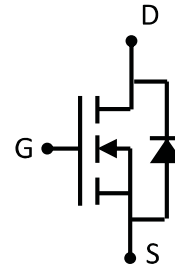


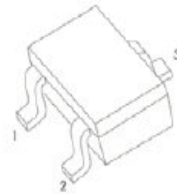
N-Channel Enhancement Mode Power MOSFET

Features

- 40V,5A
 $R_{DS(ON)} < 40m\Omega @ V_{GS}=10V$ TYP:30m Ω
 $R_{DS(ON)} < 60m\Omega @ V_{GS}=4.5V$ TYP:40m Ω
- Lead free and Green Device Available
- Excellent RDS(ON) and Low Gate Charge
- Lead free product Fast switching speed



Schematic diagram



SOT-23

Applications

- Load Switch
- PWM Application
- Power management
- Halogen-free

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
5040	RM5N40S2	SOT-23	-	-	3000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a = 25^\circ\text{C}$)	I_D	5	A
Continuous Drain Current ($T_a = 100^\circ\text{C}$)	I_D	3	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	20	A
Power Dissipation ($T_a = 25^\circ\text{C}$)	P_D	1.6	W
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-40~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.5	2.2	V
Drain-source on-resistance ⁽²⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4A$	-	30	40	m Ω
		$V_{GS} = 4.5V, I_D = 3A$		40	60	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1.0\text{MHz}$	-	435	-	pF
Output Capacitance	C_{oss}		-	58	-	
Reverse Transfer Capacitance	C_{rss}		-	35	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 4A, R_L = 1\Omega, R_G = 3\Omega$ $V_{GS} = 10V$	-	10	-	ns
Turn-on rise time	t_r		-	8	-	
Turn-off delay time	$t_{d(off)}$		-	29	-	
Turn-off fall time	t_f		-	12	-	
Total Gate Charge	Q_g	$V_{DS} = 20V, I_D = 3A,$ $V_{GS} = 10V$	-	11	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	
Gate-Drain Charge	Q_{gd}		-	2.5	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$T_J = 25^{\circ}\text{C}, V_{GS} = 0V, I_S = 5A$	-	-	1.2	V
Diode Forward current	I_S	$T_C = 25^{\circ}\text{C}$	-	-	5	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 5A, di/dt = 100A/\mu s$		20		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 5A, di/dt = 100A/\mu s$		11		uc

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

RATING AND CHARACTERISTICS CURVES (RM5N40S2)

Figure 1: Output Characteristics

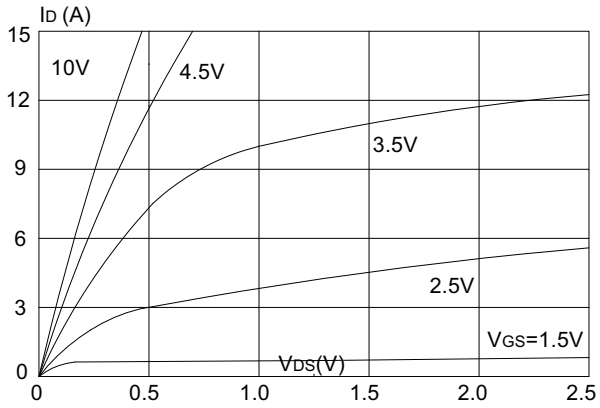


Figure 2: Typical Transfer Characteristics

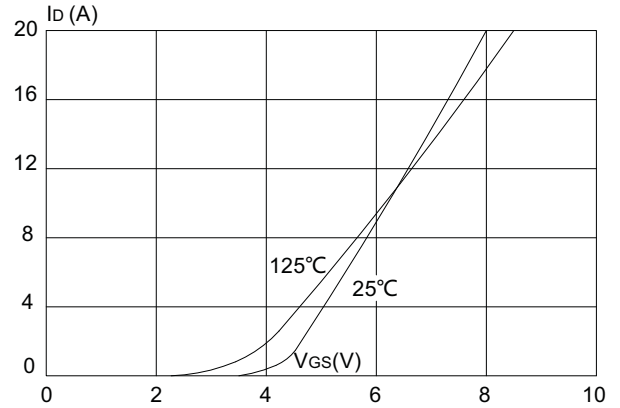


Figure 3: On-resistance vs. Drain Current

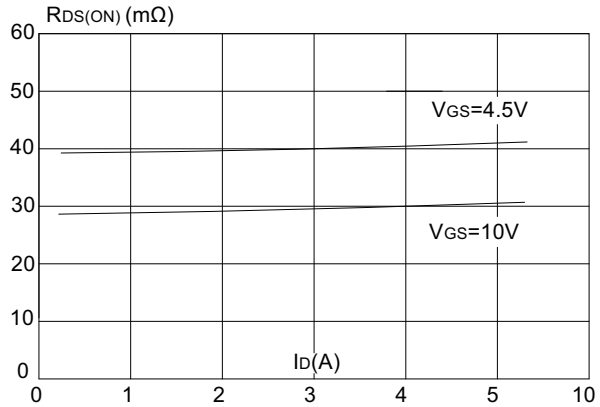


Figure 4: Body Diode Characteristics

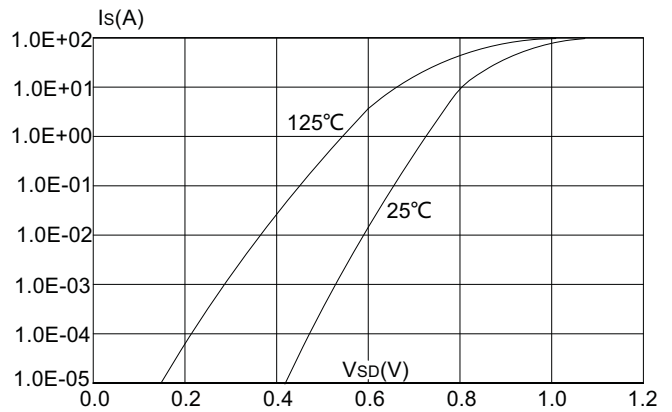


Figure 5: Gate Charge Characteristics

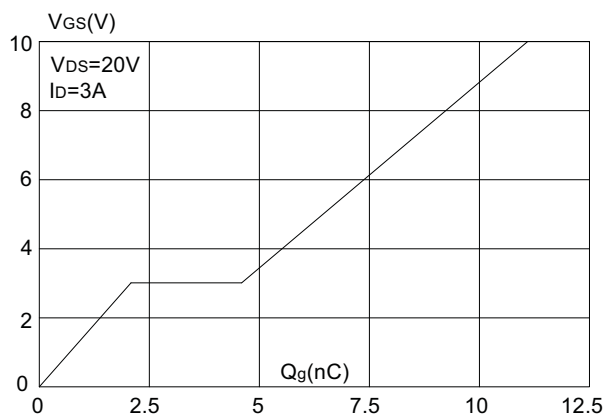
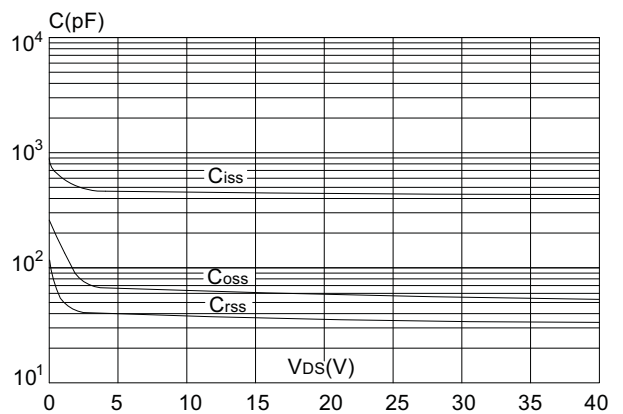


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTICS CURVES (RM5N40S2)

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

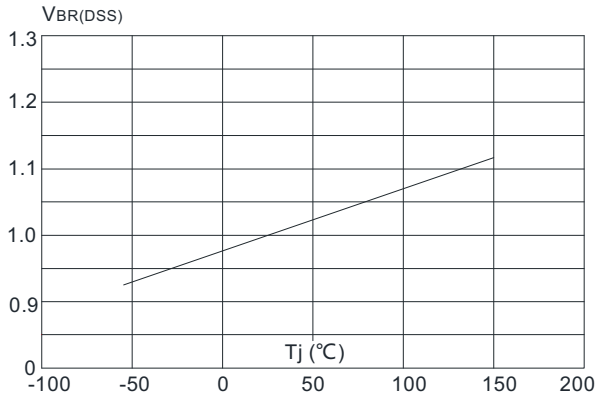


Figure 8: Normalized on Resistance vs. Junction Temperature

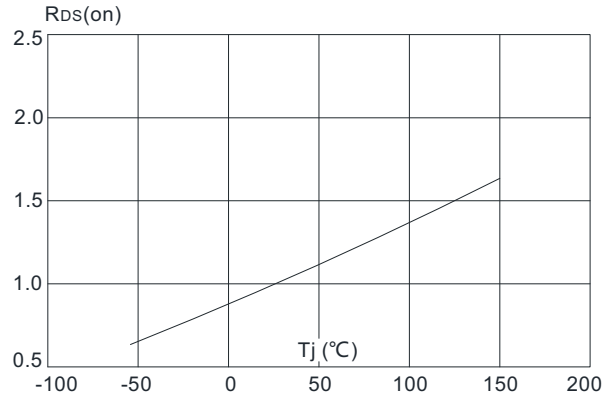


Figure 9: Maximum Safe Operating Area

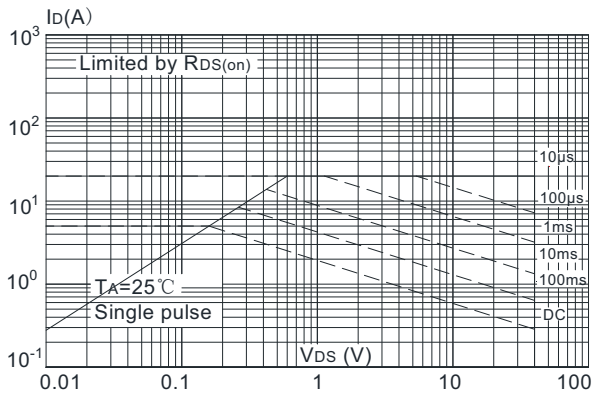


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

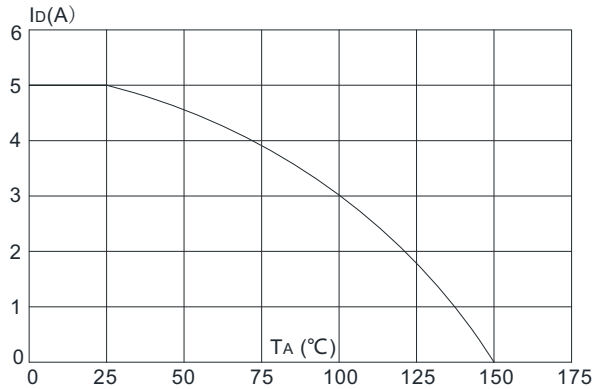
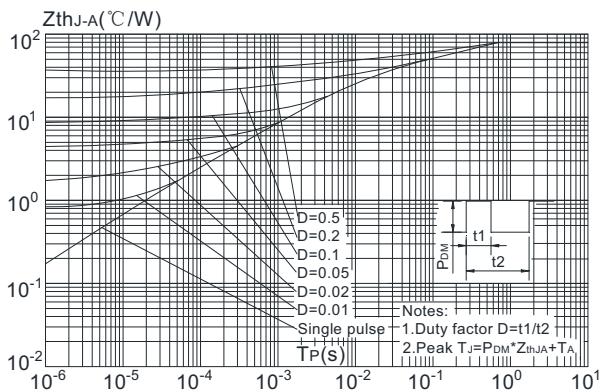


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

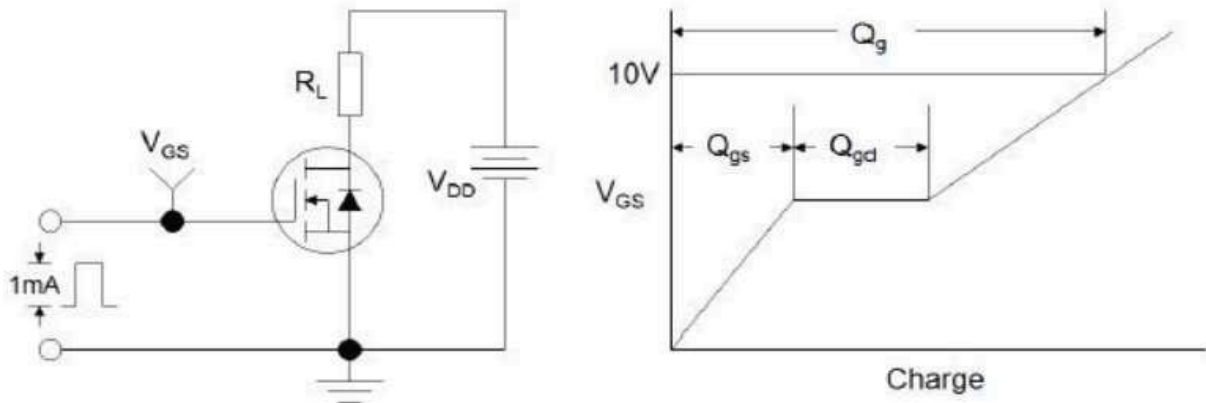


Figure 1: Gate Charge Test Circuit & Waveform

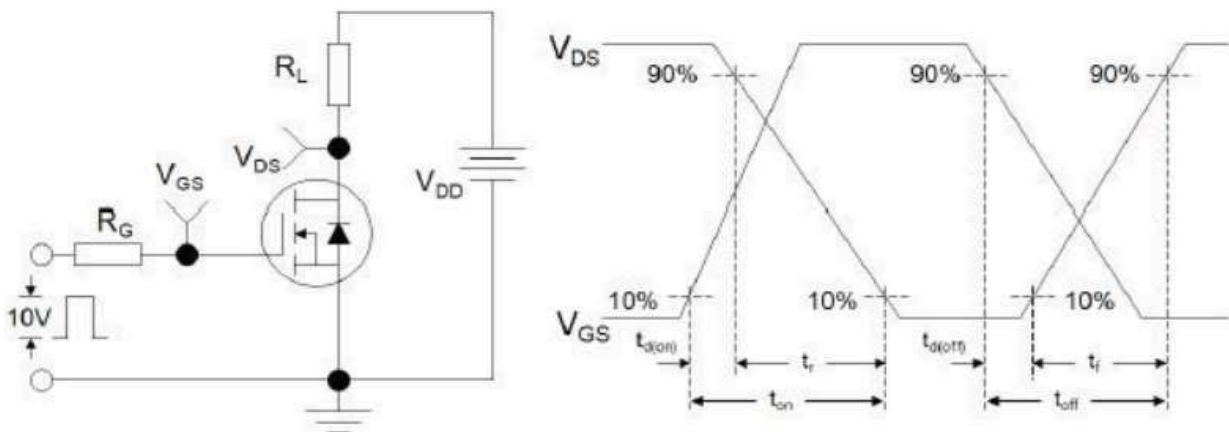


Figure 2: Resistive Switching Test Circuit & Waveforms

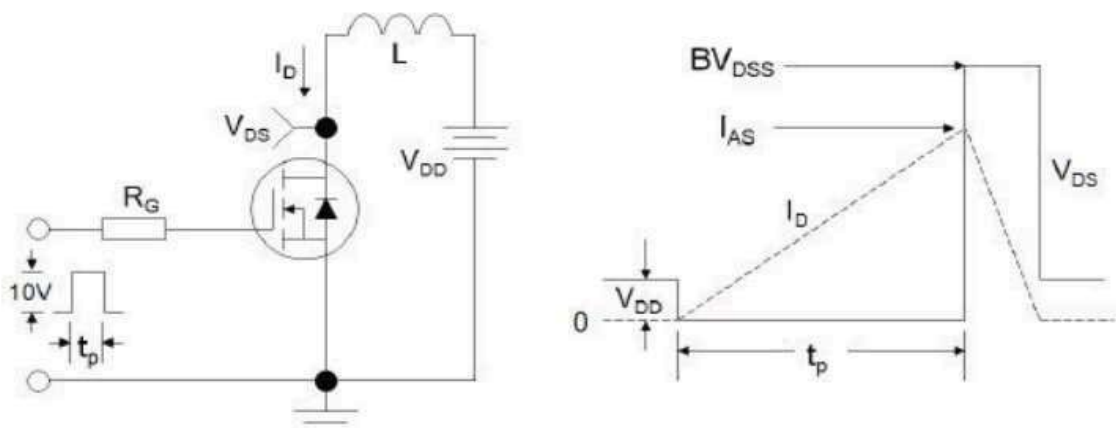
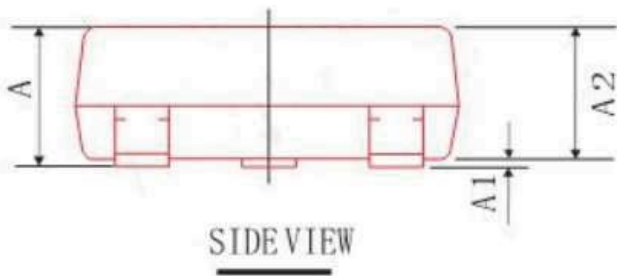
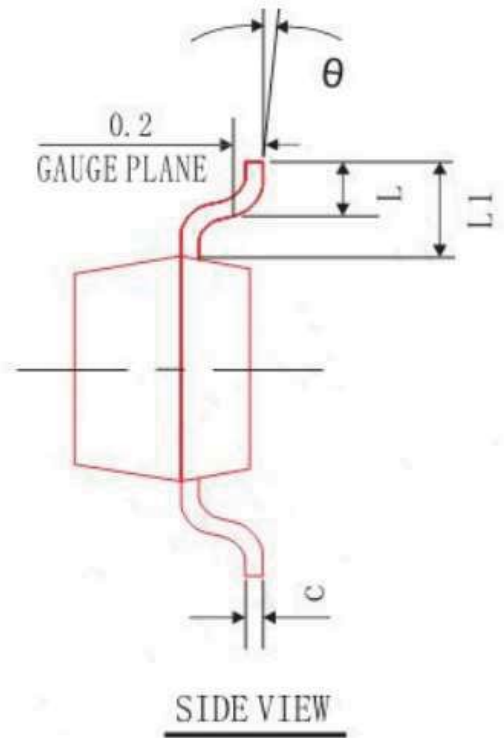
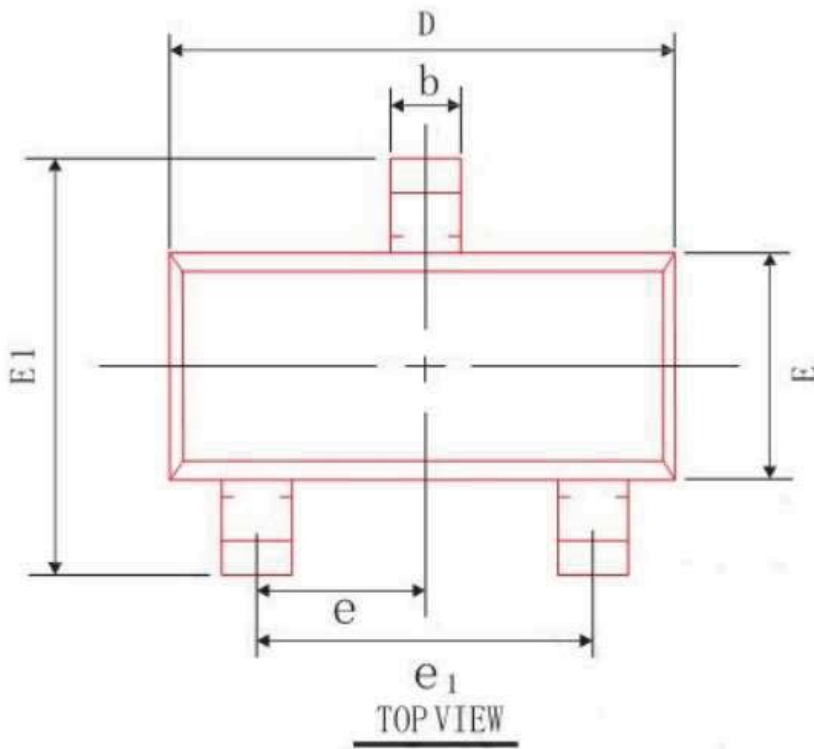


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data-SOT-23



SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e_1	1.90 REF		

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