

900V 12A Advanced N-Ch Power MOSFET

FEATURES

- High Voltage : $BV_{DSS}=900V(\text{Min.})$
- Low C_{rss} : $C_{rss}=32pF(\text{Typ.})$
- Low gate charge : $Q_g=83nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.86\Omega(\text{Typ.})$

Marking Information

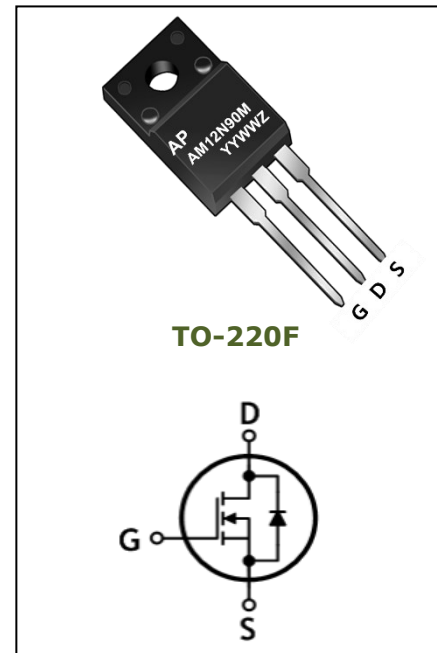
Row 1 : AP

Row 2 : Product Information

Row 3 : Date Code

- YY : Year Code

- WW : Week Code



Ordering Information

Part No	Package	Packing	Finish	Halogen	Packing Unit
AM12N90MF	TO-220F	Tube	Sn	Free	5,000ea

Maximum Ratings (Tc=25 °C, unless otherwise noted)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	900	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current (DC)*	I_D	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
Drain current (Pulsed)*	I_{DM}	40	A
Power Dissipation – TO220F	P_D	48	W
Avalanche current (Single) (Note 2)	I_{AS}	15	A
Single pulsed avalanche energy (Note 2)	E_{AS}	800	mJ
Avalanche current (Repetitive) (Note 1)	I_{AR}	12	A
Repetitive avalanche energy (Note 1)	E_{AR}	4.8	mJ
Junction temperature	T_J	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	

*Limited only maximum junction temperature

Thermal Characteristic

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 2.6	$^{\circ}\text{C/W}$
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics ($T_C=25^{\circ}\text{C}$, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DS}	$I_D = 250\mu\text{A}$, $V_{GS} = 0$	900	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$	3	-	5	V
Drain-source cut-off current	I_{DSS}	$V_{DS} = 800\text{V}$, $V_{GS} = 0\text{V}$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS} = 640\text{V}$, $V_{GS} = \pm 30\text{V}$	-	-	± 100	nA
Drain-source on-resistance (Note 4)	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 5.5\text{A}$	-	0.88	1.10	Ω
Input capacitance	C_{iss}	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	-	2650	-	pF
Output capacitance	C_{oss}		-	210	-	
Reverse transfer capacitance	C_{rss}		-	32	-	
Turn-on delay time (Note 3,4)	$T_{d(on)}$	$V_{DS} = 450\text{V}$, $I_D = 11\text{A}$, $R_G = 25\Omega$	-	66	-	ns
Rise time (Note 3,4)	T_r		-	63	-	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	195	-	
Fall time (Note 3,4)	t_f		-	74	-	
Total gate charge (Note 3,4)	Q_g	$V_{DS} = 720\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 11\text{A}$	-	83	-	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	15	-	
Gate-drain charge (Note 3,4)	Q_g		-	42	-	

Source-Drain Diode Ratings and Characteristics ($T_C=25^{\circ}\text{C}$, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	12	A
Source current (Pulsed) (Note 1)	I_{SM}		-	-	33	A
Forward voltage (Note 4)	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 10\text{A}$	-	-	1.5	V
Reverse recovery time	t_{rr}	$I_S = 10\text{A}$, $V_{GS} = 0\text{V}$	-	920	-	ns
Reverse recovery charge	Q_{rr}	$dI/dt = 100\text{A}/\mu\text{s}$	-	7.2	-	μC

Note :

1. Repetitive rating : Pulse width limited by maximum junction temperature.
2. $L=2\text{mH}$, $I_{AS}=15\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature

Typical Electrical Characteristics Curve

Fig. 1 $I_D - V_{DS}$

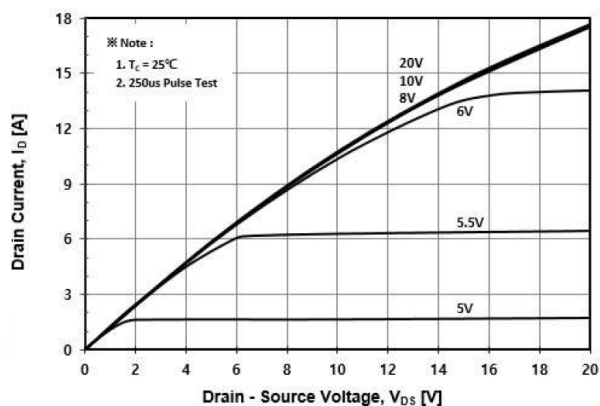


Fig. 2 $I_D - V_{GS}$

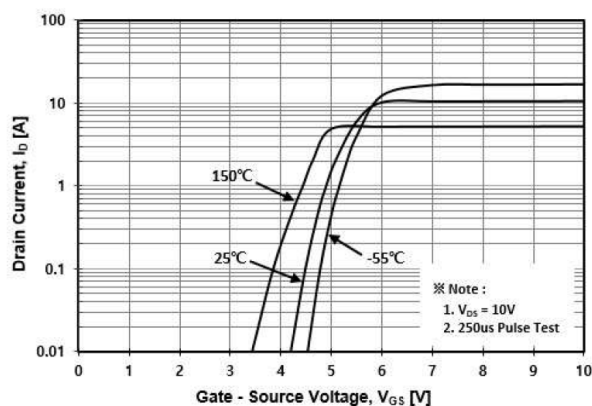


Fig. 3 $R_{DS(ON)} - I_D$

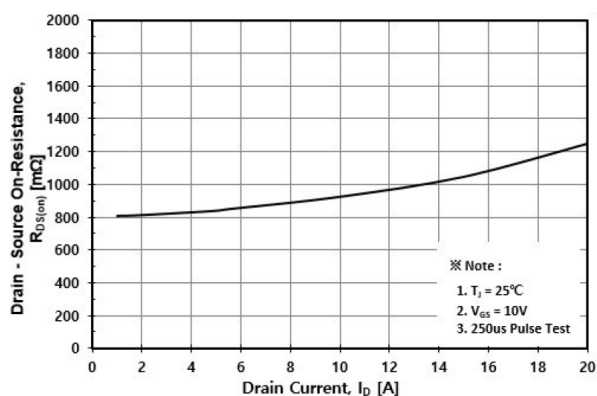


Fig. 4 $I_S - V_{SD}$

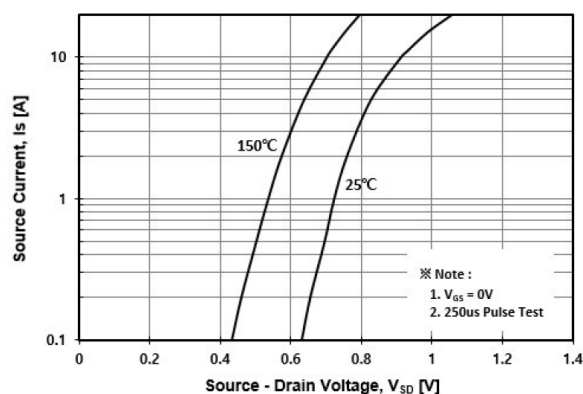


Fig. 5 Capacitance - V_{DS}

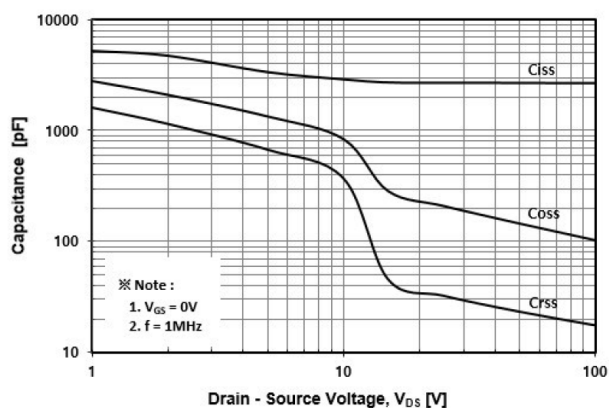
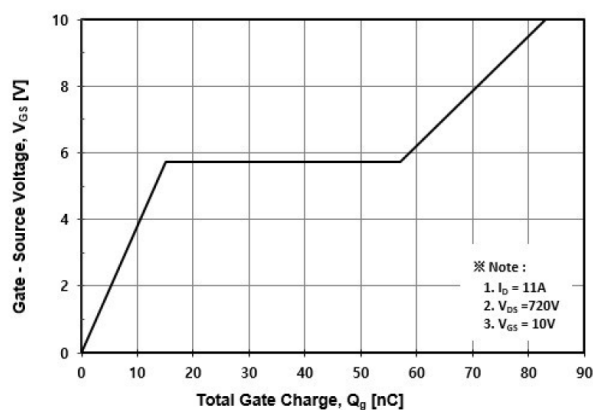


Fig. 6 $V_{GS} - Q_G$





Typical Electrical Characteristics Curve

Fig. 7 $BV_{DSS} - T_J$

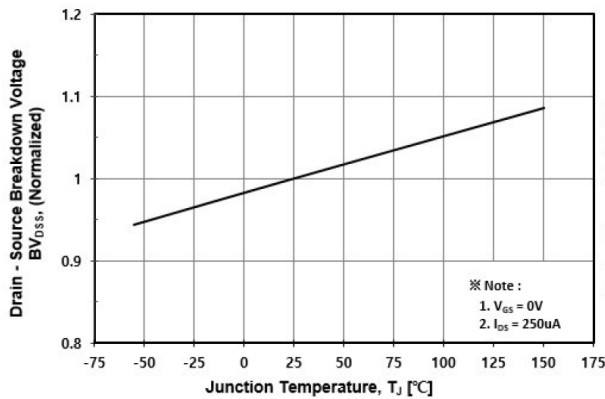


Fig. 8 $R_{DS(ON)} - T_J$

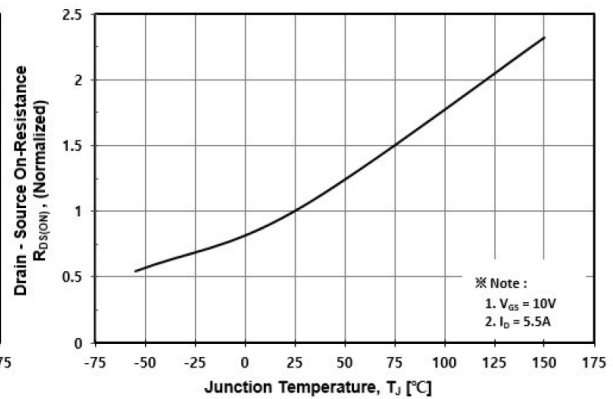


Fig. 9 $I_D - T_C$

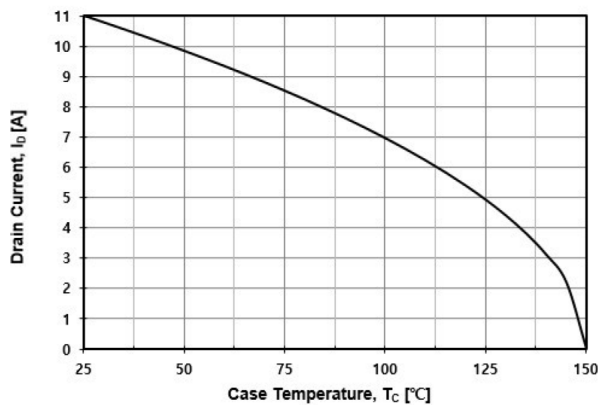


Fig. 10 Safe Operating Area

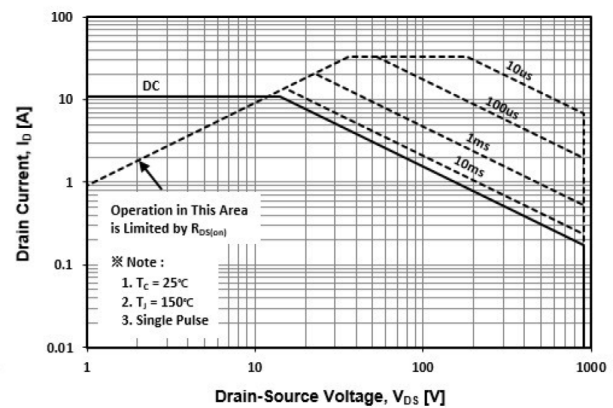


Fig. 11 Transient Thermal Impedance

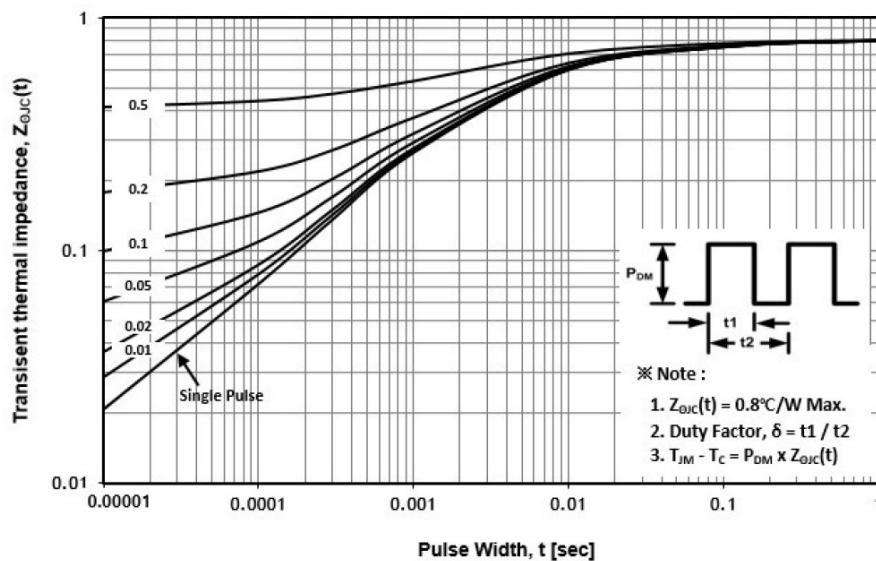




Fig. 12 Gate Charge Test Circuit & Waveform

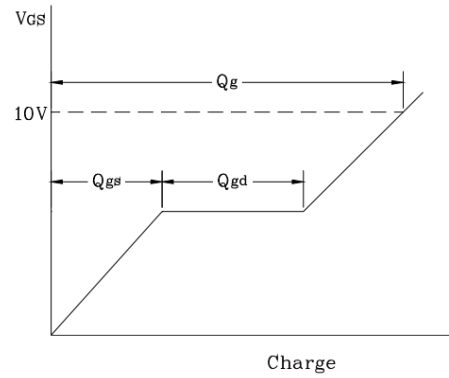
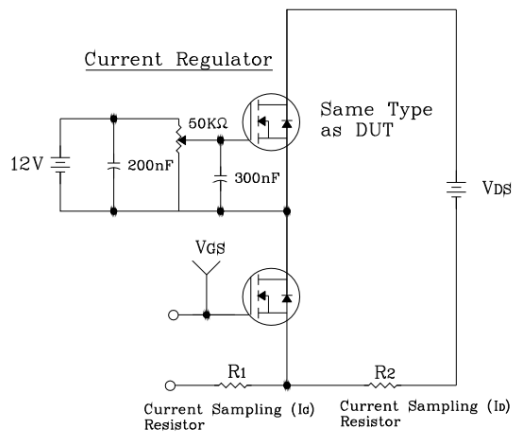


Fig. 13 Resistive Switching Test Circuit & Waveform

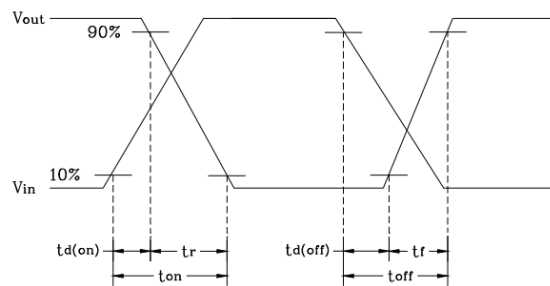
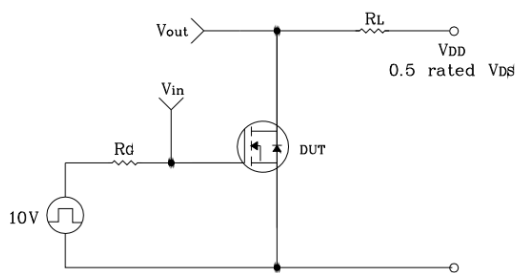


Fig. 14 EAS Test Circuit & Waveform

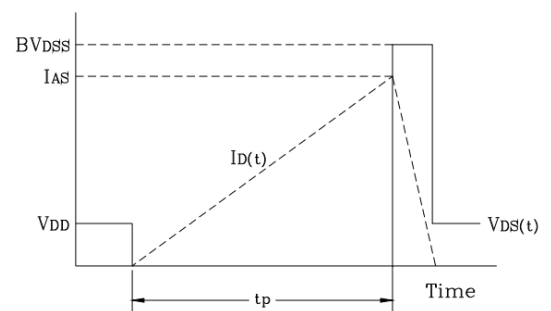
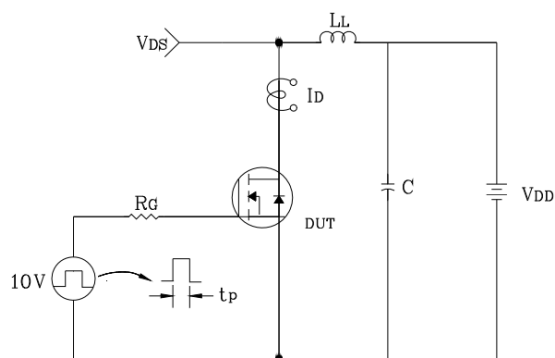
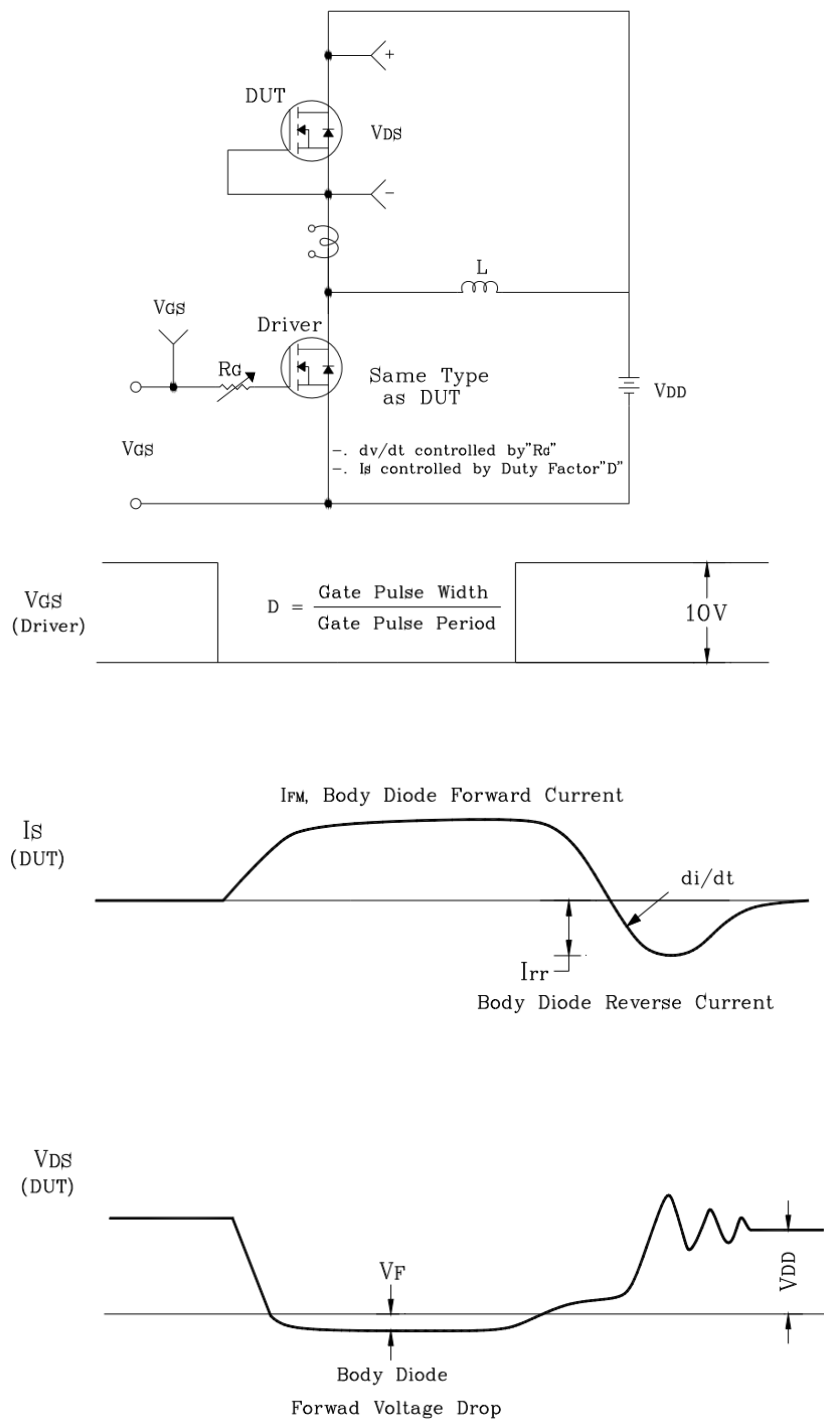




Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform

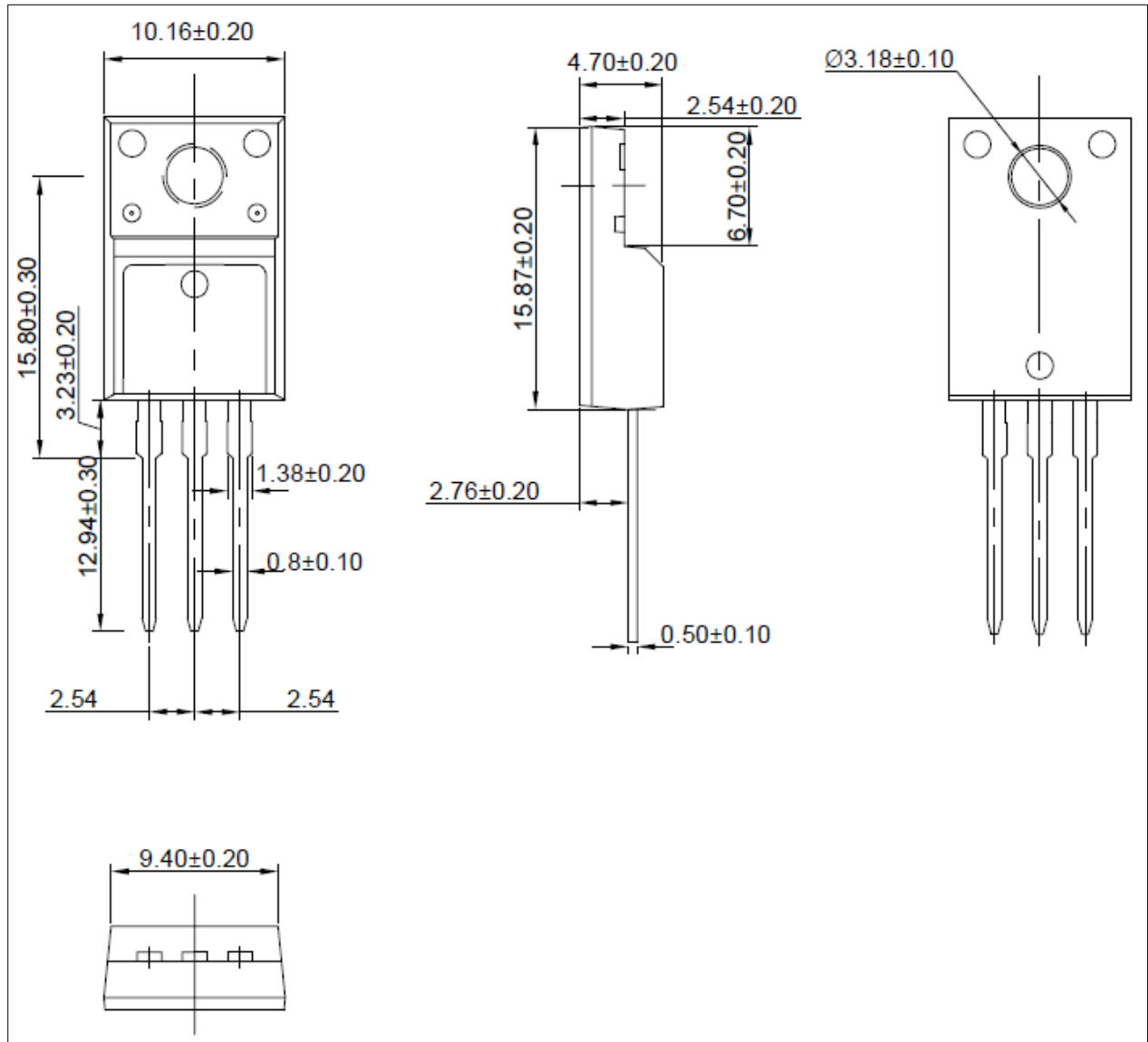




Package Dimensions

TO-220F

Unit : mm





Revision History

No	Date	Contents
0	2023-11-13	Initial Brief Datasheet Release

<http://www.apsemi.com>

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