P-Channel Enhancement Mode Power MOSFET

Description

The HM5P55R uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

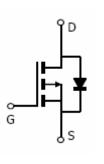
General Features

• V_{DS} =-55V, I_{D} =-5A $R_{DS(ON)}$ <80m Ω @ V_{GS} =-10V

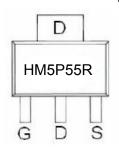
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- DC-DC Converter



Schematic diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM5P55R	HM5P55R	SOT-223	Ø330mm	12mm	2500 units

Absolute Maximum Ratings (T_A=25°Cunless otherwise noted)

The control manufacture of the control of the contr					
Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V _{DS}	-55	V		
Gate-Source Voltage	V _{GS}	±20	V		
Drain Current-Continuous	I _D	-5	А		
Drain Current-Continuous(T _C =100 °C)	I _D (100℃)	-3.0	А		
Pulsed Drain Current	I _{DM}	-25	А		
Maximum Power Dissipation	P _D	3	W		
Operating Junction and Storage Temperature Range	T_{J}, T_{STG}	-55 To 150	$^{\circ}$		

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Thermal Characteristic

Thermal Resistance ,Junction-to-Ambient(Note 2)	$R_{\theta JA}$	42	°C/W	
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Electrical Characteristics (T_A=25 ℃ unless otherwise noted)

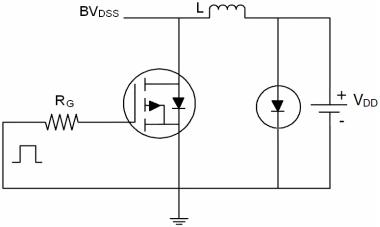
Parameter	Symbol	Condition	Min	Тур	Max	Unit
Off Characteristics				•		
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-55	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-55V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)	·					
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-1.5	-2.6	-3.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V_{GS} =-10V, I_D =-5A	-	64	80	mΩ
Forward Transconductance	g FS	V _{DS} =-15V,I _D =-5A	16	-	-	S
Dynamic Characteristics (Note4)	·					
Input Capacitance	C _{lss}	V _{DS} =-20V,V _{GS} =0V, F=1.0MHz	-	1450	-	PF
Output Capacitance	Coss		-	145	-	PF
Reverse Transfer Capacitance	C _{rss}	r-1.0WIHZ	-	110	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}		-	8	-	nS
Turn-on Rise Time	t _r	V_{DD} =-30V, , R_L =30 Ω	-	9	-	nS
Turn-Off Delay Time	t _{d(off)}	V_{GS} =-10 V , R_{GEN} =6 Ω	-	65	-	nS
Turn-Off Fall Time	t _f		-	30	-	nS
Total Gate Charge	Qg	V _{DS} =-30V,I _D =-5A, V _{GS} =-10V	-	26	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	nC
Gate-Drain Charge	Q_{gd}	V _{GS} =-10V		7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =-3A	_	-	1.2	V
Diode Forward Current (Note 2)	Is		-	-	-5	Α

Notes:

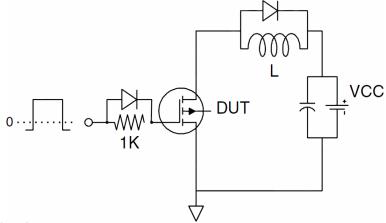
- $\textbf{1.} \ \ \textbf{Repetitive Rating: Pulse width limited by maximum junction temperature.}$
- 2. Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
- 4. Guaranteed by design, not subject to production

Test Circuit

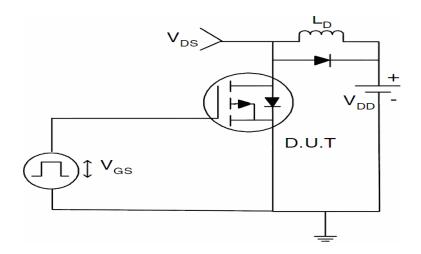
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



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Typical Electrical and Thermal Characteristics

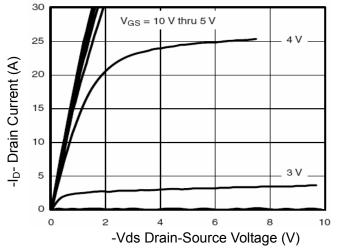


Figure 1 Output Characteristics

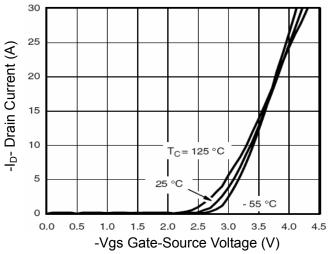


Figure 2 Transfer Characteristics

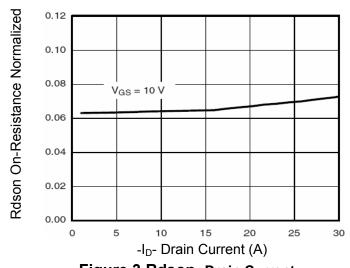


Figure 3 Rdson- Drain Current

(Curves)

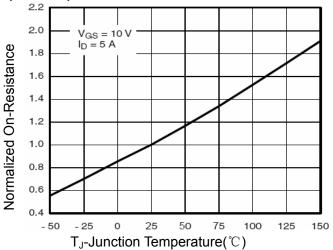


Figure 4 Rdson-Junction Temperature

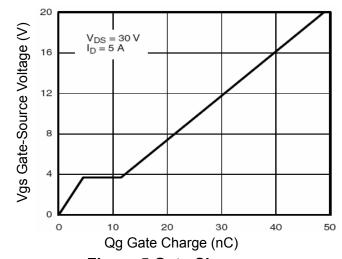


Figure 5 Gate Charge

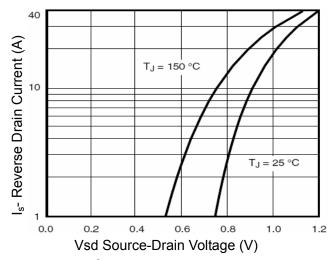


Figure 6 Source- Drain Diode Forward

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100

10

0.1

0.01

0.001

T_A = 25 °C Single Pulse

Ip- Drain Current (A)

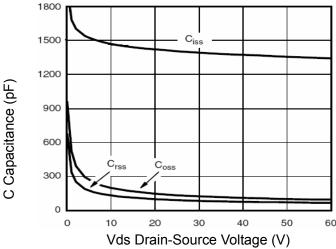
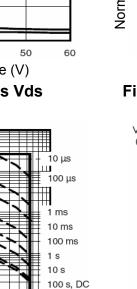


Figure 7 Capacitance vs Vds



Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area

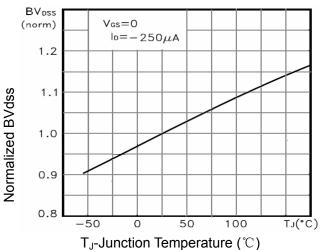


Figure 9 BV_{DSS} vs Junction Temperature

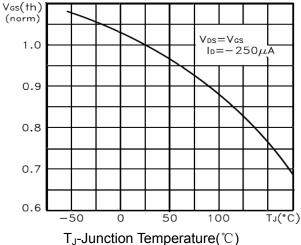


Figure 10 V_{GS(th)} vs Junction Temperature

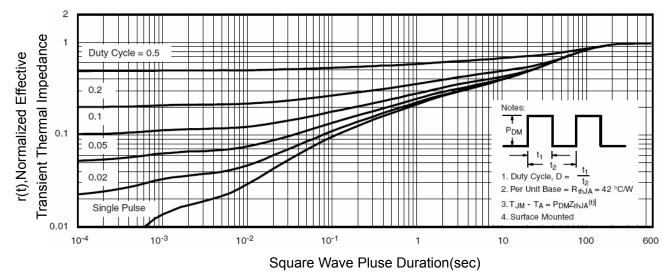
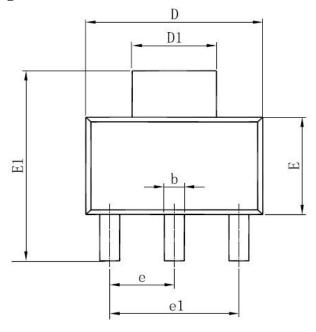


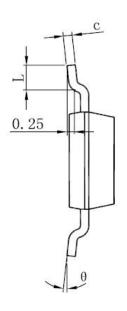
Figure 11 Normalized Maximum Transient Thermal Impedance

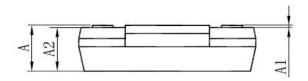
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Package Information:







C	Dimensions In Millimeters		Dimensions In Inches		
Symbol	Min	Max	Min	Max	
Α	1.520	1.800	0.060	0.071	
A1	0.000	0.100	0.000	0.004	
A2	1.500	1.700	0.059	0.067	
b	0.660	0.820	0.026	0.032	
С	0.250	0.350	0.010	0.014	
D	6.200	6.400	0.244	0.252	
D1	2.900	3.100	0.114	0.122	
E	3.300	3.700	0.130	0.146	
E1	6.830	7.070	0.269	0.278	
е	2.300(BSC)		0.091(BSC)		
e1	4.500	4.700	0.177	0.185	
L	0.900	1.150	0.035	0.045	
θ	0°	10°	0°	10°	

SOT-223 Package

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