MOSFET Silicon N-Channel MOS

1. Applications

Synchronous rectification in SMPS,
Hard switching and High speed circuit
DC/DC in telecoms and inductrial

2. Features

Low drain-source on-resistance: RDS(ON) = 2.9mΩ (typ.)
High speed power switching
Enhanced body diode dv/dt capability
Enhanced avalanche ruggedness

Table 1   Key Performance Parameters

Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	85	V
$R_{DS(on),max}$	3.3	mΩ
$Q_{g,typ}$	109	nC
$I_{D,pulse}$	640	A

3. Packaging and Internal Circuit

Part Name	Package	Marking
AUB033N08BG	TO263	AUB033N08BG
AUP033N08BG	TO220	AUP033N08BG
AUW033N08BG	TO247	AUW033N08BG

TO263	TO220	TO247

AUB033N08BG，AUP033N08BG，AUW033N08BG
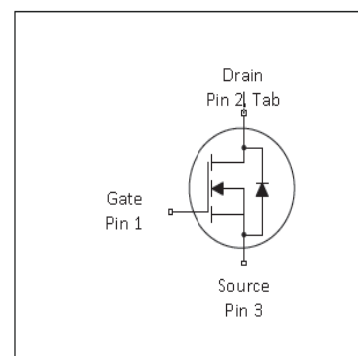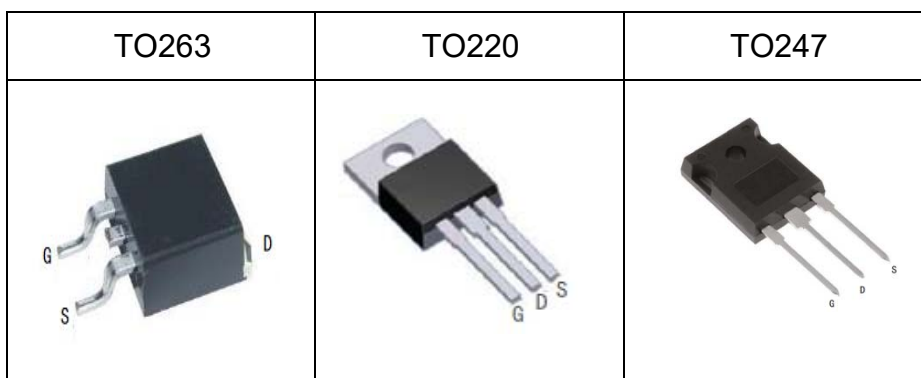
1   Maximum ratings

at T_j= 25°C, unless otherwise specified

Table 2   Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current[1]	I_D		-	160 115	A	T_C=25°C T_C=100°C
Pulsed drain current[2]	$I_{D,pulse}$	-		640	A	T_C=25°C
Avalanche energy, single pulse	E_{AS}	-	-	884	mJ	
Gate source voltage (static)	V_{GS}	-20	-	20	V	static;
Power dissipation(TO220)	P_{tot}	-	-	370	W	T_C=25°C
Power dissipation(TO263)	P_{tot}	-	-	179	W	T_C=25°C
Power dissipation(TO247)	P_{tot}	-	-	340	W	T_C=25°C
Storage temperature	T_{stg}	-55	-	175	°C	
Operating junction temperature	T_j	-55	-	175	°C	

[1] Limited by $T_{j,max}$. Maximum Duty Cycle D = 0.50
[2] Pulse width t_p limited by $T_{j,max}$
[3] Identical low side and high side switch with identical R_G

2   Thermal characteristics

Table 3   Thermal characteristics(TO220)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.42	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	°C/W	device on PCB, minimal footprint

Thermal characteristics (TO263)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.7	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	°C/W	device on PCB, minimal footprint

Thermal characteristics (TO247)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.44	°C/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	40	°C/W	device on PCB, minimal footprint

3 Electrical characteristics

at T_j=25°C, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	85	-	-	V	V_{GS}=0V, I_D=10mA
Gate threshold voltage	$V_{(GS)th}$	2.5		3.5	V	V_{DS}= V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1000	nA	V_{DS}=80V, V_{GS}=0V, T_j=25°C
Gate-source leakage current	I_{GSS}	-	-	100	nA	V_{GS}=20V, V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.9	3.3	mΩ	V_{GS}=10V, I_D=20A, T_j=25°C
Gate resistance (Intrinsic)	R_G	-	0.7	-	Ω	f=1MHz, open drain

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	7463	-	pF	Vds=40V,Vgs=0V f=1MHz
Output capacitance	C_{oss}	-	1292	-	pF	Vds=40V,Vgs=0V f=1MHz
Reverse transfer capacitance	C_{rss}	-	43.4	-	pF	Vds=40V,Vgs=0V f=1MHz
Turn-on delay time	$t_{d(on)}$	-	24	-	ns	VDD=40V,VGS=10V,RG=10Ω ID=20A
Rise time	t_r	-	53	-	ns	VDD=40V,VGS=10V,RG=10Ω ID=20A
Turn-off delay time	$t_{d(off)}$	-	107	-	ns	VDD=40V,VGS=10V,RG=10Ω ID=20A
Fall time	t_f	-	66	-	ns	VDD=40V,VGS=10V,RG=10Ω ID=20A

Table 6 Gate charge characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	27.5	-	nC	VDS=40V,VGS=0 to 10V ID=20A
Gate to drain charge	Q_{gd}	-	26.4	-	nC	VDS=40V,VGS=0 to 10V ID=20A
Gate charge total	Q_g	-	109	-	nC	VDS=40V,VGS=0 to 10V ID=20A

Table 7   Reverse diode characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	-	0.67	-	V	V_{GS}=0V, I_F=1A, T_j=25°C
Reverse recovery time	t_{rr}	-	52	-	ns	VR=40V,IF=20A, diF/dt=200A/us
Reverse recovery charge	Q_{rr}	-	137	-	uC	VR=40V,IF=20A,diF/dt=200A/us
Peak reverse recovery current	I_{rrm}	-	-3.7	-	A	VR=40V,IF=20A,diF/dt=200A/us

Electrical characteristics diagram
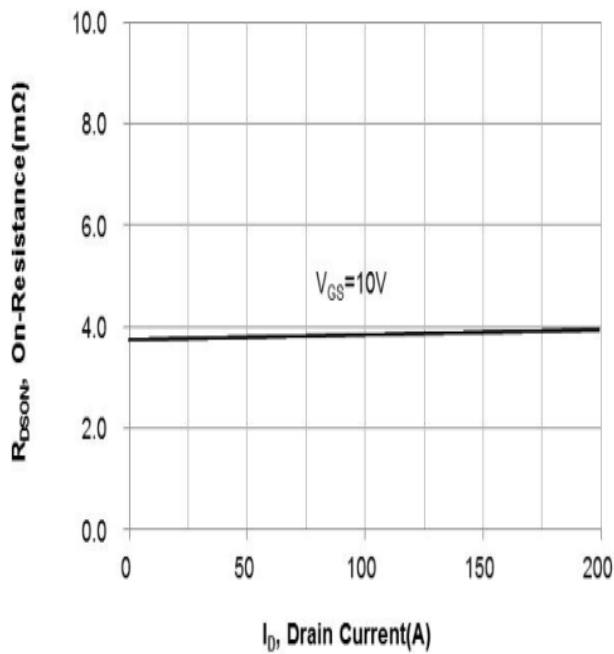
Diagram 1: Drain-Source on-state resistance	Diagram 2: Typ. transfer characteristics
$R_{DS(on)}$=f(T_j); I_D=20 A; V_{GS}=10 V	I_D=f(V_{GS}); V_{DS} =5V; parameter: T_j
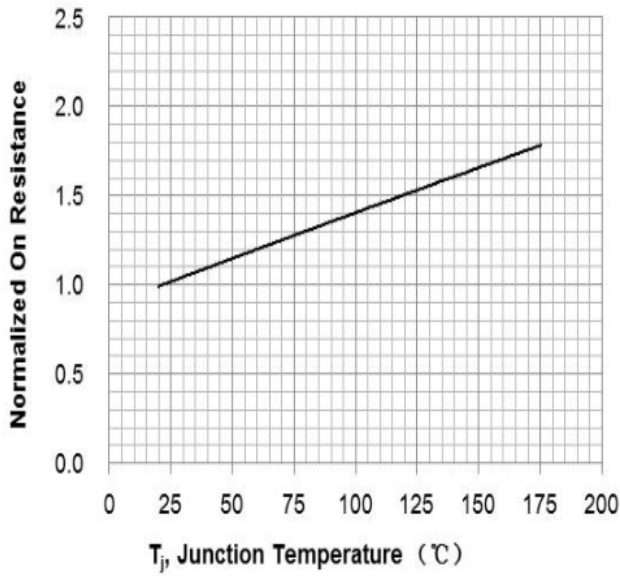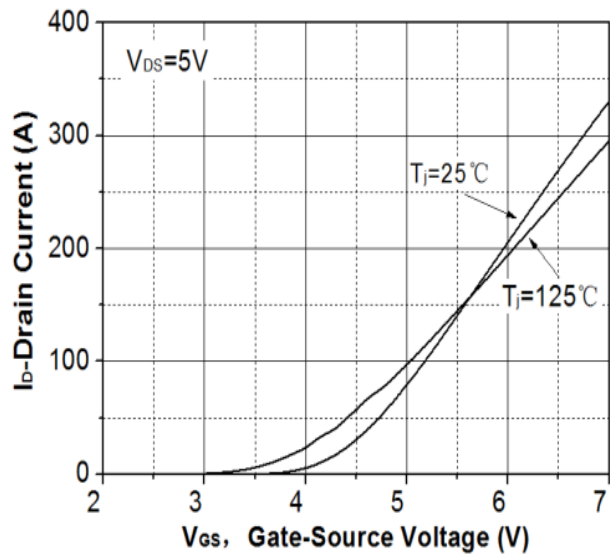
Diagram 3: Drain-Source on-state resistance	Diagram 4: Typ. Capacitances
$R_{DS(on)}$=f(I_D); parameter: V_{GS}	C=f(V_{DS}); V_{GS}=0 V; f=1 MHz
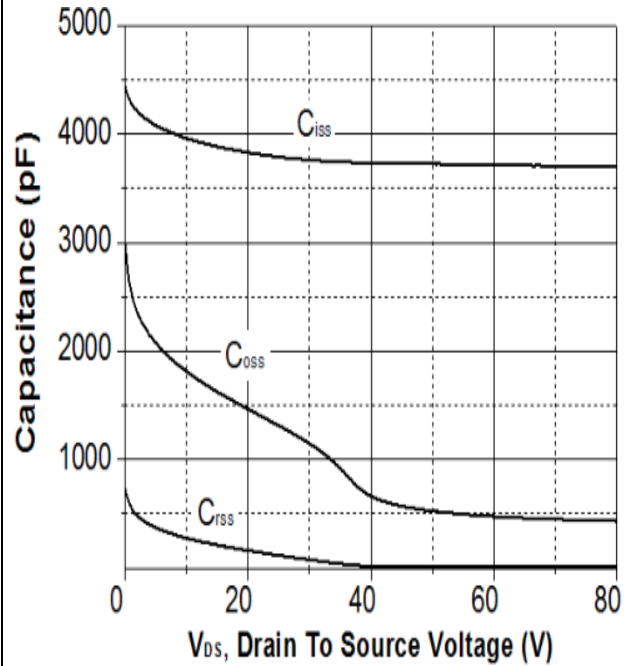
4   Package Outlines

单位：mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	4.30	4.70	E	9.00	9.40
B	1.00	1.40	e1	2.34	2.74
b	0.70	0.90	e2	4.88	5.28
b1	1.15	1.35	L1	15.00	16.00
b2	0.40	0.60	L2	2.24	2.84
C	1.20	1.40	L3	1.20	1.60
D	9.80	10.20			
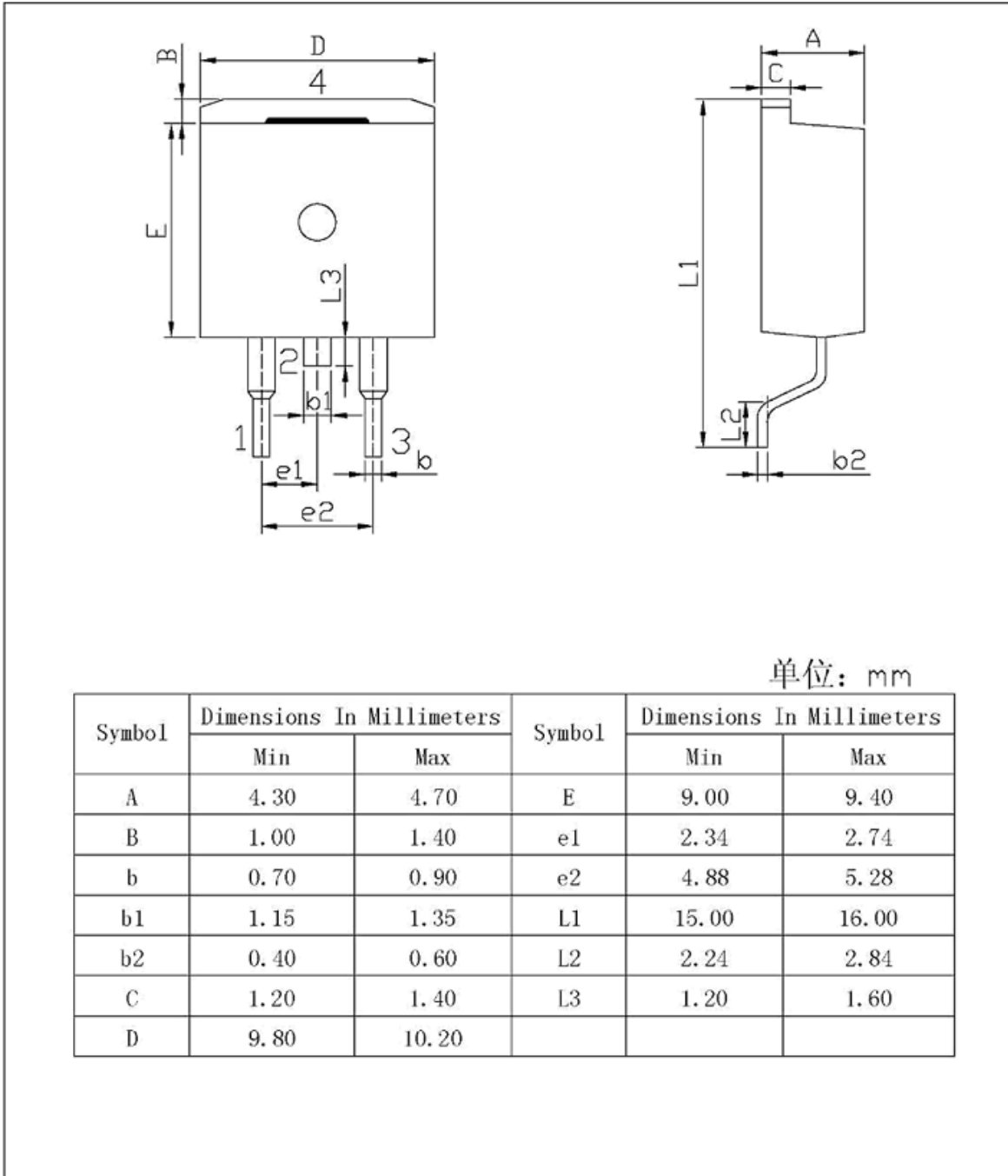
Figure1：Outline PG-TO263

Figure2：Outline PG-TO220

单位： mm			
	MIN	NOM	MAX
A	4.8	5	5.2
A1	3.3	3.5	3.7
A2	2.1	2.3	2.5
b	1	1.2	1.4
b1	2.9	3.1	3.3
b2	1.9	2.1	2.3
c	0.4	0.6	0.8
e	5.25	5.45	5.65
E	15.6	15.8	16
E1	10.6	10.8	11
H	20.8	21	21.2
H1	19.4	19.9	20.4
H2	3.9	4.1	4.3
G	5.9	6.1	6.3
ØP	3.3	3.5	3.7
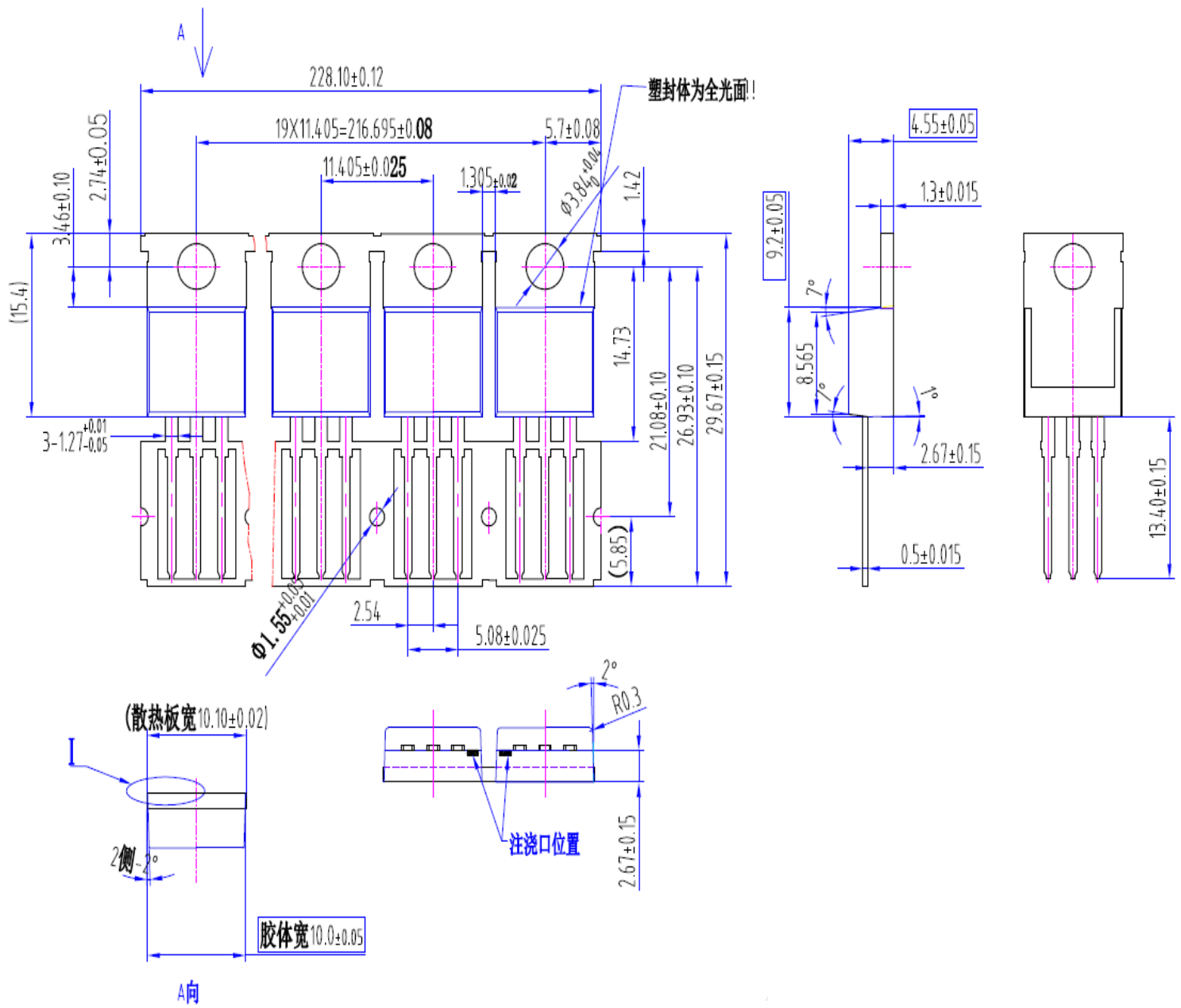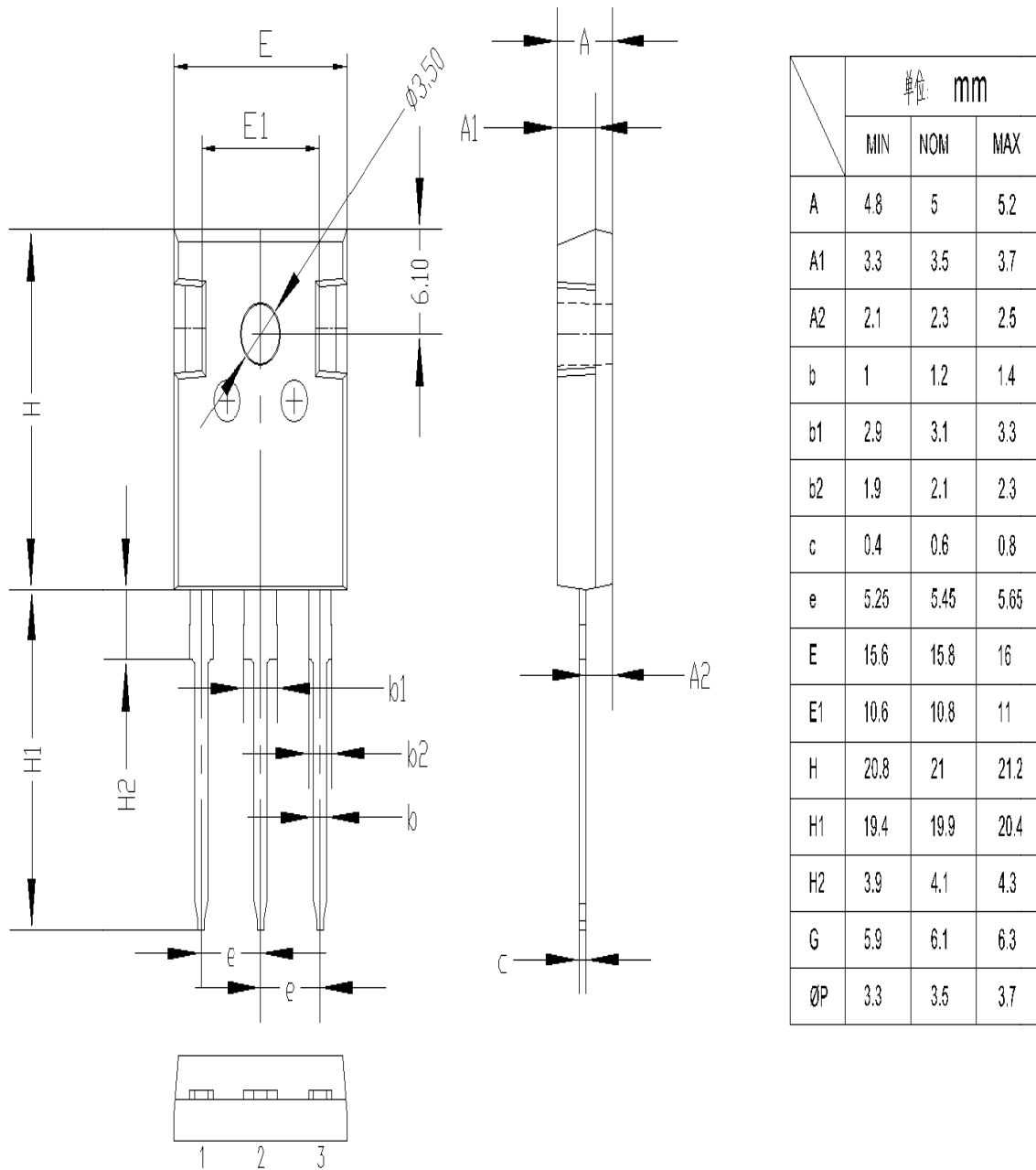
Figure3：Outline PG-TO247

Revision History

Revision	Date	Subjects (major changes since last revision)
1.0	2021-06-1	Preliminary version