

## 80V N-Channel SGT Power MOSFET

### FEATURES

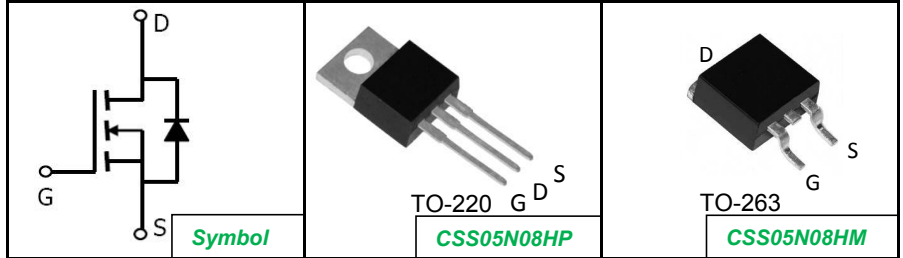
- High Speed Power Switching
- 100% avalanche tested
- Improved dv/dt capability
- Uses advanced SGT technology

### APPLICATIONS

- Motor control and drives
- Battery management
- DC/DC converter

### Parameters Summary

**VDS:80V** **ID** (at VGS=10V) :**120A** **Rds(on)** (at VGS=10V):**4.8mΩ(Typ.)**



### Device Ordering Marking Packing Information

Ordering Number	Package	Marking	Packing
CSS05N08HP	TO-220	CSS05N08HP	Tube
CSS05N08HM	TO-263	CSS05N08HM	Reel



### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	80	V
Continuous Drain Current	$I_D$	120	A
Pulsed Drain Current (note1)	$I_{DM}$	480	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	580	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	220	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

### Thermal Resistance

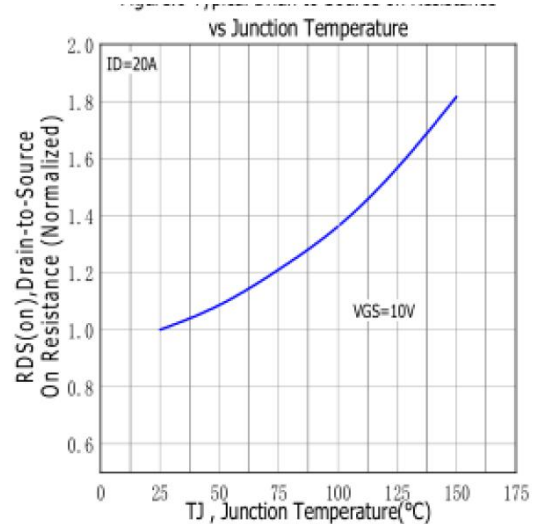
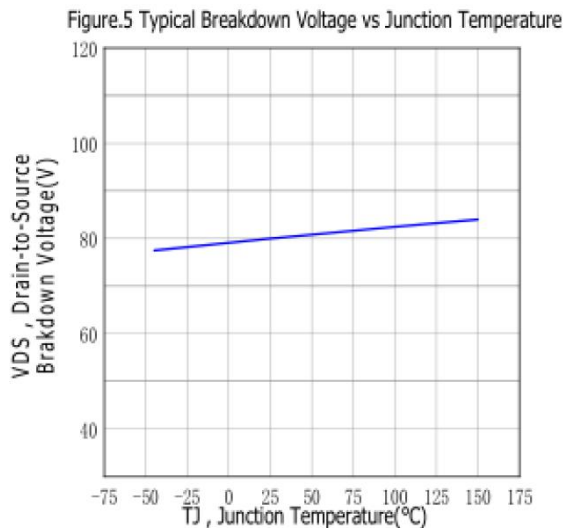
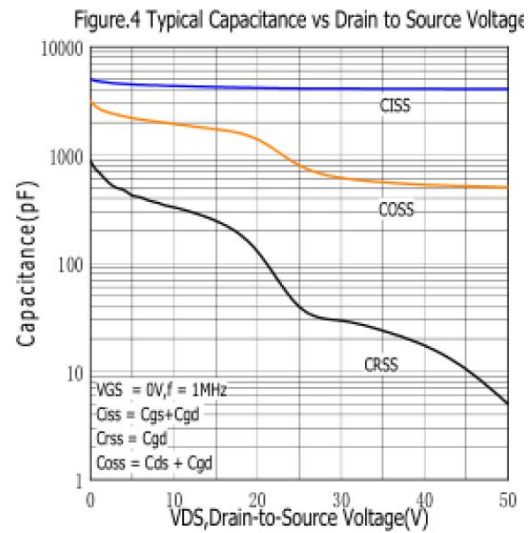
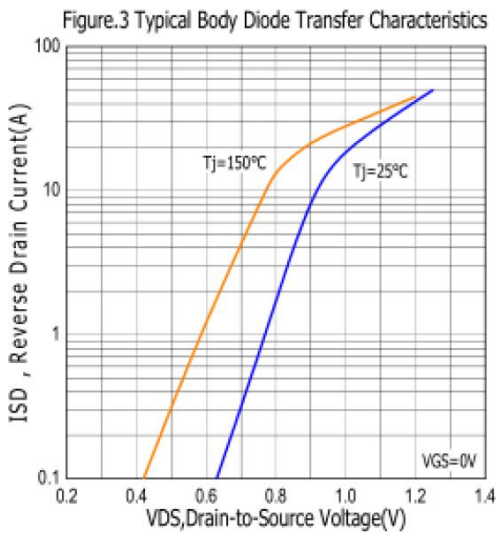
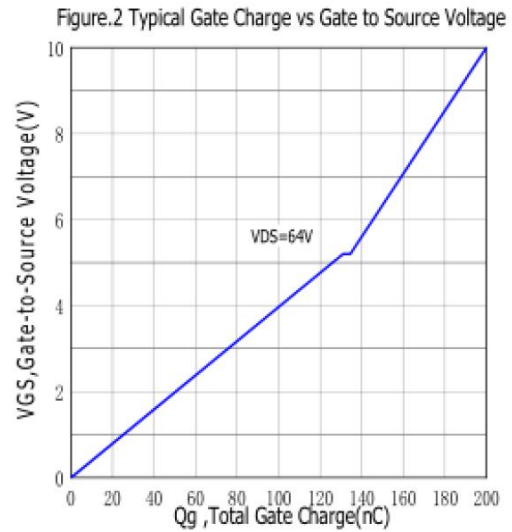
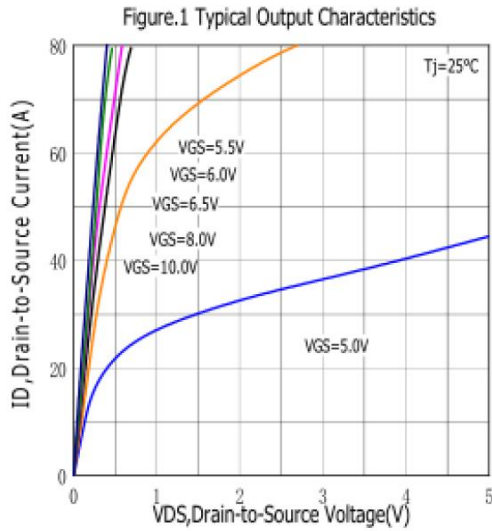
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.57	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	65	

<b>Specifications</b> $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	80	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 80, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1.0	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 25A$	--	4.8	5.5	m $\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 40V,$ $f = 1.0\text{MHz}$	--	4000	--	pF
Output Capacitance	$C_{oss}$		--	550	--	
Reverse Transfer Capacitance	$C_{rss}$		--	35	--	
Total Gate Charge	$Q_g$	$V_{DD} = 40V, I_D = 25A,$ $V_{GS} = 10V$	--	65	--	nC
Gate-Source Charge	$Q_{gs}$		--	25	--	
Gate-Drain Charge	$Q_{gd}$		--	14	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 40V, R_L = 3\Omega,$ $T_J = 25^\circ\text{C}, V_{GS} = 10V,$	--	20	--	ns
Turn-on Rise Time	$t_r$		--	35	--	
Turn-off Delay Time	$t_{d(off)}$		--	45	--	
Turn-off Fall Time	$t_f$		--	21	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	120	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	480	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 25A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_F = 25A,$ $di_F/dt = 500A/\mu s$	--	60	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	300	--	nC

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $V_{DD} = 40V$ , Starting  $T_J = 25^\circ\text{C}, L = 0.5\text{mH}, R_g = 25\Omega$
3. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$

## Typical Performance Characteristics



## Typical Performance Characteristics

Figure.7 Maximum Forward Bias Safe Operating Area

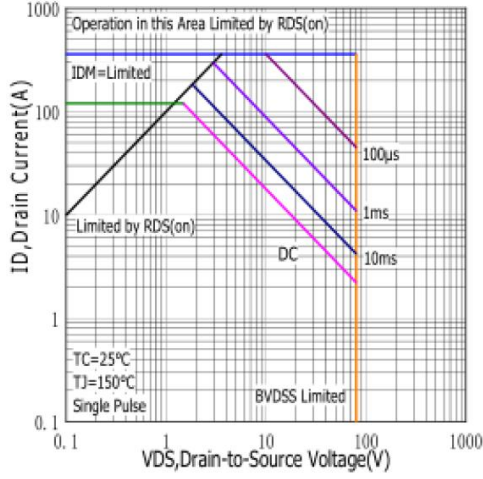


Figure.8 Typical Drain to Source ON Resistance vs Drain Current

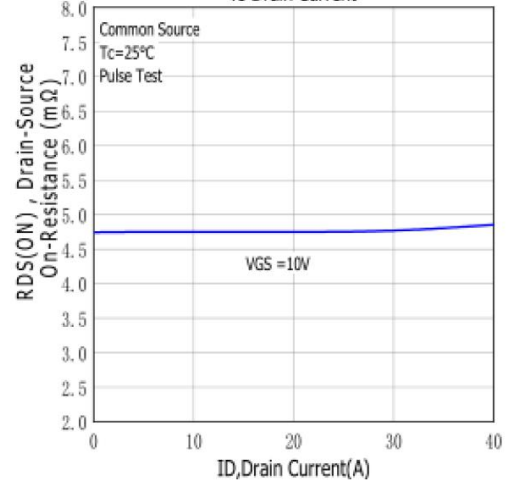


Figure.9 Maximum EAS vs Channel Temperature

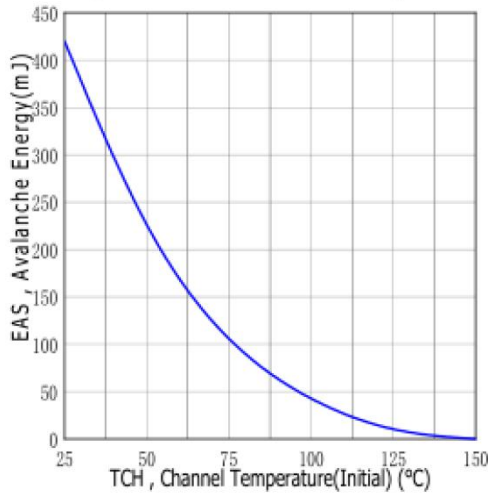


Figure.10 Typical Threshold Voltage vs Case Temperature

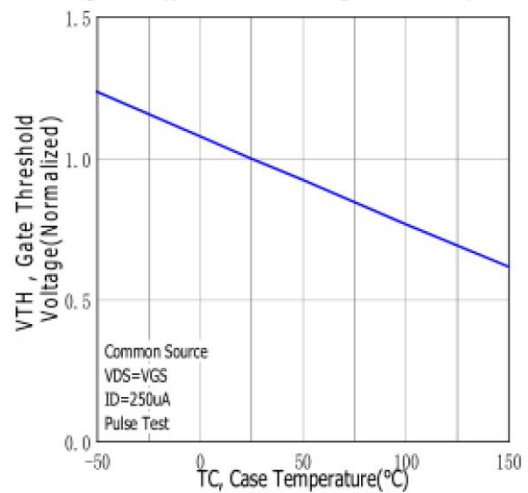


Figure.11 Maximum Effective Thermal Impedance, Junction to Case

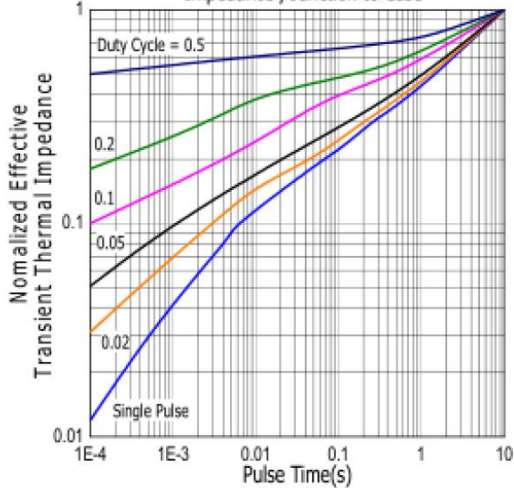
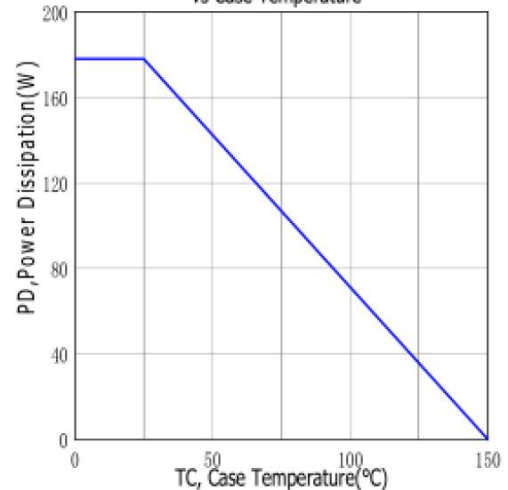


Figure.12 Maximum Power Dissipation vs Case Temperature



TEST CIRCUITS AND WAVEFORMS

Figure A: Gate Charge Test Circuit and Waveform

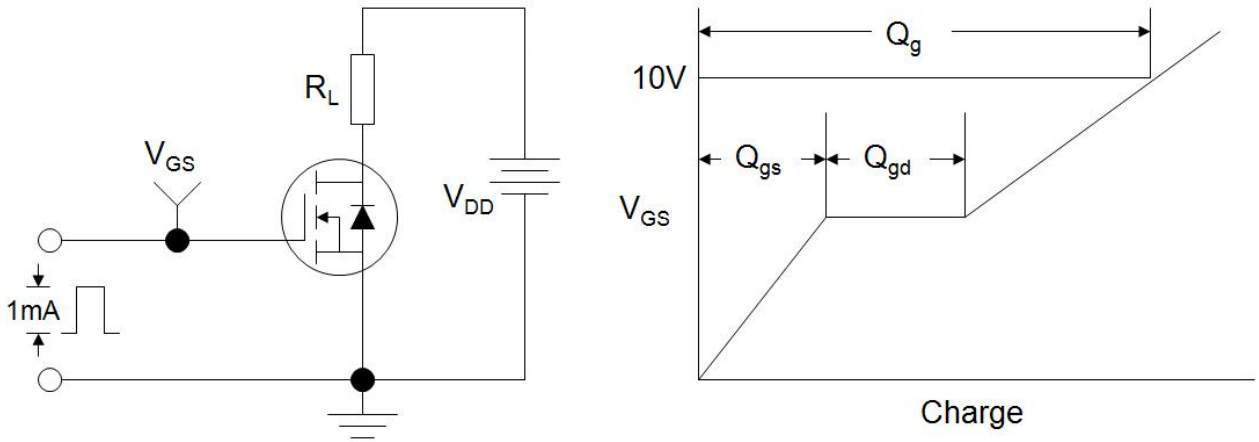


Figure B: Resistive Switching Test Circuit and Waveform

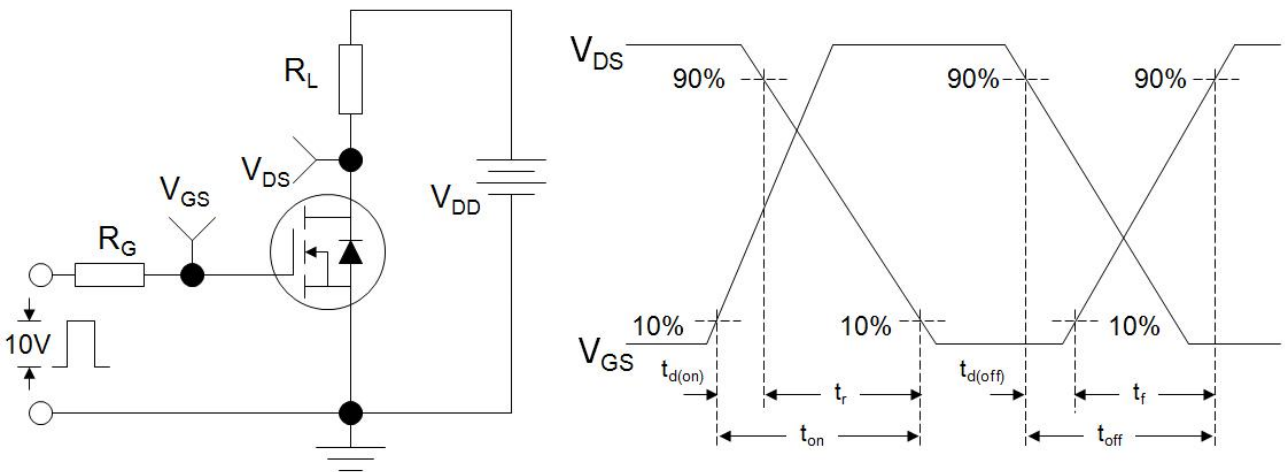
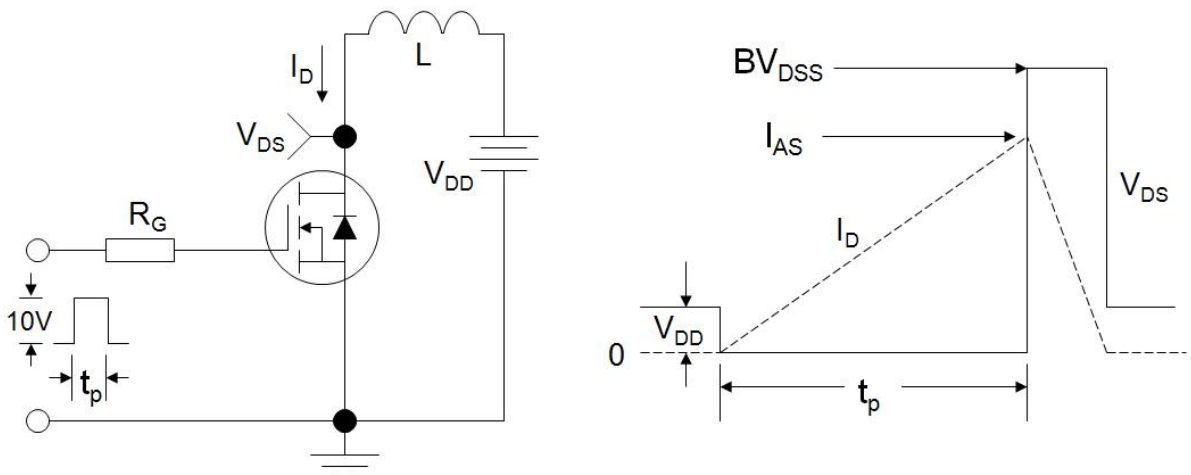
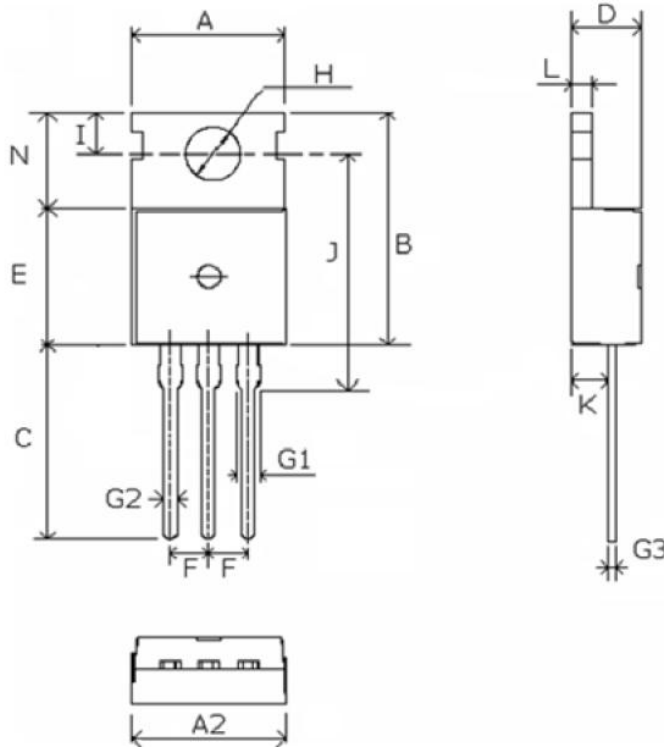


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

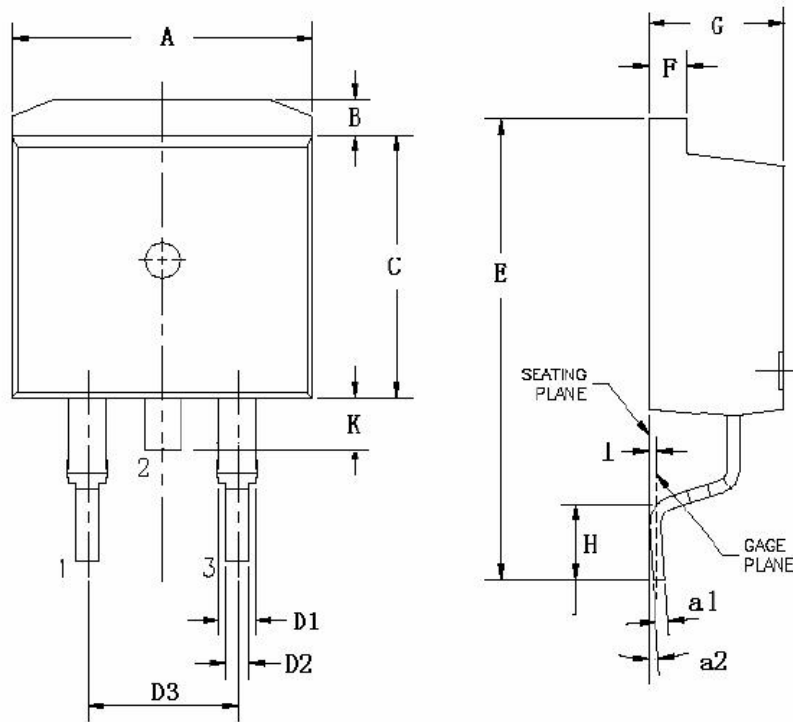


**TO-220 MECHANICAL DATA**


Dimention in mm unless otherwise specified

Symbol	Min	Nom	Max
A	9.66	9.97	10.28
A2	9.80	10.00	10.20
B	15.60	15.70	15.80
C	12.70	13.48	14.27
D	4.30	4.50	4.70
E	9.00	9.20	9.40
F		2.54	
G1	1.32	1.52	1.72
G2	0.70	0.82	0.95
G3	0.45	0.52	0.60
H	3.50	3.60	3.70
I	2.70	2.80	2.90
J	15.70	15.97	16.25
K	2.20	2.40	2.60
L	1.15	1.27	1.40
N	6.40	6.60	6.80

TO-263 MECHANICAL DATA



Dimensions in mm unless otherwise specified

Symbol	Min	Nom	Max
A	9.66	9.97	10.28
B	1.02	1.17	1.32
C	8.59	9.00	9.40
D1	1.14	1.27	1.40
D2	0.70	0.83	0.95
D3		5.08	
E	15.09	15.24	15.39
F	1.15	1.28	1.40
G	4.30	4.50	4.70
H	2.29	2.54	2.79
I		0.25	
K	1.30	1.45	1.60
a1	0.45	0.55	0.65
a2(degree)	0°		8°

## Disclaimer

All product specifications and data are subject to change without notice.

For documents and material available from this datasheet, Wu Xi Ji Lai Micro-Electronics Co., Ltd. does not warrant or assume any legal liability or responsibility for the accuracy, completeness of any product or technology disclosed hereunder.

No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document or by any conduct of Wu Xi Ji Lai Micro-Electronics Co., Ltd. .

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless. Customers using or selling Wu Xi Ji Lai Micro-Electronics Co., Ltd. products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Wu Xi Ji Lai Micro-Electronics Co., Ltd. for any damages arising or resulting from such use or sale.

Wu Xi Ji Lai Micro-Electronics Co., Ltd. disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Wu Xi Ji Lai Micro-Electronics Co., Ltd. 's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

Wu Xi Ji Lai Micro-Electronics Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

In the event that any or all Wu Xi Ji Lai Micro-Electronics Co., Ltd. products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. Wu Xi Ji Lai Micro-Electronics Co., Ltd. believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.