N-Channel Enhancement Mode Power MOSFET

DESCRIPTION

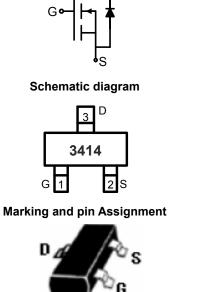
The HM3414 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

GENERAL FEATURES

- V_{DS} = 20V,I_D = 2.9A
 - $R_{DS(ON)} < 59m\Omega @ V_{GS}=2.5V$
 - $R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- Battery protection
- Load switch
- Power management



SOT-23!' @top view

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3414	HM3414	SOT-23ËHŠ	Ø180mm	8 mm	3000 units

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	Vds	20	V
Gate-Source Voltage	Vgs	±10	V
Drain Current-Continuous	Ι _D	2.9	A
Drain Current-Pulsed (Note 1)	I _{DM}	10	A
Maximum Power Dissipation	PD	1	W
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	R _{0JA}	125	°C /W
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Тур	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250µA	20	22	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V_{DS} =20V, V_{GS} =0V	-	-	1	μA

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HM3414

Gate-Body Leakage Current	I _{GSS}	V_{GS} =±10V, V_{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)	·					
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250µA	0.5	0.75	1.2	V
Drain-Source On-State Resistance	P	V _{GS} =2.5V, I _D =2.5A	-	37	59	mΩ
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =2.9A	-	30	45	mΩ
Forward Transconductance	g fs	V _{DS} =5V,I _D =2.9A	-	8	-	S
Dynamic Characteristics (Note4)	·					
Input Capacitance	C _{lss}		-	300	-	PF
Output Capacitance	Coss	V _{DS} =10V,V _{GS} =0V, F=1.0MHz	-	120	-	PF
Reverse Transfer Capacitance	Crss		-	80	-	PF
Switching Characteristics (Note 4)	·					
Turn-on Delay Time	t _{d(on)}		-	10	15	nS
Turn-on Rise Time	tr	V _{DD} =10V,I _D =2.9A	-	50	85	nS
Turn-Off Delay Time	t _{d(off)}	V _{GS} =4.5V,R _{GEN} =6Ω	-	17	45	nS
Turn-Off Fall Time	t _f		-	10	20	nS
Total Gate Charge	Qg)/ _10)/ L _2 0A	-	4.0	10	nC
Gate-Source Charge	Q _{gs}	$V_{DS}=10V, I_{D}=2.9A,$	-	0.65	-	nC
Gate-Drain Charge	Q _{gd}	V _{GS} =4.5V	-	1.2	-	nC
Drain-Source Diode Characteristics		•	·	·		
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =2.9A	-	0.75	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	2.9	А

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, $t \le 10$ sec.

3. Pulse Test: Pulse Width \leq 300µs, Duty Cycle \leq 2%.

4. Guaranteed by design, not subject to production

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

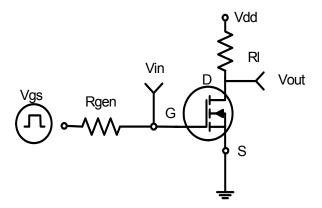
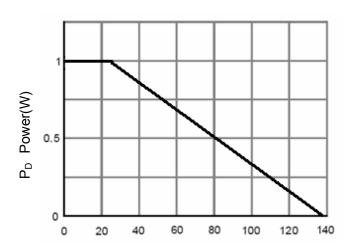
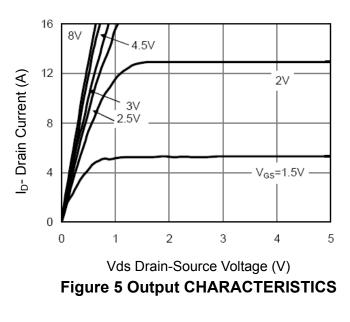
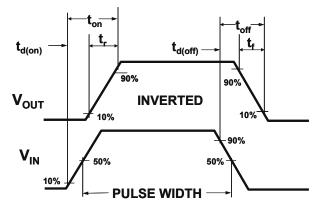


Figure 1:Switching Test Circuit

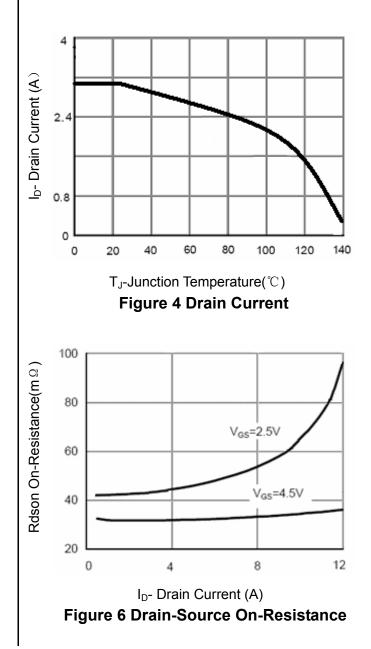


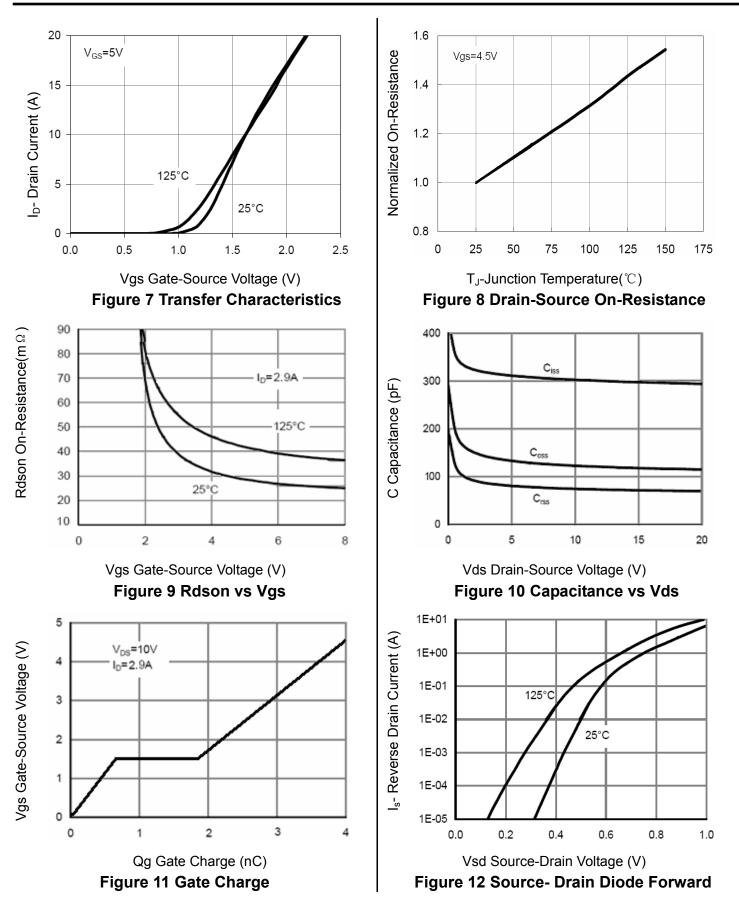
T_J-Junction Temperature(℃) Figure 3 Power Dissipation











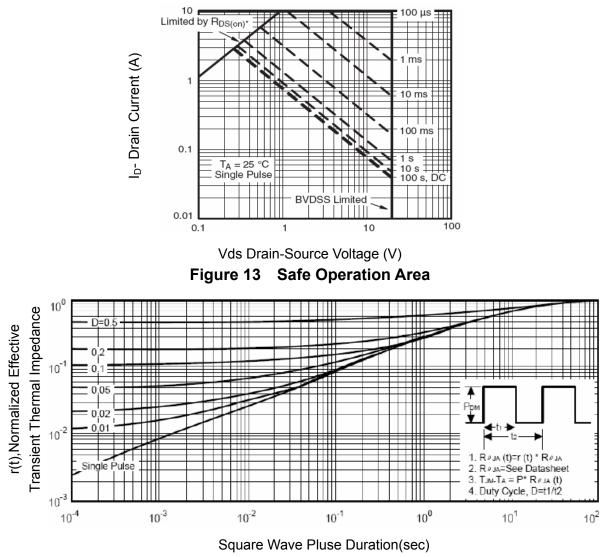
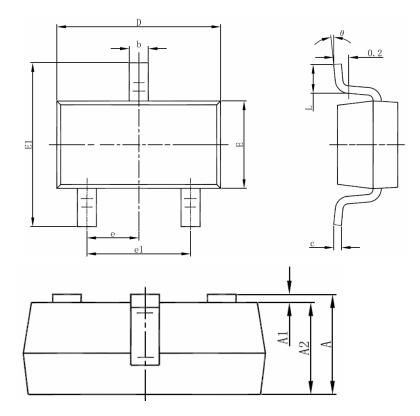


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23-3L PACKAGE INFORMATION



Symbol	Dimensions Ir	n Millimeters	Dimensions In Inches		
Symbol	Min	Max	Min	Max	
A	1.050	1.250	0.041	0.049	
A1	0.000	0.100	0.000	0.004	
A2	1.050	1.150	0.041	0.045	
b	0.300	0.500	0.012	0.020	
С	0.100	0.200	0.004	0.008	
D	2.820	3.020	0.111	0.119	
E	1.500	1.700	0.059	0.067	
E1	2.650	2.950	0.104	0.116	
е	0.950	(BSC)	0.037(BSC)	
e1	1.800	2.000	0.071	0.079	
L	0.300	0.600	0.012	0.024	
θ	0°	8°	0°	8°	

NOTES

- 1. All dimensions are in millimeters.
- 2. Tolerance ±0.10mm (4 mil) unless otherwise specified
- 3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
- 4. Dimension L is measured in gauge plane.
- 5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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