

General Description :

The HMP3012AD3 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ 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 DFN3.3*3.3-8L, which accords with the RoHS standard and Halogen Free standard.

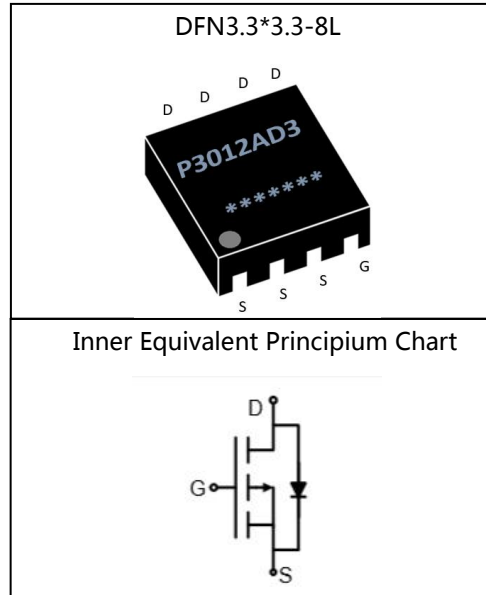
Features :

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Low Reverse transfer capacitances

Applications :

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

V_{DSS}	-30	V
I_D	-24	A
P_D	35	W
$R_{DS(ON)}$ TYPE	9.5	mΩ



Package Marking and Ordering Information:

Device Marking	Device	Device Package	Quantity
P3012AD3	HMP3012AD3	DFN3.3*3.3-8L	5000 units

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-30	V
I_D	Continuous Drain Current $T_C = 25^\circ\text{C}$	-24	A
	Continuous Drain Current $T_C = 70^\circ\text{C}$	-19	A
I_{DM}^{a1}	Pulsed Drain Current	-80	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	35	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150 , -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

Electrical Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	-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.	
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS} = -10V, I_D = -12A$	--	9.5	12	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS} = -4.5V, I_D = -12A$	--	13	18	$m\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.5	-2.0	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	$V_{DS} = -15V, I_D = -12A$	13	--	--	S
C_{iss}	Input Capacitance	$V_{GS} = 0V$	--	2100	--	pF
C_{oss}	Output Capacitance	$V_{DS} = -15V$	--	450	--	
C_{rss}	Reverse Transfer Capacitance	$f = 1.0MHz$	--	390	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D = -1.0A$	--	13	--	ns
t_r	Rise Time	$V_{DS} = -15V$	--	20	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS} = 10V$	--	140	--	
t_f	Fall Time	$R_G = 6.0\Omega$	--	90	--	
Q_g	Total Gate Charge	$I_D = -12A$	--	40	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS} = -15V$	--	7.2	--	
Q_{gd}	Gate to Drain ("Miller") Charge	$V_{GS} = -10V$	--	10.4	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current		--	--	-24	A
V_{SD}	Diode Forward Voltage	$I_S = -15A, V_{GS} = 0V$	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	4.5	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-Ambient	83	$^{\circ}C/W$

^{a1} : Repetitive rating; pulse width limited by maximum junction temperature

Typical Electrical and Thermal Characteristics

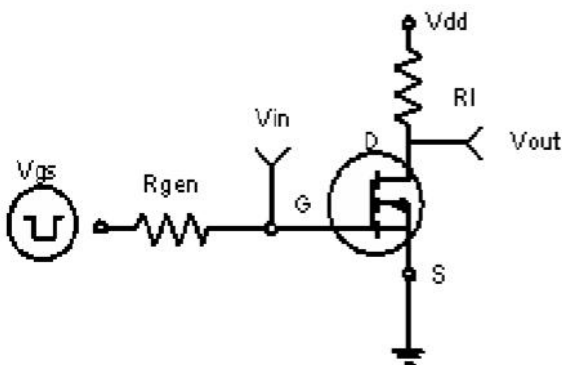


Figure 1 Switching Test Circuit

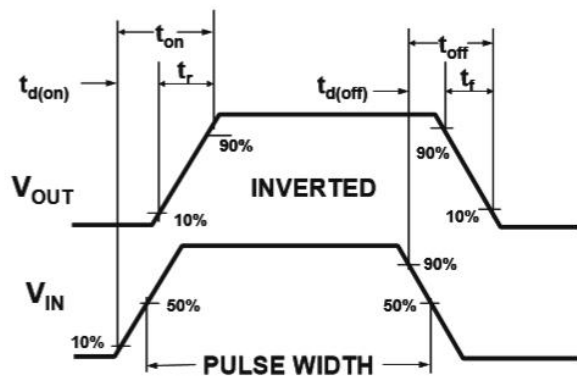


Figure 2 Switching Waveforms

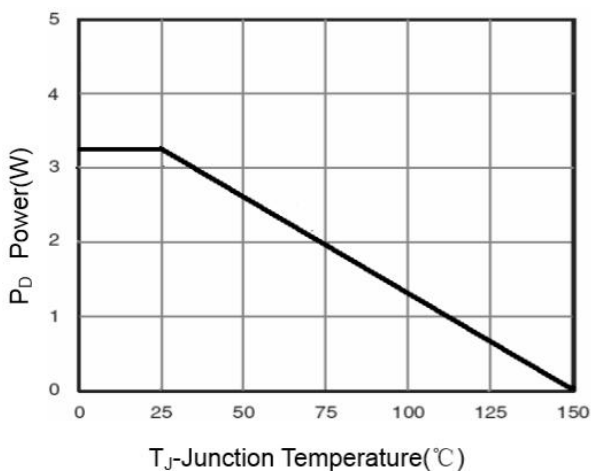


Figure 3 Power Dissipation

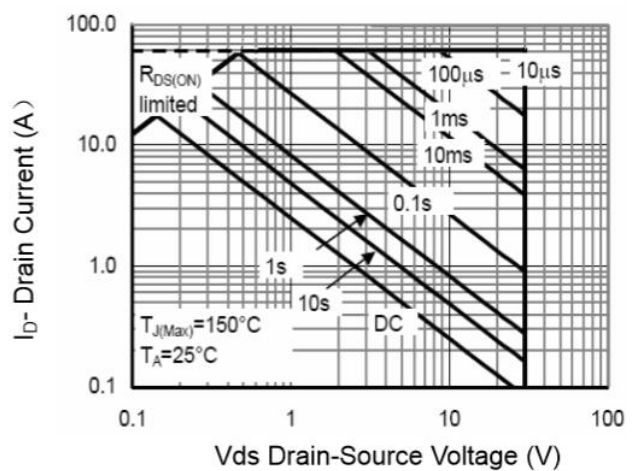


Figure 4 Safe Operation Area

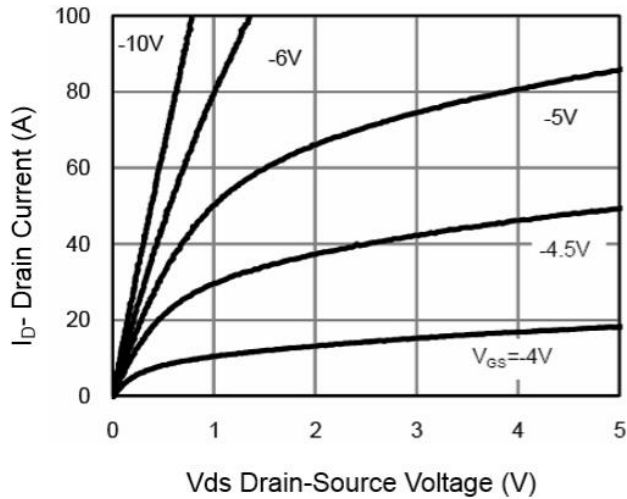


Figure 5 Output Characteristics

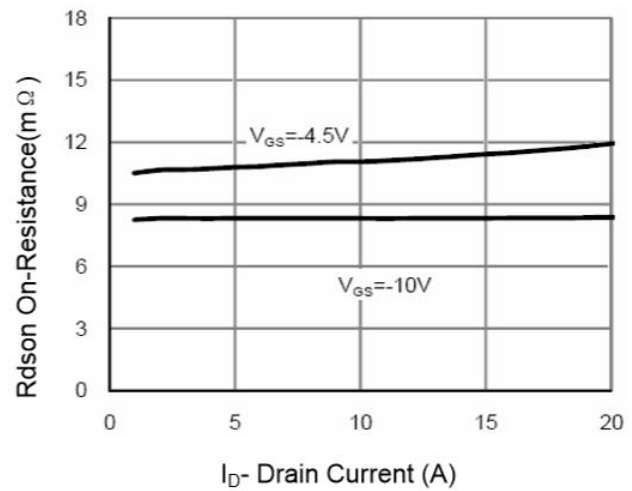


Figure 6 Drain-Source On-Resistance

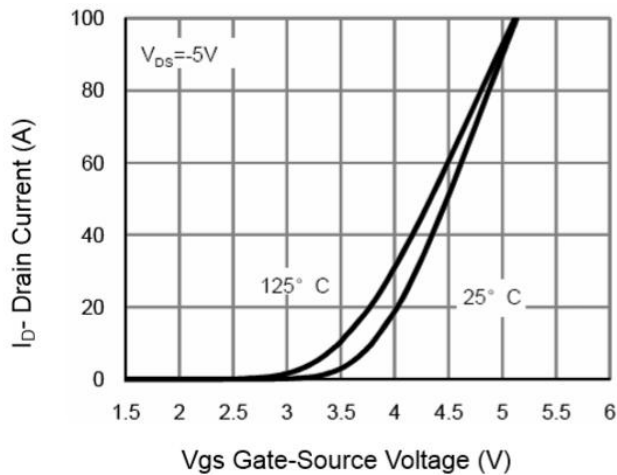


Figure 7 Transfer Characteristics

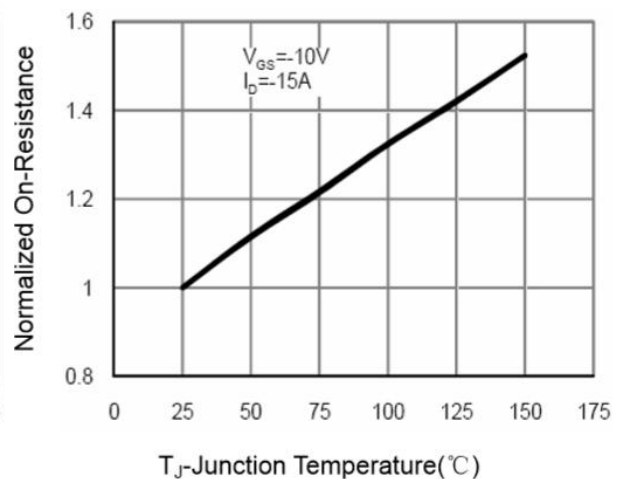


Figure 8 Drain-Source On-Resistance

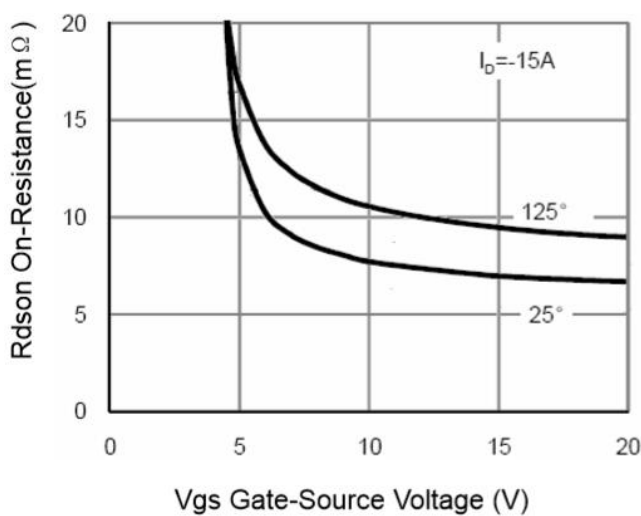


Figure 9 Rdson vs VGS

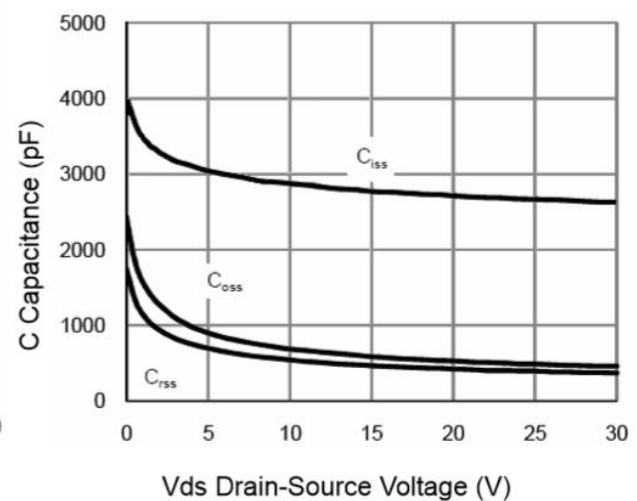


Figure 10 Capacitance vs Vds

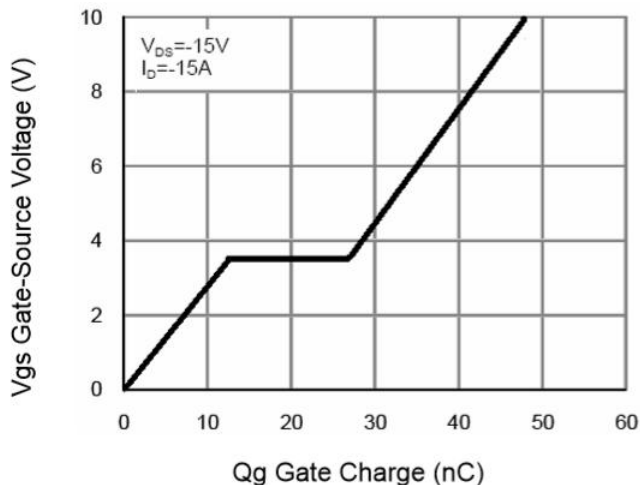


Figure 11 Gate Charge

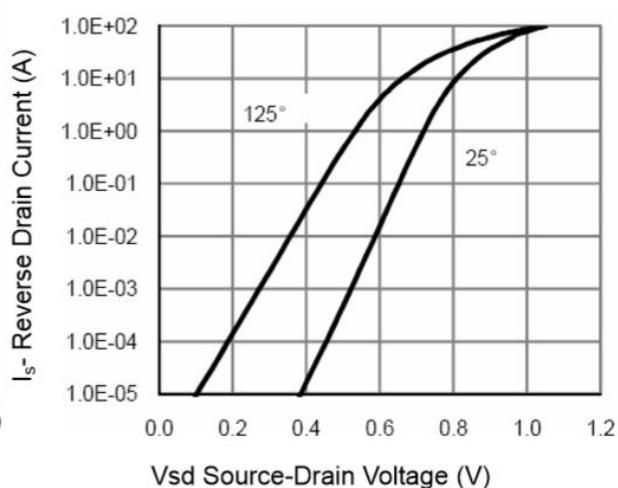


Figure 12 Source- Drain Diode Forward

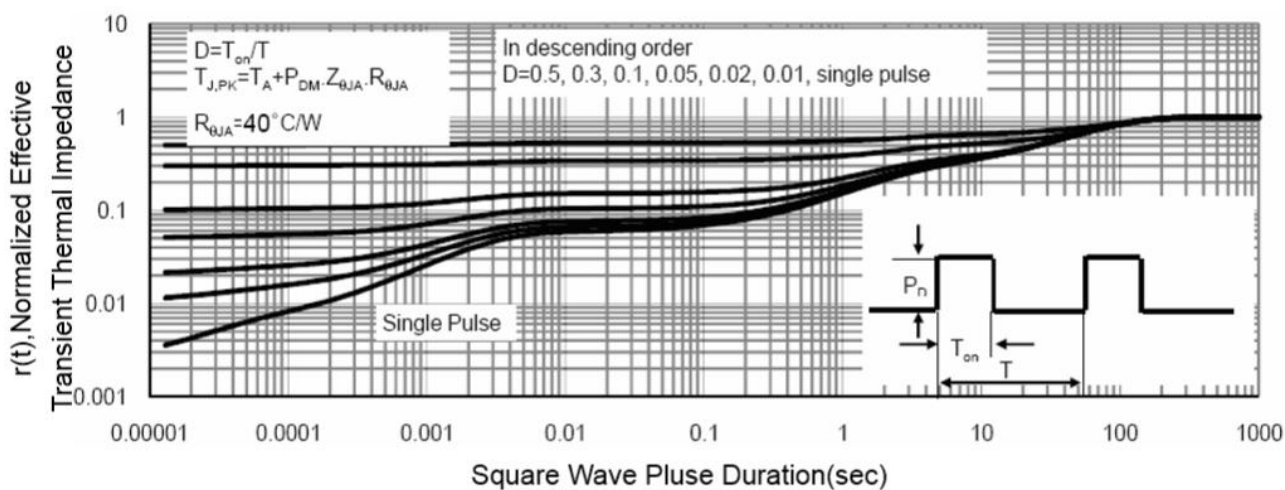
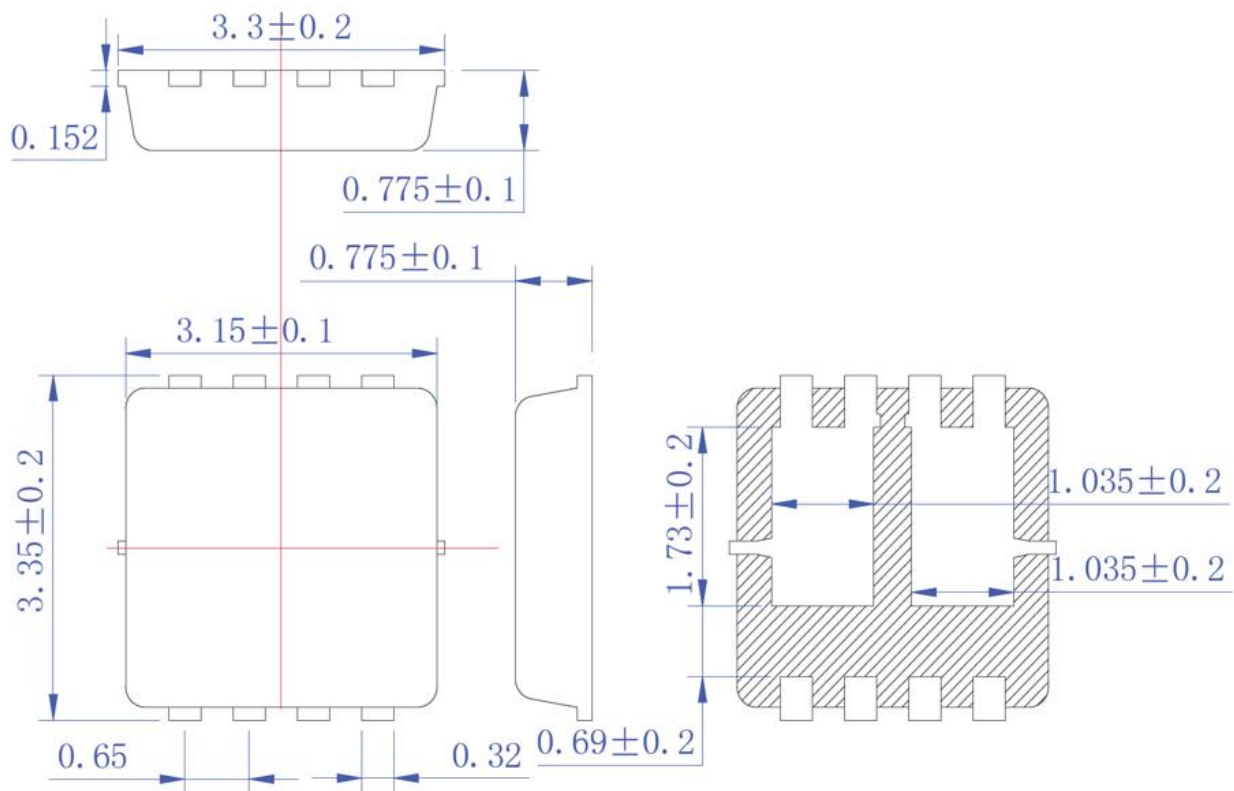


Figure 13 Normalized Maximum Transient Thermal Impedance

Marking Information

	Part	NO.		
●	Y	M	W	SN
Part NO.	HMP3012AD3			
●	Pin 1 Indicator			
Lot NO.	Y : Year ; M : Month ; W : Week ; SN : Pipeline Code			

Package Information



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