

APP50N06

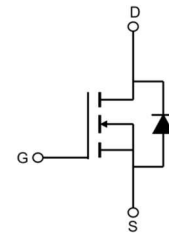
Planar N-Channel Power Mosfet

AIIPOWER

DATA SHEET

Feature

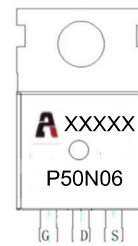
- 60V,50A
 $R_{DS(ON)} < 23m\Omega @ V_{GS}=10V$ TYP=18 m Ω
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
P50N06	APP50N06	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a = 25^{\circ}C$)	I_D	50	A
Continuous Drain Current ($T_a = 100^{\circ}C$)	I_D	34	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	200	A
Singel Pulsed Avalanche Energy ⁽²⁾	E_{AS}	272	mJ
Power Dissipation	P_D	120	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.65	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	60	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	2.8	4	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	18	23	m Ω
Forward tranconductance ⁽³⁾	g_{FS}	$V_{DS} = 10V, I_D = 20A$	20	-	-	S
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	-	1050	-	pF
Output Capacitance	C_{oss}		-	460	-	
Reverse Transfer Capacitance	C_{rss}		-	70	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 25A, R_L = 1\Omega$ $V_{GS} = 10V, R_G = 3\Omega$	-	20	-	ns
Turn-on rise time	t_r		-	100	-	
Turn-off delay time	$t_{d(off)}$		-	80	-	
Turn-off fall time	t_f		-	85	-	
Total Gate Charge	Q_g	$V_{DS} = 48V, I_D = 50,$ $V_{GS} = 10V$	-	32	-	nC
Gate-Source Charge	Q_{gs}		-	8	-	
Gate-Drain Charge	Q_{gd}		-	15	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = 50A$	-	-	1.3	V
Diode Forward current ⁽⁴⁾	I_S		-	-	50	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}, I_F = 50A, di/dt = 100A/\mu s$		52		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^{\circ}, I_F = 50A, di/dt = 100A/\mu s$		65		nc

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, R_G = 25\Omega, L = 0.5\text{mH}$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10\text{ sec}$

Test Circuit

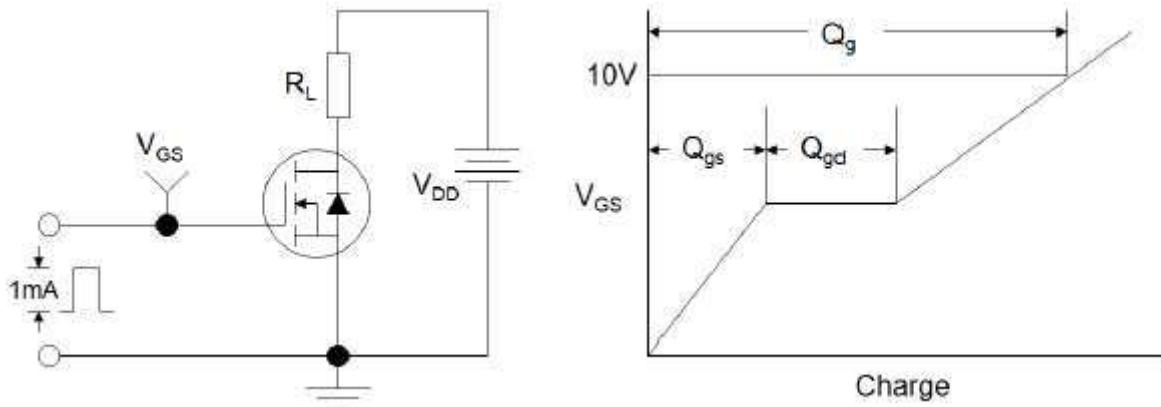


Figure 1: Gate Charge Test Circuit & Waveform

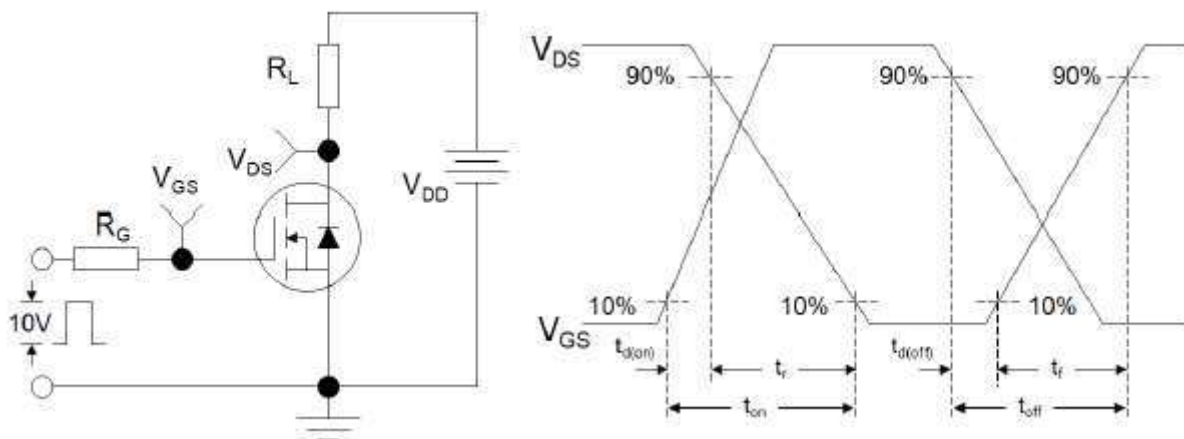


Figure 2: Resistive Switching Test Circuit & Waveforms

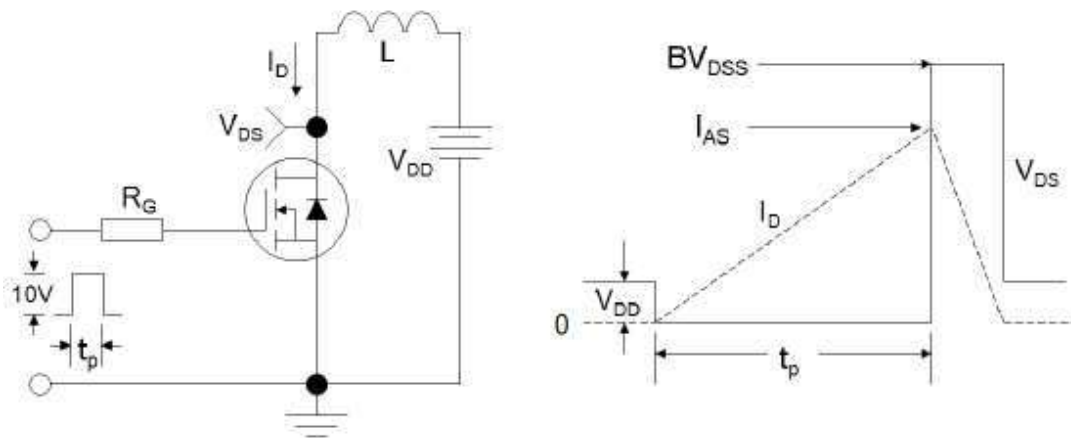
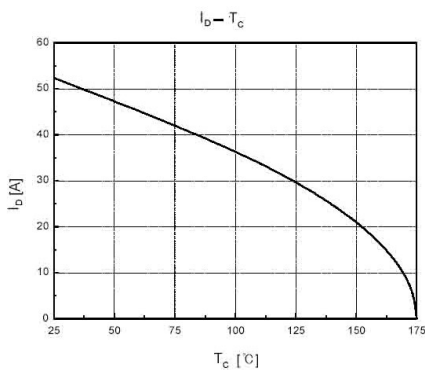
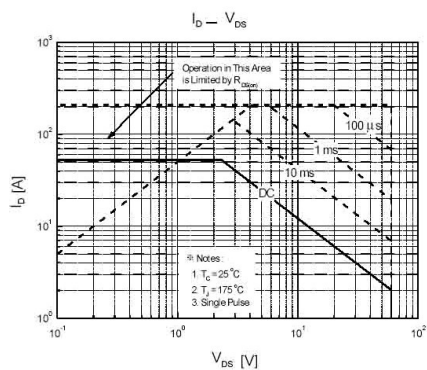
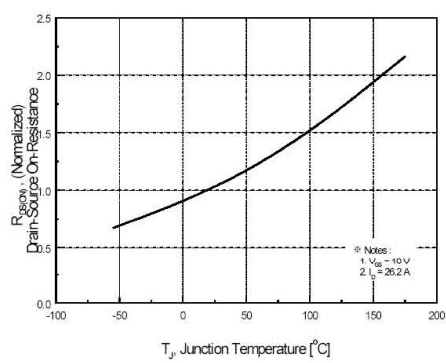
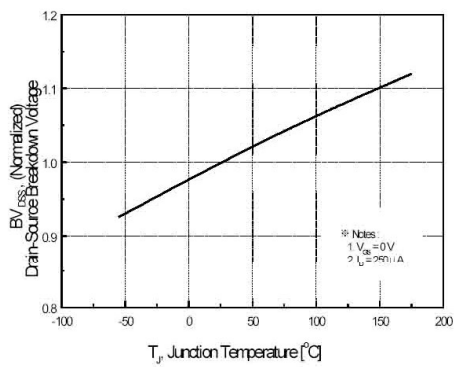
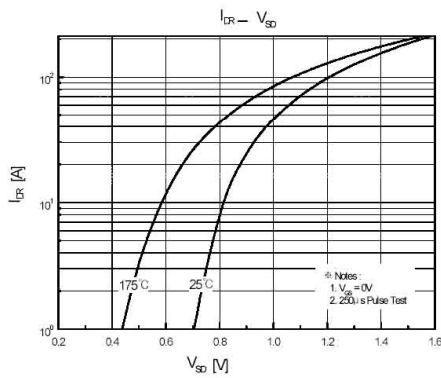
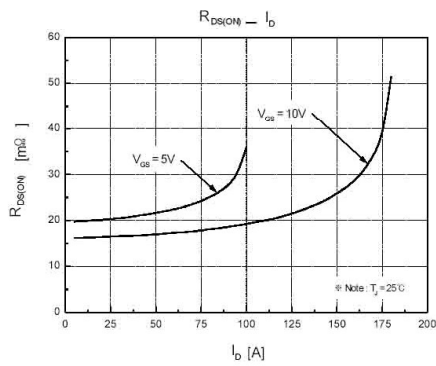
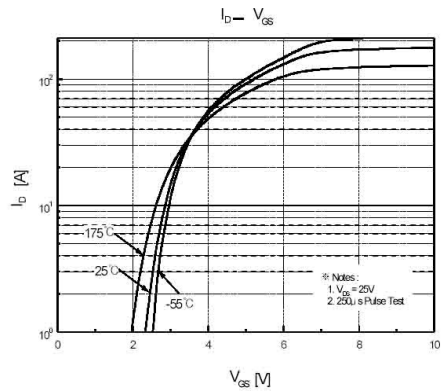
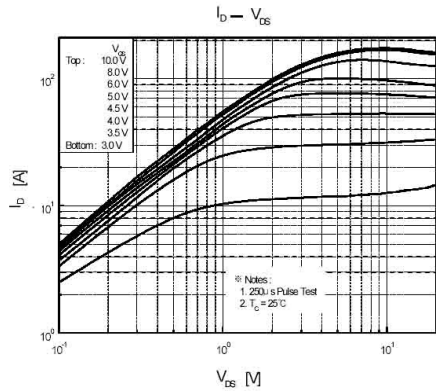


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

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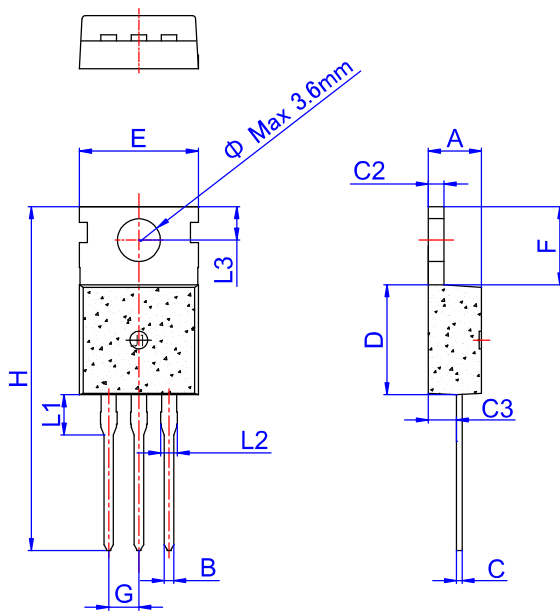
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TO-220C Package Information



TO-220C

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

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