

**DESCRIPTION**

The AM04N60TF is available in TO-220F package.

BVDSS	RDSON	ID
600V	2.2Ω	4A

APPLICATION

- High frequency switching mode power supply

ORDERING INFORMATION

Package Type	Part Number	
TO-220F	TF	AM04N60TF
Note	SPQ: 50pcs/Tube	
AiT provides all RoHS products		

ABSOLUTE MAXIMUM RATING

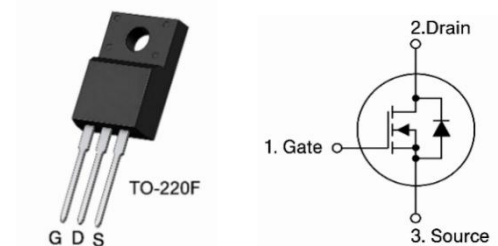
T_C = 25°C, unless otherwise specified.

V _{DSS} , Drain-to-Source Voltage	600V
I _D , Continuous Drain Current	4A
I _D , Continuous Drain Current T _C = 100 °C	2.6A
I _{DM} , Pulsed Drain Current ⁽¹⁾	16A
V _{GS} , Gate-to-Source Voltage	±30V
E _{AS} , Single Pulse Avalanche Energy ⁽²⁾	350mJ
dv/dt, Peak Diode Recovery dv/dt ⁽³⁾	5.0V/ns
P _D , Power Dissipation	38W
P _D , Derating Factor above 25°C	0.3W/°C
T _J , T _{STG} , Operating Junction and Storage Temperature Range	150°C, -55°C~+150°C
T _L , Maximum Temperature for Soldering	300°C
R _{θJC} , Junction-to-Case	3.3°C/W
R _{θJA} , Junction-to-Ambient	62.5°C/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.

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



ELECTRICAL CHARACTERISTICS

T_C = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
OFF Characteristics						
Drain to Source Breakdown Voltage	V _{DSS}	V _{GS} =0V, I _D =250μA	600	-	-	V
BV _{DSS} Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_J$	I _D =250μA Reference 25°C	-	0.58	-	V/°C
Drain to Source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =480V, V _{GS} =0V, T _J =125°C	-	-	100	
Gate to Source Forward Leakage	I _{GSS(F)}	V _{GS} =+30V	-	-	100	μA
Gate to Source Reverse Leakage	I _{GSS(R)}	V _{GS} =-30V	-	-	-100	μA
ON Characteristics						
Drain-to-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2A ⁽⁴⁾	-	2.2	2.6	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D =250μA ⁽⁴⁾	2.0	-	4.0	V
Forward Transconductance	g _{fs}	V _{DS} =15V, I _D =4A ⁽⁴⁾	-	3.3	-	S
Dynamic Characteristics						
Gate resistance	R _g	f=1.0MHz	-	3.2	-	Ω
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	605	-	pF
Output Capacitance	C _{oss}		-	51	-	
Reverse Transfer Capacitance	C _{rss}		-	1.5	-	
Switching Characteristics						
Turn-on Delay Time	t _{d (ON)}	I _D =4A, V _{DD} =300V, V _{GS} =10V, R _G =5Ω	-	14	-	ns
Rise Time	t _r		-	45	-	
Turn-Off Delay Time	t _{d (OFF)}		-	26	-	
Fall Time	t _f		-	36	-	
Total Gate Charge	Q _g	I _D =4A, V _{DD} =480V, V _{GS} =10V	-	17.1	-	nC
Gate to Source Charge	Q _{gs}		-	5.6	-	
Gate to Drain (“Miller”) Charge	Q _{gd}		-	4.9	-	



Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	$T_C=25^{\circ}\text{C}$	-	-	4	A
Maximum Pulsed Current (Body Diode)	I_{SM}		-	-	16	A
Diode Forward Voltage	V_{SD}	$I_S=4\text{A}$, $V_{GS}=0\text{V}^{(4)}$	-	-	1.2	V
Reverse Recovery Time	T_{rr}	$I_S=4\text{A}$, $T_J=25^{\circ}\text{C}$ $dI_F/dt = 100\text{A}/\mu\text{s}$, $V_{GS}=0\text{V}$	-	255	-	ns
Reverse Recovery Charge	Q_{rr}		-	1510	-	nC

Note1: Pulse width limited by maximum junction temperature

Note2: $L=10\text{mH}$, $V_{DS}=150\text{V}$, Start $T_J=25^{\circ}\text{C}$

Note3: $I_{SD}=4\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DS}$, Start $T_J=25^{\circ}\text{C}$

Note4: Pulse width $t_p \leq 300\mu\text{s}$, $\delta \leq 2\%$



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area

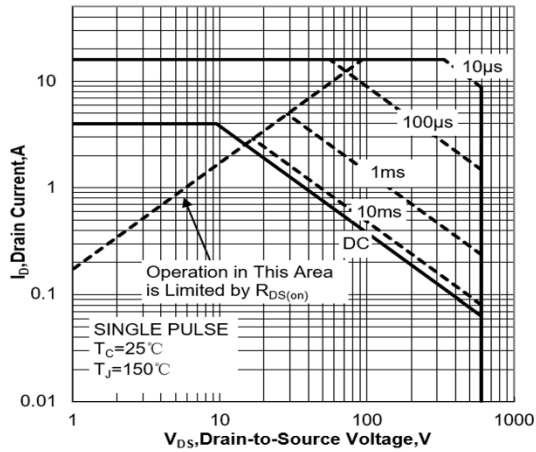


Fig 2. Power Dissipation

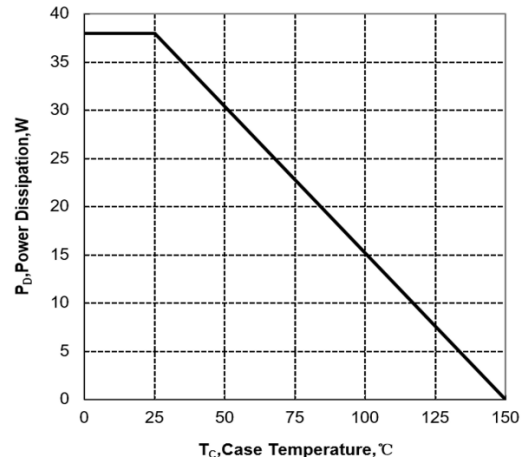


Fig 3. Max Thermal Impedance

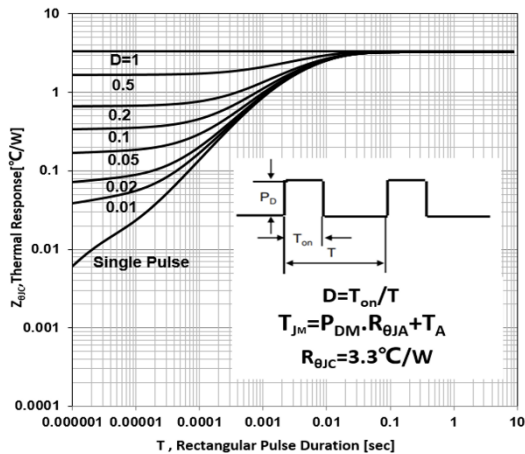


Fig 4. Typical Output Characteristics

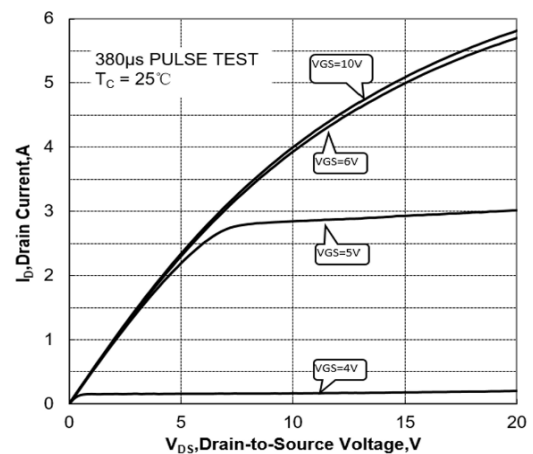


Fig 5. Typical Transfer Characteristics

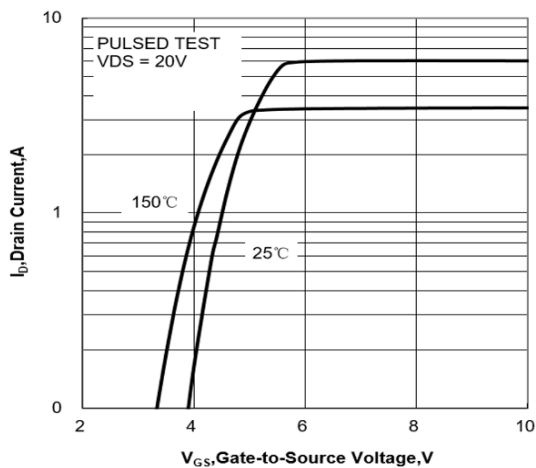


Fig 6. Typical Drain to Source ON Resistance vs. Drain Current

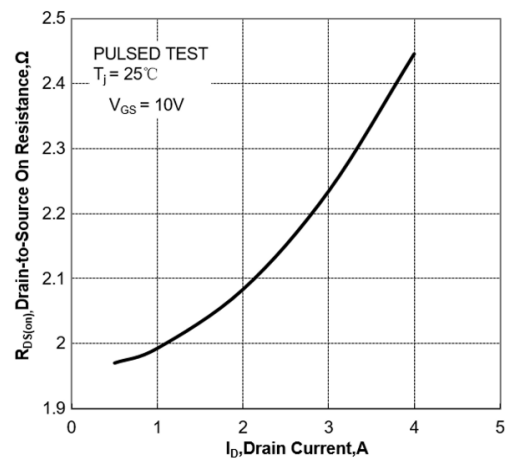




Fig 7. Typical Drian to Source on Resistance
vs. Junction Temperature

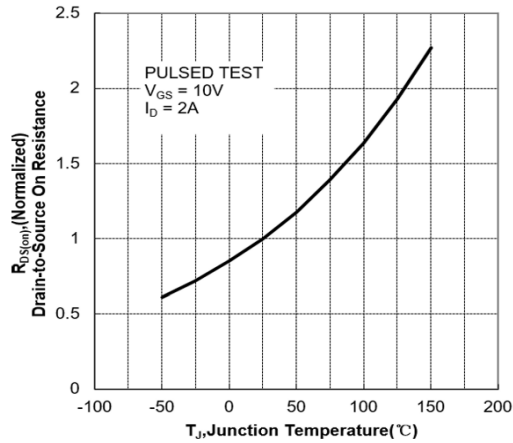


Fig 8. Typical Threshold Voltage
vs. Junction Temperature

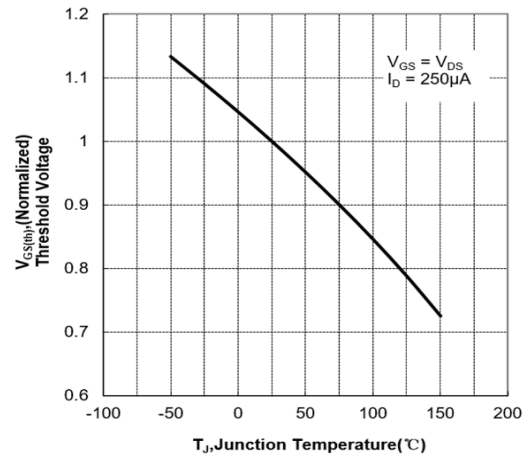


Fig 9. Typical Breakdown Voltage
vs. Junction Temperature

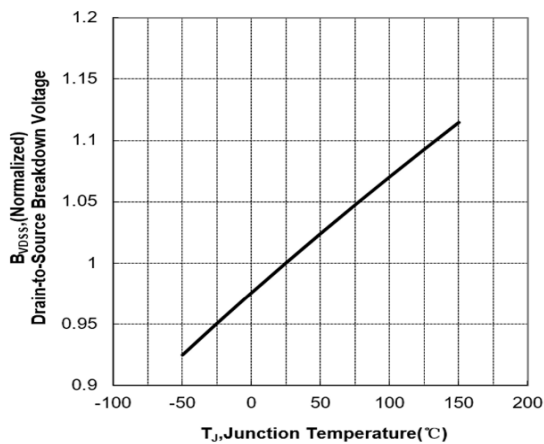


Fig 10. Typical Capacitance
vs. Drain to Source Voltage

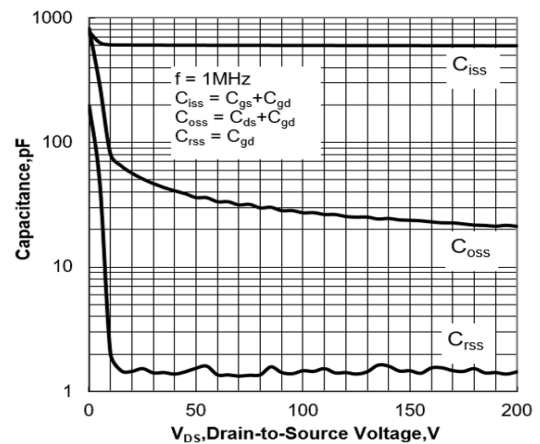
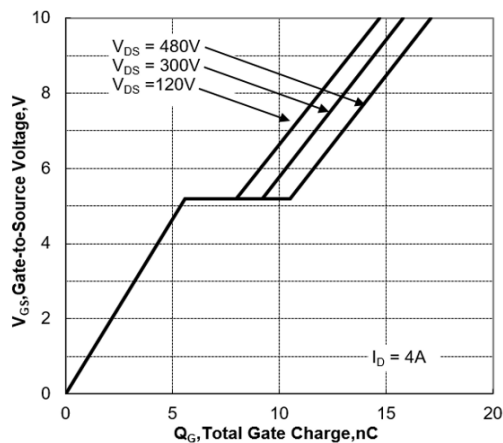


Fig 9. Typical Breakdown Voltage vs. Junction Temperature





Test Circuit & Waveform

Fig 10. Gate Charge Test Circuit & Waveform

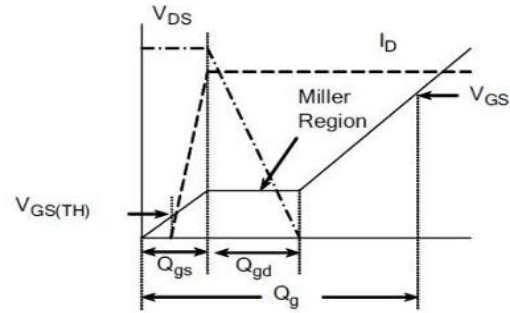
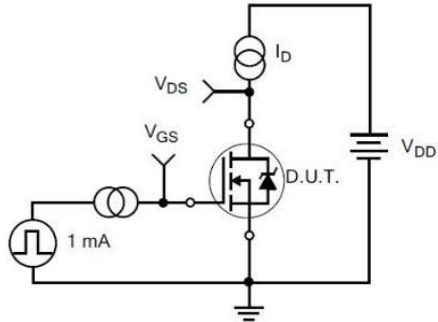


Fig 11. Resistive Switching Test Circuit & Waveform

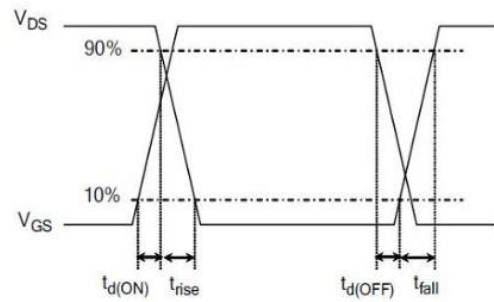
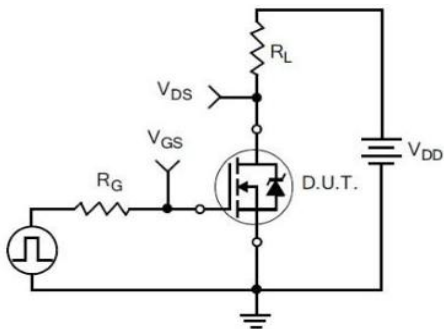


Fig 12. Diode Reverse Recovery Test Circuit & Waveform

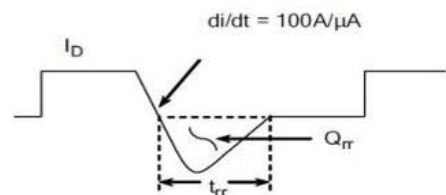
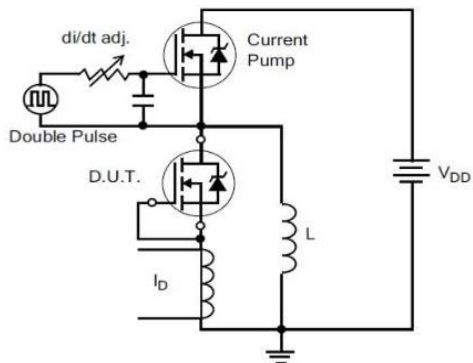
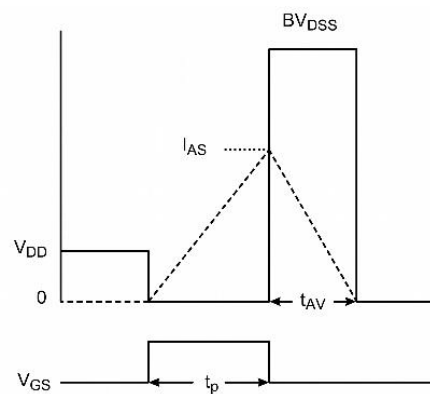
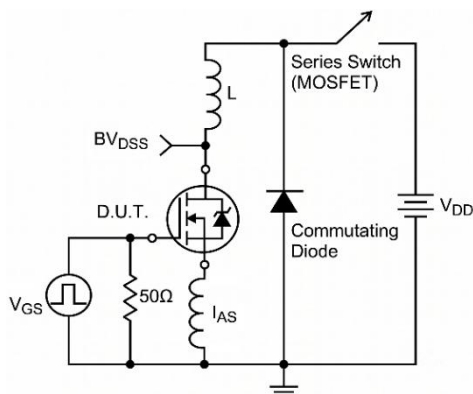


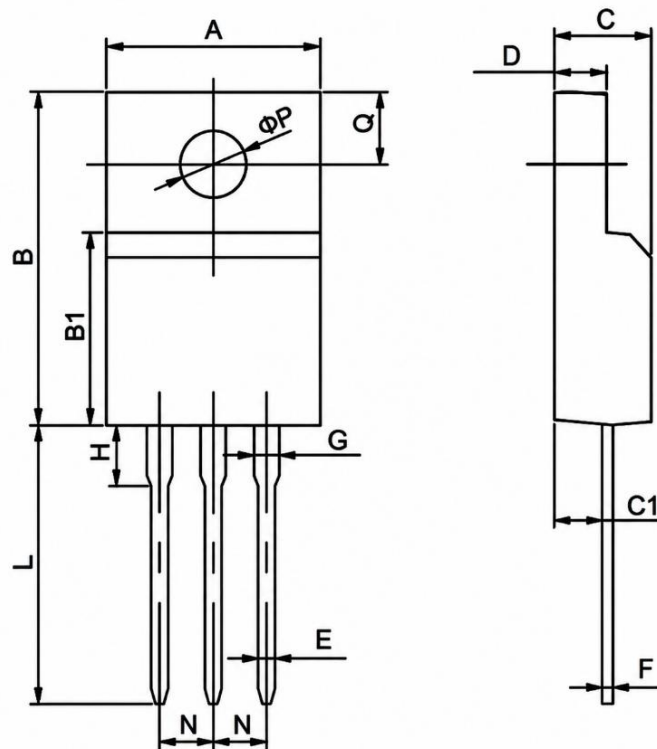
Fig 13. Unclamped Inductive Switching Test Circuit & Waveforms





PACKAGE INFORMATION

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



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