



**DESCRIPTION**

The AM04N150 is available in TO-220, TO-220F, TO-3PN, TO-3PF, TO-247 Packages

BVDSS	RDSON	ID
1500V	4Ω	4A

**APPLICATIONS**

- High Frequency Switching Mode Power Supply

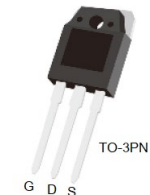
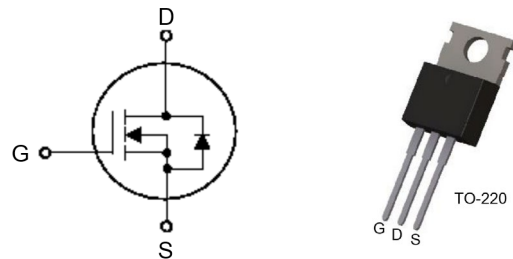
**ORDERING INFORMATION**

Package Type	Part Number	
TO-220 SPQ: 50pcs/Tube	T3	AM04N150T3U
		AM04N150T3VU
TO-220F SPQ: 50pcs/Tube	T3F	AM04N150T3FU
		AM04N150T3FVU
TO-3PN SPQ: 30pcs/Tube	TX	AM04N150TXU
		AM04N150TXVU
TO-3PF SPQ: 30pcs/Tube	TXF	AM04N150TXFU
		AM04N150TXFVU
TO-247 SPQ: 30pcs/Tube	TL3F	AM04N150TL3FU
		AM04N150TL3FVU
Note	V: Halogen free Package	
	U: Tube	
AiT provides all RoHS products		

**FEATURE**

- Fast Switching
- Low Crss
- 100% avalanche tested
- Improved dv/dt capability

**PIN DESCRIPTION**



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

**ABSOLUTE MAXIMUM RATINGS** $T_C = 25^\circ\text{C}$ , unless otherwise specified.

$V_{DS}$ , Drain-to-Source Voltage		1500V
$I_D$ , Continuous Drain Current		4A
$I_D$ , Continuous Drain Current $T_C = 100^\circ\text{C}$		2.52A
$I_{DM}$ , Pulsed Drain Current <sup>(1)</sup>		16A
$V_{GS}$ , Gate-to-Source Voltage		$\pm 30\text{V}$
$E_{AS}$ , Single Pulse Avalanche Energy <sup>(2)</sup>		450mJ
$dv/dt$ , Peak Diode Recovery $dv/dt$ <sup>(3)</sup>		5V/ns
$P_D$ , Power Dissipation	TO-220, TO-3PN, TO-247	200W
	TO-220F, TO-3PF	63W
$P_D$ , Derating Factor above $25^\circ\text{C}$	TO-220, TO-3PN, TO-247	1.6W/ $^\circ\text{C}$
	TO-220F, TO-3PF	0.5W/ $^\circ\text{C}$
$T_J$ , Operating Junction Temperature Range		$150^\circ\text{C}$
$T_{STG}$ , Storage Temperature Range		$-55^\circ\text{C} \sim +150^\circ\text{C}$
$T_L$ , Maximum Temperature for Soldering		$300^\circ\text{C}$
$R_{\theta JA}$ , Junction-to-Ambient	TO-220, TO-3PN	62.5 $^\circ\text{C}/\text{W}$
	TO-220F, TO-3PF	62.5 $^\circ\text{C}/\text{W}$
$R_{\theta JC}$ , Junction-to-Case	TO-220, TO-3PN	0.63 $^\circ\text{C}/\text{W}$
	TO-220F, TO-3PF	2.00 $^\circ\text{C}/\text{W}$

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1) Pulse width limited by maximum junction temperature

(2)  $L=10\text{mH}$ ,  $V_{DS}=50\text{V}$ , Start  $T_J=25^\circ\text{C}$

(3)  $I_{SD}=4\text{A}$ ,  $di/dt \leq 100\text{A}/\mu\text{s}$ ,  $V_{DD} \leq B_{VDS}$ , Start  $T_J=25^\circ\text{C}$



**ELECTRICAL CHARACTERISTICS**

T<sub>c</sub> = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
<b>OFF Characteristics</b>						
Drain to Source Breakdown Voltage	V <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	1500	-	-	V
BV <sub>DSS</sub> Temperature Coefficient	ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	I <sub>D</sub> =250μA Reference 25°C	-	1.2	-	V/°C
Drain to Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =1500V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	10	μA
		V <sub>DS</sub> =1200V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	500	
Gate to Source Forward Leakage	I <sub>GSS(F)</sub>	V <sub>GS</sub> =+30V	-	-	100	nA
Gate to Source Reverse Leakage	I <sub>GSS(R)</sub>	V <sub>GS</sub> =-30V	-	-	100	nA
<b>ON Characteristics</b>						
Drain-to-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =2A *	-	4.0	5.5	Ω
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA*	3.0	-	5.0	V
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =2A*	-	5.0	-	S
<b>Dynamic Characteristics</b>						
Gate Resistance	R <sub>g</sub>	f=1.0MHz	-	2.8	-	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz	-	1910	-	pF
Output Capacitance	C <sub>oss</sub>		-	115	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	4.8	-	
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(ON)</sub>	I <sub>D</sub> =4A, V <sub>DD</sub> =750V, V <sub>GS</sub> =10V, R <sub>G</sub> =4Ω	-	35	-	ns
Rise Time	t <sub>r</sub>		-	28	-	
Turn-Off Delay Time	t <sub>d(OFF)</sub>		-	41	-	
Fall Time	t <sub>f</sub>		-	43	-	
Total Gate Charge	Q <sub>g</sub>	I <sub>D</sub> =4A, V <sub>DD</sub> =1200V, V <sub>GS</sub> =10V	-	39	-	nC
Gate to Source Charge	Q <sub>gs</sub>		-	10	-	
Gate to Drain ("Miller") Charge	Q <sub>gd</sub>		-	15	-	
<b>Source-Drain Diode Characteristics</b>						
Continuous Source Current (Body Diode)	I <sub>S</sub>	T <sub>c</sub> =25°C	-	-	4	A
Maximum Pulsed Current (Body Diode)	I <sub>SM</sub>		-	-	16	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =4A, V <sub>GS</sub> =0V *	-	-	1.2	V
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =4A, T <sub>J</sub> =25°C dIF/dt =100A/μs, V <sub>GS</sub> =0V	-	526	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	3182	-	nC
Reverse Recovery Current	I <sub>rrm</sub>		-	12.1	-	A

\* Pulse width tp≤300μs, δ≤2%



**TYPICAL PERFORMANCE CHARACTERISTICS**

Fig 1. Safe Operating Area (TO-220)

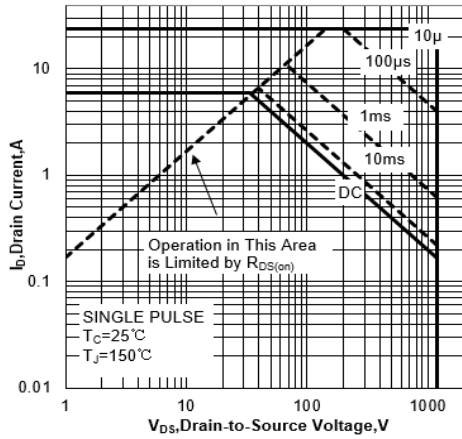


Fig 2. Safe Operating Area (TO-220F)

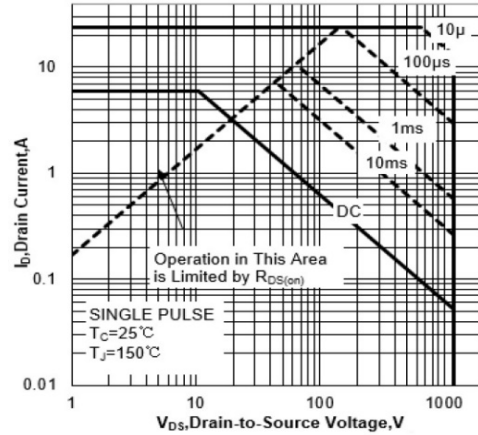


Fig 3. Power Dissipation (TO-220)

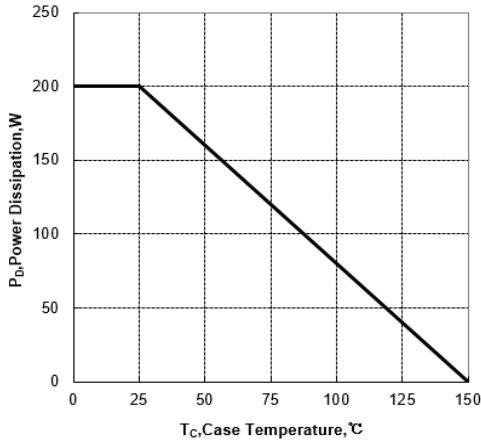


Fig 4. Power Dissipation (TO-220F)

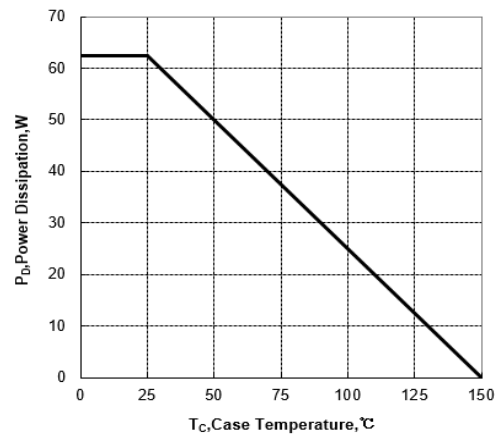


Fig 5. Max Thermal Impedance (TO-220)

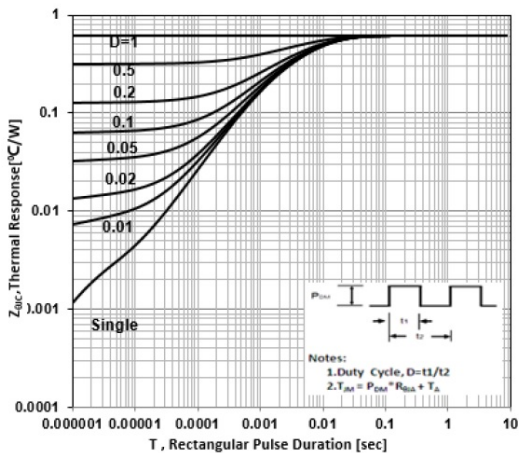


Fig 6. Max Thermal Impedance (TO-220F)

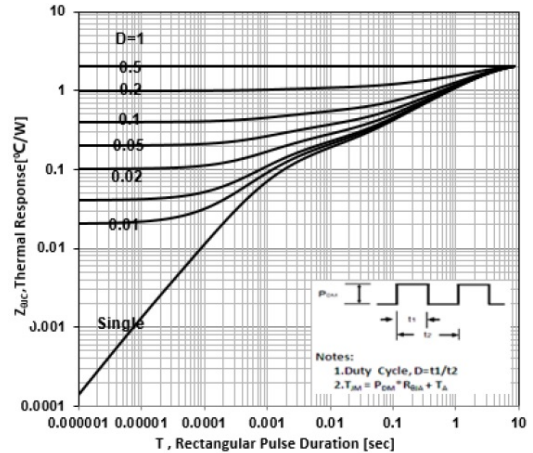




Fig 7. Typical Output Characteristics

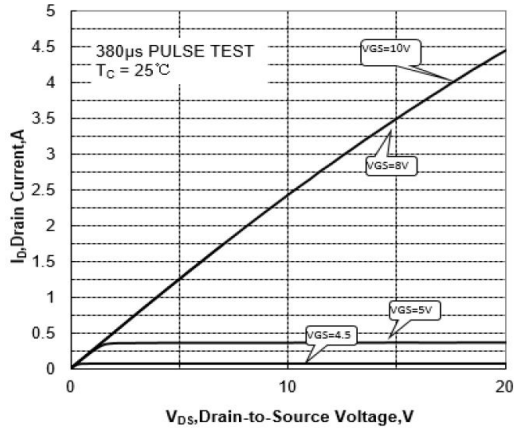


Fig 8. Typical Transfer Characteristics

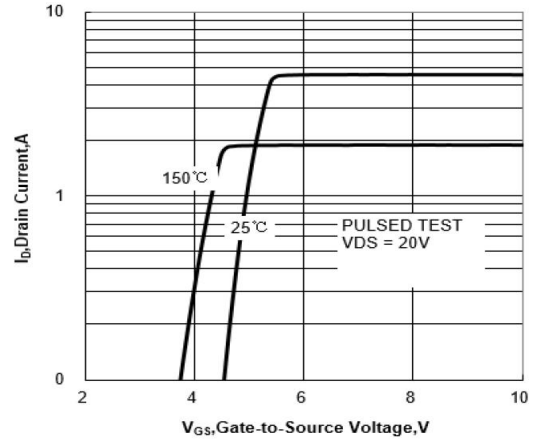


Fig 9. Typical Drain to Source ON Resistance vs. Drain Current

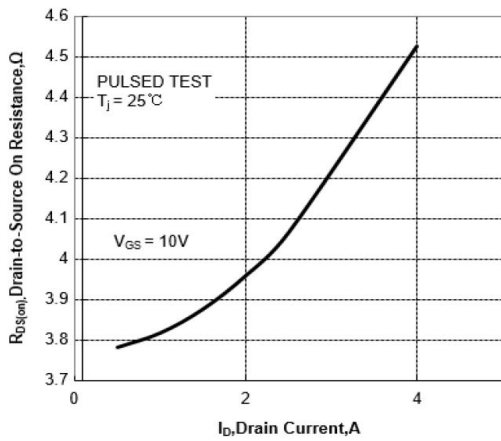


Fig 10. Typical Drain to Source on Resistance vs. Junction Temperature

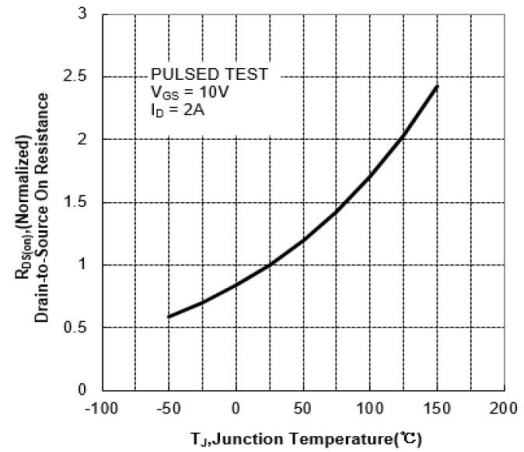


Fig 11. Typical Threshold Voltage vs. Junction Temperature

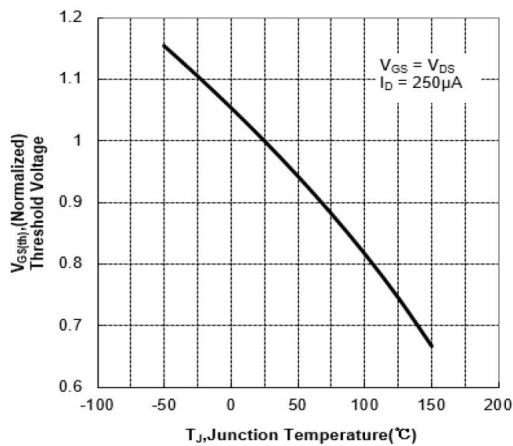


Fig 12. Typical Breakdown Voltage vs. Junction Temperature

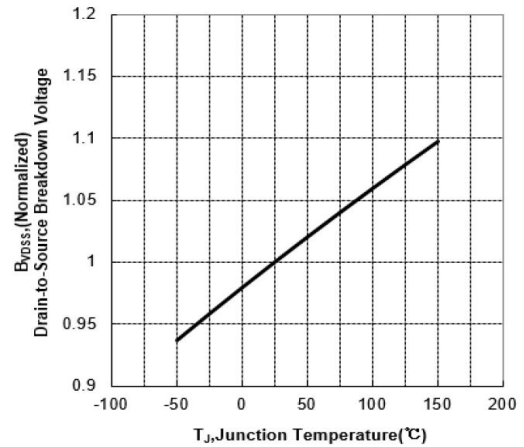




Fig 13. Typical Threshold Voltage vs. Junction Temperature

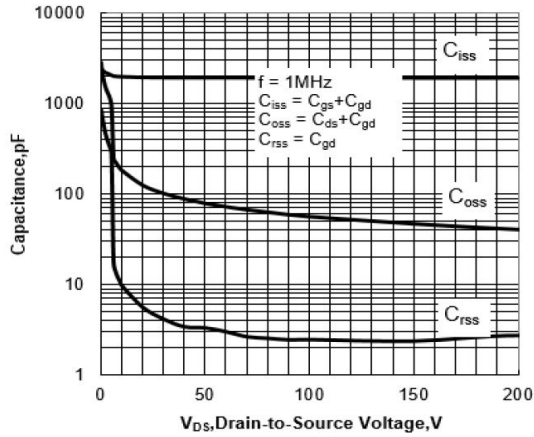


Fig 14. Typical Breakdown Voltage vs. Junction Temperature

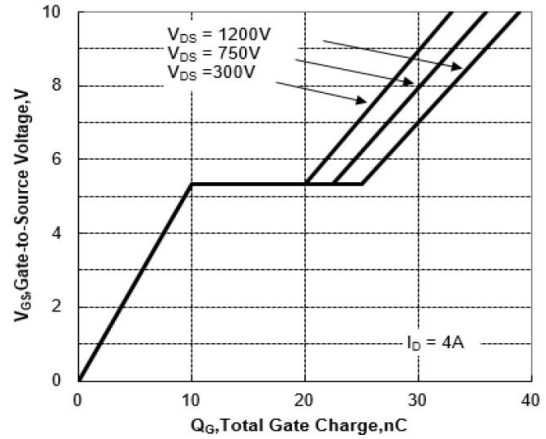


Fig 15. Gate Charge Test Circuit

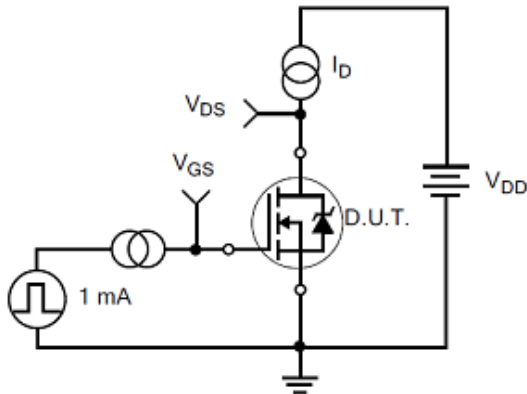


Fig 16. Gate Charge Waveforms

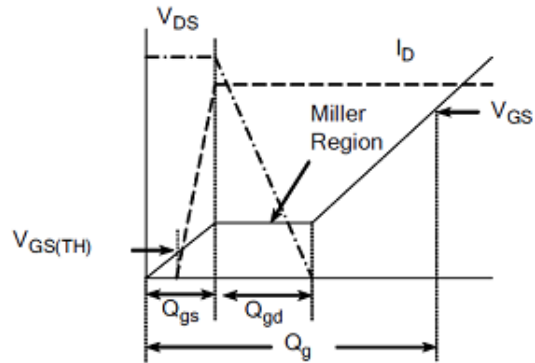


Fig 17. Resistive Switching Test Circuit

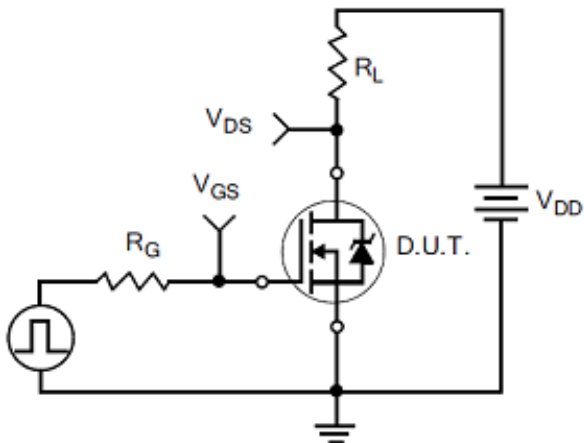


Fig 18. Resistive Switching Waveforms

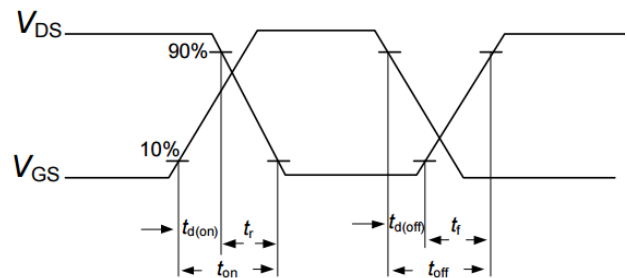




Fig 19. Diode Reverse Recovery Test Circuit

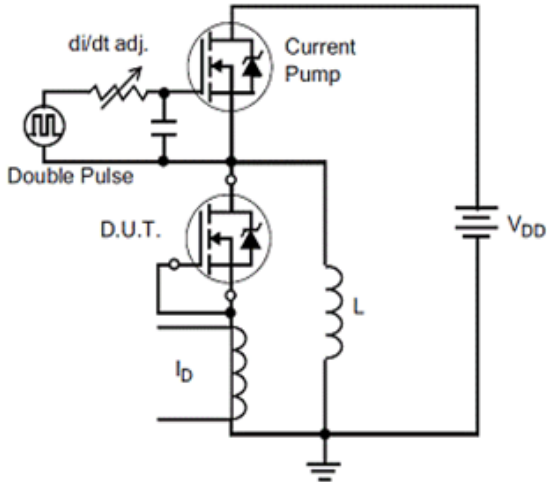


Fig 20. Diode Reverse Recovery Waveform

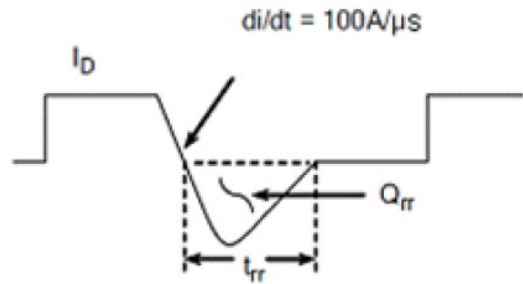


Fig 21. Unclamped Inductive Switching Test Circuit

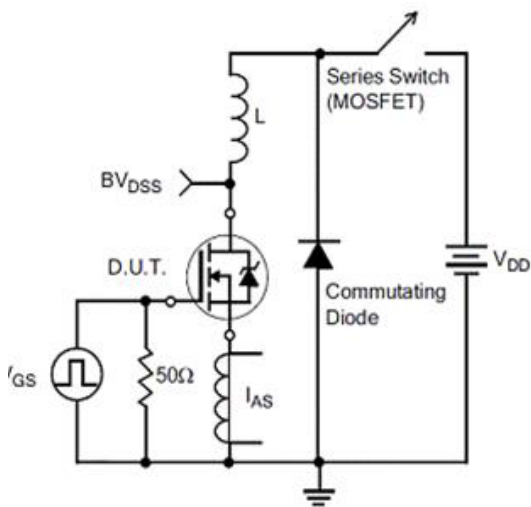
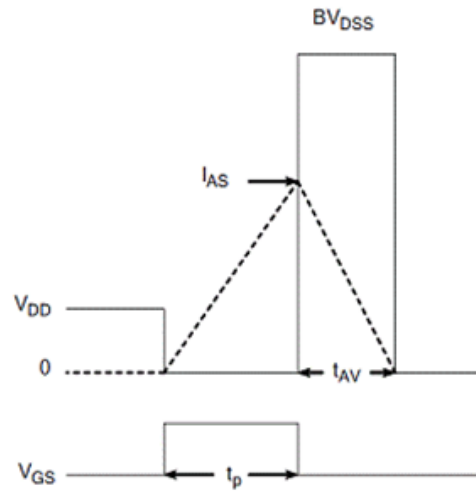


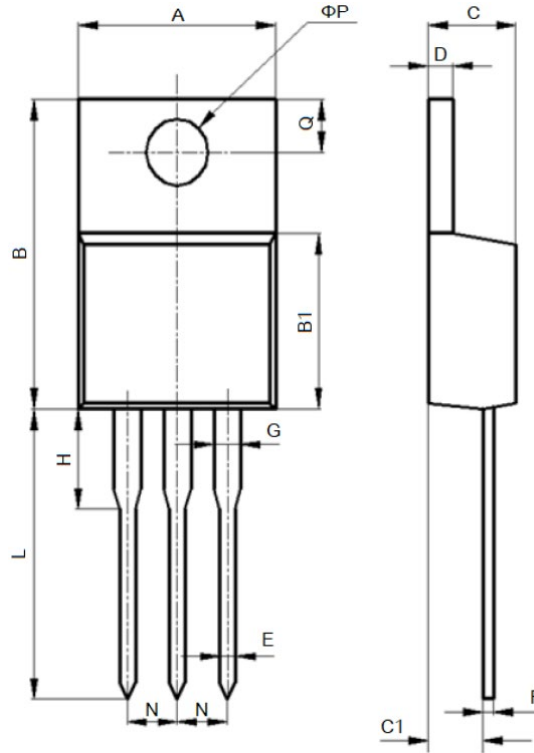
Fig 22. Unclamped Inductive Switching Waveform





## PACKAGE INFORMATION

Dimension in TO-220 (Unit: mm)

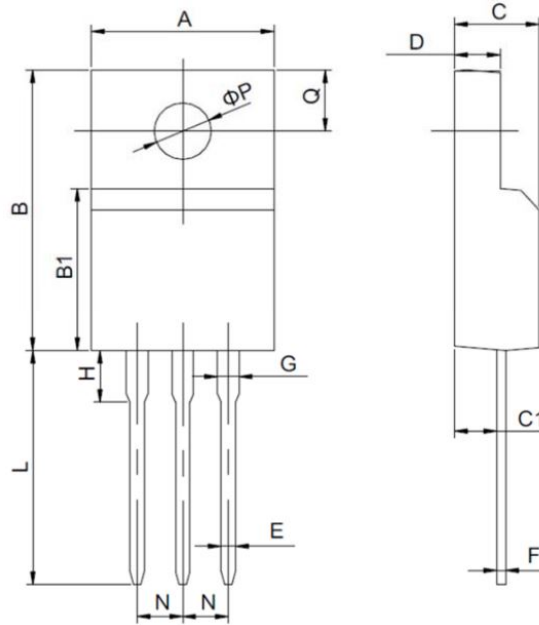


Symbol	Min.	Max.
A	9.600	10.600
B	15.000	16.000
B1	8.900	9.500
C	4.300	4.800
C1	2.300	3.100
D	1.200	1.400
E	0.700	0.900
F	0.300	0.600
G	1.170	1.370
H	2.700	3.800
L	12.600	14.800
N	2.340	2.740
Q	2.400	3.000
ΦP	3.500	3.900





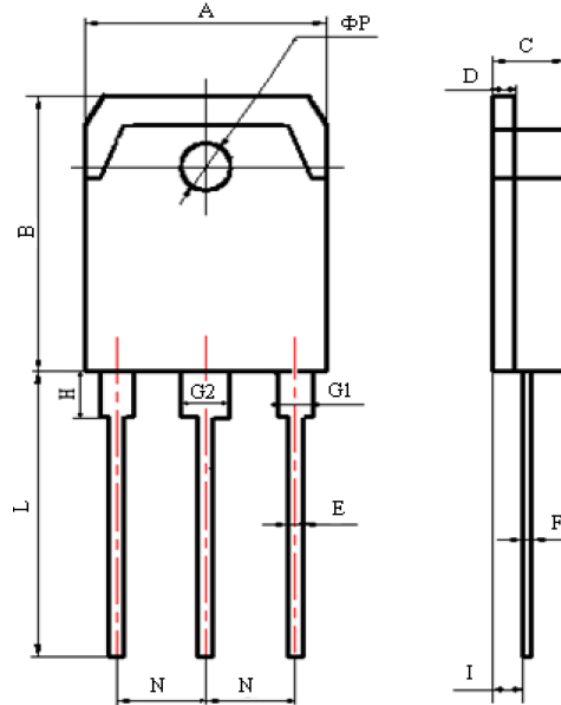
Dimension in TO-220F (Unit: mm)



Symbol	Min.	Max.
A	9.600	10.400
B	15.400	16.200
B1	8.900	9.500
C	4.300	4.900
C1	2.100	3.000
D	2.400	3.000
E	0.600	1.000
F	0.300	0.600
G	1.120	1.420
H	1.600	3.800
L	12.000	14.000
N	2.340	2.740
Q	3.150	3.550
ΦP	2.900	3.300



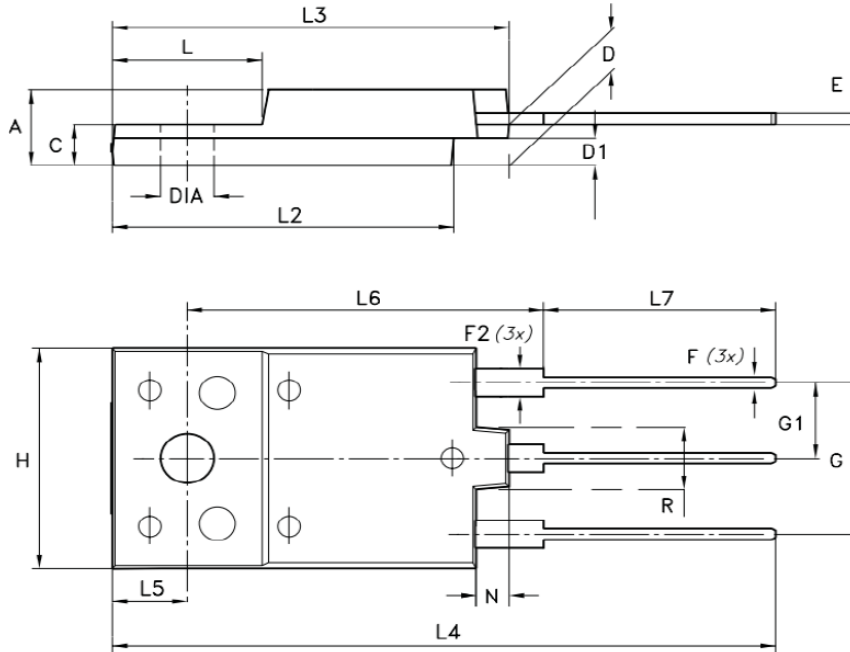
Dimension in TO-3PN (Unit: mm)



Symbol	Min.	Max.
A	15.000	16.000
B	19.200	20.600
C	4.600	5.000
D	1.400	1.600
E	0.900	1.100
F	0.500	0.700
G1	2.000	2.200
G2	3.000	3.200
H	3.000	3.700
I	1.200	2.900
L	19.000	21.000
N	5.250	5.650
ΦP	3.100	3.300



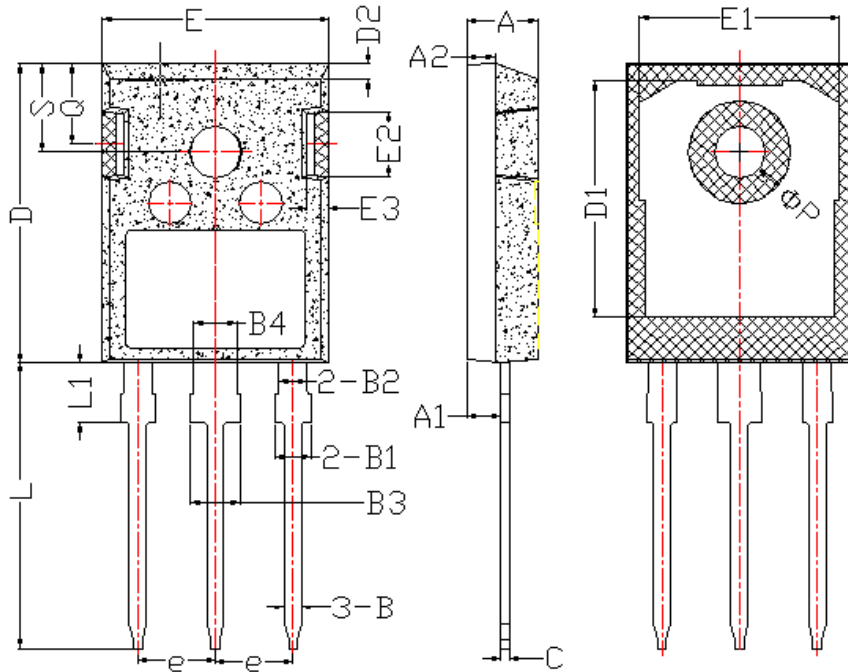
Dimension in TO-3PF (Unit: mm)



Symbol	Min.	Max.
A	5.300	5.700
C	2.800	3.200
D	3.100	3.500
D1	1.800	2.200
E	0.800	1.100
F	0.650	0.950
F2	1.800	2.200
G	10.300	11.500
G1	5.450 REF	
H	15.300	15.700
L	9.800	10.200
L2	22.800	23.200
L3	26.300	26.700
L4	43.200	44.400
L5	4.300	4.700
L6	24.300	24.700
L7	14.600	15.000
N	1.800	2.200
R	3.800	4.200
DIA	3.400	3.800



Dimension in TO-247 (Unit: mm)



Symbol	Min.	Max.
A	4.600	5.200
A1	2.200	2.600
B	0.900	1.400
B1	1.750	2.350
B2	1.750	2.150
B3	2.800	3.350
B4	2.800	3.150
C	0.500	0.700
D	20.600	21.300
D1	16.000	18.000
E	15.500	16.100
E1	13.000	14.700
E2	3.800	5.300
E3	0.800	2.600
e	5.200	5.700
L	19.000	20.500
L1	3.900	4.600
ΦP	2.500	3.700
Q	5.200	6.000
S	5.800	6.600



## IMPORTANT NOTICE

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