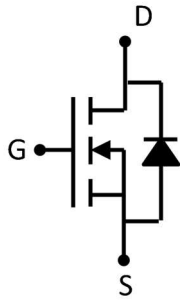
AP90N08

N-Channel Enhancement Mosfet

DATA SHEET

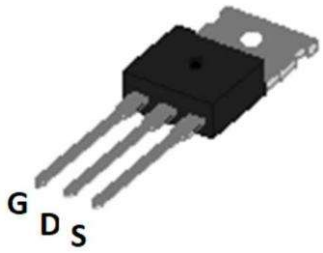
Feature

- 85V,90A
  $R_{DS(ON)}$ <8.7mΩ @V_{GS}=10V (TYP:7.3mΩ)
- Lead free product is acquired
- Excellent $R_{DS(ON)}$



Application

- PWM applications
- Load Switch
- Power management



TO-220C

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
90N08	AP90N08	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C =25℃)	I_D	90	A
Continuous Drain Current (T_C =100℃)	I_D	63	A
Pulsed Drain Current (1)	I_{DM}	360	A
Single Pulsed Avalanche Energy (2)	E_{AS}	360	mJ
Power Dissipation	P_D	150	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.0	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_j=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	85	88	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =85V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.0	-	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =40A	-	7.3	8.7	mΩ
Forward Threshold Voltage	g_{fs}	V_{DS} =10V, I_D =15A	-	15	-	S
Gate Resistance	R_g	V_{DS} =V_{GS} =0V, f =1MHz	-	0.58	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =1MHz	-	4160	-	pF
Output Capacitance	C_{oss}		-	245	-	
Reverse Transfer Capacitance	C_{rss}		-	180	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=40V, R_L=1Ω V_{GS}=10V, R_G=3Ω	-	27	-	ns
Turn-on rise time	t_r		-	20	-	
Turn-off delay time	$t_{d(off)}$		-	58	-	
Turn-off fall time	t_f		-	24	-	
Total Gate Charge	Qg	VDS=40V, ID=40A, VGS=10V	-	97	-	nC
Gate-Source Charge	Qgs		-	18	-	
Gate-Drain Charge	Qgd		-	38	-	
Reverse Recovery Chrage	Qrr	I_F=20A,di/dt=100A/us		35		nC
Reverse Recovery Time	Trr	I_F=20A,di/dt=100A/us		8		ns
Source-Drain Diode characteristics						
Diode Forward voltage[3]	V_{DS}	V_{GS} =0V, I_S=40A	-	-	1.2	V
Diode Forward current[4]	I_S		-	-	90	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=40V,R_G=25Ω,L=0.5Mh
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit

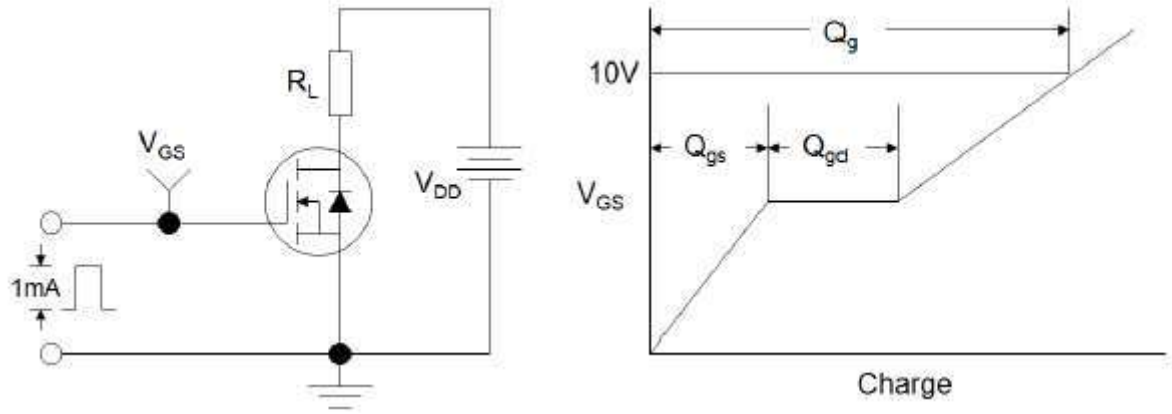


Figure1:Gate Charge Test Circuit & Waveform

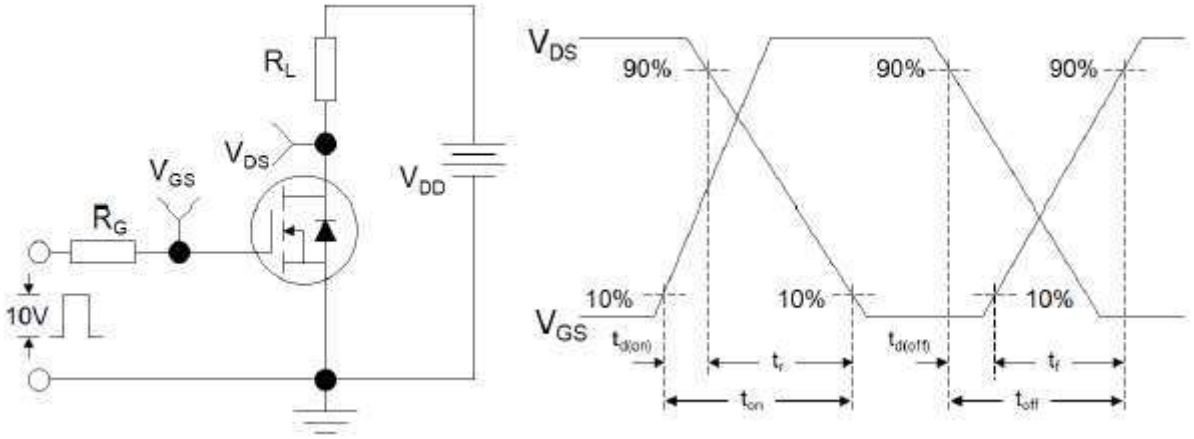


Figure 2: Resistive Switching Test Circuit & Waveforms

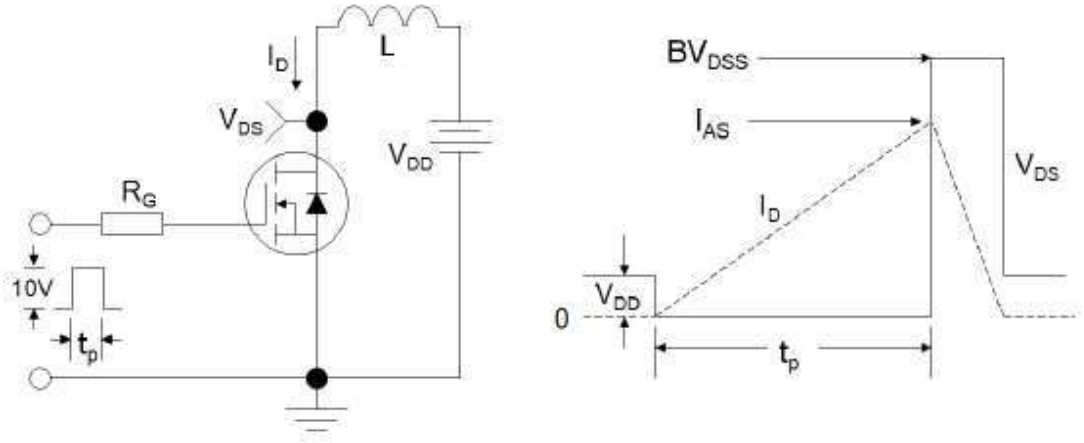


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics

Figure 1. Output Characteristics

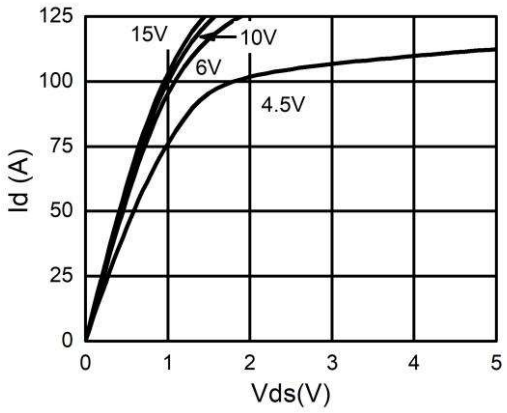


Figure 2. Transfer Characteristics

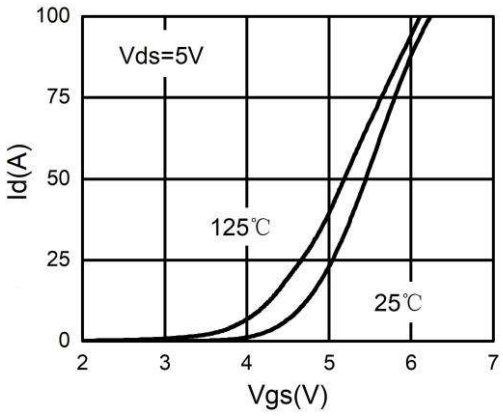


Figure 3. Power Dissipation

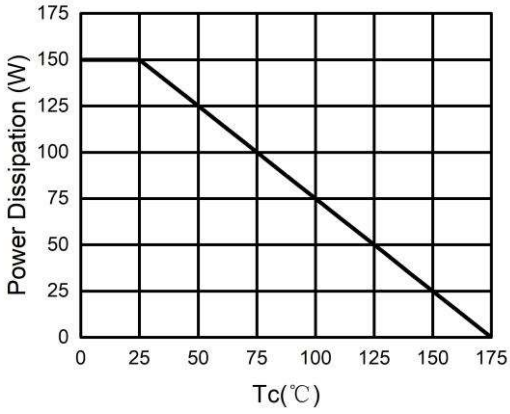


Figure 4. Drain Current

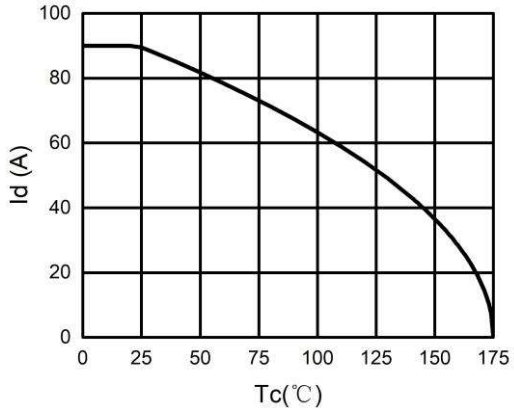


Figure 5. BV_{DSS} vs Junction Temperature

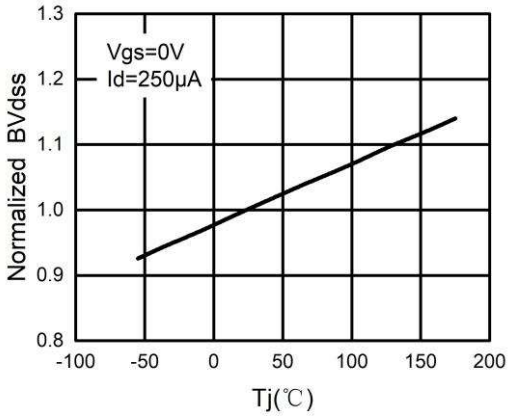


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

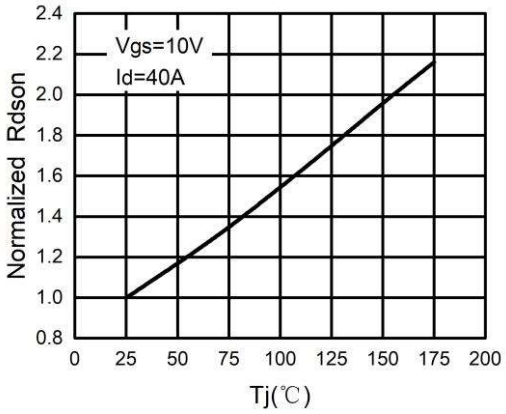


Figure 7. Gate Charge Waveforms

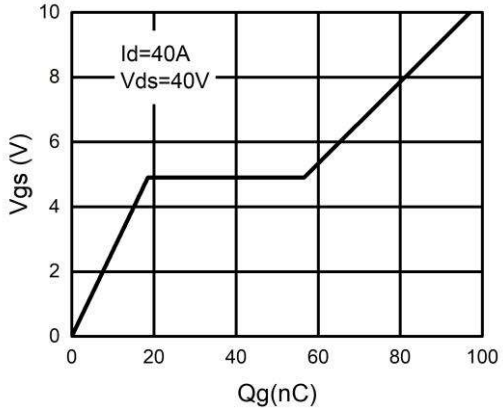


Figure 8. Capacitance

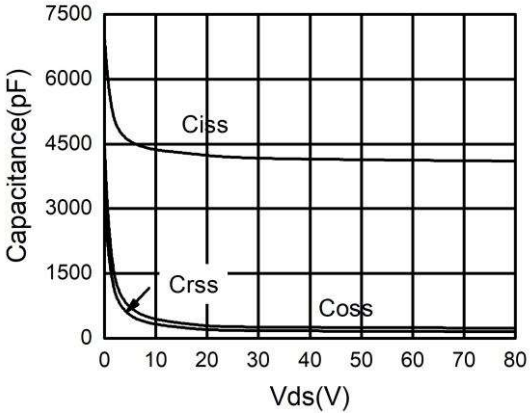


Figure 9. Body-Diode Characteristics

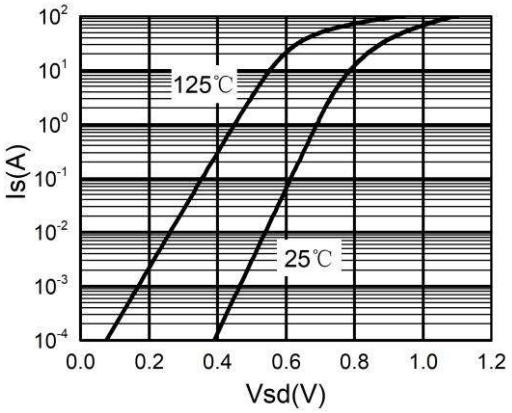
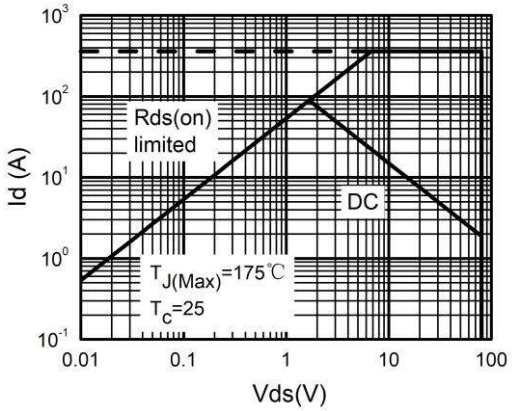
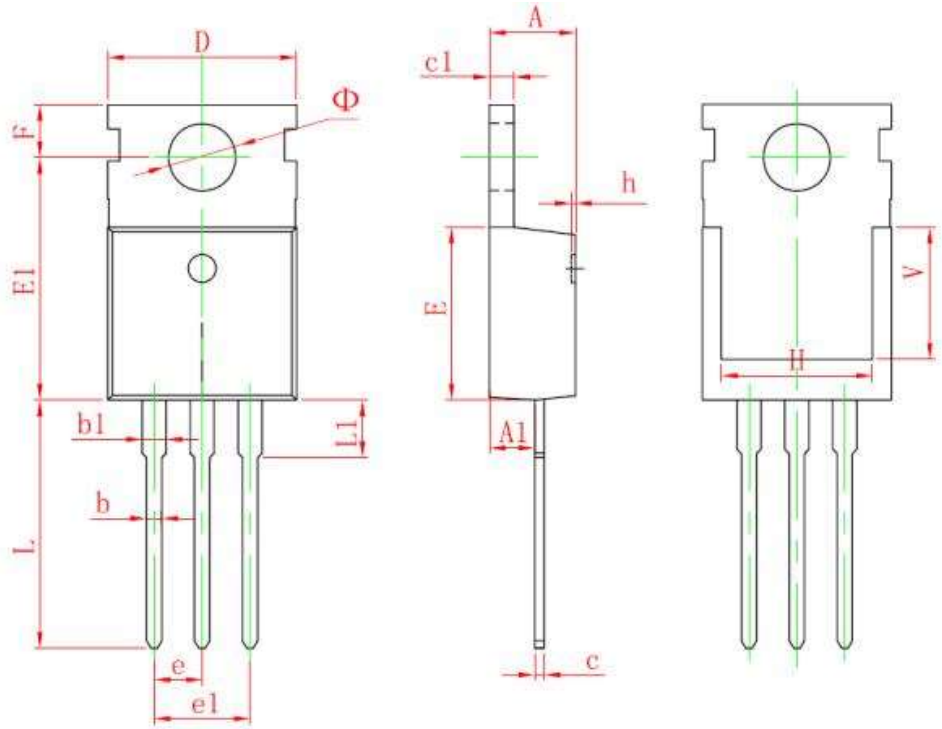


Figure 10. Maximum Safe Operating Area



TO-220C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

Revision History

Revision	Release	Remark
V1.1	2022/10/23	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.

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