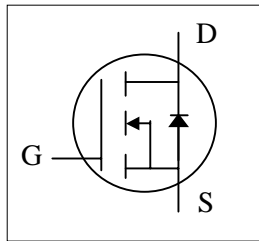




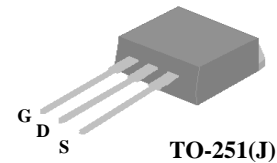
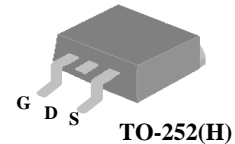
- ▼ Simple Drive Requirement
- ▼ Low On-resistance
- ▼ Fast Switching Characteristic



$BV_{DSS}$	25V
$R_{DS(ON)}$	6m $\Omega$
$I_D$	75A

## Description

The TO-252 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters. The through-hole version (AP86T02GJ) is available for low-profile applications.



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	25	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^3$	75	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	62	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	300	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	75	W
	Linear Derating Factor	0.5	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	2	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ C/W$



## Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	25	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	-	0.02	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =45A	-	-	6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	-	-	10	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =30A	-	42	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V	-	-	1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =175°C)	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	250	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =30A	-	23	37	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =20V	-	5		nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	14		nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DS</sub> =10V	-	11	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =30A	-	105	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V	-	32	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =0.3Ω	-	8	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1830	2930	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	490	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	360	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.1	1.6	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =45A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =20A, V <sub>GS</sub> =0V,	-	28	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	15	-	nC

## Drain-Source Avalanche Ratings

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
E <sub>AS</sub>	Drain-Source Avalanche Energy <sup>4</sup>	I <sub>D</sub> =24A, V <sub>DD</sub> =20V, L=100uH	-	-	29	mJ

### Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Package limitation current is 75A .
- 4.Single Pulse Test.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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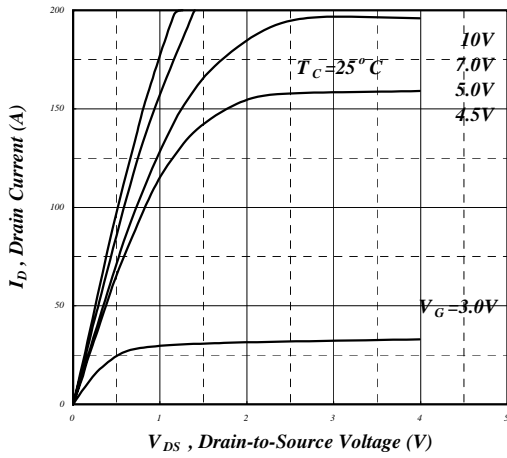


Fig 1. Typical Output Characteristics

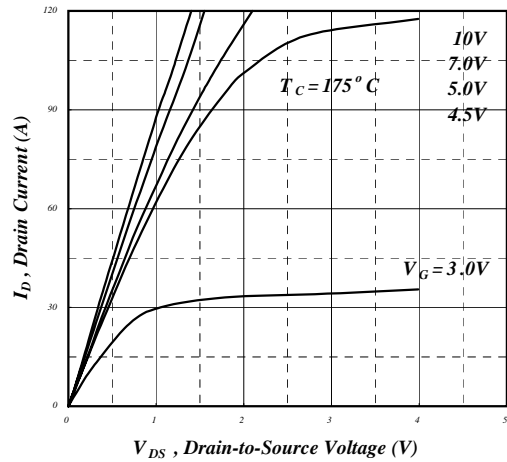


Fig 2. Typical Output Characteristics

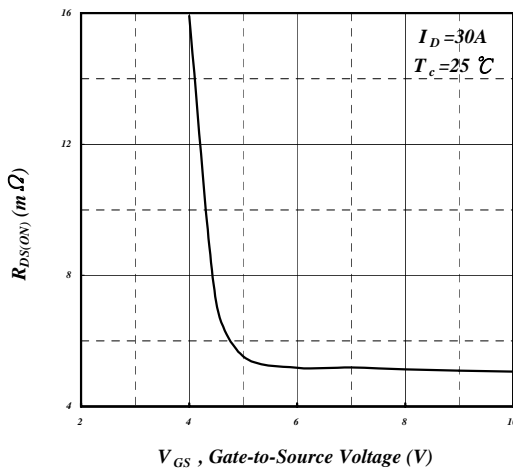


Fig 3. On-Resistance v.s. Gate Voltage

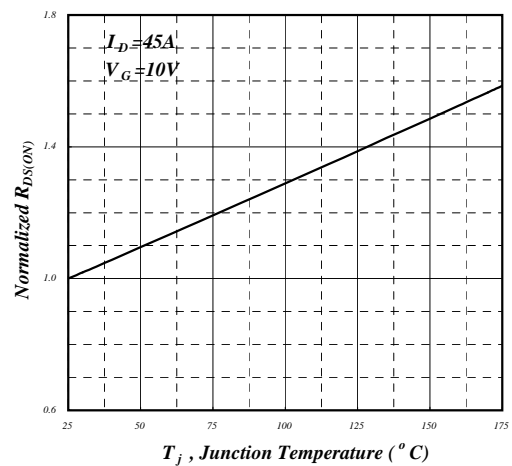


Fig 4. Normalized On-Resistance v.s. Junction Temperature

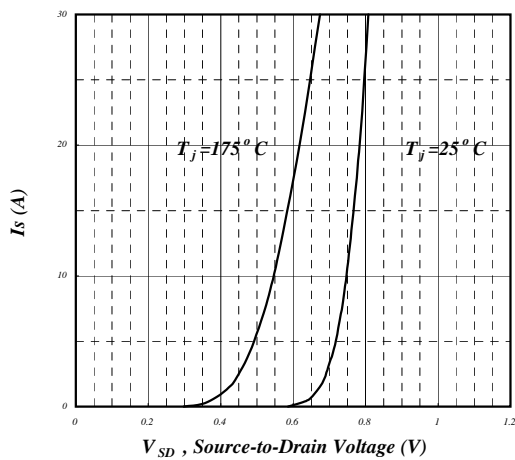


Fig 5. Forward Characteristic of Reverse Diode

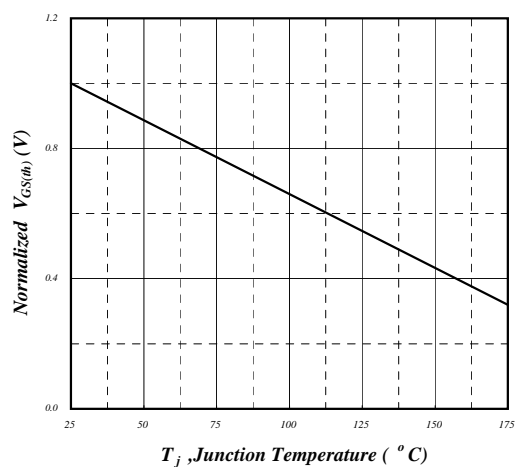


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

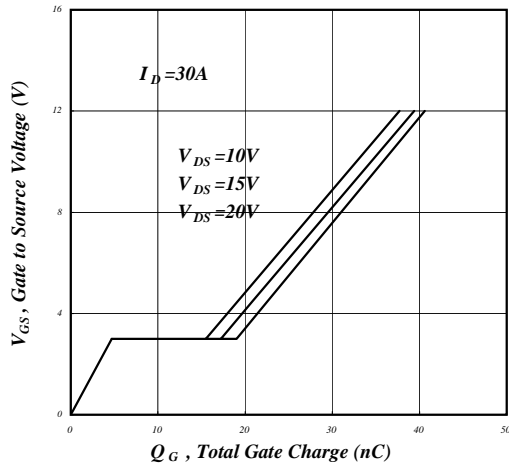


Fig 7. Gate Charge Characteristics

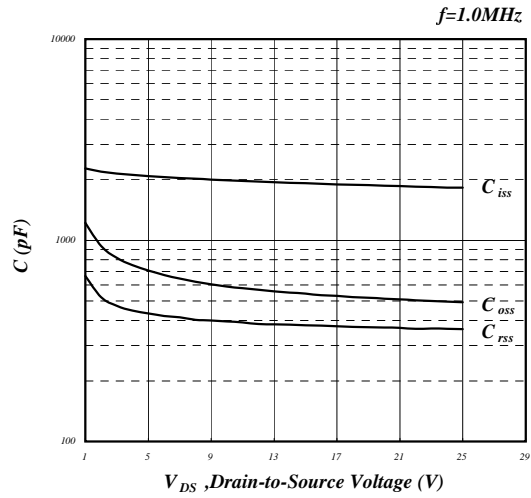


Fig 8. Typical Capacitance Characteristics

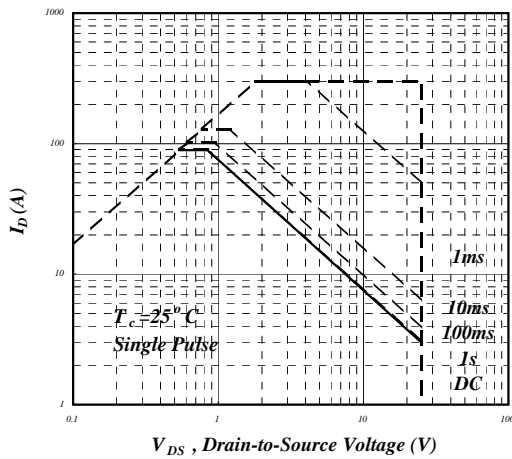


Fig 9. Maximum Safe Operating Area

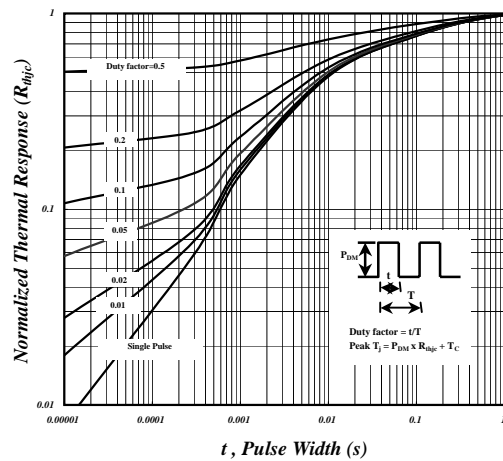


Fig 10. Effective Transient Thermal Impedance

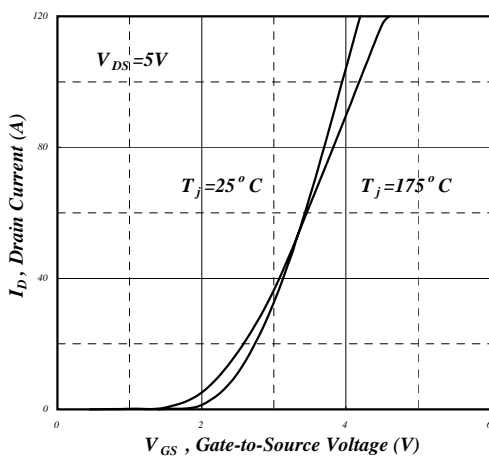


Fig 11. Transfer Characteristics

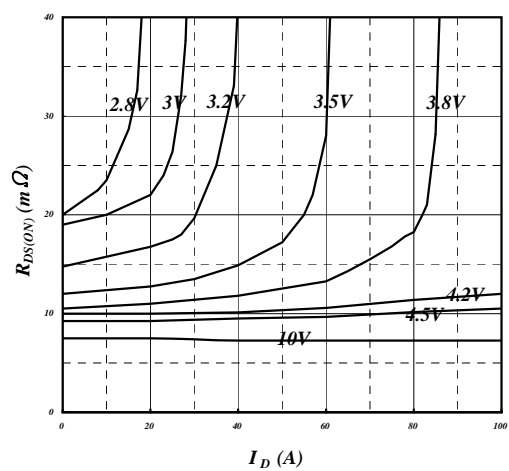
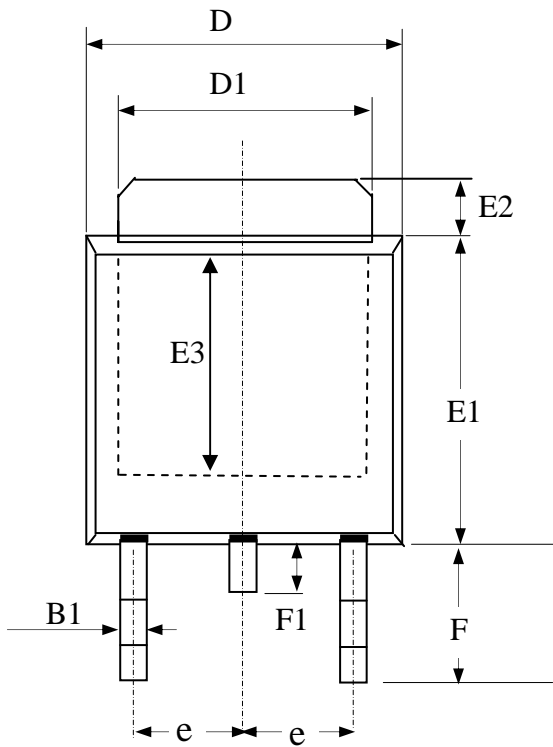


Fig 12. Drain-Source On Resistance

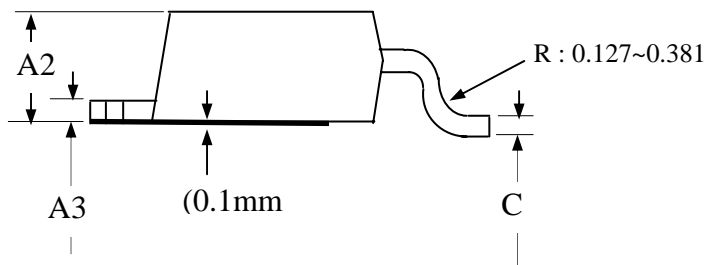


**Package Outline : TO-252**

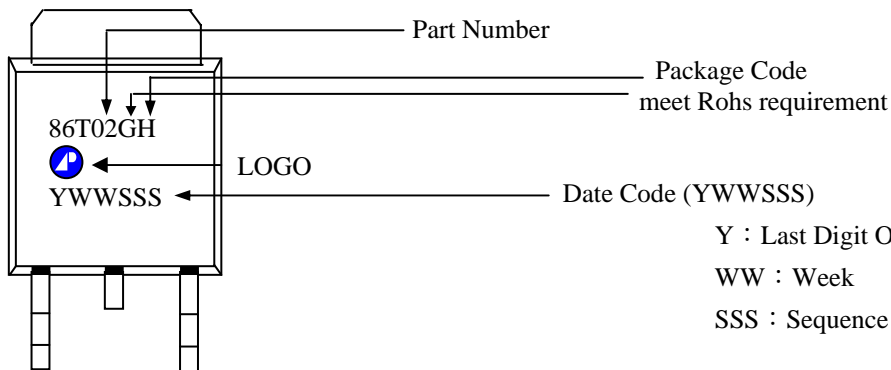


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	1.80	2.30	2.80
A3	0.40	0.50	0.60
B1	0.40	0.70	1.00
D	6.00	6.50	7.00
D1	4.80	5.35	5.90
E3	3.50	4.00	4.50
F	2.20	2.63	3.05
F1	0.5	0.85	1.20
E1	5.10	5.70	6.30
E2	0.50	1.10	1.80
e	--	2.30	--
C	0.35	0.50	0.65

- 1.All Dimensions Are in Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.

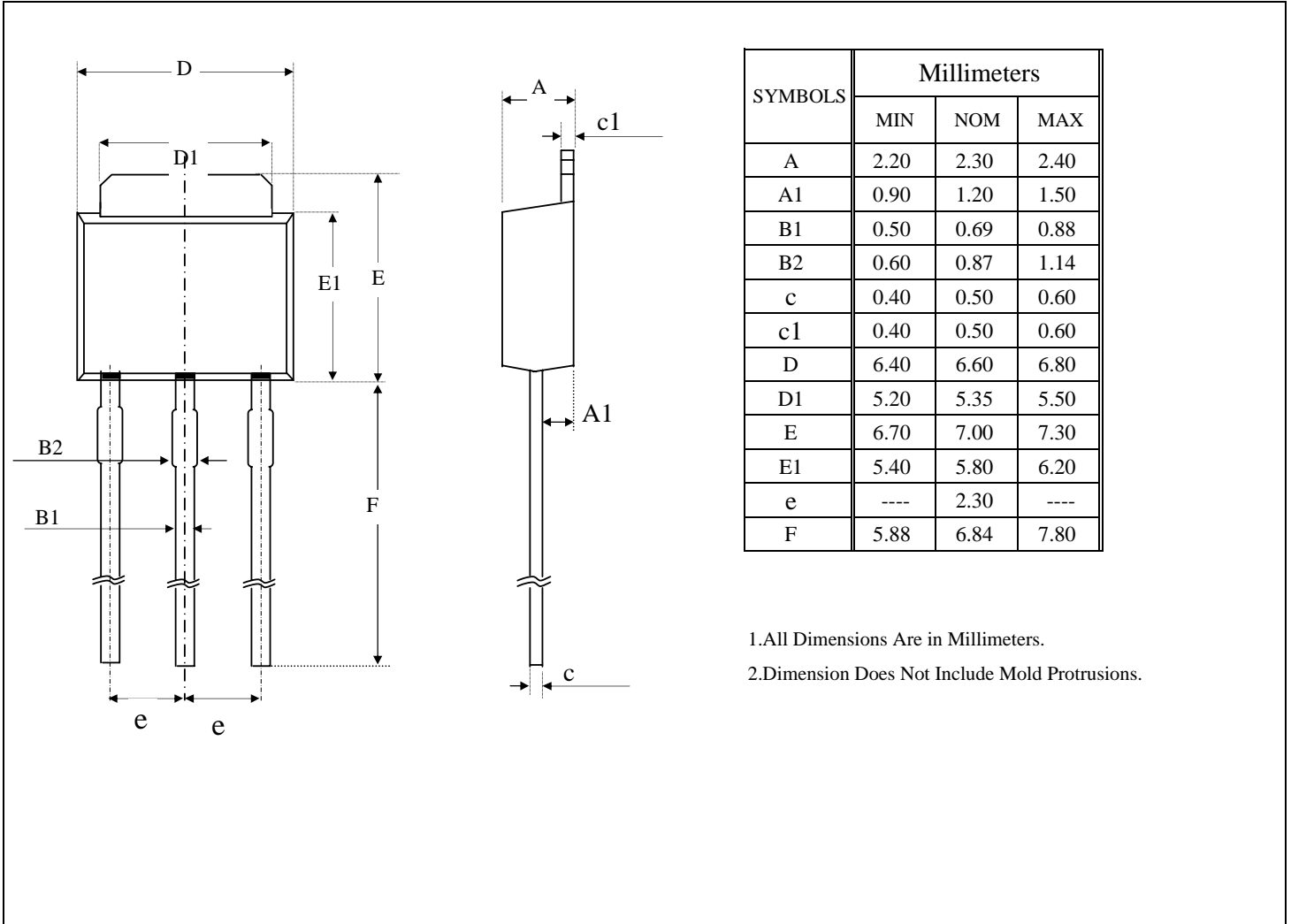


**Part Marking Information & Packing : TO-252**





Package Outline : TO-251



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