ATM7414NDH

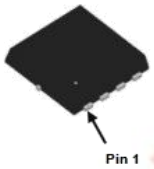
N-Channel Enhancement Mode Field Effect Transistor

Drain-Source Voltage: 30V Drain Current: 18A

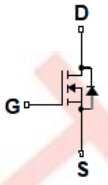
Description

The ATM7414NDH uses advanced trench technology to provide excellent $R_{DS(ON)}$,low gate charge and operation with gate voltages as low as 4.5V.This device is suitable for use as a load switch or in PWM applications. Standard Product ATM7414NDH is Pb-free.

DFN3x3-8L



Top View



Schematic

Features

- V_{DS}(V)=30V
- I_D=18A(V_{GS}=10V)
- $R_{DS(ON)}$ < 16mΩ (V_{GS} =10V)
- $R_{DS(ON)}$ < 24mΩ (V_{GS} =4.5V)

Absolute maximum ratings (Ta=25℃ unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current NOTE 2	Ta=25℃	I_D	18	A
	Ta=70℃		13.5	
Pulsed Drain Current NOTE 3		I_{DM}	52	A
Continuous Drain Current NOTE 1	Ta=25℃	I_{DSM}	12.5	A
	Ta=70℃		10	A
Avalanche energy L=0.3mH		E_{AS}	17.8	mJ
Power Dissipation NOTE 2	Ta=25℃	P_D	10.7	W
	Ta=70℃		4.3	W
Power Dissipation NOTE 1	Ta=25℃	P_{DSM}	3.7	W
	Ta=70℃		2.4	W
Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient NOET 1	t≤ 10s	$R_{\theta JA}$	27	34	℃/W
Maximum Junction-to-Ambient NOET 1	Steady-State		52	65	℃/W
Maximum Junction-to-Case NOET 1	Steady-State	$R_{\theta JC}$	9.8	11.7	℃/W

Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =24V,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	1.0	1.6	2.0	V
Static Drain-source on-resistance[1]	$R_{DS(on)}$	V_{GS} =10V, I_D = 8.0A		12.8	16.0	mΩ
		V_{GS} = 4.5V, I_D = 7.0A		18.0	24.0	
Forward Transconductance	g_{FS}	V_{DS}=5.0V, I_D=8.0A		9.5		S
Diode Forward Voltage	V_{SD}	I_S=1.0A,V_{GS}=0V		0.75	1.2	V
Dynamic characteristics[2]						
Input Capacitance	C_{iss}	V_{DS} =15V,V_{GS} =0V,f =1MHz		645		pF
Output Capacitance	C_{oss}			87		
Reverse Transfer Capacitance	C_{rss}			68		
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.5		Ω
Total Gate Charge	Q_{gtot}(10V)	V_{GS}=10V,V_{DS}=15V, I_D=8.0A		15.5		nC
Total Gate Charge	Q_{gtot}(4.5V)			7.5		nC
Gate Source Charge	Qgs			2.6		nC
Gate Drain Charge	Qgd			2.7		nC
Turn-on delay time	$t_{d(on)}$	V_{DS}=15V,R_L=2Ω, V_{GS}=10V,R_{GEN}=3Ω		6.0		ns
Turn-on rise time	t_r			18.0		
Turn-off delay time	$t_{d(off)}$			27.5		
Turn-off fall time	t_f			9.8		

Notes:

1.The value of RθJA is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

2.The Power dissipation PD is based on TJ(MAX)=150°C, using junction to case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heat sinking is used.

3.Repetitive rating, pulse width limited by junction temperature.

4.The RθJA is the sum of the thermal impedence from junction to case R θJC and case to ambient.

5.The static characteristics in Figures 1 to 6 are obtained using 80 μs pulses, duty cycle 0.5% max.

6.These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with TA=25 °C. The SOA curve provides a single pulse rating.

7.The maximum current rating is package limit.

Typical Characteristics Curves

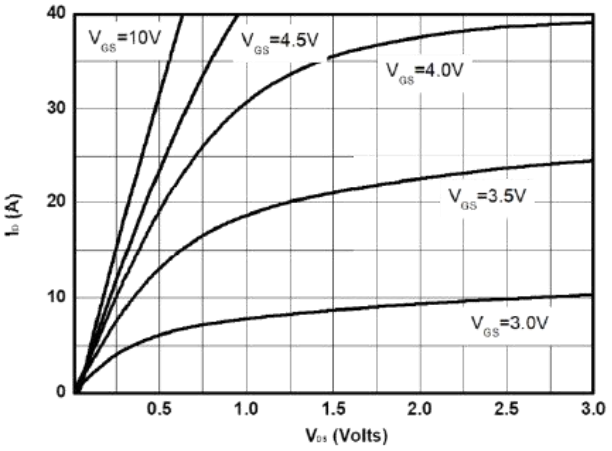


Fig 1: On-Region Characteristics

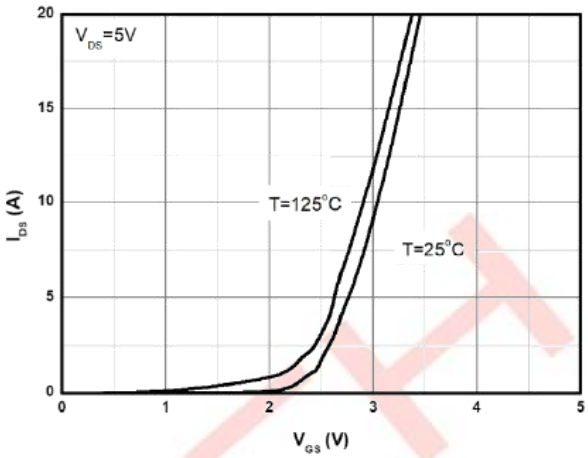


Figure 2: Transfer Characteristics

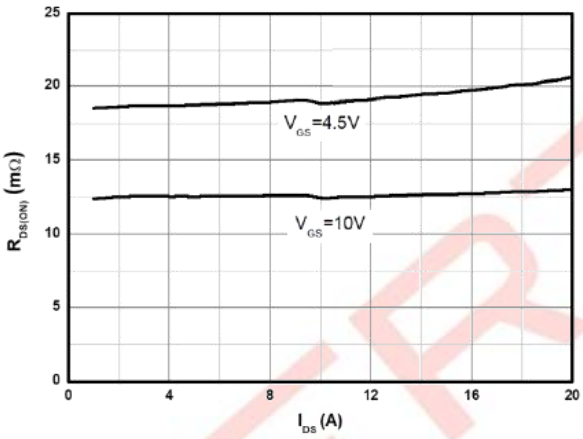


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

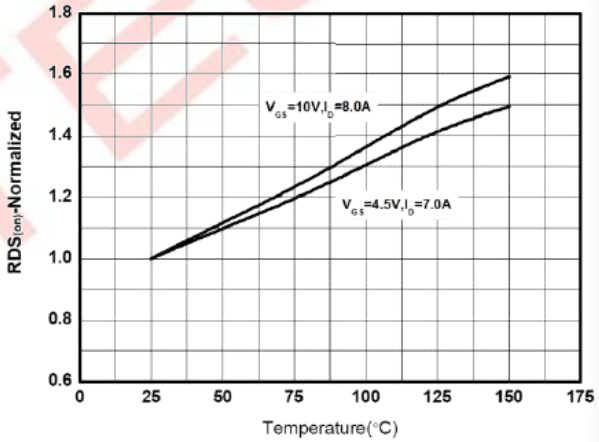


Figure 4: On-Resistance vs. Junction Temperature

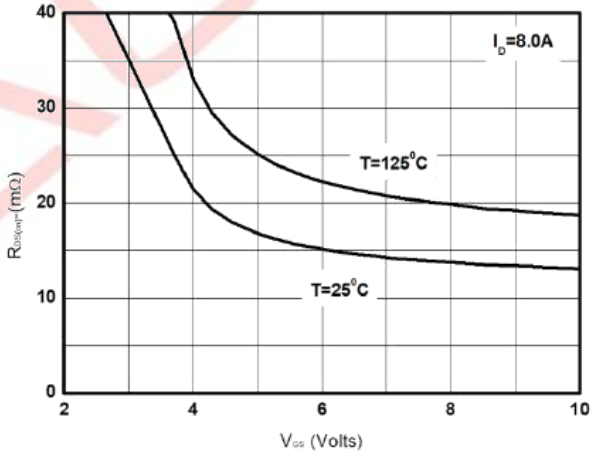


Figure 5: On-Resistance vs Gate-Source

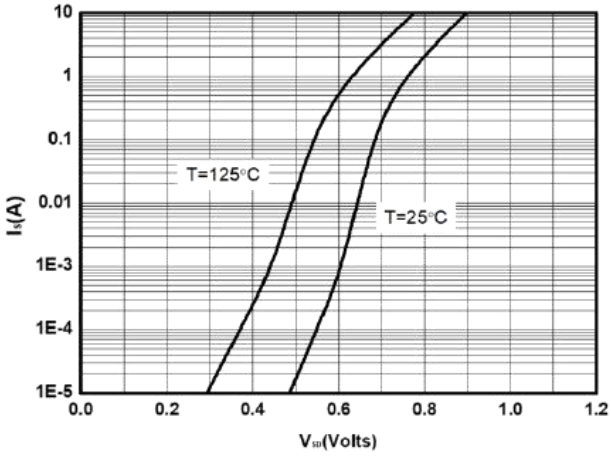


Figure 6: Body-Diode Characteristics

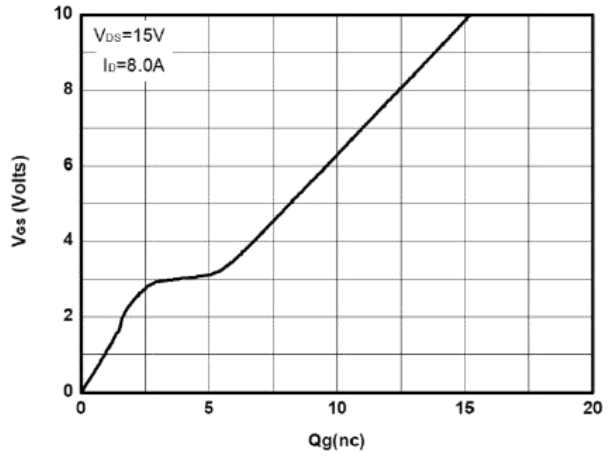


Figure 7: Gate-Charge Characteristics

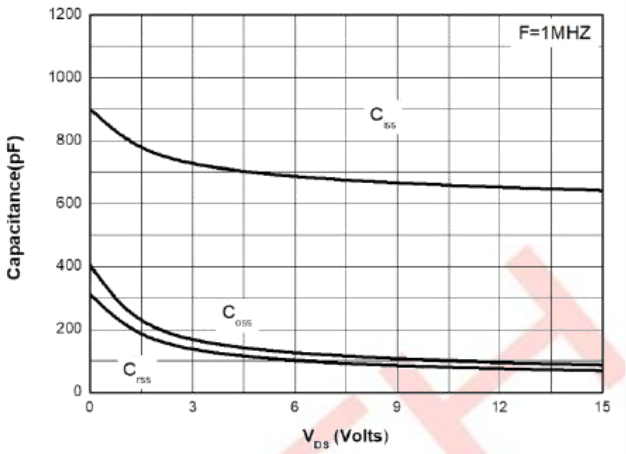


Figure 8: Capacitance Characteristics

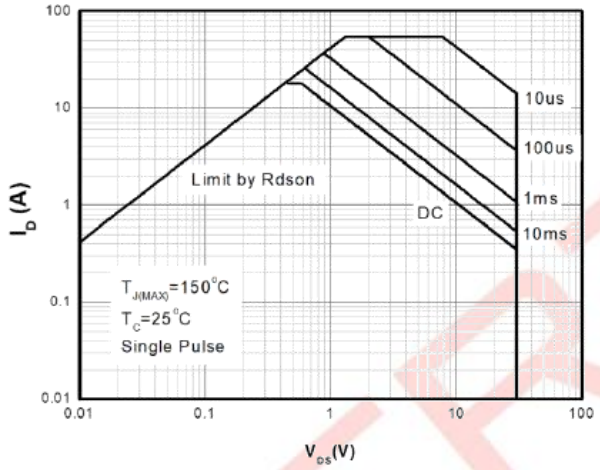


Figure 9: Maximum Forward Biased Safe Operating Area (Note 2)

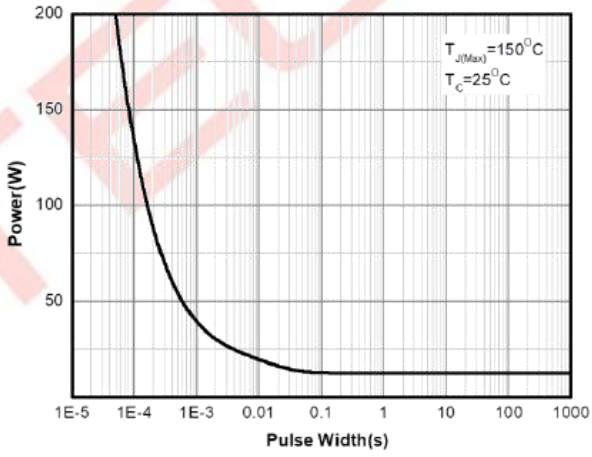


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note 2)

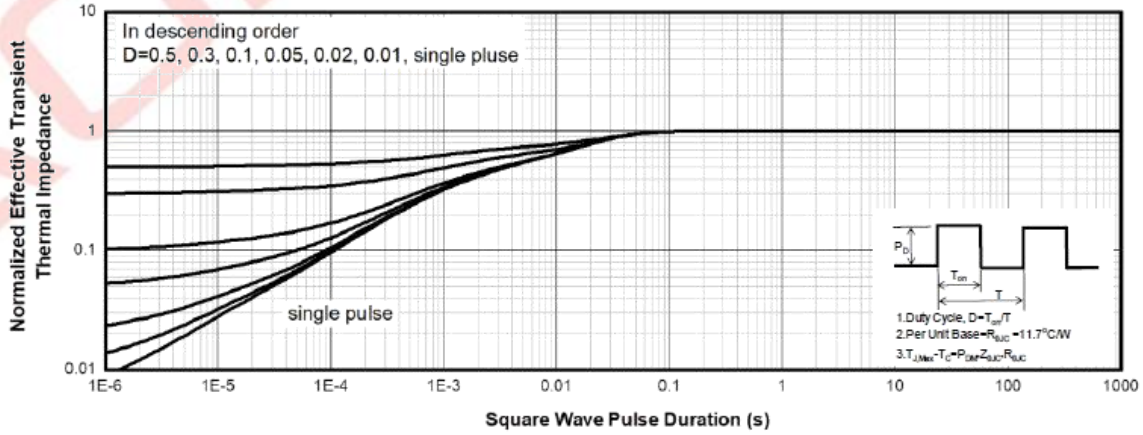
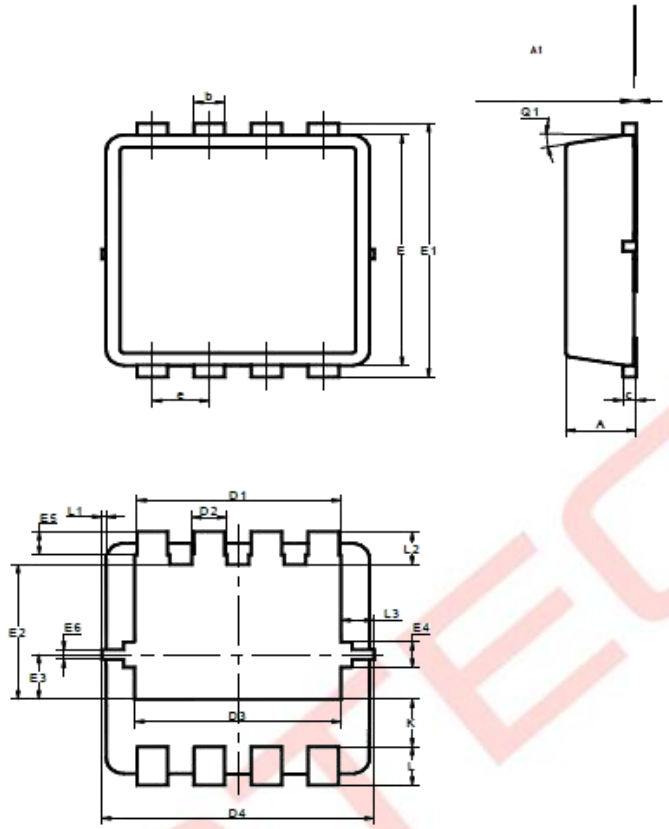


Figure 11: Normalized Maximum Transient Thermal Impedance (Note 2)

Package Outline



UNIT	A	A1	b	c	D	D1	D2	D3	D4	E	E1	E2	E3
mm	0.9	0.05	0.35	0.25	3.1	2.45	0.5	2.7	3.2	3.1	3.3	1.85	0.68
	0.7	0	0.24	0.1	2.9	2.25	0.3	2.5	3	2.9	3.1	1.65	0.48

UNIT	E4	E5	E6	e	K	L	L1	L2	L3	θ1
mm	0.43	0.4	0.175	0.7	0.72	0.5	0.1	0.53	0.475	12°
	0.23	0.2	0.075	0.6	0.52	0.3	0	0.33	0.275	0°

Recommended Soldering Footprint