General Description

The AGM12T05F combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

This device is ideal for load switch and battery protection applications.

Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

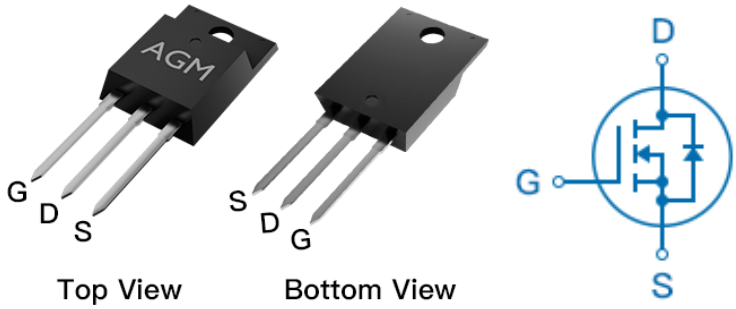
Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

BVDSS	RDSON	ID
120V	5.5mΩ	100A

TO-220F Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM12T05F	AGM12T05F	TO-220F	----	----	1000

Table 1. Absolute Maximum Ratings (TA=25℃)

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	120	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25℃) **(Note 1)**	100	A
	Drain Current-Continuous(Tc=100℃)	63	A
IDM (pluse)	Drain Current-Pulsed **(Note 2)**	400	A
PD	Maximum Power Dissipation(Tc=25℃)	125	w
	Maximum Power Dissipation(Tc=100℃)	50	w
EAS	Avalanche energy **(Note 3)**	529	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State)[1]	---	63	℃/W
RθJC	Thermal Resistance Junction-Case[1]	---	1	℃/W

Table 3. Electrical Characteristics (TJ=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	120	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=120V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	--	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=20A	--	47	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	5.5	7.0	mΩ
		VGS=4.5V, ID=15A	--	6.0	9.0	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=40V,VGS=0V, F=1MHZ	--	4330	--	pF
Coss	Output Capacitance		--	1178	--	pF
Crss	Reverse Transfer Capacitance		--	31	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	0.5	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=60V, ID=20A,RGEN=3.3Ω	--	20	--	nS
tr	Turn-on Rise Time		--	13	--	nS
td(off)	Turn-Off Delay Time		--	36	--	nS
tf	Turn-Off Fall Time		--	18	--	nS
Qg	Total Gate Charge	VGS=60V, VDS=10V, ID=20A	--	88	--	nC
Qgs	Gate-Source Charge		--	10	--	nC
Qgd	Gate-Drain Charge		--	24	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	100	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=15A , dI/dt=100A/μs , TJ=25℃	--	--	43	ns
Qrr	Reverse Recovery Charge		--	--	88	nc

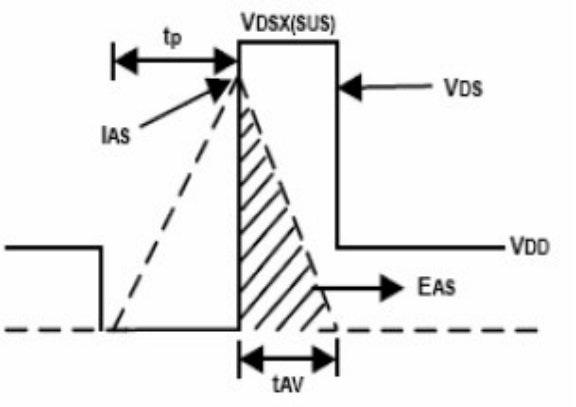
Notes 1.The maximum current rating is package limited.

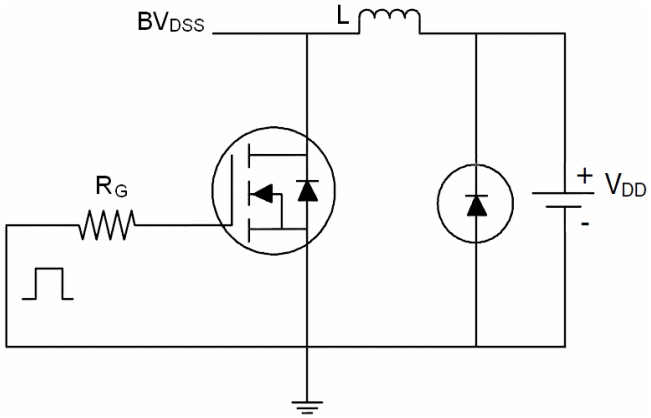
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25℃,VDD=50V,Vgs=10V,ID=46A,L=0.5mH,RG=25ohm

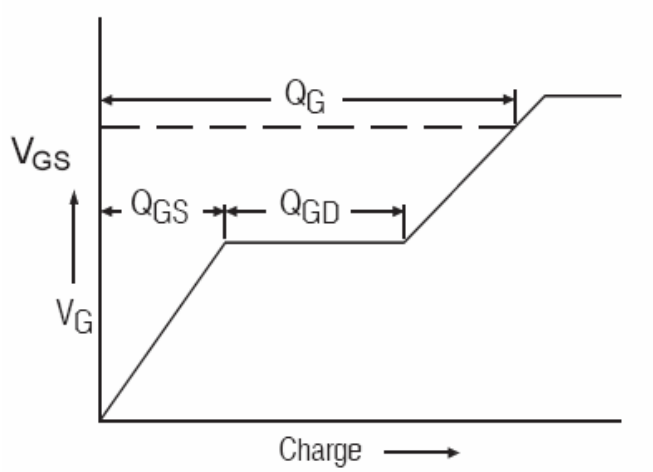
Test Circuit

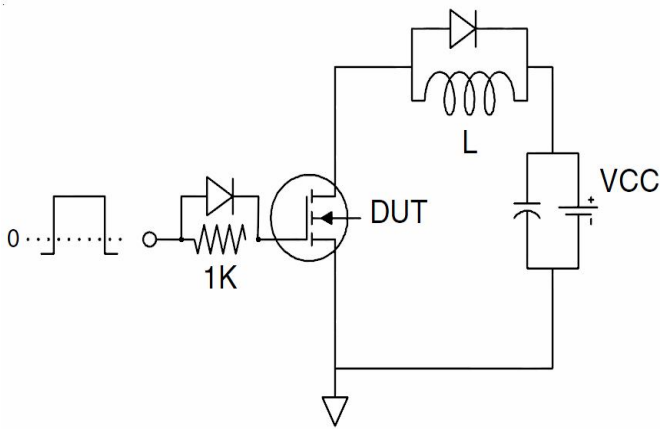
1) E_{AS} Test Circuits



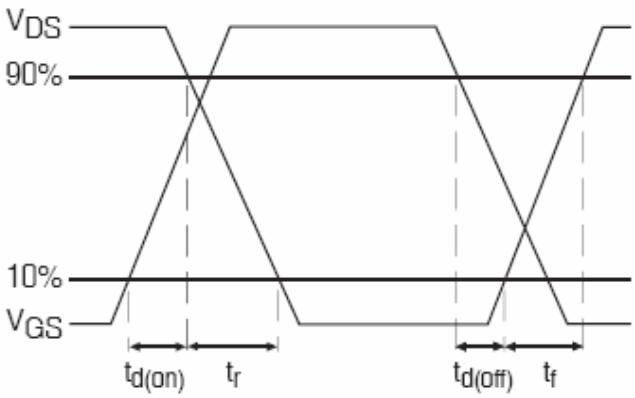


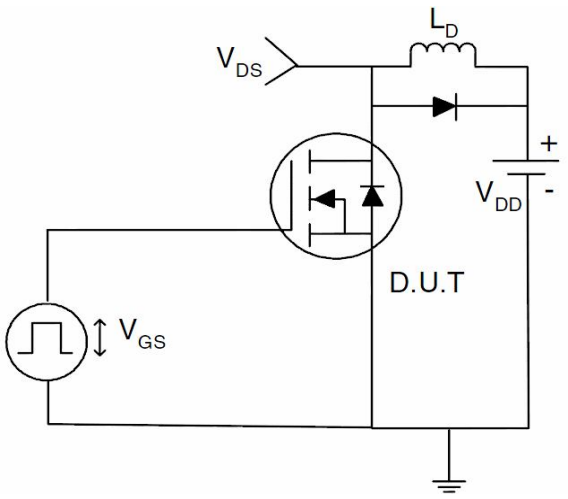
2) **Gate Charge Test Circuit:**





3) **Switch Time Test Circuit:**





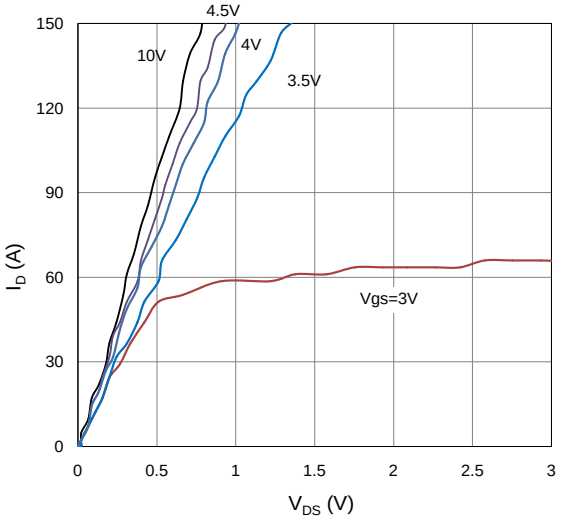


Fig.1 Typical Output Characteristics

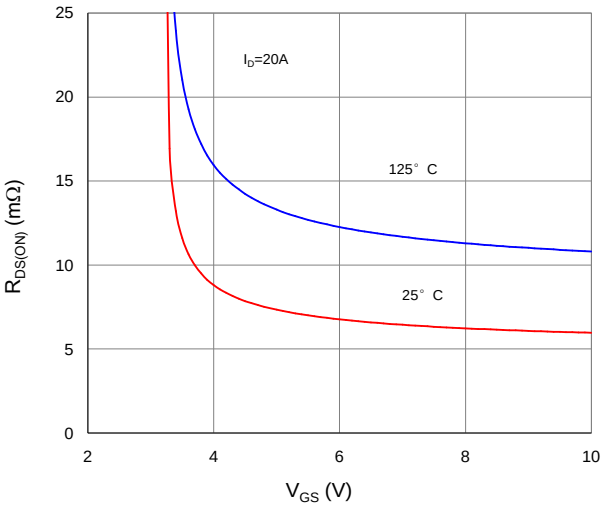


Fig.2 On-Resistance vs. Gate-Source Voltage

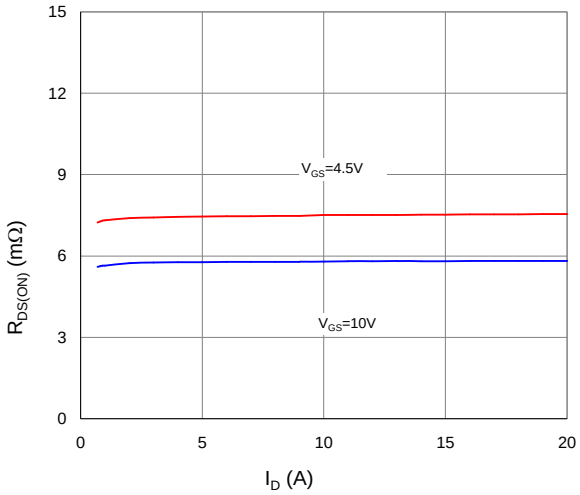


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

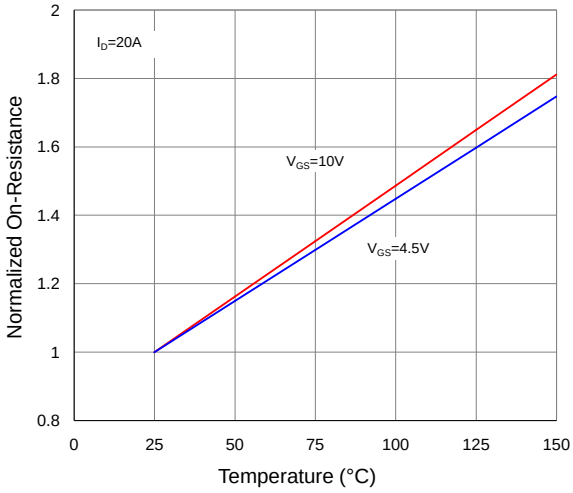


Fig.4 Normalized On-Resistance vs. Junction Temperature

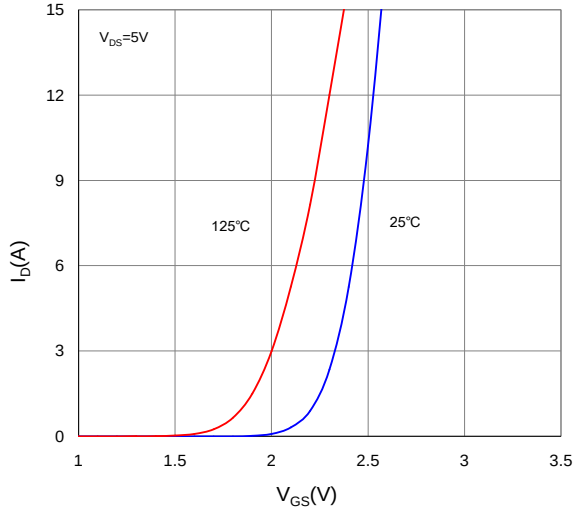


Fig.5 Typical Transfer Characteristics

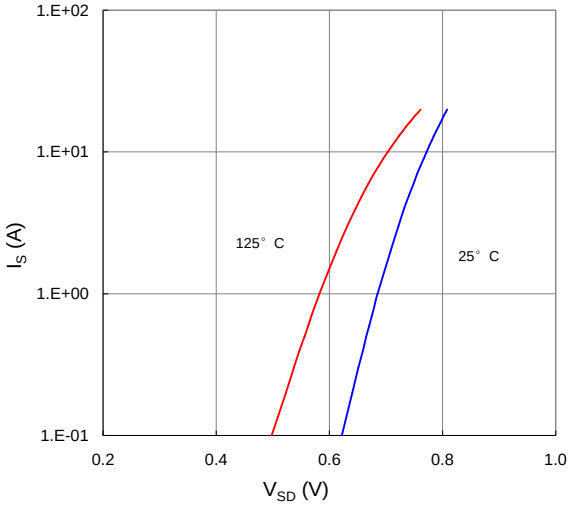


Fig.6 Typical Source-Drain Diode Forward Voltage

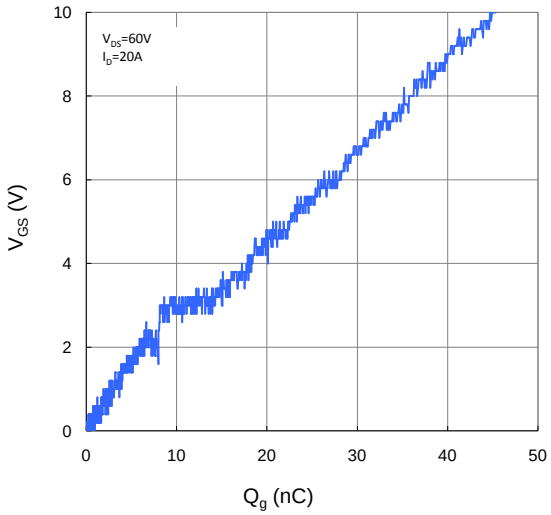


Fig.7 Typical Gate-Charge vs. Gate-to-Source Voltage

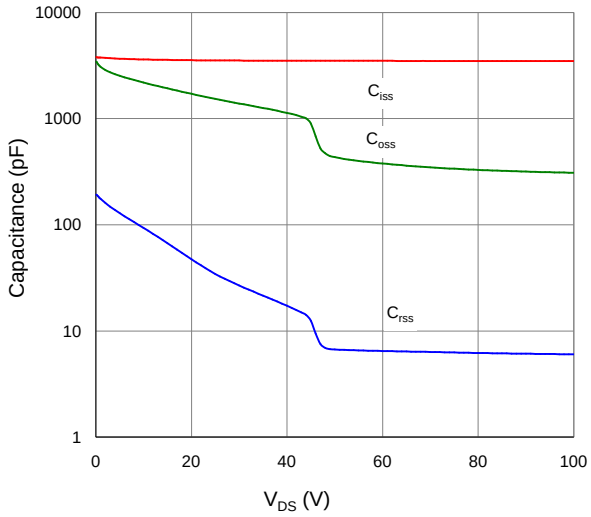


Fig.8 Typical Capacitance vs. Drain-to-Source Voltage

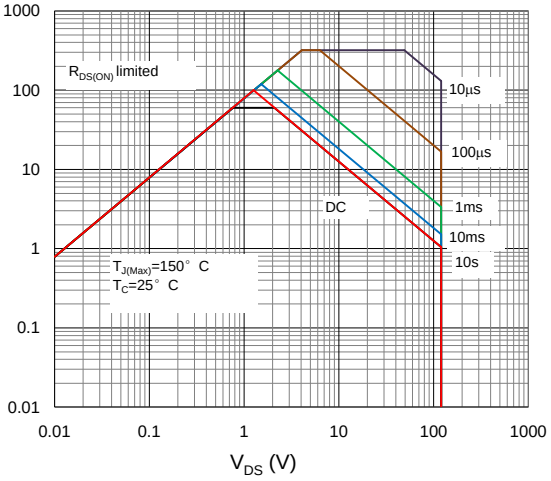


Fig.9 Maximum Safe Operating Area

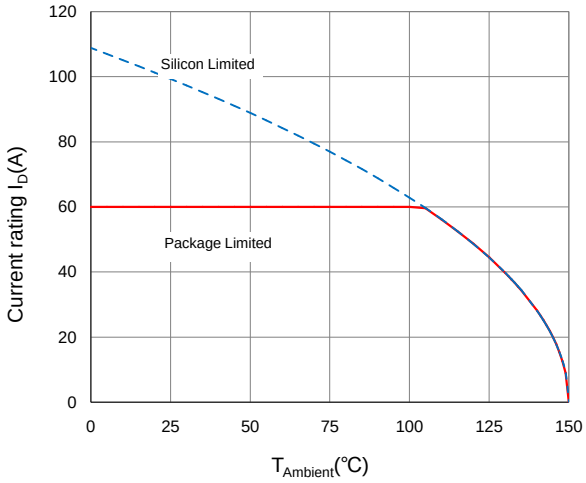


Fig.10 Maximun Drain Current vs. Case Temperature

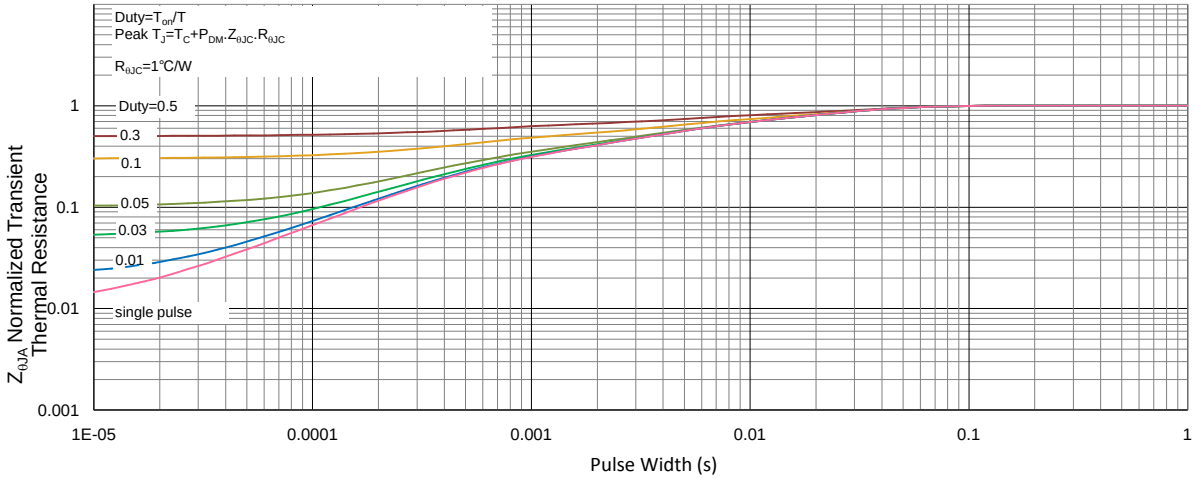
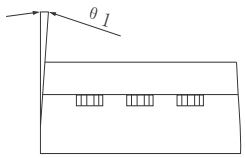
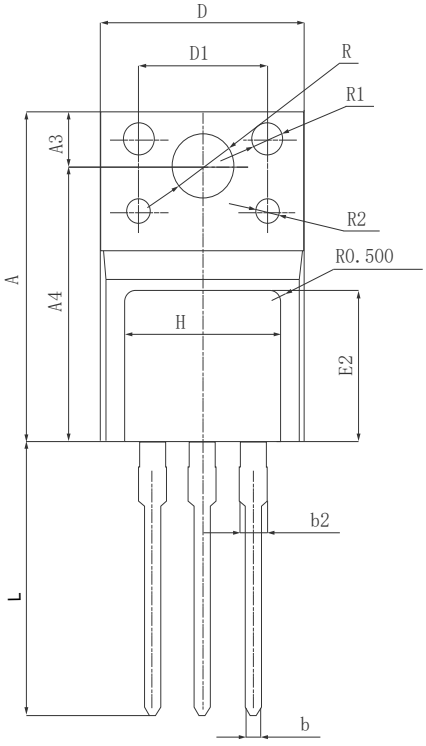


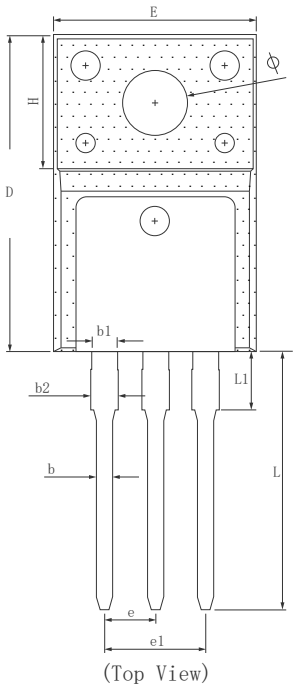
Fig.11 Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

●Dimensions（TO-220F）

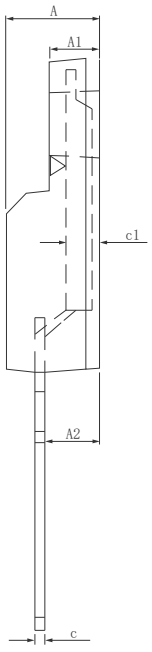


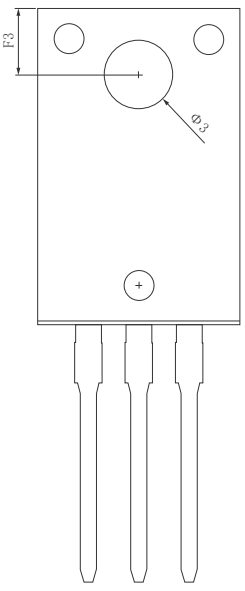


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	15.670	15.870	16.070
A1	2.150	2.350	2.550
A2	4.500	4.700	4.900
A3	3.100	3.300	3.500
A4	12.270	12.570	12.870
b	0.770	0.800	0.830
b2	1.200	1.300	1.400
b3	1.200BSC		
c	0.400	0.500	0.600
c1	2.440	2.540	2.640
D	9.860	10.160	10.460
D1	6.900	7.000	7.100
E	6.480	6.680	6.880
E1	8.990	9.190	9.390
E2	7.100	7.300	7.500
e	2.540BSC		
e1	5.080BSC		
L	13.140	13.340	13.540
R	3.100	3.300	3.500
R1	1.500REF.		
R2	1.200REF.		
R3	1.500REF.		
H	7.600	7.800	8.000
θ1	4°	4.5°	5°



(Top View)



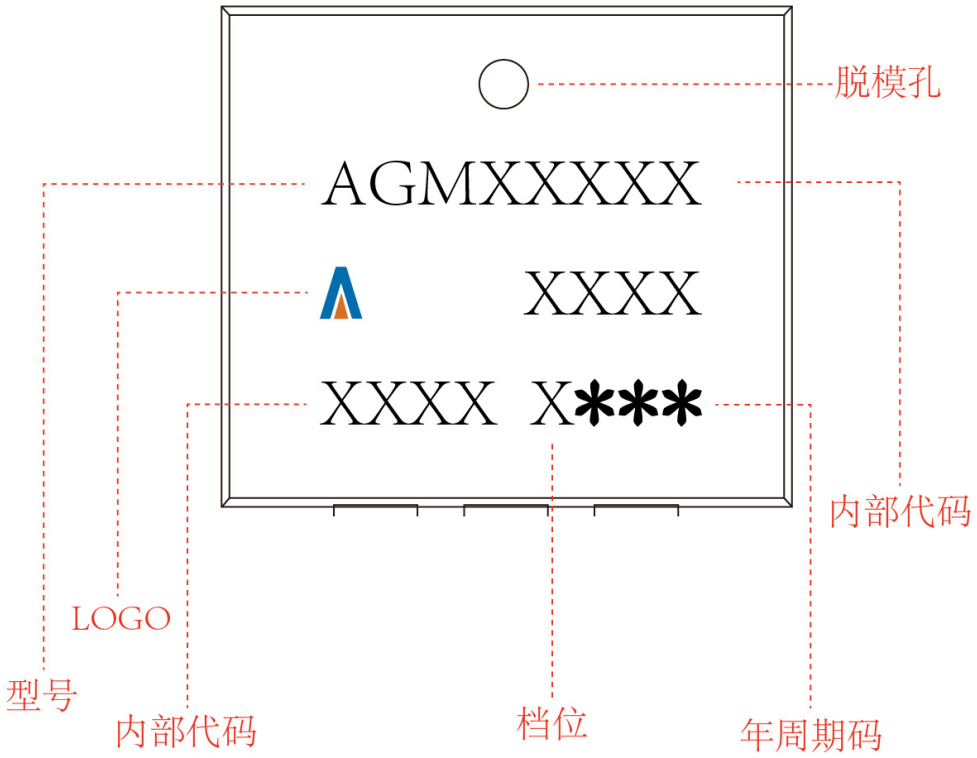


(Bottom View)

SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.500	4.700	4.900
A1	2.340	2.540	2.740
A2	2.560	2.760	2.960
b	0.700	0.800	0.950
b1	1.180	1.280	1.430
b2	1.250	1.350	1.550
c	0.400	0.500	0.650
c1	1.200	1.300	1.350
D	15.570	15.870	16.170
H	6.700 REF		
E	9.960	10.160	10.360
e	2.540 BSC		
e1	5.080 BSC		
L	12.680	12.980	13.280
L1	2.780	2.930	3.080
F3	3.150	3.300	3.450
Φ	3.030	3.180	3.450
Φ3	3.150	3.450	3.650

(注：全尺寸测量时c1不测)

TO-220F
Marking Instructions:



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This document is the third version issued on April 10th, 2024. This document replaces all previously provided information.