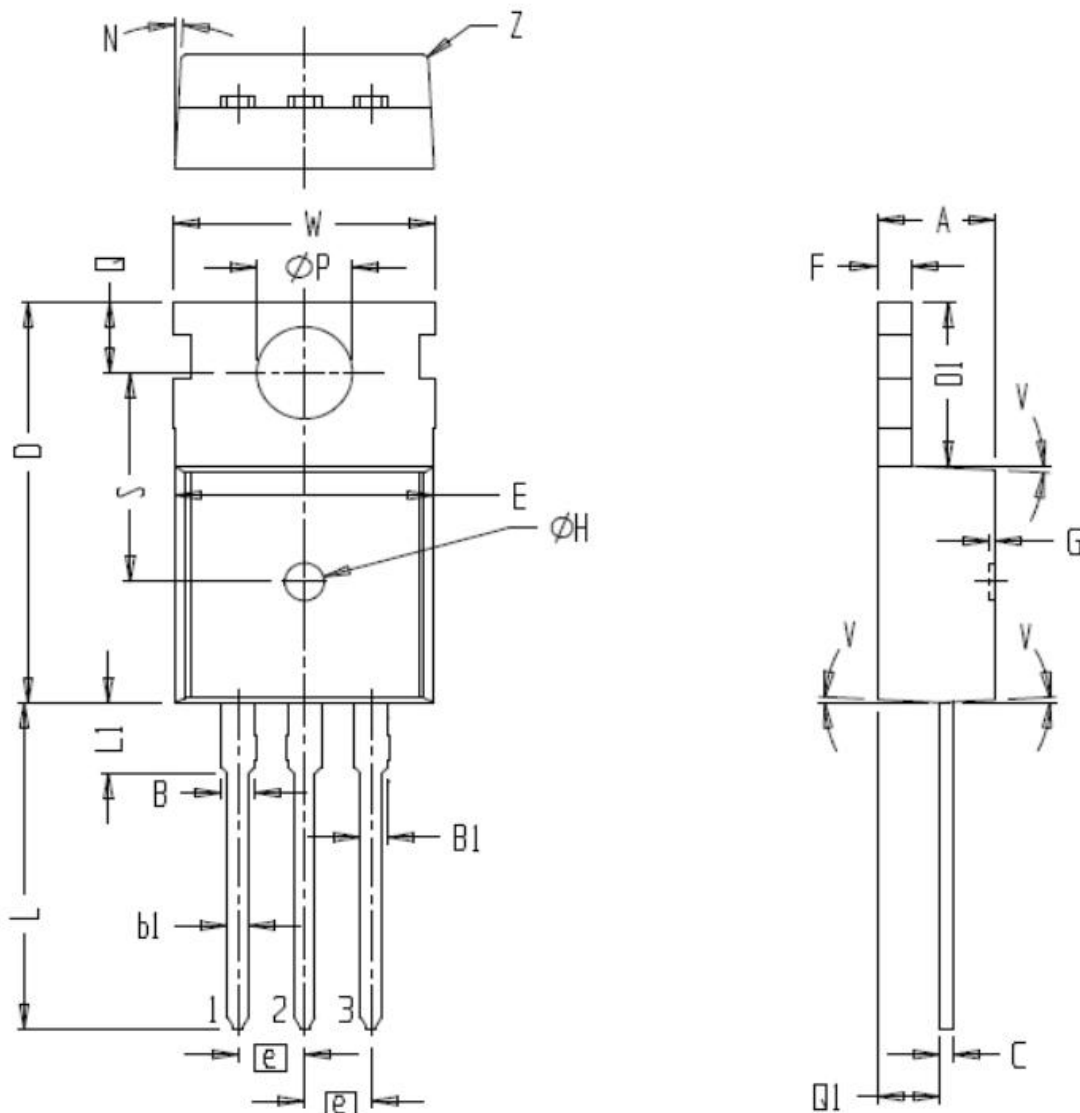
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## TO-220C Package Dimensions

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	$\phi P$	3.40	3.65	3.90
S		8.30		Z	0		0.20
$\phi H$		1.50		N		3 °	
G		0.10		V		3 °	





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#### 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	2022-12-9	首次发行