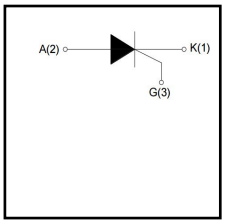
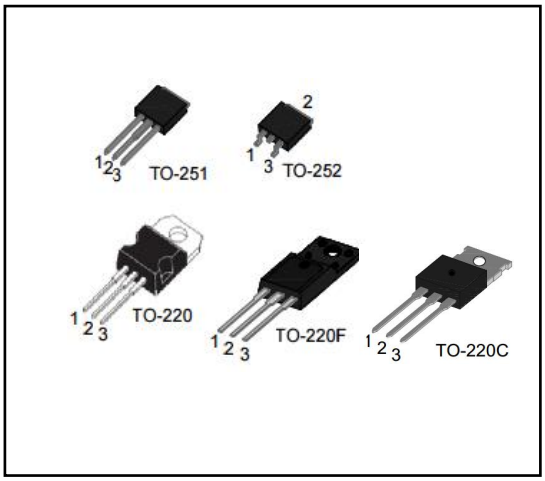
Silicon Controlled Rectifier series

1 Description

BT151 series of silicon controlled rectifiers, with high ability to withstand the shock loading of large current, provide high dv/dt rate with strong resistance to electromagnetic interference. They are especially recommended for use on solid state
TO-220F provides insulation voltage rated at 2000V RMS from all three terminals to external heatsink. TO-220F series comply with UL standards (File ref: E252906).



V_{RRM}/V_{DRM} =600/800
I_{GT} =≤15mA
$I_{T(RMS)}$ =12A



2 Features

- High current output up to 12A
- Low Peak on-state voltage drop
- High voltage
- High reliability

3 Applications

- relay
- Motorcycle
- power charger
- T-tools etc

4 Electrical Characteristics

4.1 Absolute Maximum Ratings (Tc=25℃,unless otherwise noted)

PARAMETER			SYMBOL	VALUE	UNIT
Repetitive peak off-state voltage (Tj=25℃)			V_{DRM}	600/800	V
Repetitive peak reverse voltage (Tj=25℃)			V_{RRM}	600/800	V
RMS on-state current	TO-220 (T_C=110℃)		$I_{T(RMS)}$	12	A
	TO-220F/252 (T_C=80℃)				
Non repetitive surge peak on-state current		tp=8.3ms	I_{TSM}	130	A
		tp=10ms		120	
I^2t value for fusing (tp=10ms)			I^2t	72	A
Repetitive rate of rise of on-state current (IG=2×IGT)			$d_{IT/dt}$	50	A/us
Peak gate current			I_{GM}	2	A
Peak gate power			P_{GM}	5	W
Average gate power dissipation			$P_{G(AV)}$	0.5	W
Operating junction temperature range			T_J	- 40 ~ 125	℃
Storage junction temperature range			T_{STG}	- 40 ~ 150	℃

4.2 Thermal Characteristics

PARAMETER	SYMBOL	VALUE			UNIT
		TO-220	TO-252/251	TO-220F	
Thermal Resistance, Junction to Case-sink	R_{thJC}	1.7	2.0	4.5	℃/W

4.3 Electrical Characteristics (Tc=25℃,unless otherwise noted)

SYMBOL	PARAMETER	Test Conditions		Min	Typ	Max	Unit
I_{GT}	Triggering gate current	V_D=12V R_L=33Ω		-	3	15	mA
V_{GT}	Triggering gate voltage			-	0.8	1.5	V
V_{GD}	Non-triggering gate voltage	$V_D=V_{DRM}$ T_j=125℃ R_L=3.3KΩ		0.2	-	-	V
I_L	Latching Current	$I_G=1.2I_{GT}$		-	13	40	mA
I_H	Holding Current	I_T=500mA		-	11	30	mA
$dv_{/dt}$	Critical Rate of Rise of Off-state Voltage	$V_D=2/3V_{DRM}$ Gate Open T_j=125℃		200	400	-	V/us
V_{TM}	Peak Forward On-State Voltage	I_{TM}=23A tp=380us		-	1.32	1.7	V
I_{DRM}	Maximum forward or reverse leakage current	$V_D=V_{DRM}$ $V_R=V_{RRM}$	Tj=25℃	-	-	10	uA
I_{RRM}	Maximum reverse leakage current		Tj=125℃	-	-	500	uA

5 Typical characteristics diagrams

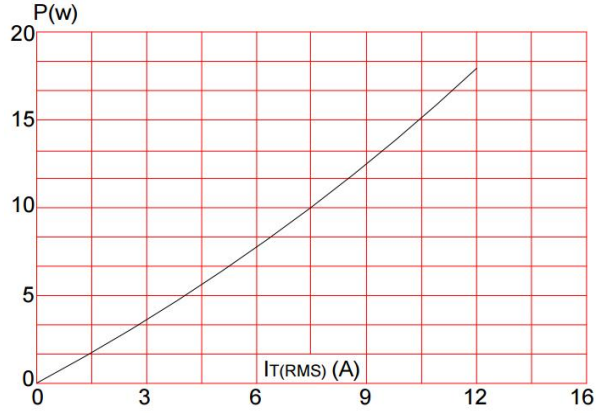


FIG.1: Maximum power dissipation versus RMS on-state current

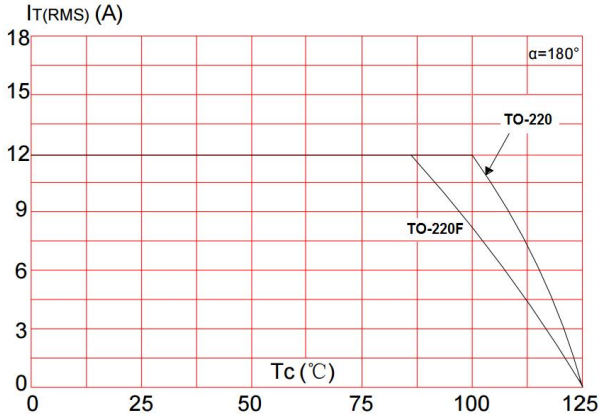


FIG.2: RMS on-state current versus case temperature

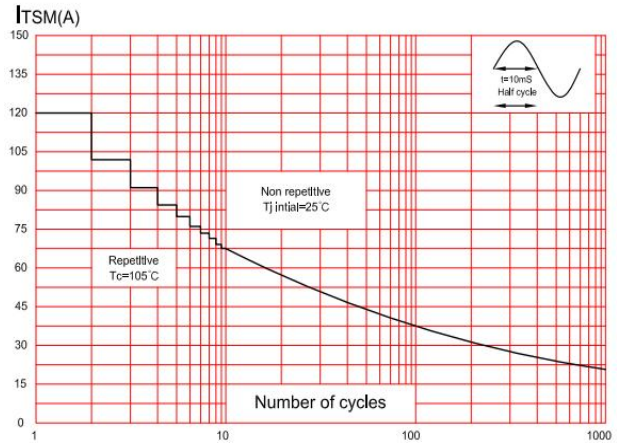


FIG.3: Surge peak on-state current versus number of cycles

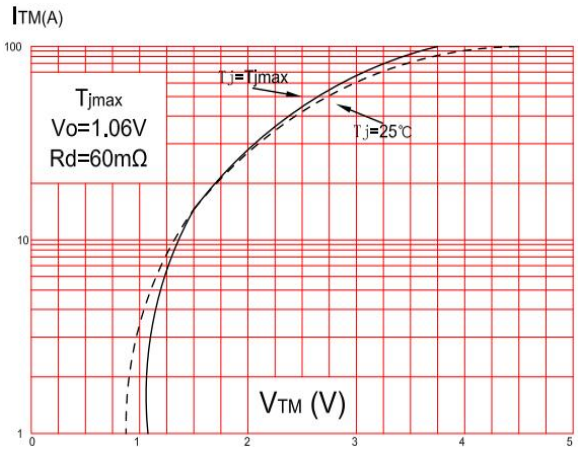


FIG.4: On-state characteristics (maximum values)

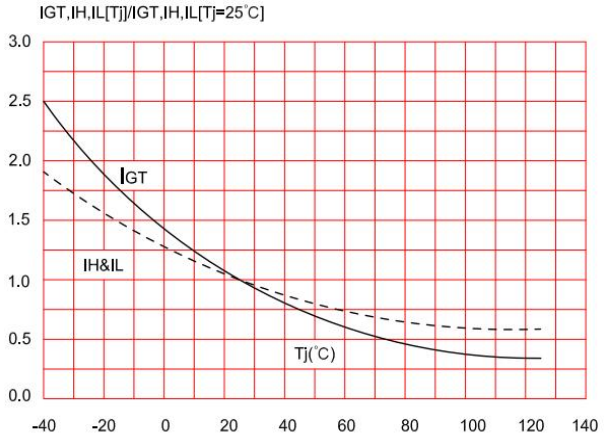
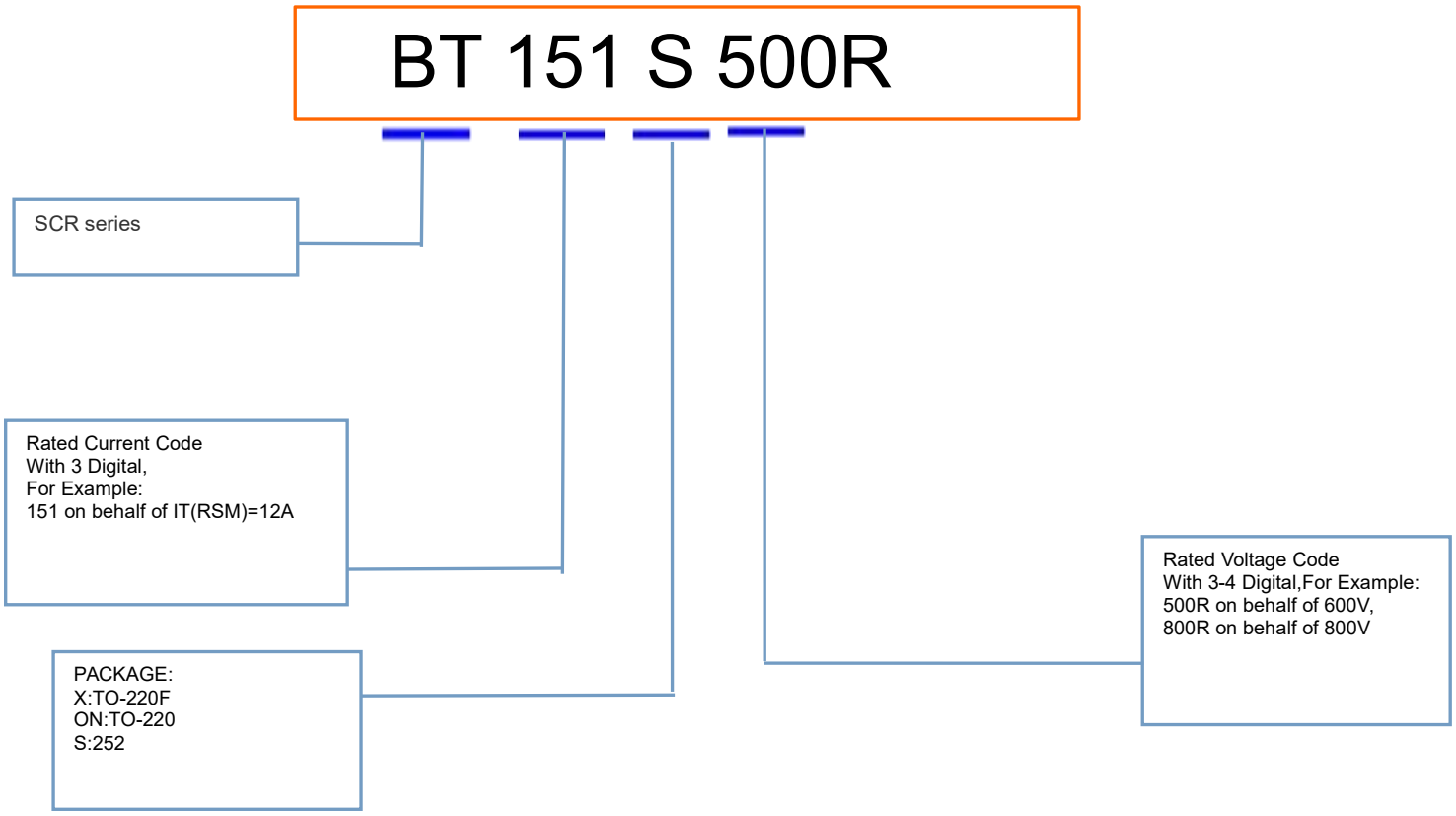


FIG.5: Relative variations of gate trigger current, holding current and latching current versus junction temperature

6 Product Names Rules

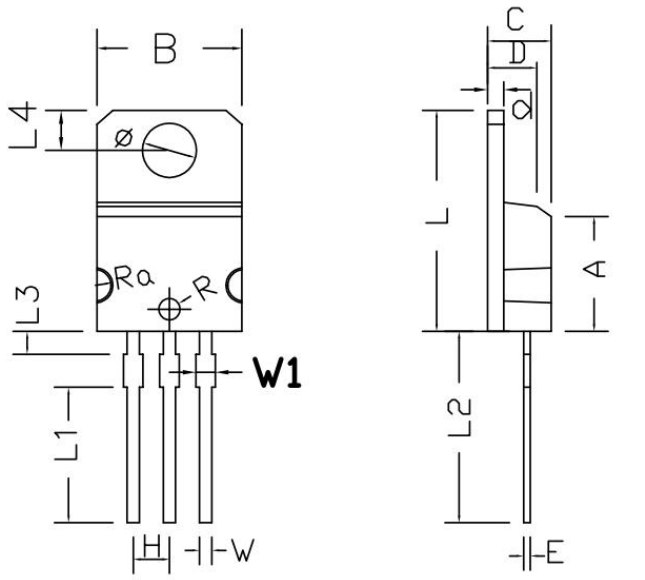


7 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
BT151	TO-220	BT151	Pb-free	Tube	1000//box
BT151X	TO-220F	BT151X	Pb-free	Tube	1000//box
BT151S	TO-252	BT151S	Pb-free	Braid	3000//disc

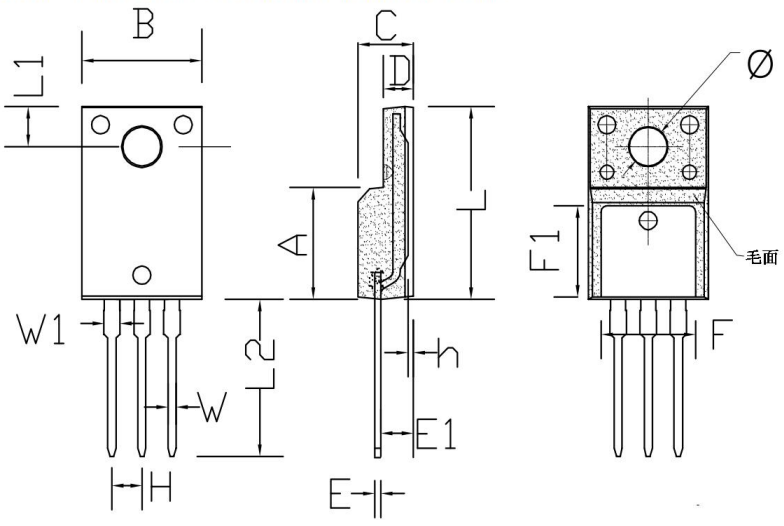
8 Dimensions

TO-220M PACKAGE OUTLINE DIMENSIONS



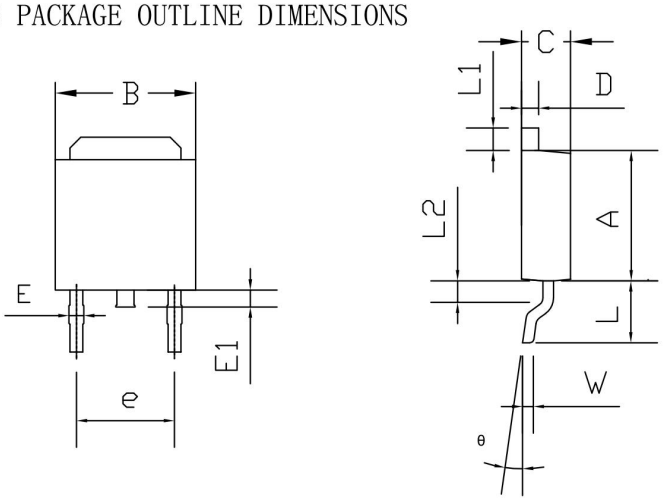
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
	MIN	MAX	MIN	MAX
A	8.03	8.05	0.316	0.317
B	10.13	10.23	0.399	0.403
C	4.42	4.52	0.174	0.178
D	3.42	3.52	0.135	0.139
E	0.44	0.46	0.017	0.018
L	15.25	15.45	0.601	0.609
H	2.52	2.56	0.099	0.101
W	0.85	0.87	0.033	0.034
Φ	3.60	3.90		
R	0.74	0.76	0.029	0.030
Ra	9.44	9.48	0.372	0.374
d	1.28	1.32	0.050	0.052
L1	9.4	9.6	0.370	0.378
L2	13.22	13.62	0.521	0.537
L3	1.52	1.72	0.060	0.068
L4	2.7	2.9	0.106	0.114
W1	1.32	1.42	0.052	0.056

TO-220F PACKAGE OUTLINE DIMENSIONS



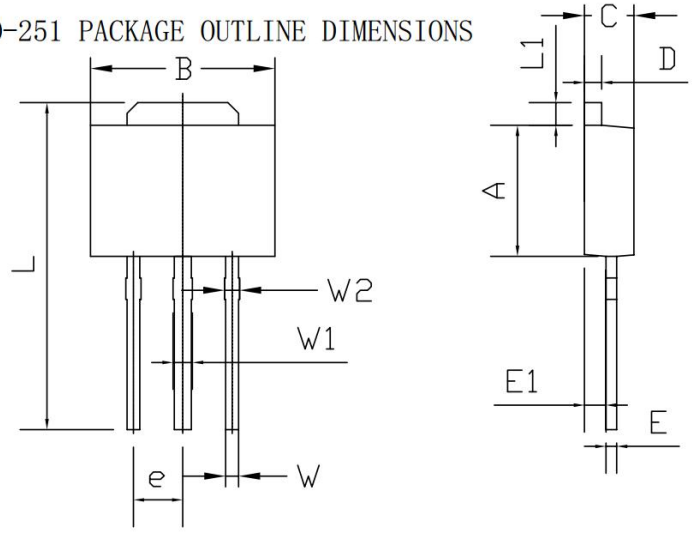
Symbol	DimensionsIn Millimeters		DimensionsIn Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
Φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309

TO-252 PACKAGE OUTLINE DIMENSIONS



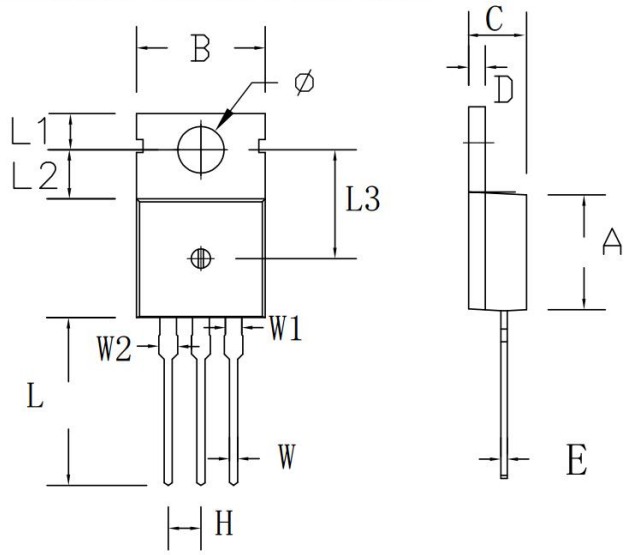
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	5.70	6.30	0.224	0.248
B	6.30	6.90	0.248	0.272
C	2.05	2.55	0.081	0.100
D	0.70	0.90	0.028	0.035
E	0.40	0.60	0.016	0.024
E1	0.60	1.00	0.024	0.039
e	4.50	4.65	0.177	0.183
L	2.75	3.05	0.108	0.120
L1	0.75	1.15	0.030	0.045
L2	0.75	1.25	0.030	0.049
W	0.40	0.60	0.016	0.024
θ	0	8	0	8

TO-251 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	6.00	6.20	0.236	0.244
B	2.25	2.35	0.089	0.093
C	2.45	2.65	0.097	0.104
D	0.75	0.85	0.030	0.033
E	8.48	8.52	0.3341	0.3357
E1	5.10	5.46	0.201	0.215
e	2.29	2.31	0.0902	0.0910
L	15.00	15.40	0.5910	0.6068
L1	1.00	1.10	0.0394	0.0433
W	0.55	0.65	0.0217	0.0256
W1	0.85	0.95	0.0335	0.0374
W2	0.65	0.75	0.0256	0.0296

TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

9 Attentions

- Jiangsu Donghai Semiconductor Co.,Ltd. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Jiangsu Donghai Semiconductor Co.,Ltd. products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

10 Appendix

Revision history:

Date	REV.	Description	Page
2017.08.14	1.0	Original	
2022.01.01	1.1	Modify company name	all
2022.5.23	1.2	Add profile	1、6 page