HM4614B

N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET　N 加 P 沟道增强型 MOS 管

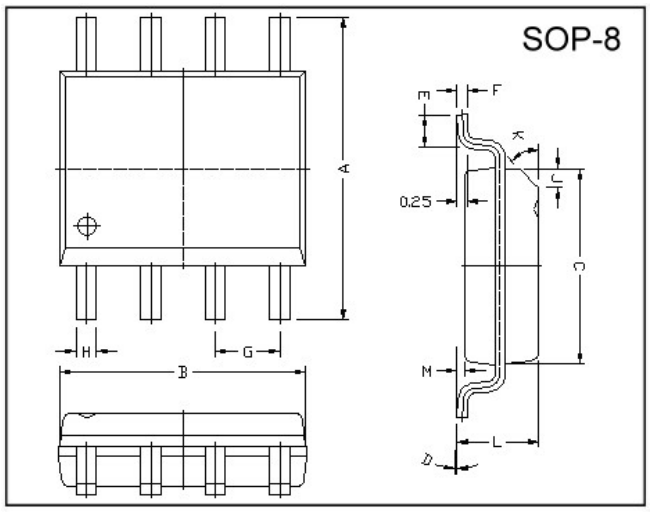
N-CH　V_{DS}= 40V
$R_{DS(ON)}$, V_{gs}@10V, I_{ds}@6.0A = 31mΩ
$R_{DS(ON)}$, V_{gs}@4.5V, I_{ds}@5.0A= 45mΩ

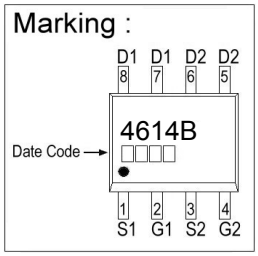
P-CH　V_{DS}= - 40V
$R_{DS(ON)}$, V_{gs}@-10V, I_{ds}@-5.0A = 45mΩ
$R_{DS(ON)}$, V_{gs}@-4.5V, I_{ds}@-4.0A = 63mΩ

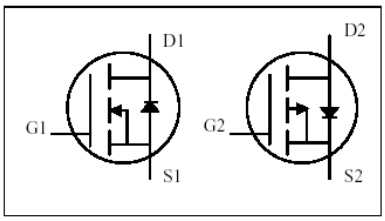
Features　特性

Advanced trench process technology　高级的加工技术
High Density Cell Design For Ultra Low On-Resistance　极低的导通电阻高密度的单元设计
Improved Shoot-Through FOM　改良的成形工艺

Package Dimensions　封装尺寸及外形图







REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.49
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.375 REF.	
E	0.40	0.90	K	45°	
F	0.19	0.25	G	1.27 TYP.	

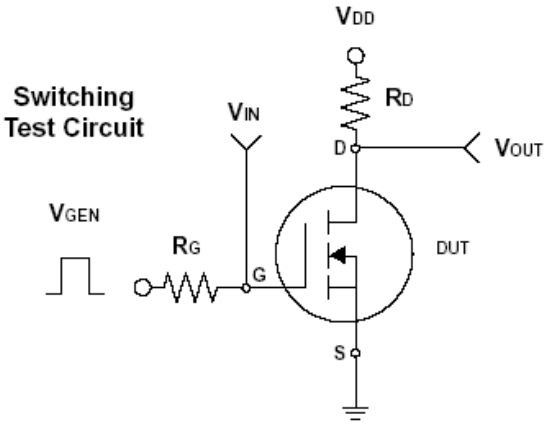
Maximum Ratings and Thermal Characteristics (TA = 25oC unless otherwise noted)　25℃ 极限参数和热特性

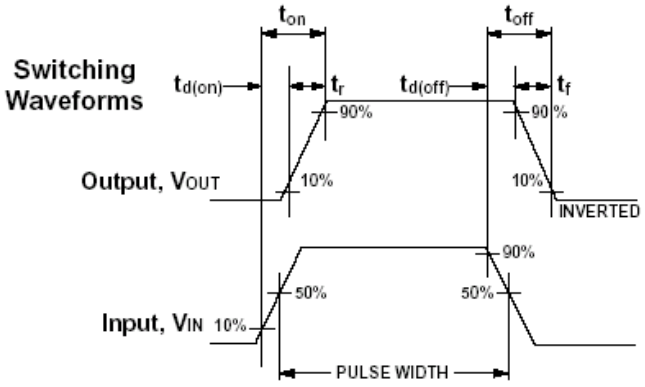
Parameter 极限参数	Symbol 符号	Ratings 等级		Unit 单位
		N-沟道	P-沟道	
Drain-Source Voltage　漏源电压	V_{DS}	40	-40	V
Gate-Source Voltage　栅源电压	V_{GS}	±20	±20	V
Continuous Drain Current　连续漏极电流	I_D @TA=25℃	6.0	-5.0	A
Continuous Drain Current　连续漏极电流	I_D @TA=70℃	5.0	-4.0	A
Pulsed Drain Current　脉冲漏极电流	I_{DM}	20	-20	A
Total Power Dissipation　功耗	P_D @TA=25℃	2.1		W
Linear Derating Factor　线性因子		0.016		W/℃
Operating Junction and Storage Temperature Range　使用及储存温度	Tj, Tstg	-55 ~ +150		℃

N-Channel Electrical Characteristics (Tj = 25℃ unless otherwise specified)　N 沟道电气特性　25℃

Parameter 参数	符号	Test Condition 测试条件	最小值	典型值	最大值	单位
Static　静态参数						
Drain-Source Breakdown Voltage 漏源击穿电压	BV_{DSS}	V_{GS} = 0V, I_D = 250uA	40			V
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 5.0A		33.0	45.0	mΩ
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6.0A		23.0	31.0	
Gate Threshold Voltage　开启电压	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D = 250uA	1	1.8	3	V
Zero Gate Voltage Drain Current 零栅压漏极电流	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V			1	uA
Gate Body Leakage　漏极短路时截止栅电流	I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			± 100	nA
Forward Transconductance　正向跨导	g_{fs}	V_{DS} = 5V, I_D = 5A		17	__	S
Dynamic　动态参数						
Total Gate Charge　栅极总电荷	Q_g	V_{DS} = 20V, I_D = 1.5A V_{GS} = 10V		14.5		nC
Gate-Source Charge　栅-源极电荷	Q_{gs}			1.5		
Gate-Drain Charge　栅-漏极电荷	Q_{gd}			3.5		
Turn-On Delay Time　导通延迟时间	$t_{d(on)}$	V_{DD} = 20 V, R_L = 5 Ω I_D = 1A,　V_{GEN} = 10V R_G = 3 Ω		10.5		ns
Turn-On Rise Time　导通上升时间	t_r			16.05		
Turn-Off Delay Time　关断延迟时间	$t_{d(off)}$			39		
Turn-Off Fall Time　关断下降时间	t_f			10		
Input Capacitance　输入电容	C_{iss}	V_{DS} = 20 V, V_{GS} = 0V f = 1.0 MHz		745		pF
Output Capacitance　输出电容	C_{oss}			65.7		
Reverse Transfer Capacitance　反向传输电容	C_{rss}			53.35		
Source-Drain Diode　源漏二极管参数						
Max. Diode Forward Current 最大正向电流	I_S				4.3	A
Diode Forward Voltage　正向电压	V_{SD}	I_S = 1A, V_{GS} = 0V			1.3	V

Note: Pulse test: pulse width <= 300us, duty cycle<= 2%　注意：脉冲测试：脉冲宽度<= 300us 死区<= 2%





N-Channel Characteristics Curve　N 沟道电气性能特征曲线

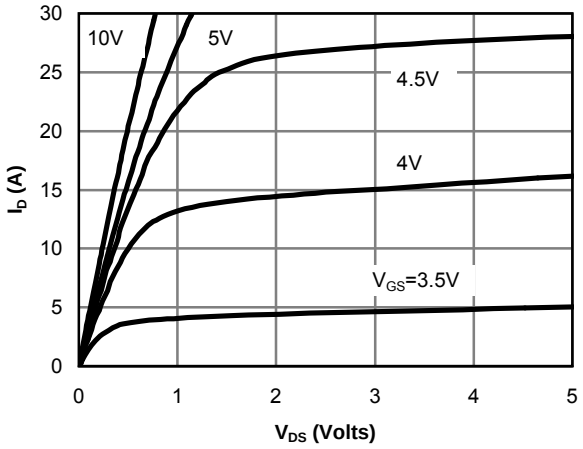


Figure 1: On-Region Characteristics

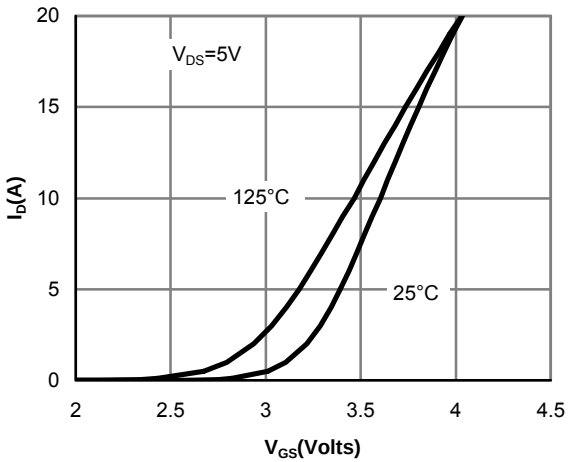


Figure 2: Transfer Characteristics

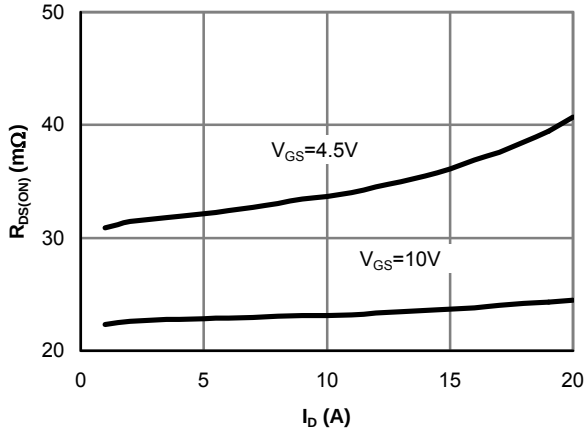


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

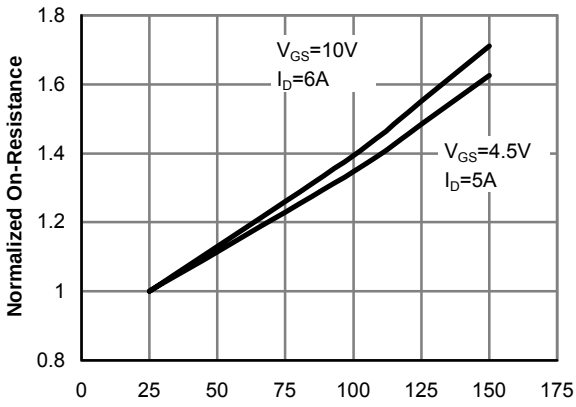


Figure 4: On-Resistance vs. Junction Temperature

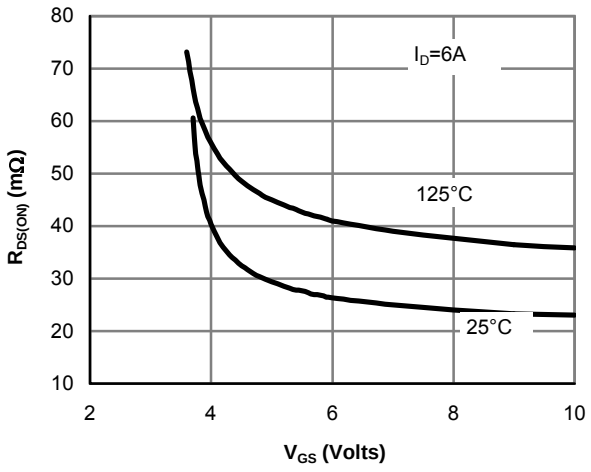


Figure 5: On-Resistance vs. Gate-Source Voltage

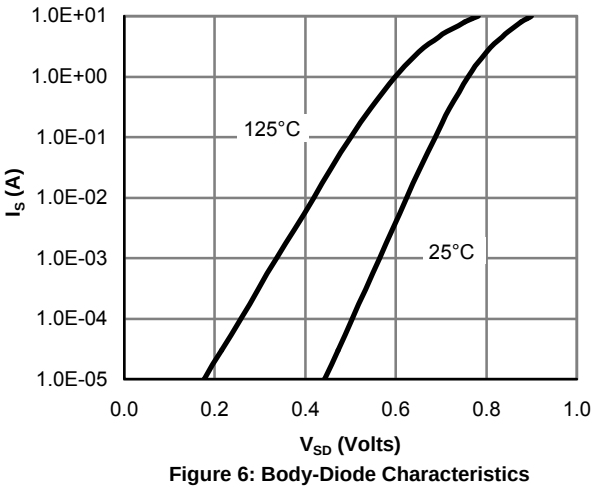


Figure 6: Body-Diode Characteristics

P-Channel Electrical Characteristics (Tj = 25℃ unless otherwise specified)　P 沟道电气特性　25℃

Parameter 参数	符号	Test Condition 测试条件	最小值	典型值	最大值	单位
Static　静态参数						
Drain-Source Breakdown Voltage 漏源击穿电压	BV_{DSS}	V_{GS} = 0V, I_D = -250u A	-40			V
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -4.0A		51	63	mΩ
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -5.0A		35	45	
Gate Threshold Voltage　栅源电压	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250 uA	-1	-1.7	-3	V
Zero Gate Voltage Drain Current 0 栅压漏极电流	I_{DSS}	V_{DS} = -40 V, V_{GS} = 0V			-1	uA
Gate Body Leakage　漏极短路时截止栅电流	I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			± 100	nA
Forward Transconductance　正向跨导	gfs	V_{DS} = -5V, I_D = -5A		5		S
Dynamic[3)]　动态参数						
Total Gate Charge　栅极总电荷	Q_g	V_{DS} = -20V, I_D = -1.5A V_{GS} = -10 V		21.52		nC
Gate-Source Charge　栅-源极电荷	Q_{gs}			2.4		
Gate-Drain Charge　栅-漏极电荷	Q_{gd}			4.82		
Turn-On Delay Time　导通延迟时间	$t_{d(on)}$	V_{DD} = -20 V, R_L = 5 Ω I_D = -1A, V_{GEN} = -10 V R_G = 3 Ω		15.08		ns
Turn-On Rise Time　导通上升时间	t_r			14.53		
Turn-Off Delay Time　关断延迟时间	$t_{d(off)}$			51		
Turn-Off Fall Time　关断下降时间	t_f			14.8		
Input Capacitance　输入电容	C_{iss}	V_{DS} = - 20 V, V_{GS} = 0V f = 1.0 MHz		1238		pF
Output Capacitance　输出电容	C_{oss}			99		
Reverse Transfer Capacitance　反向传输电容	C_{rss}			67.5		
Source-Drain Diode　源漏二极管参数						
Max. Diode Forward Current 最大正向电流	I_S				-2.3	A
Diode Forward Voltage　正向电压	V_{SD}	I_S = -2.3A, V_{GS} = 0V			-1.2	V

P-Channel

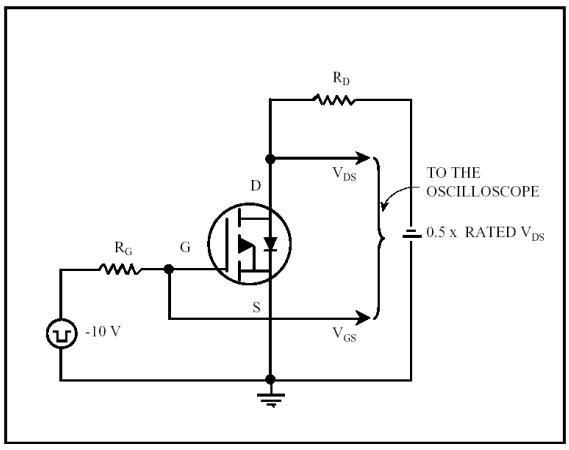


Fig 13. Switching Time Circuit

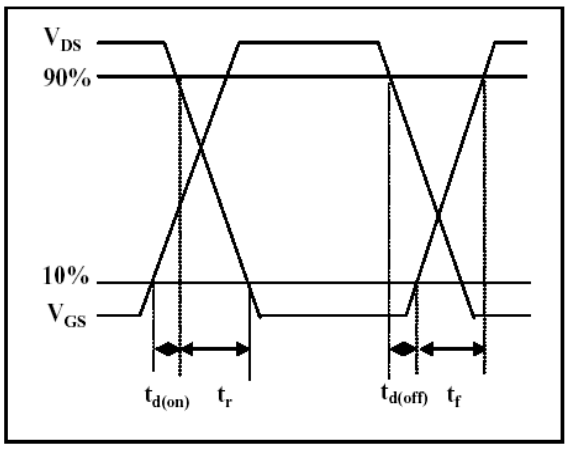


Fig 14. Switching Time Waveform

P-Channel Characteristics Curve P 沟道电气性能特征曲线

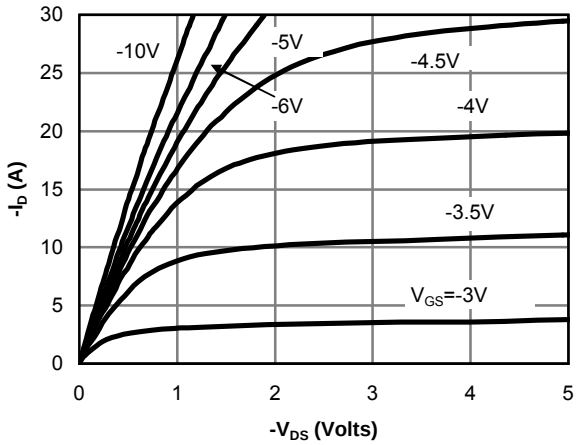


Figure 1: On-Region Characteristics

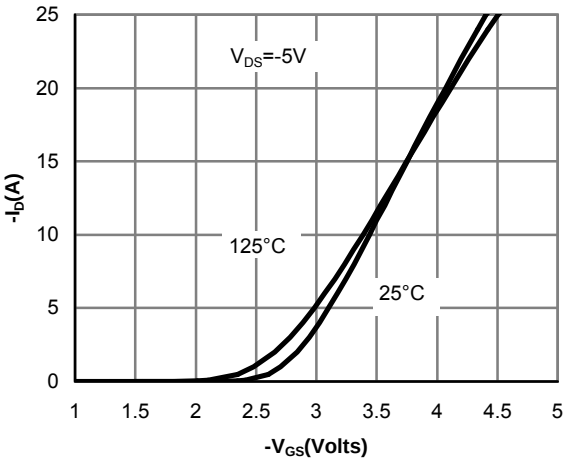


Figure 2: Transfer Characteristics

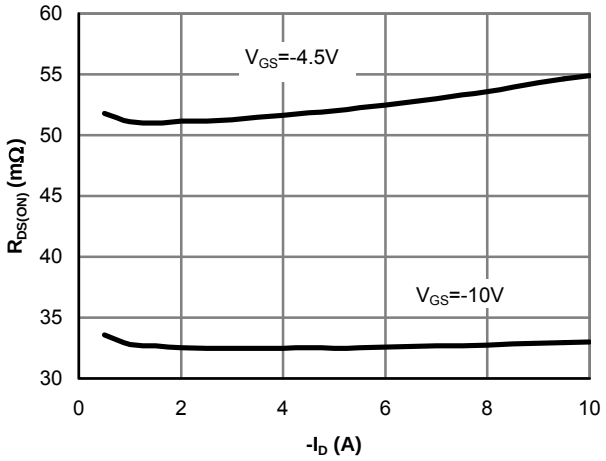


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

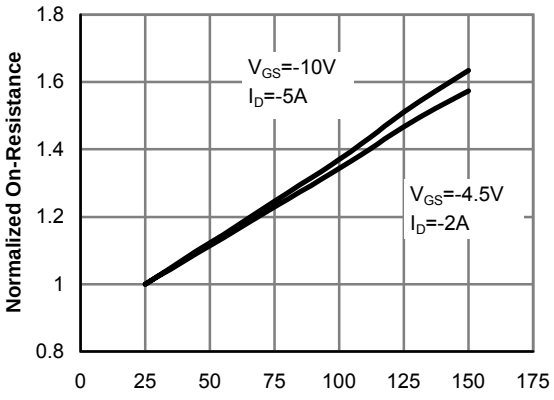


Figure 4: On-Resistance vs. Junction Temperature

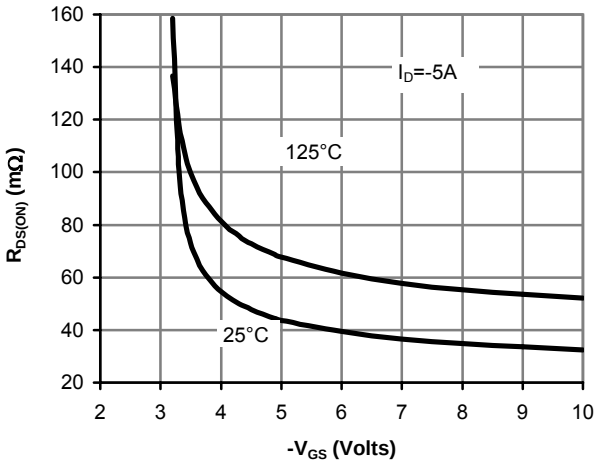


Figure 5: On-Resistance vs. Gate-Source Voltage

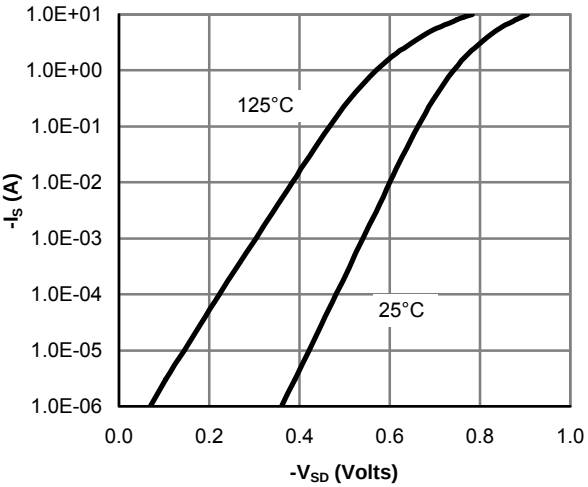


Figure 6: Body-Diode Characteristics