

100V N-Channel Enhancement Mode MOSFET

Description

The HM1003MR 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

- ◆ $I_D = 2.6A, V_{DS} = 100V$
 $R_{DS(ON)}(Typ.) = 85m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 90m\Omega @ V_{GS} = 4.5V$
- ◆ High density cell design for ultra low $R_{DS(ON)}$
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation
- ◆ Special process technology for high ESD capability

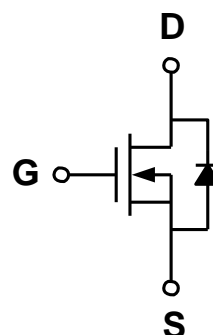
Application

- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply

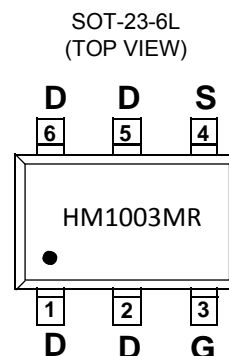
Package

- ◆ SOT-23-6L

Schematic diagram



Marking and pin assignment



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
HM1003MR	-55 °C to +150 °C	SOT-23-6L	3000

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

parameter	symbol	limit	unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current —Continuous (Note 1a) —Pulsed	I_D	2.6	A
		10.4	
Single Pulse Avalanche Energy (Note 3)	E_{AS}	37	mJ
Maximum Power Dissipation (Note 1a) (Note 1b)	P_D	1.6	W
		0.8	
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25℃	-	60	200	mV/℃
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage, Forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V	-	-	100	nA
Gate-Body Leakage, Reverse	I _{GSSR}	V _{GS} =-20V, V _{DS} =0V	-	-	-100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.3	2.0	3	V
Gate Threshold Voltage Temperature Coefficient	ΔV _{GS(th)} /ΔT _J	I _D =250μA, Referenced to 25℃	-	-6	-	mV/℃
Static Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.6A	-	85	125	mΩ
		V _{GS} =4.5V, I _D =2.6A		90	145	
On-State Drain Current	I _{D(ON)}	V _{DS} =5V, V _{GS} =10V	2.6	-	-	A
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =2.6A	-	10	-	S
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{GS} =0V ,V _{DS} =50V f=1.0MHz	-	840	-	pF
Output Capacitance	C _{OSS}		-	43	-	
Reverse Transfer Capacitance	C _{RSS}		-	23	-	
Gate Resistance	R _G		0.1	1.35	3.0	Ω
Switching Characteristics						
Turn-on Delay Time	t _{D(ON)}	V _{DD} =50V, I _D =1A, V _{GS} =10V, R _{GEN} =6Ω	-	4.4	-	ns
Turn-on Rise time	t _r		-	21	-	
Turn-off delay time	t _{D(OFF)}		-	25	-	
Turn-off Fall time	t _f		-	21.2	-	
Total Gate Charge	Q _g	V _{GS} =10V, I _D =2.6A,V _{DS} =50V	-	20.5	-	nC
Gate-Source Charge	Q _{gs}		-	3.2	-	
Gate-Drain Charge	Q _{gd}		-	4	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain-Source Diode Forward Current	I _S		-	-	1.3	A
Drain-Source Diode Forward Voltage	V _{SD}	I _{SD} = 1.3A, V _{GS} = 0V	-	0.76	1.2	V
Reverse Recovery Time	trr	I _F = 2.6A, dI _F /d _t = 100A/μs		40	-	ns
Reverse Recovery Charge	Qrr			22	-	nC
Thermal Characteristics						
Thermal Resistance, Junction-to-Ambient	R _{θJA}		-	78	-	℃ /W
Thermal Resistance, Junction-to-Case	R _{θJC}		-	30	-	℃ /W

Typical Performance Characteristics

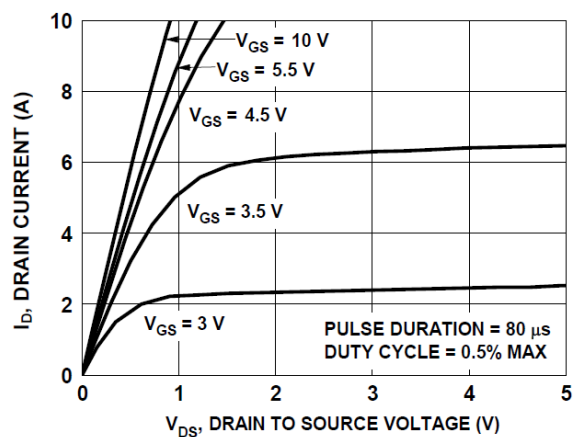


Figure 1. On Region Characteristics

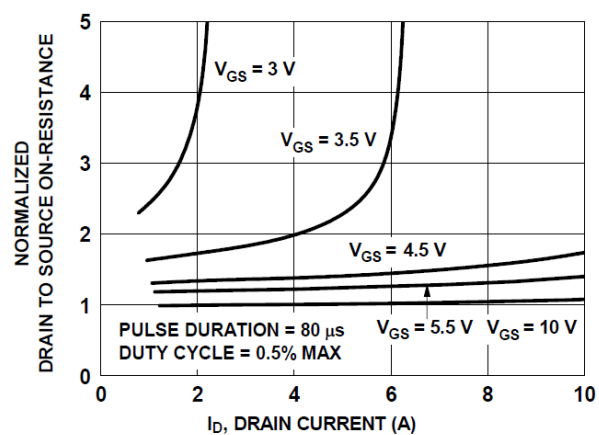


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

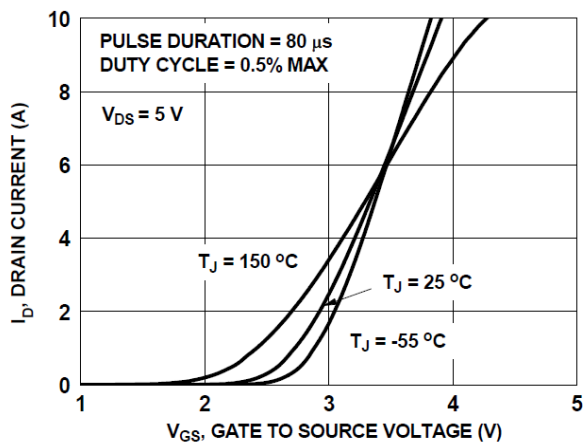
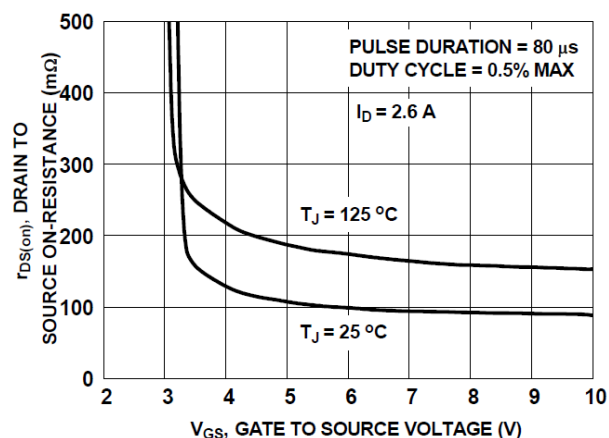
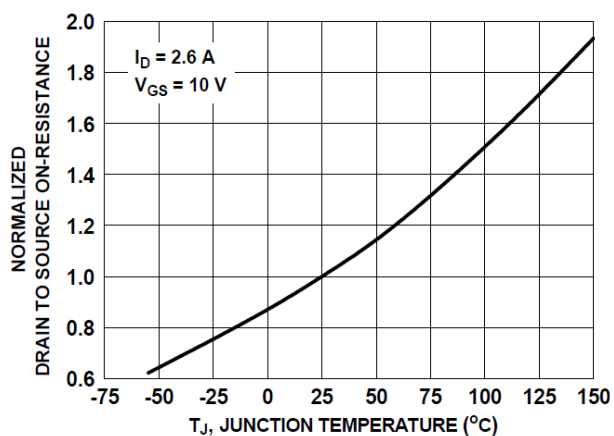


Figure 5. Transfer Characteristics

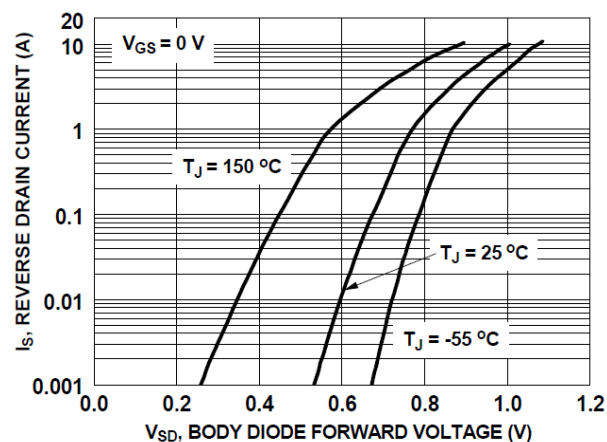


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

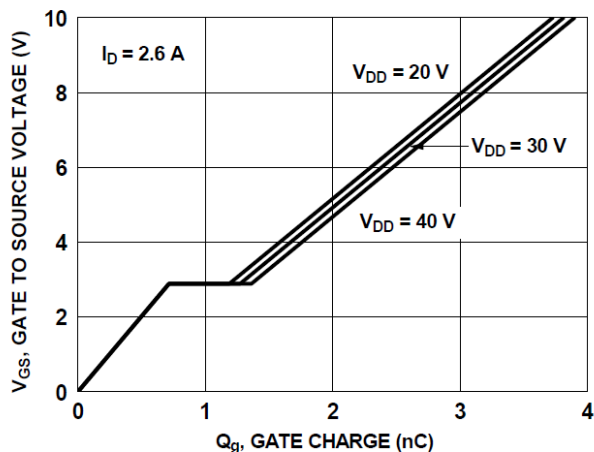


Figure 7. Gate Charge Characteristics

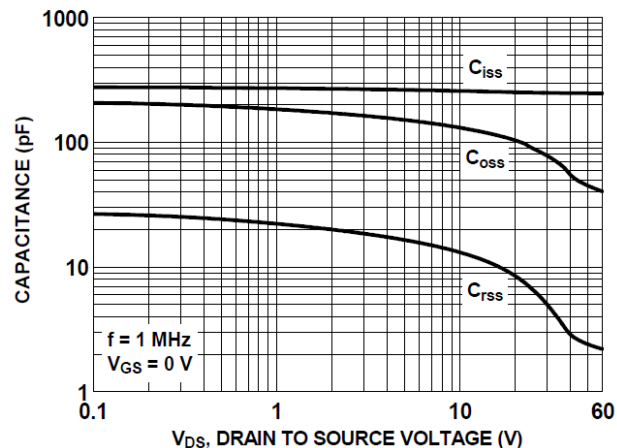


Figure 8. Capacitance vs. Drain to Source Voltage

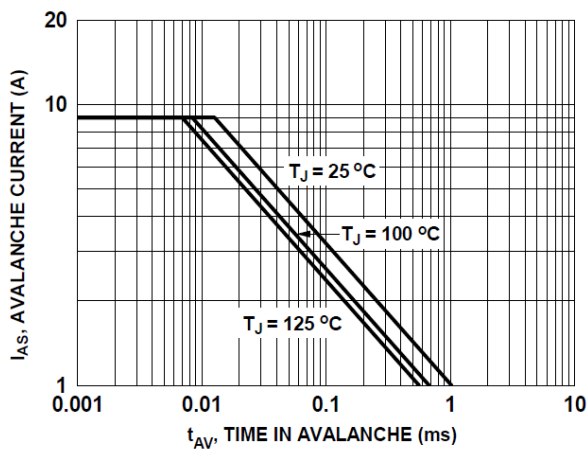


Figure 9. Unclamped Inductive Switching Capability

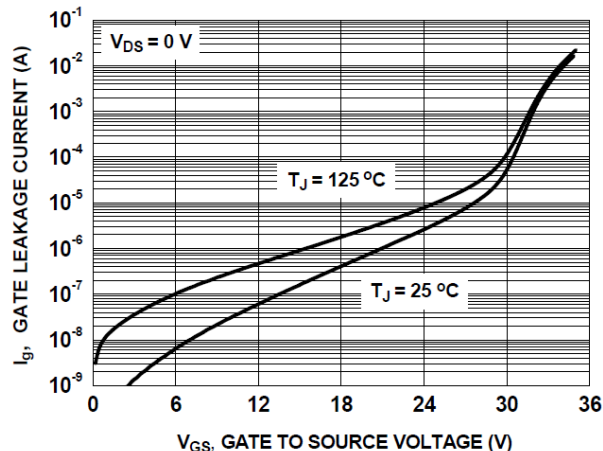


Figure 10. Gate Leakage Current vs. Gate to Source Voltage

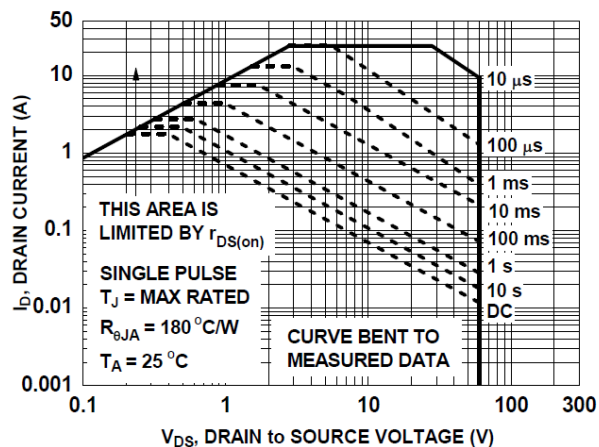


Figure 11. Forward Bias Safe Operating Area

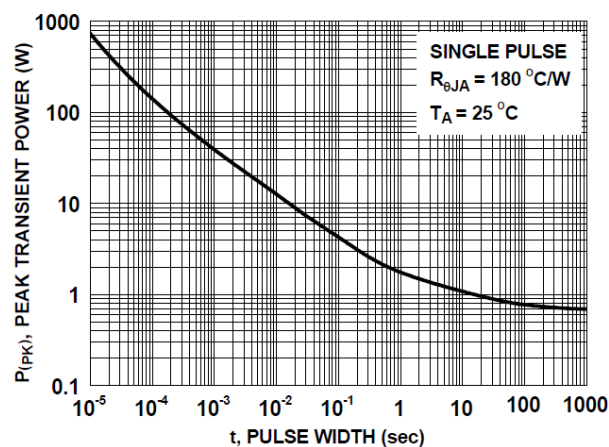


Figure 12. Single Pulse Maximum Power Dissipation

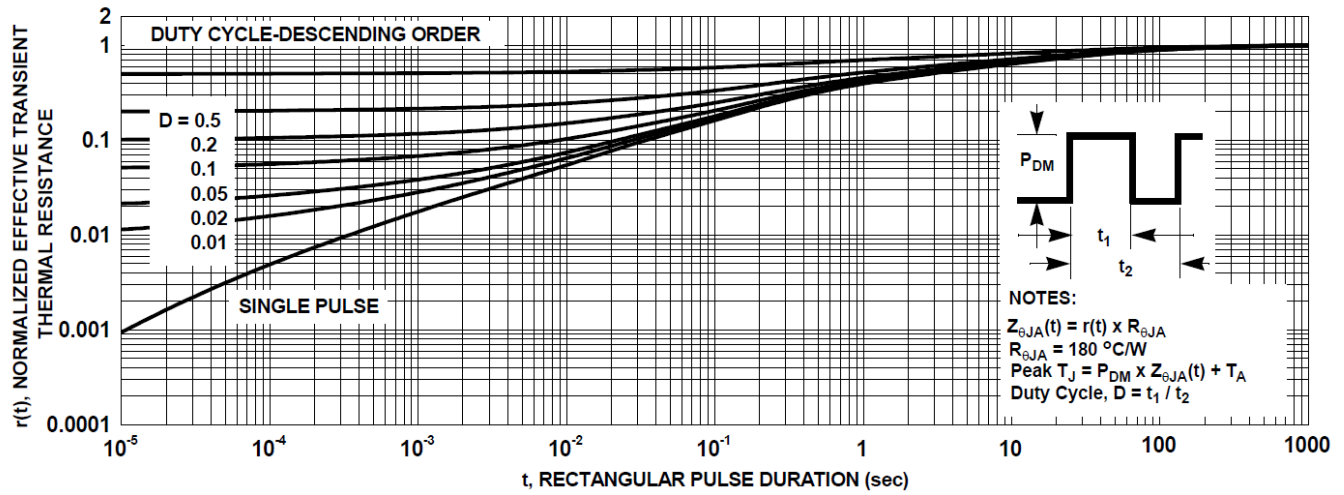
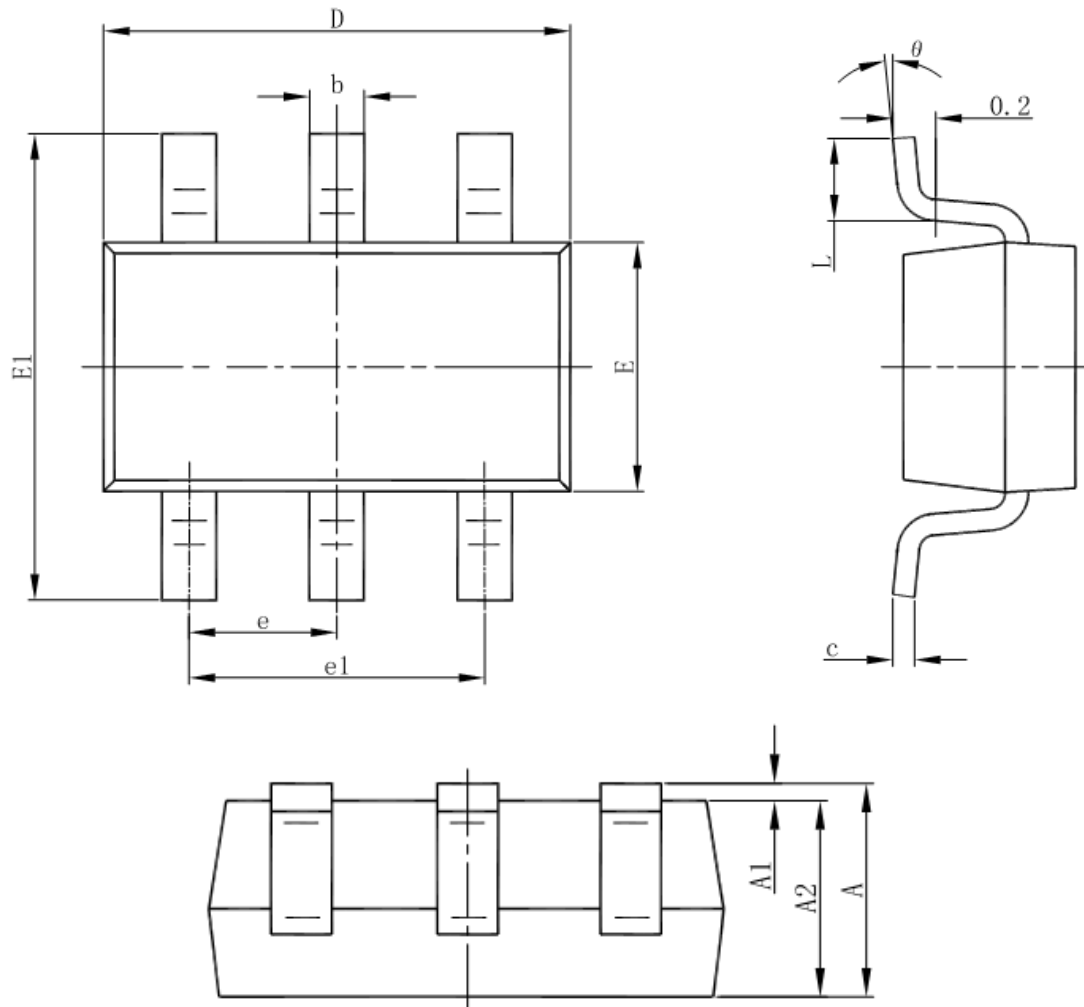


Figure 13. Junction-to-Ambient Transient Thermal Response Curve

Package Information

- SOT-23-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	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
c	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
e	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°