



## DESCRIPTION

AM2144 is available in a TO-220 package.

## ORDERING INFORMATION

Package Type	Part Number	
TO-220 SPQ: 50pcs/Tube	T3	AM2144T3U
		AM2144T3VU
Note	V: Halogen free Package U: Tube	
AiT provides all RoHS products		

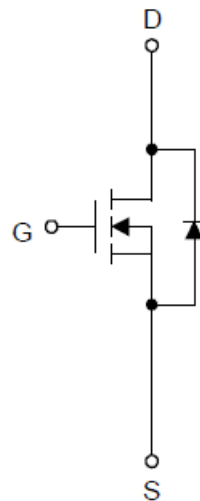
## FEATURES

- 40V/120A,  
 $R_{DS(ON)} = 1.9m\Omega$  (max.) @  $V_{GS} = 10V$
- 100% UIS +  $R_g$  Tested
- Reliable and Rugged
- Lower  $R_{DS(ON)}$  to Minimize Conduction Losses
- Available in a TO-220 package.

## APPLICATION

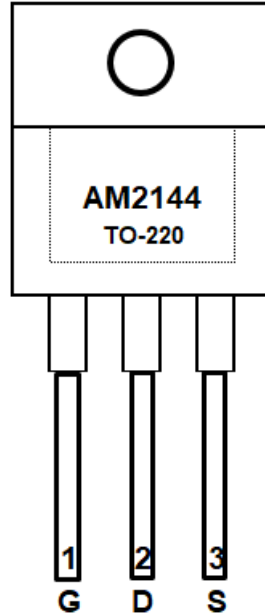
- SMPS Synchronous Rectification
- Load Switch
- DC-DC Conversion
- Or-ing

## PIN DESCRIPTION





## PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source



## ABSOLUTE MAXIMUM RATINGS

T<sub>A</sub> = 25°C, unless otherwise noted

V <sub>DSS</sub> , Drain-Source Voltage		40V
V <sub>GSS</sub> , Gate-Source Voltage		±20V
T <sub>J</sub> , Maximum Junction Temperature		175°C
T <sub>STG</sub> , Storage Temperature Range		-55°C~+175°C
I <sub>S</sub> , Diode Continuous Forward Current <sup>NOTE1</sup>	T <sub>C</sub> =25°C	90A
I <sub>D</sub> , Continuous Drain Current <sup>NOTE1</sup>	T <sub>C</sub> =25°C	120A
	T <sub>C</sub> =100°C	120A
I <sub>DM</sub> , Pulsed Drain Current <sup>NOTE2</sup>	T <sub>C</sub> =25°C	400A
P <sub>D</sub> , Maximum Power Dissipation	T <sub>C</sub> =25°C	176W
	T <sub>C</sub> =100°C	88W
R <sub>θJC</sub> , Thermal Resistance-Junction to Case	Steady State	0.85°C/W
I <sub>S</sub> , Diode Continuous Forward Current <sup>NOTE3</sup>	T <sub>A</sub> =25°C	2.2A
I <sub>D</sub> , Continuous Drain Current <sup>NOTE3</sup>	T <sub>A</sub> =25°C	29A
	T <sub>A</sub> =70°C	24.3A
I <sub>DM</sub> , Pulsed Drain Current <sup>NOTE2</sup>	T <sub>A</sub> =25°C	116A
P <sub>D</sub> , Maximum Power Dissipation <sup>NOTE3</sup>	T <sub>A</sub> =25°C	2.4W
	T <sub>A</sub> =70°C	1.7W
R <sub>θJA</sub> , Thermal Resistance-Junction to Ambient <sup>NOTE3</sup>	t ≤ 10s	15°C/W
	Steady-State	62.5°C/W
I <sub>AS</sub> , Avalanche Current, Single pulse <sup>NOTE4</sup>	L=0.5mH	45A
E <sub>AS</sub> , Avalanche Energy, Single pulse <sup>NOTE4</sup>	L=0.5mH	506mJ

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1 : Maximum continue current is limited by bonding wire.

NOTE2 : Pulse width is limited by maximum junction temperature 175°C.

NOTE3 : R<sub>θJA</sub> steady state t=999s.

NOTE4 : UIS tested and pulse width limited by maximum junction temperature 175°C (Initial temperature T<sub>J</sub>=25°C).



## ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ.	Max	Units
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C	-	-	1	μA
			-	-	30	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Drain-Source On-state Resistance <sup>NOTE5</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A T <sub>J</sub> =125°C	-	1.6	1.9	mΩ
			-	2.4	-	
Forward Transconductance	G <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>DS</sub> =20A	-	3.5	-	S
<b>Diode Characteristics</b>						
Diode Forward Voltage <sup>NOTE5</sup>	V <sub>SD</sub>	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	-	0.78	1.1	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>SD</sub> =25A, dI <sub>SD</sub> /dt=100A/μs, V <sub>DD</sub> =20V	-	61	-	ns
Charge Time	t <sub>a</sub>		-	31	-	
Discharge Time	t <sub>b</sub>		-	30	-	
Reverse Recovery Charge	Q <sub>rr</sub>		-	67	-	
<b>Dynamic Characteristics<sup>NOTE6</sup></b>						
Gate Resistance	R <sub>G</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	0.6	0.9	2	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, Frequency=1.0MHz	-	5230	-	pF
Output Capacitance	C <sub>oss</sub>		-	2000	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	175	-	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, R <sub>L</sub> =20Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =1Ω	-	18.8	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	9.8	-	
Turn-off Delay Time	t <sub>d(off)</sub>		-	50	-	
Turn-off Fall Time	t <sub>f</sub>		-	90.8	-	
<b>Gate Charge Characteristics<sup>NOTE6</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>DS</sub> =25A	-	88.98	-	nC
Threshold Gate Charge	Q <sub>gth</sub>		-	15.84	-	
Gate-Source Charge	Q <sub>gs</sub>		-	24.75	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	15.63	-	

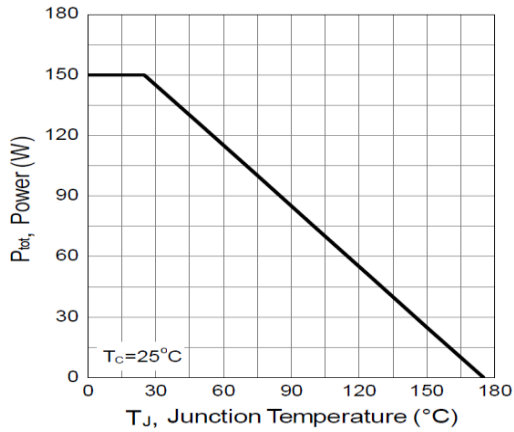
NOTE5: Pulse test ; pulse width≤300μs, duty cycle≤2%.

NOTE6: Guaranteed by design, not subject to production testing.

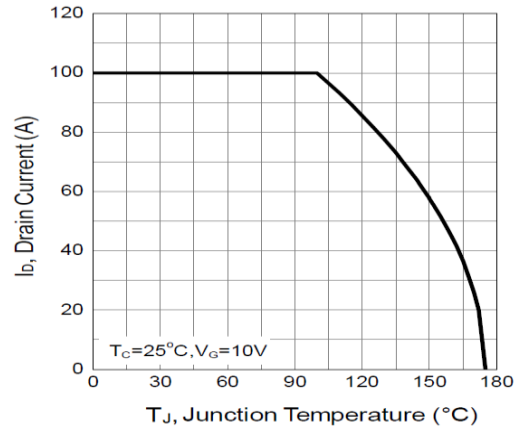


## TYPICAL CHARACTERISTICS

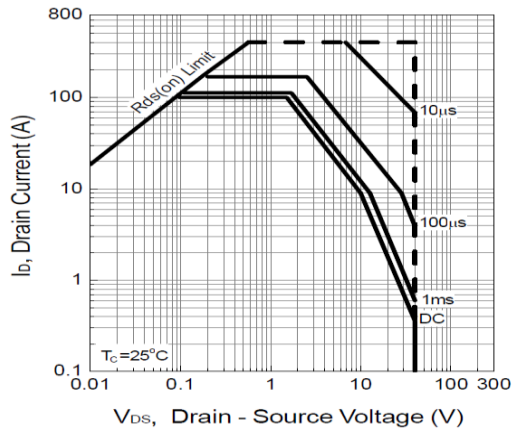
### 1. Power Dissipation



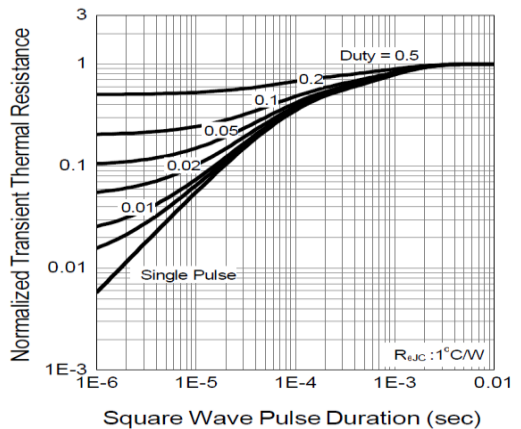
### 2. Drain Current



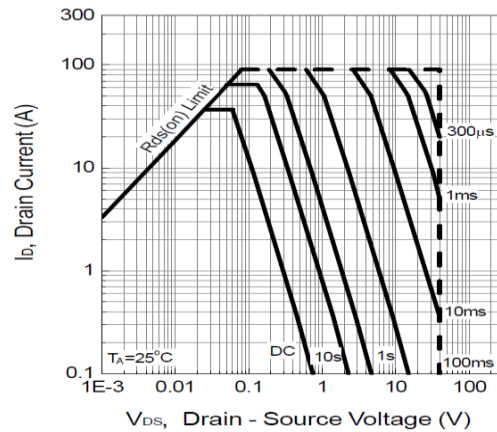
### 3. Safe Operation Area



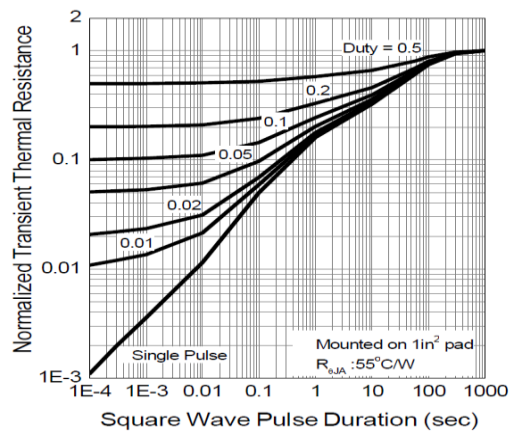
### 4. Thermal Transient Impedance



### 5. Safe Operation Area

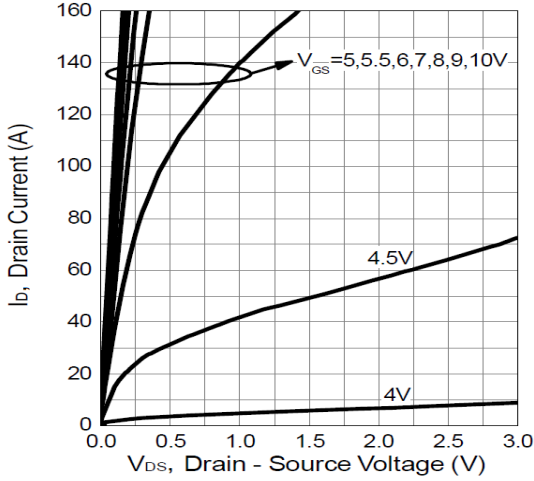


### 6. Thermal Transient Impedance

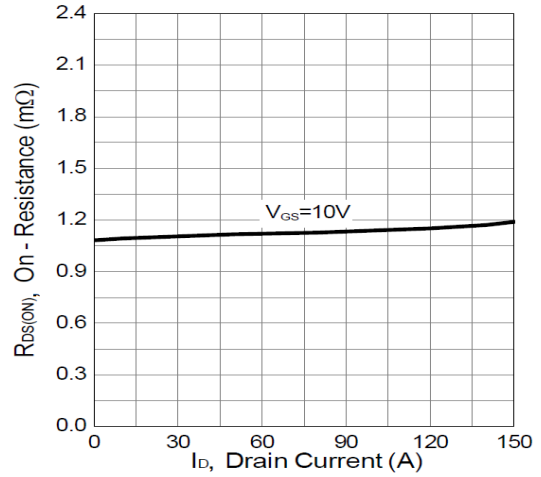




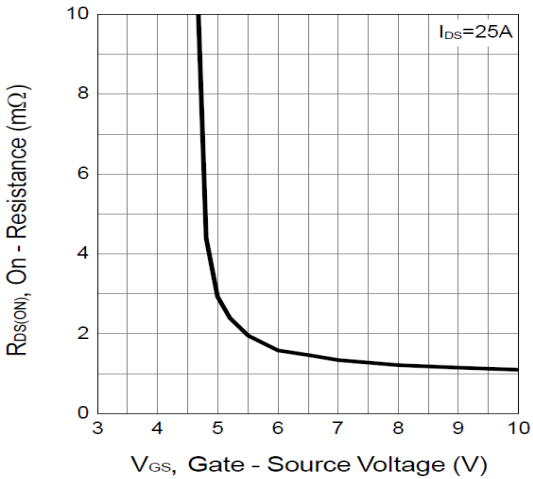
7. Output Characteristics



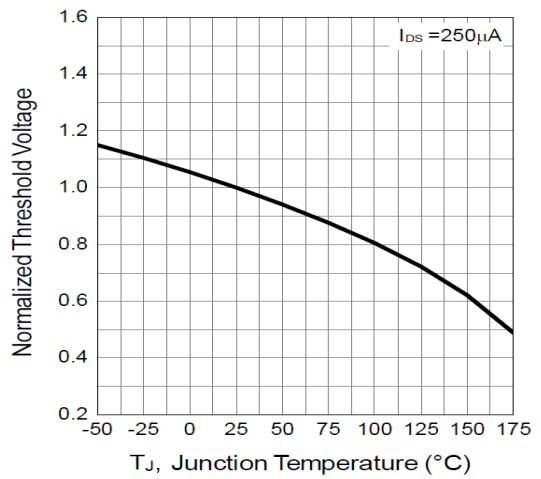
8. Drain-Source On Resistance



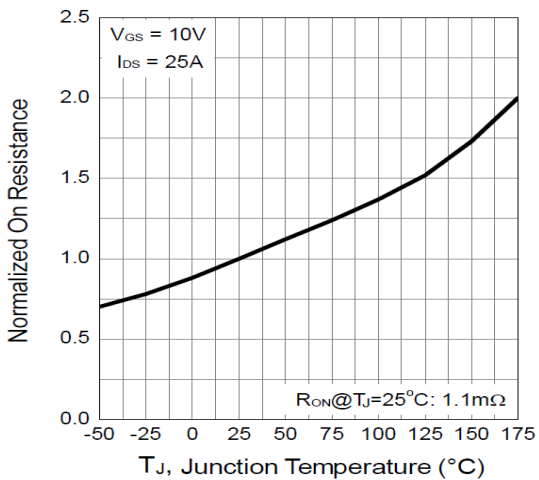
9. Gate-Source On Resistance



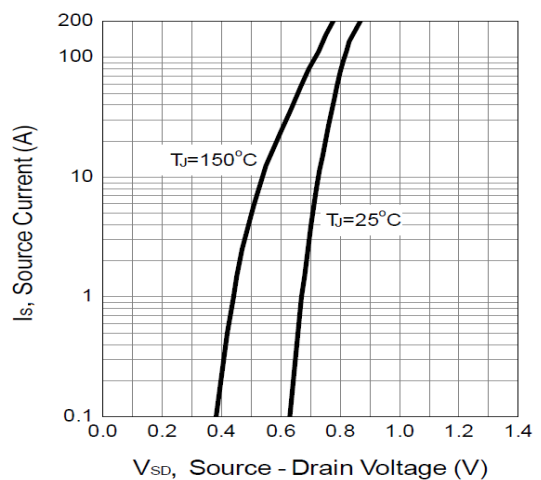
10. Gate Threshold Voltage



11. Drain-Source On Resistance

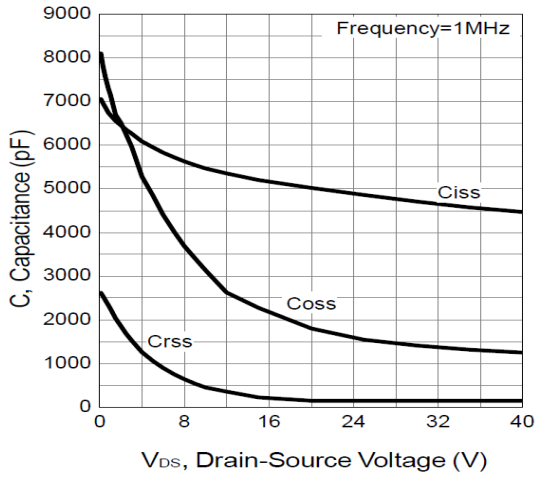


12. Source-Drain Diode Forward

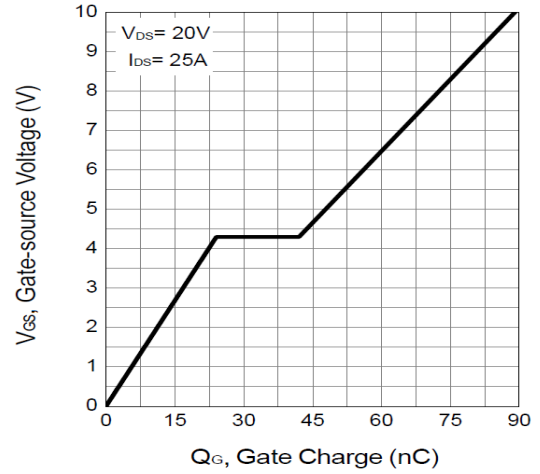




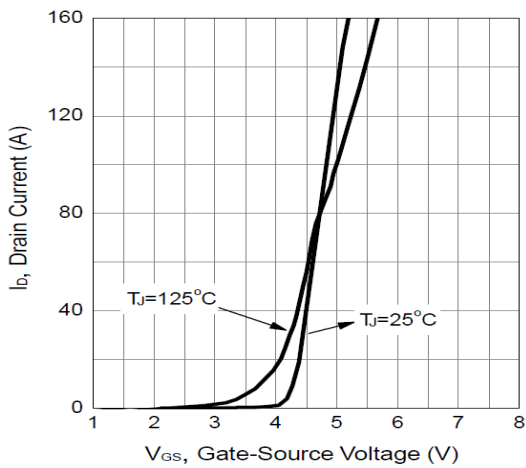
### 13. Capacitance



### 14. Gate Charge

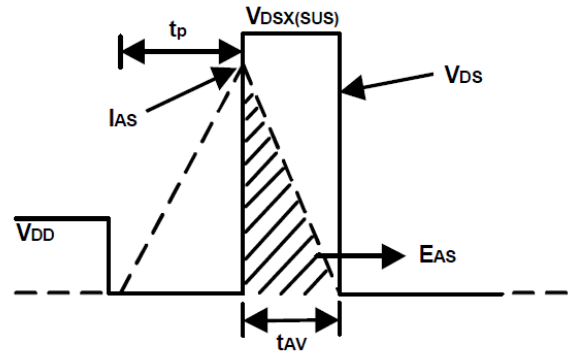
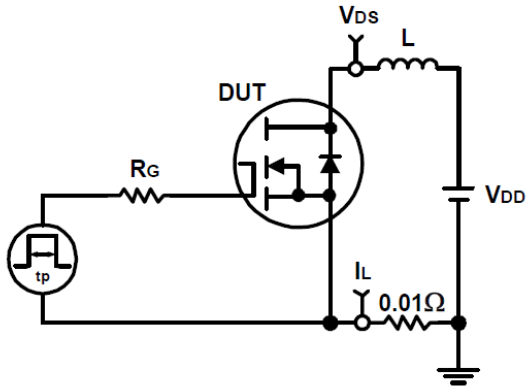


### 15. Transfer Characteristics

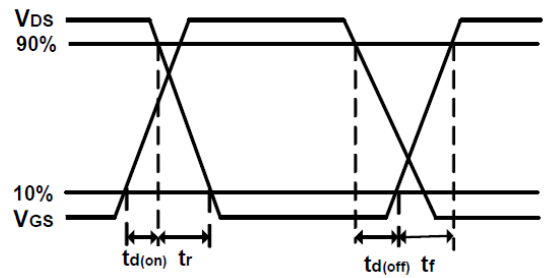
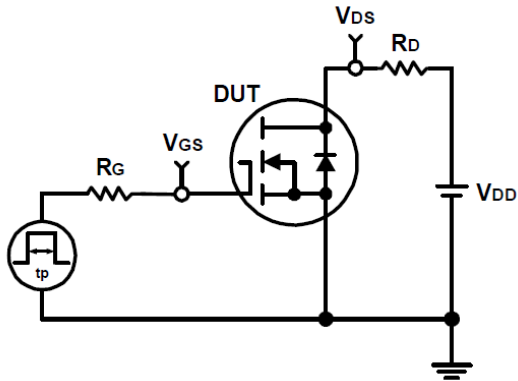




### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms

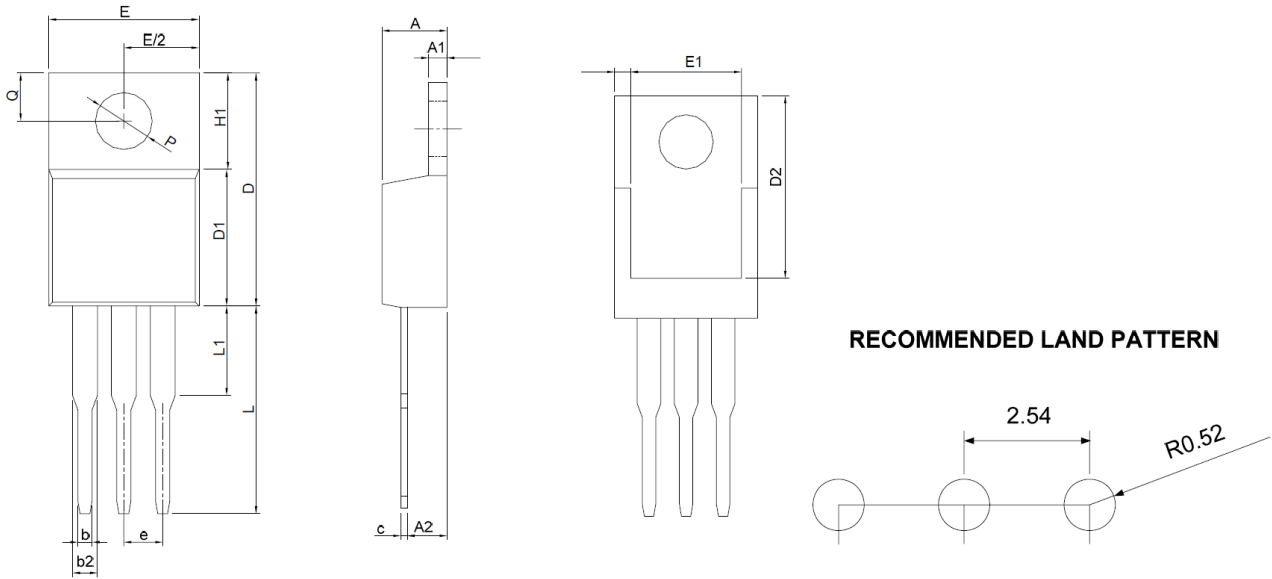






**PACKAGE INFORMATION**

Dimension in TO-220 (Unit: mm)



UNIT: mm

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.30	0.330	0.366
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135



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