HMP3009AD5

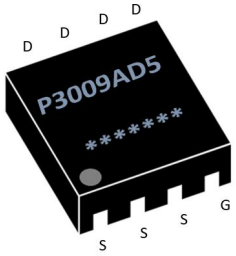
HM Silicon P-Channel Power MOSFET

V_{DSS}	-30	V
I_D	-50	A
P_D	60	W
$R_{DS(ON)\ TYPE}$	6	mΩ

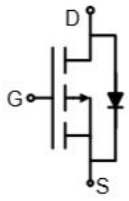
General Description :

The HMP3009AD5 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge and operation with gate voltage as low as 4.5V. It can be used in a wide variety of applications. The package form is DFN5*6-8L, which accords with the RoHS standard and Halogen Free standard.

DFN5X6-8L



Inner Equivalent Principium Chart



Features :

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances

Applications :

- Battery switching application
- Hard switched and high frequency circuits
- Power management

Package Marking and Ordering Information:

Device Marking	Device	Device Package	Quantity
P3009AD5	HMP3009AD5	DFN5*6-8L	3000 units

Absolute Maximum Ratings (TA= 25℃ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current T_C = 25 °C	-50	A
	Continuous Drain Current T_C = 70 °C	-40	A
I_{DM}[a1]	Pulsed Drain Current	-200	A
V_{GS}	Gate-to-Source Voltage	±20	V
P_D	Power Dissipation	30	W
T_J , T_{stg}	Operating Junction and Storage Temperature Range	150 , –55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

Electrical Characteristics (Tc= 25℃ unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-30	-33	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} = -30V, V_{GS}= 0V	--	--	-1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=-10V, I_D=-20A	--	6	9	mΩ
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=-4.5V, I_D=-10A	--	10	15	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.5	-2.0	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=-15V, I_D =-10A	20	--	--	S
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = -15V f = 1.0MHz	--	3000	--	pF
C_{oss}	Output Capacitance		--	650	--	
C_{rss}	Reverse Transfer Capacitance		--	550	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =-1.0A V_{DS} = -15V V_{GS} = 10V R_G = 6.0Ω	--	10	--	ns
tr	Rise Time		--	15	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	110	--	
t_f	Fall Time		--	70	--	
Q_g	Total Gate Charge	I_D =-10A V_{DS} = -15V V_{GS} = -10V	--	60	--	nC
Q_{gs}	Gate to Source Charge		--	11	--	
Q_{gd}	Gate to Drain (“Miller”) Charge		--	15	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current		--	--	-50	A
V_{SD}	Diode Forward Voltage	I_S=-35A, V_{GS}=0V	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	3.6	℃/W

[a1] : Repetitive rating; pulse width limited by maximum junction temperature

Typical Electrical and Thermal Characteristics

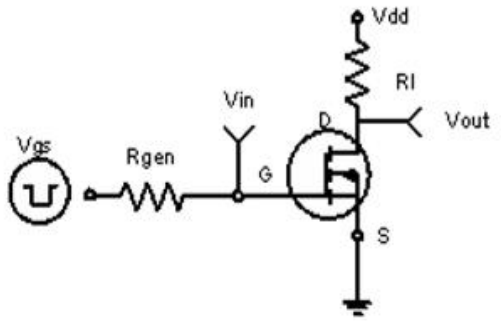


Figure 1:Switching Test Circuit

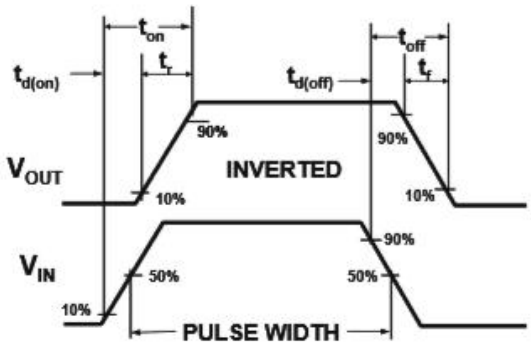


Figure 2:Switching Waveforms

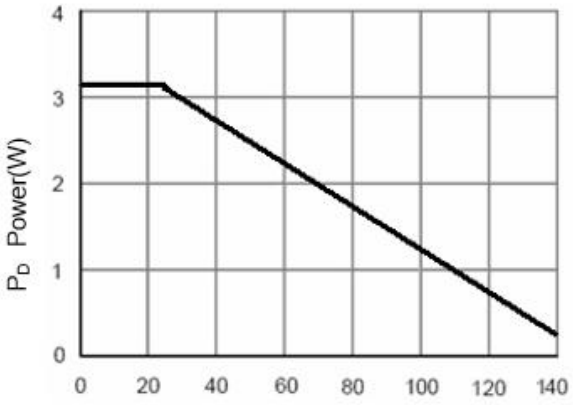


Figure 3 Power Dissipation

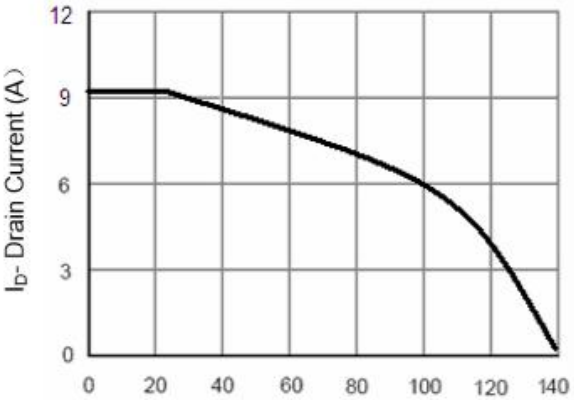


Figure 4 Drain Current

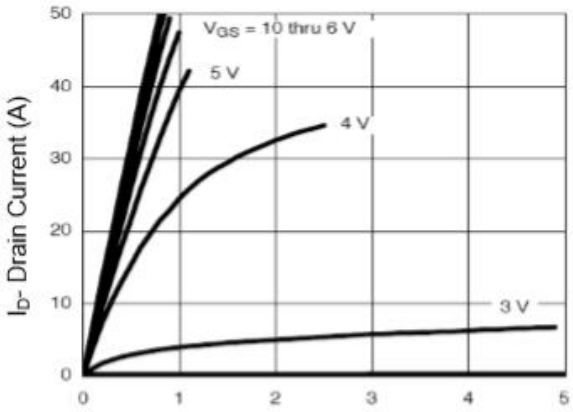


Figure 5 Output Characteristics

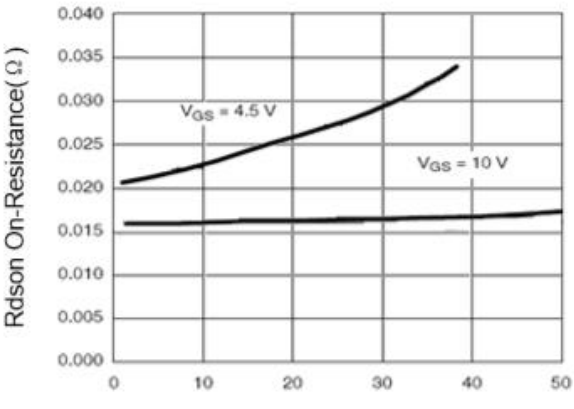


Figure 6 Drain-Source On-Resistance

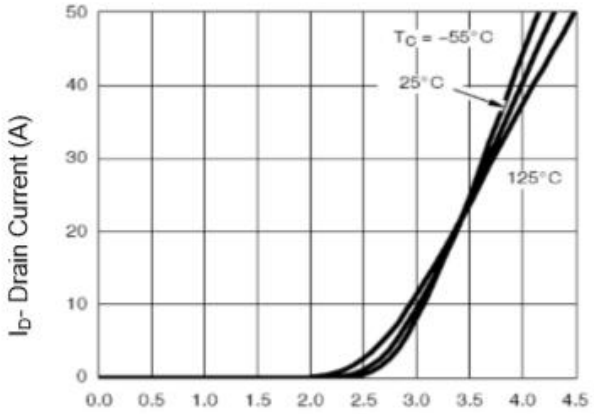


Figure 7 Transfer Characteristics

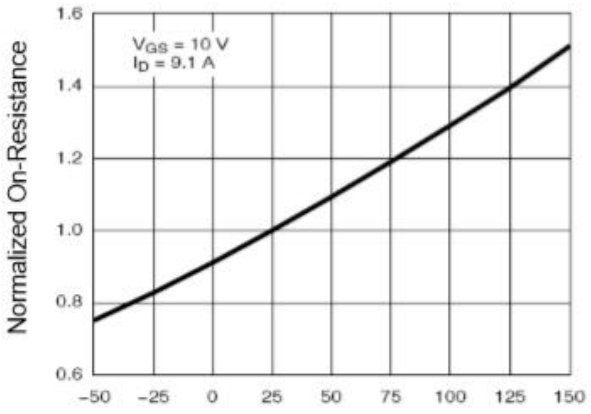


Figure 8 Drain-Source On-Resistance

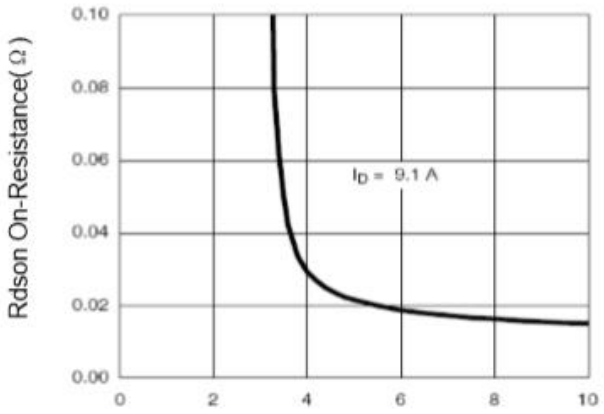


Figure 9 Rdson vs Vgs

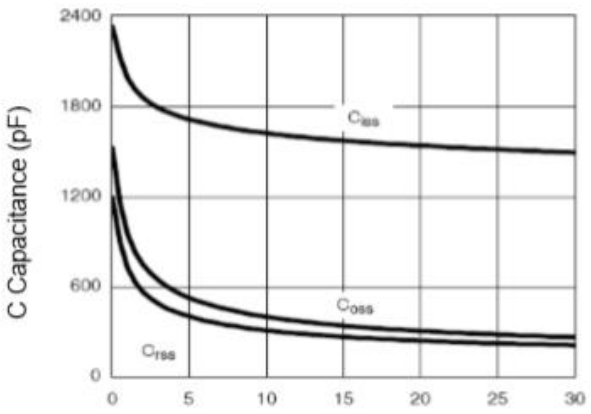


Figure 10 Capacitance vs Vds

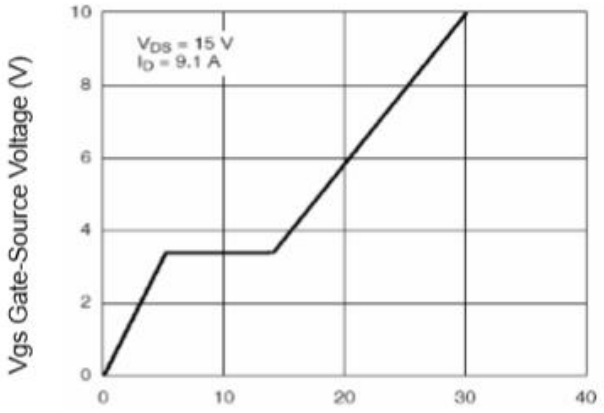


Figure 11 Gate Charge

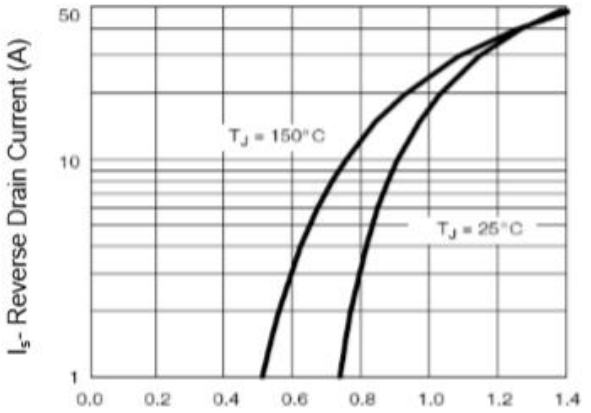


Figure 12 Source- Drain Diode Forward

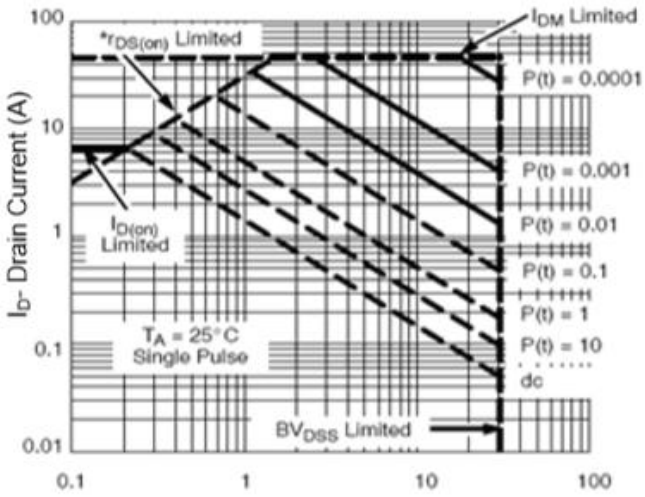


Figure 13 Safe Operation Area

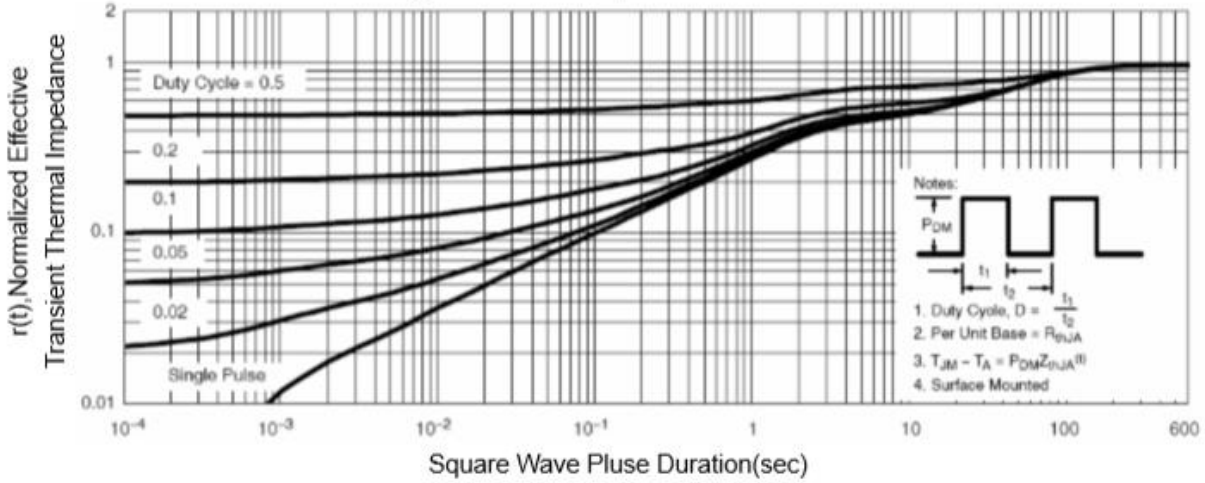
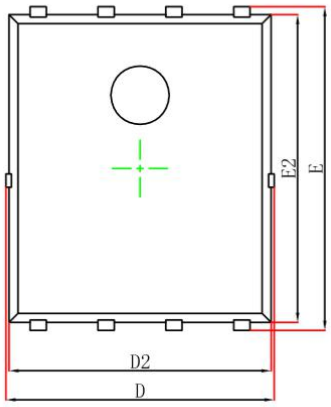


Figure 14 Normalized Maximum Transient Thermal Impedance

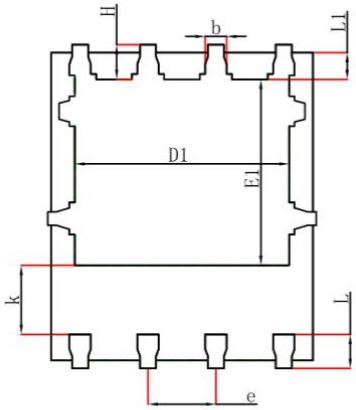
Marking Information

		Part NO.		
●	Y	M	W	SN
Part NO.	HMP3009AD5			
●	Pin 1 Indicator			
Lot NO.	Y：Year； M：Month； W：Week； SN：Pipeline Code			

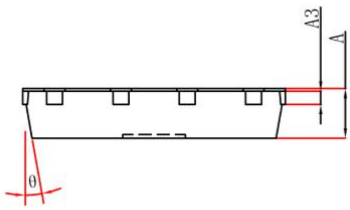
Package Information



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF		0.010REF	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP		0.050TYP	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

Revision History

Revision	Date	Descriptions
REV.1.2	May., 2019	"Typical Performance Characteristics" Update
REV.1.1	Jan., 2018	"Typical Performance Characteristics" Update
REV.1.0	July, 2017	Initial Version