

AP4N65K

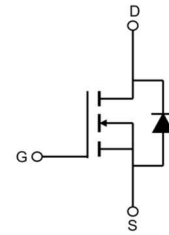
N-Channel Enhancement Mosfet

AIIPOWER

DATA SHEET

Features

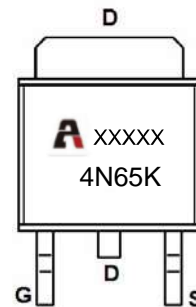
- 650V,4A
 $R_{DS(ON)} < 2.5 \Omega @ V_{GS}=10V$ TYP:2.4 Ω
- Fast switching
- Avalanche Energy Specified
- Improved dv/dt capability



Schematic Diagram

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC) PWM applications



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
4N65K	AP4N65K	TO-252	-	-	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_a=25^\circ\text{C}$)	I_D	4	A
Pulsed Drain Current	I_{DM}	16	A
Single Pulsed Avalanche Energy ($L=25\text{mH}$, $I_{AS}=3.0\text{A}$)	E_{AS}	113	mJ
Peak Diode Recovery dv/dt	dv/dt	3.79	V/ns
Power Dissipation	P_D	50	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	83	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

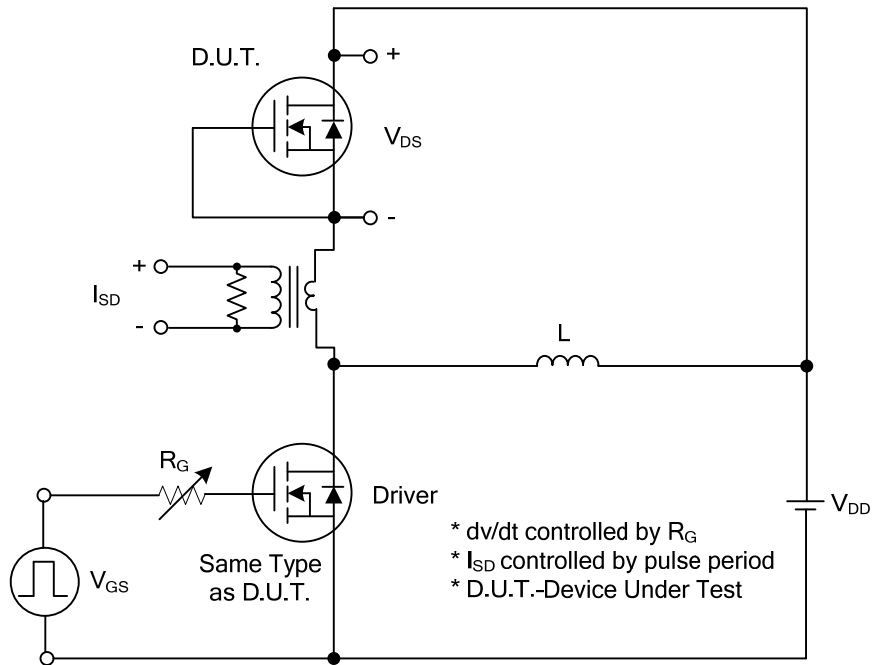
MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	V
Breakdown Voltage Temperature	$\Delta BV_{DSS}/\Delta T_J$	$I_D = 250\mu A, T_J = 25^{\circ}\text{C}$		0.6		V/ $^{\circ}\text{C}$
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$	-	2.4	2.5	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{MHz}$	-	600	-	pF
Output Capacitance	C_{oss}		-	53.8	-	
Reverse Transfer Capacitance	C_{rss}		-	3.2	-	
Switching characteristics^(1, 2)						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 2A, R_G = 25\Omega$	-	30	-	ns
Turn-on rise time	t_r		-	10	-	
Turn-off delay time	$t_{d(off)}$		-	60	-	
Turn-off fall time	t_f		-	50	-	
Total Gate Charge	Q_g	$V_{DS} = 100V, I_D = 3A, V_{GS} = 10V$	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	3.6	-	
Gate-Drain Charge	Q_{gd}		-	2	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$T_J = 25^{\circ}\text{C}, V_{GS} = 0V, I_S = 4A$	-	-	1.4	V
Diode Forward current	I_S	$T_C = 25^{\circ}\text{C}$	-	-	4	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 4A, di/dt = 100A/\mu s$		230		ns
Body Diode Reverse Recovery Charge ⁽¹⁾	Q_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 4A, di/dt = 100A/\mu s$		1.6		uc

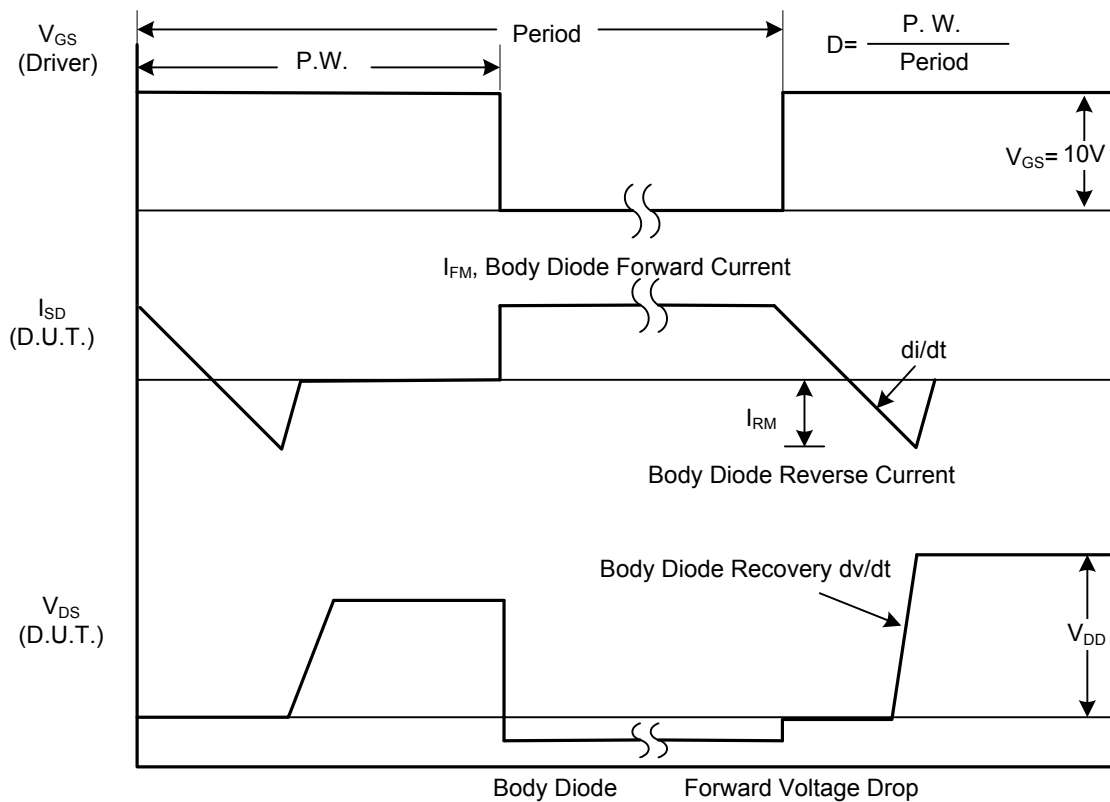
Notes:

1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

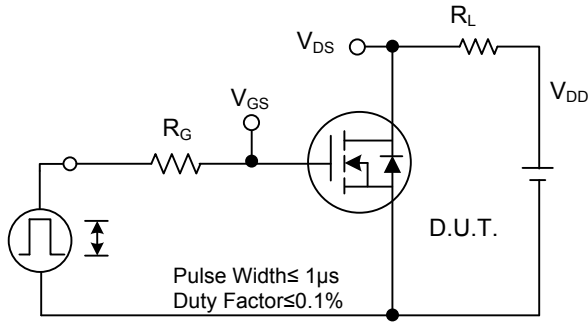


Peak Diode Recovery dv/dt Test Circuit

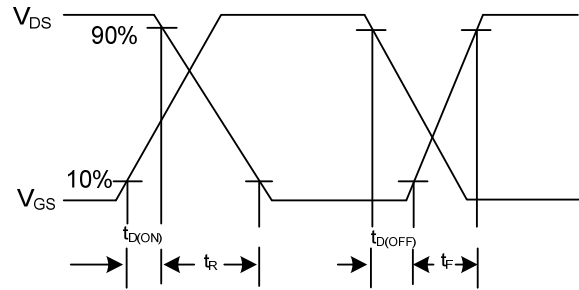


Peak Diode Recovery dv/dt Waveforms

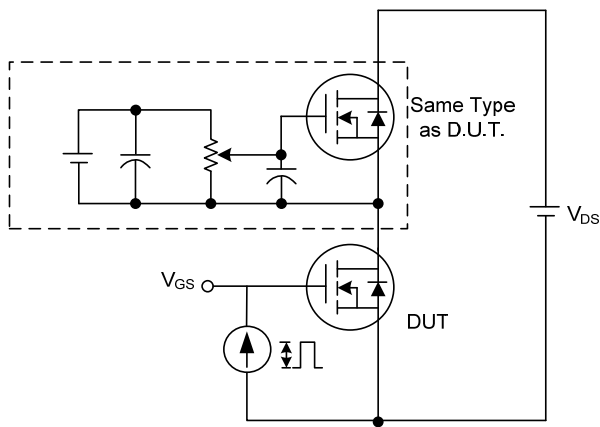
TEST CIRCUITS AND WAVEFORMS



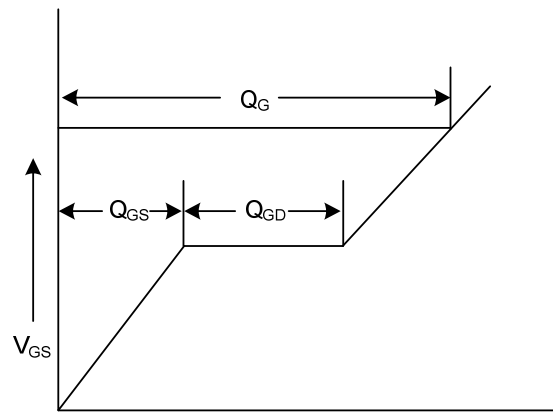
Switching Test Circuit



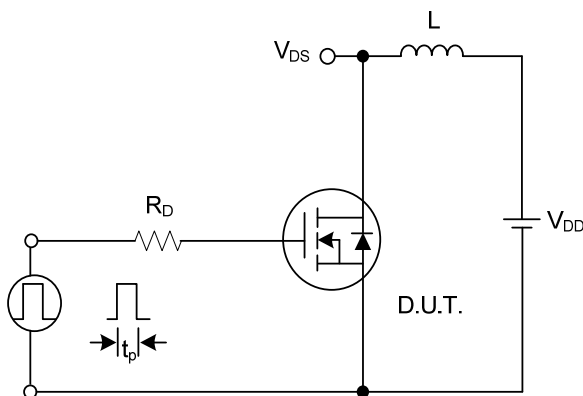
Switching Waveforms



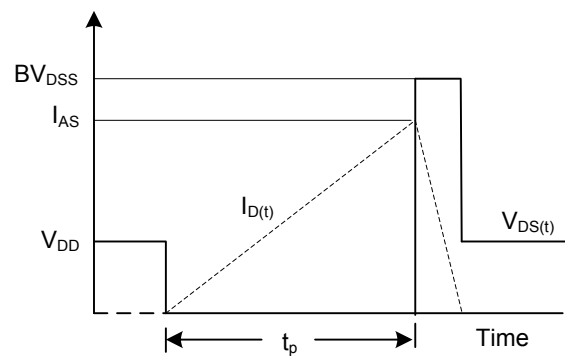
Gate Charge Test Circuit



**Charge
Gate Charge Waveform**

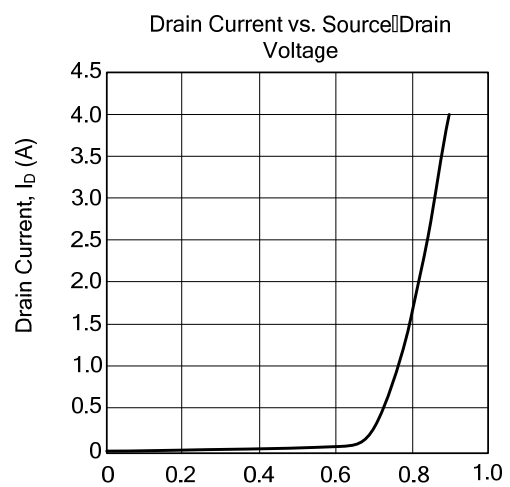
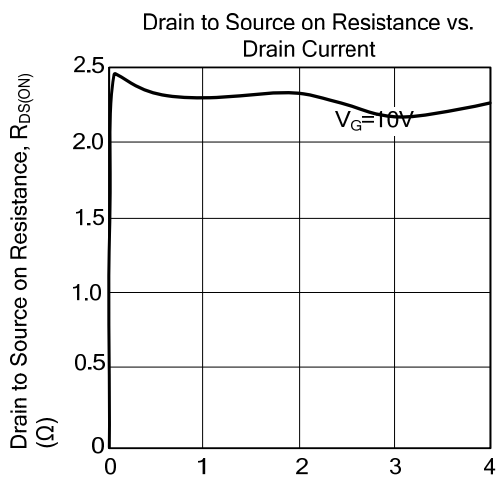
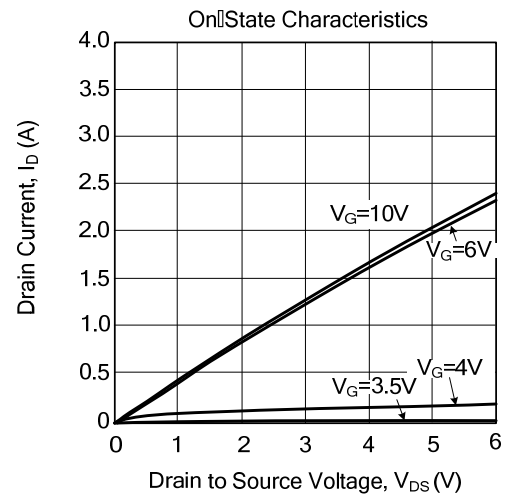
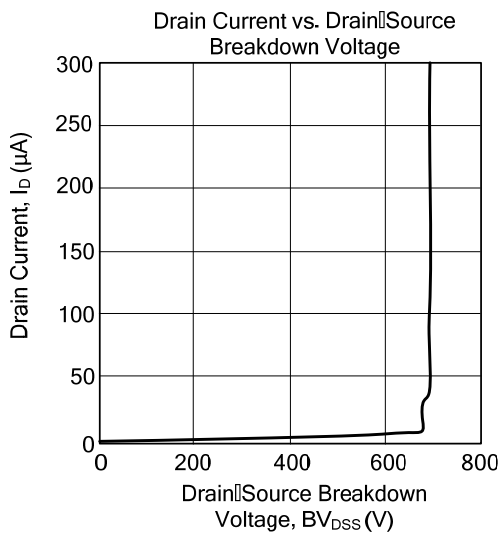
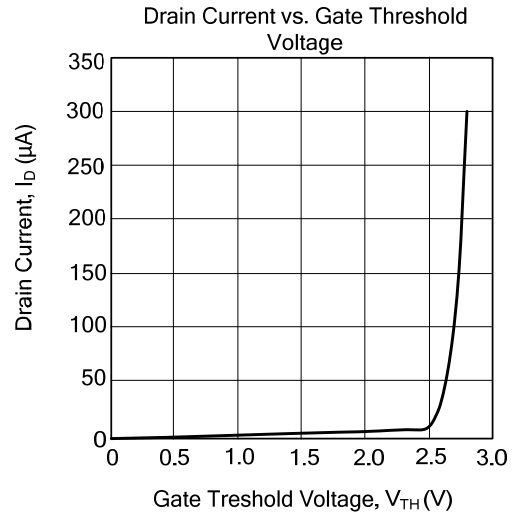
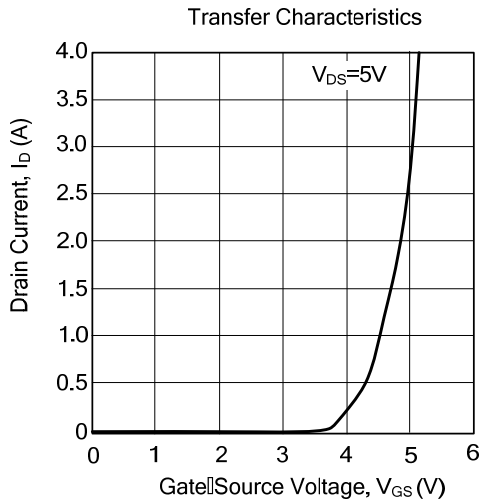


Unclamped Inductive Switching Test Circuit

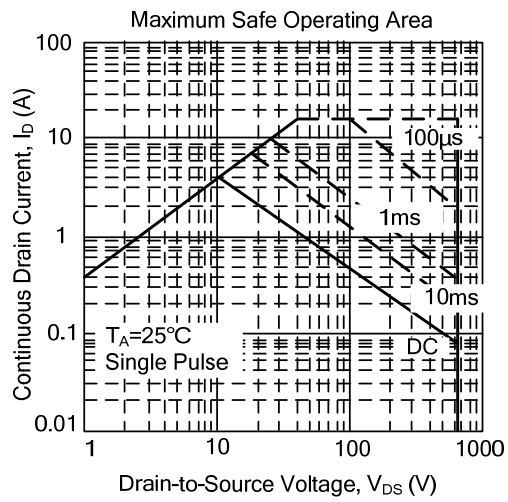


Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



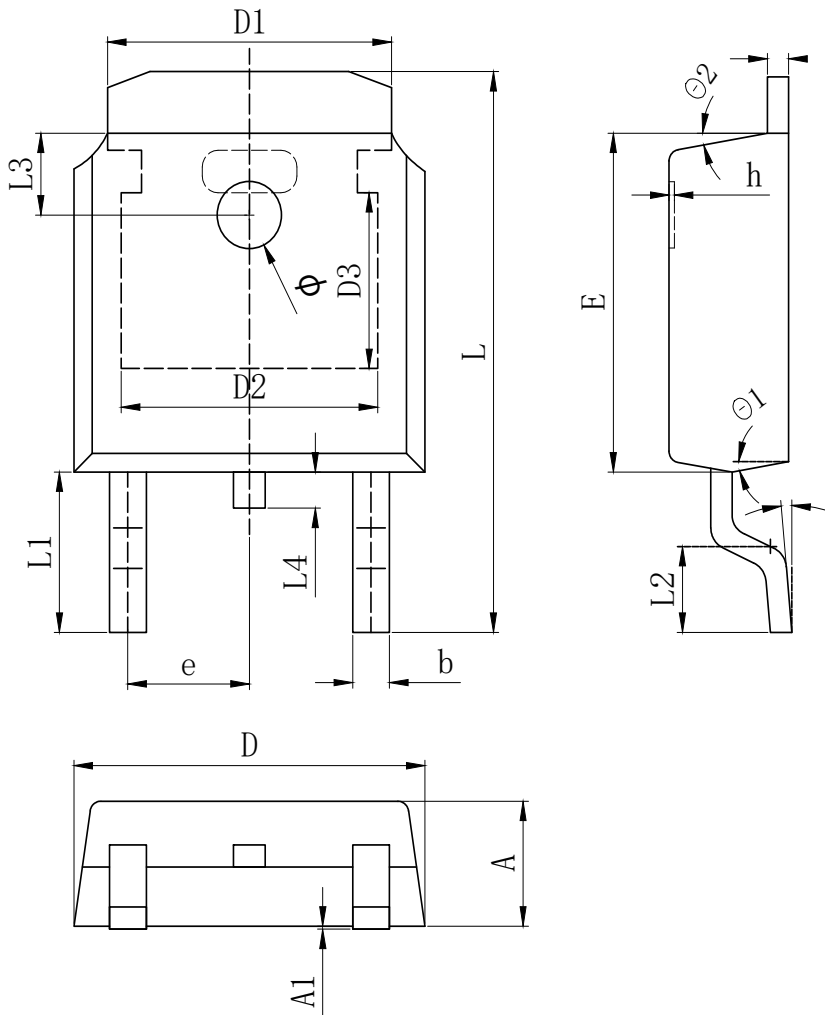
TYPICAL CHARACTERISTICS



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TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		