LM04P021

P-Channel Trench MOSFET

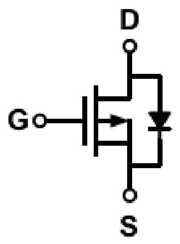
FEATURES

- Super Low Gate Charge
- RoHS compliant
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

SOP-8



Device Marking and Package Information

Device	Package	Marking
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Absolute Maximum Ratings at T_j= 25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	-40	V
Continuous Drain Current (note1)	I_D	-8.0	A
Pulsed Drain Current (note2)	I_{DM}	-32	A
Gate Source Voltage	V_{GSS}	±20	V
Power Dissipation T_A = 25°C (note4)	P_D	3.5	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient (note1)	$R_{\theta JA}$	42	K/W

Electrical Characteristics T_j= 25℃ unless otherwise specified

Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V, T_J = 25°C	--	--	-1	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.1	-1.7	-2.5	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -3A	--	21	31	mΩ
		V_{GS} = -10V, I_D = -4A	--	16	21	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1.0MHz	--	2050	--	pF
Output Capacitance	C_{oss}		--	260	--	
Reverse Transfer Capacitance	C_{rss}		--	150	--	
Total Gate Charge	Q_g	V_{DD} = -20V, I_D = -8A, V_{GS} = -10V	--	45	--	nC
Gate-Source Charge	Q_{gs}		--	6	--	
Gate-Drain Charge	Q_{gd}		--	11	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = -20V, R_L = 1.6Ω V_{GS} = -10V,I_D = -1A	--	10	--	ns
Turn-on Rise Time	t_r		--	24	--	
Turn-off Delay Time	$t_{d(off)}$		--	40	--	
Turn-off Fall Time	t_f		--	9	--	
Body Diode Characteristics						
Source-Drain Current(Body Diode)	I_{SD}	T_J = 25°C	--	--	-8.0	A
Body Diode Voltage	V_{SD}	T_J = 25°C, I_{SD} = -8A, V_{GS} = 0V	--	--	-1.2	V

Notes

1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width≦300us , duty cycle≦2%
3. The power dissipation is limited by 175℃ junction temperature
4. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics T_J = 25ºC, unless otherwise noted

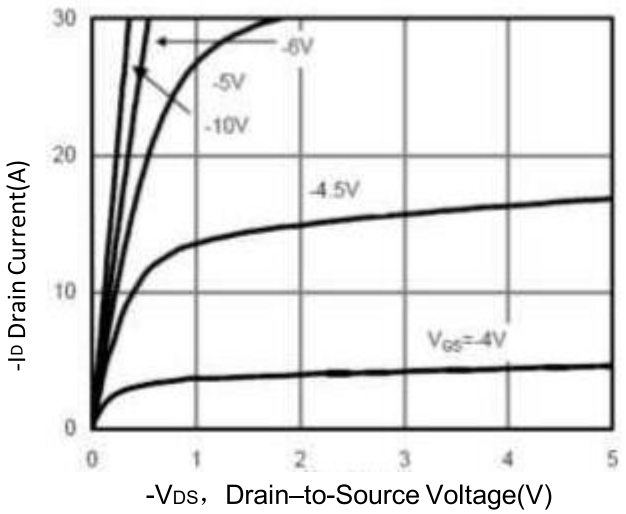


Fig.1 Typical Output Characteristics

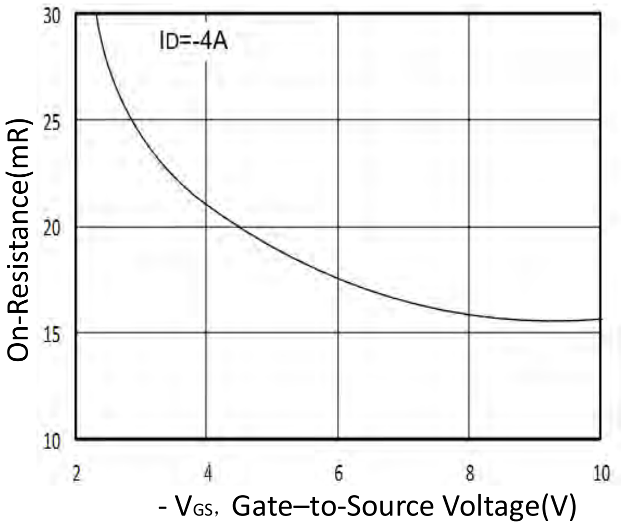
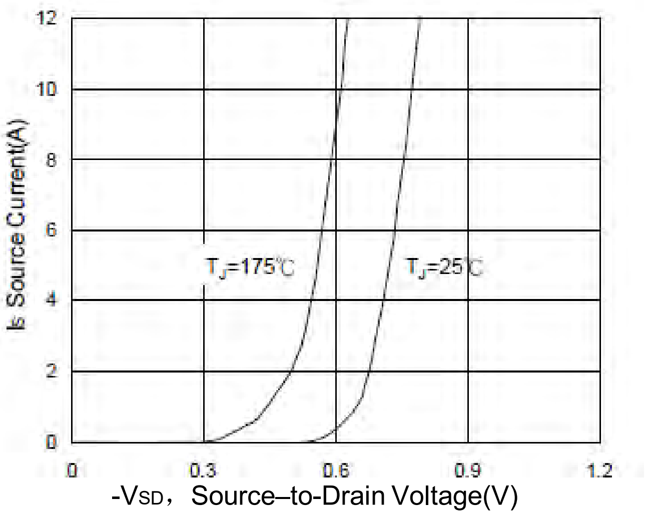


Fig.2 On-Resistance vs. G-S Voltage



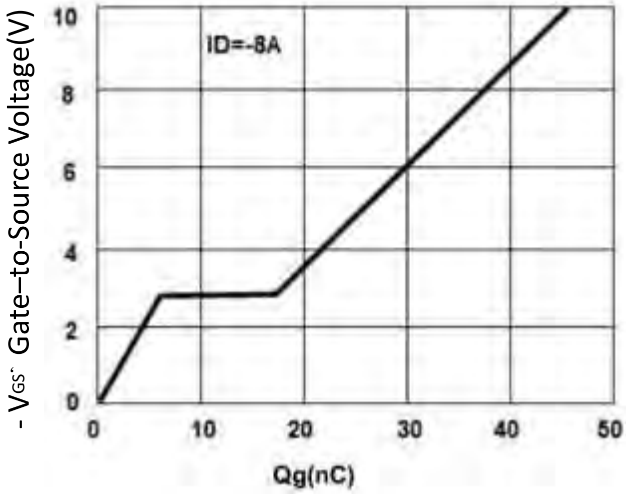


Fig.3 Forward Characteristics of Reverse Diode

Fig.4 Gate-Charge Characteristics

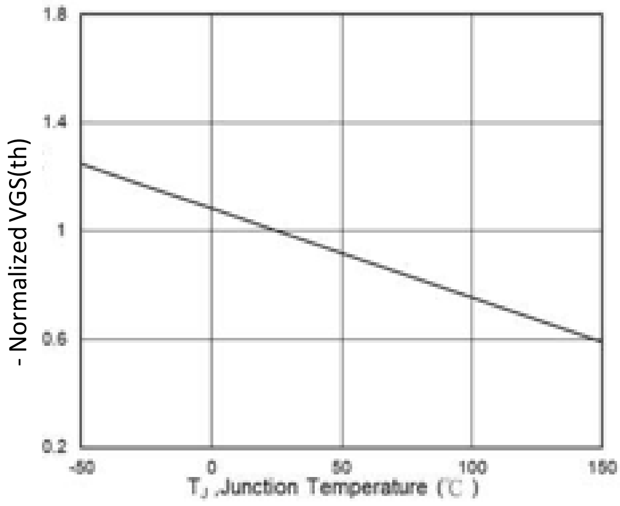


Fig.5 Normalized VGS(th) v.s TJ

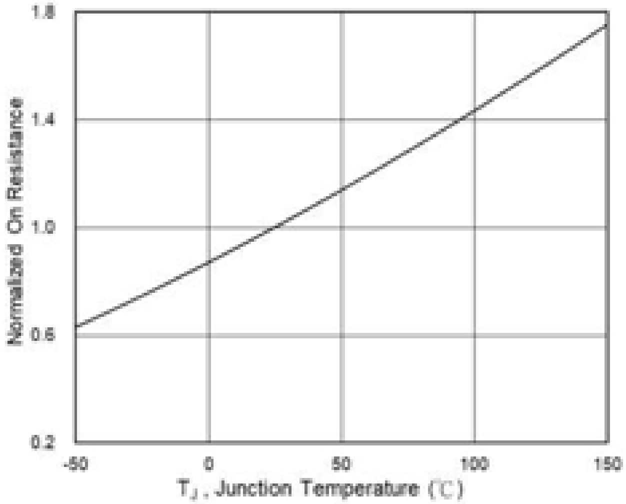


Fig.6 Normalized RDSON v.s TJ

Typical Characteristics T_J = 25ºC, unless otherwise noted

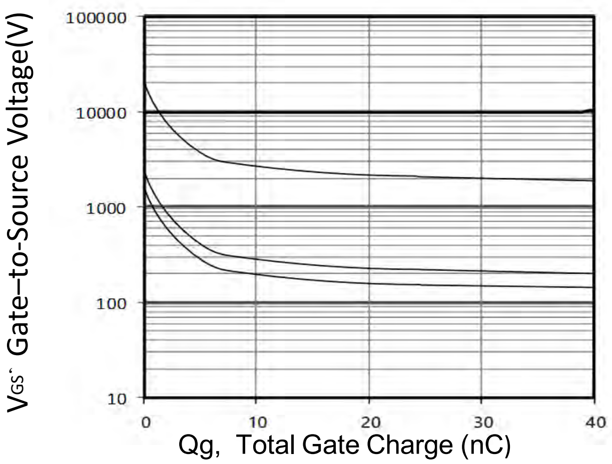


Fig.7 Capacitance

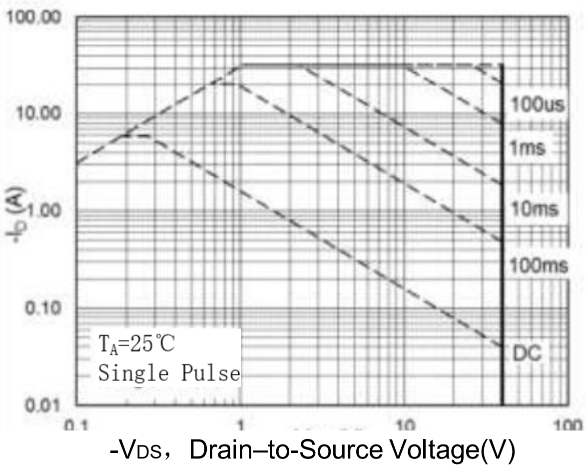


Fig.8 Safe Operating Area

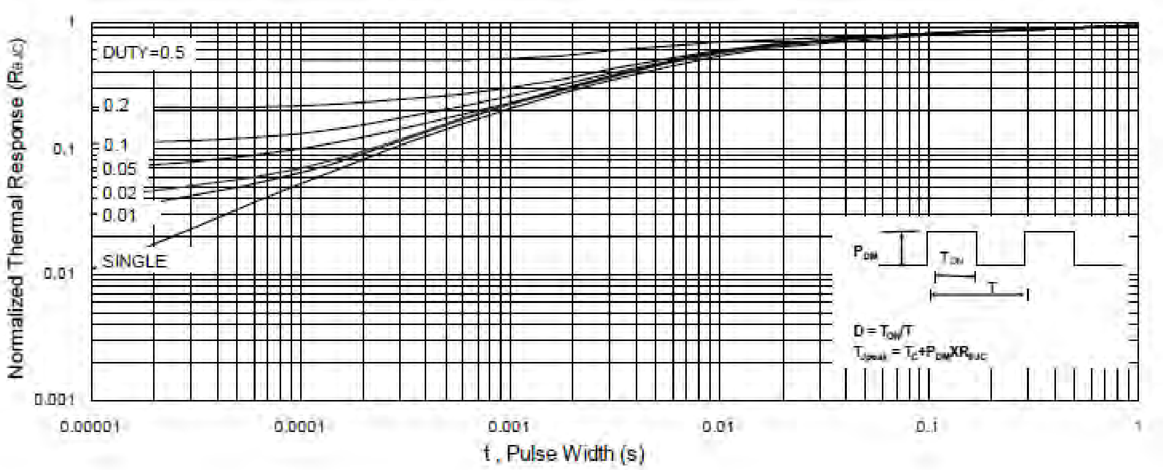


Fig.9 Normalized Maximum Transient Thermal Impedance

Figure A：Gate Charge Test Circuit and Waveform

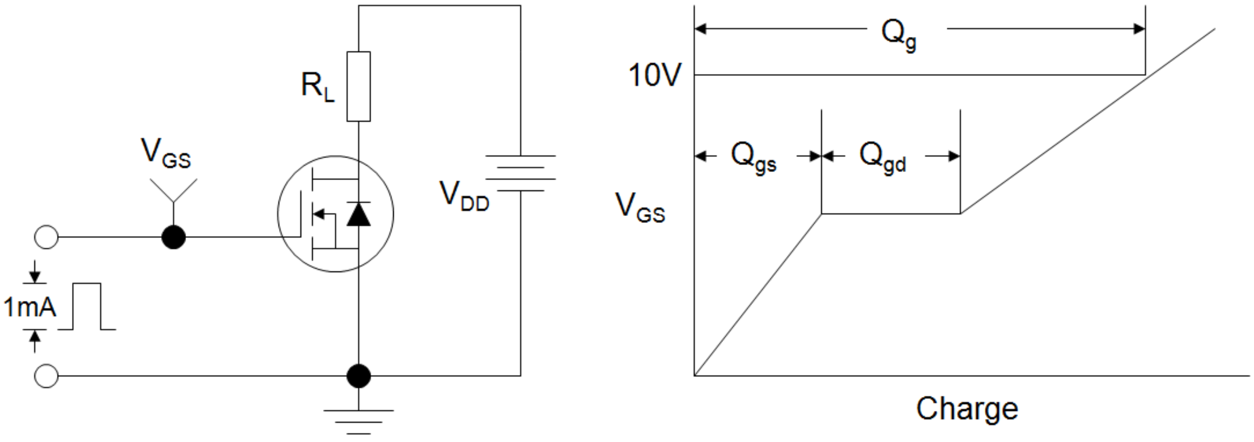


Figure B：Resistive Switching Test Circuit and Waveform

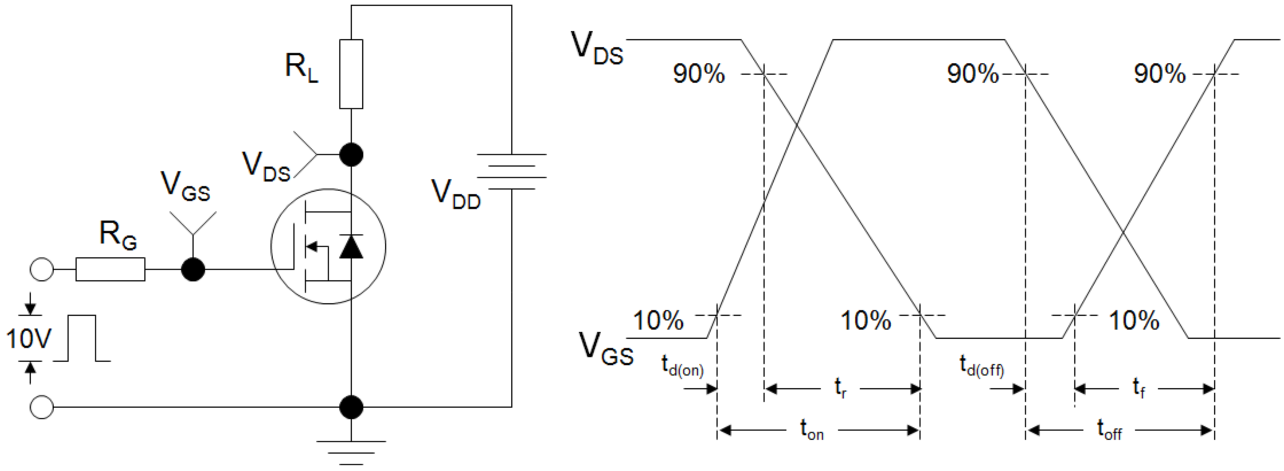
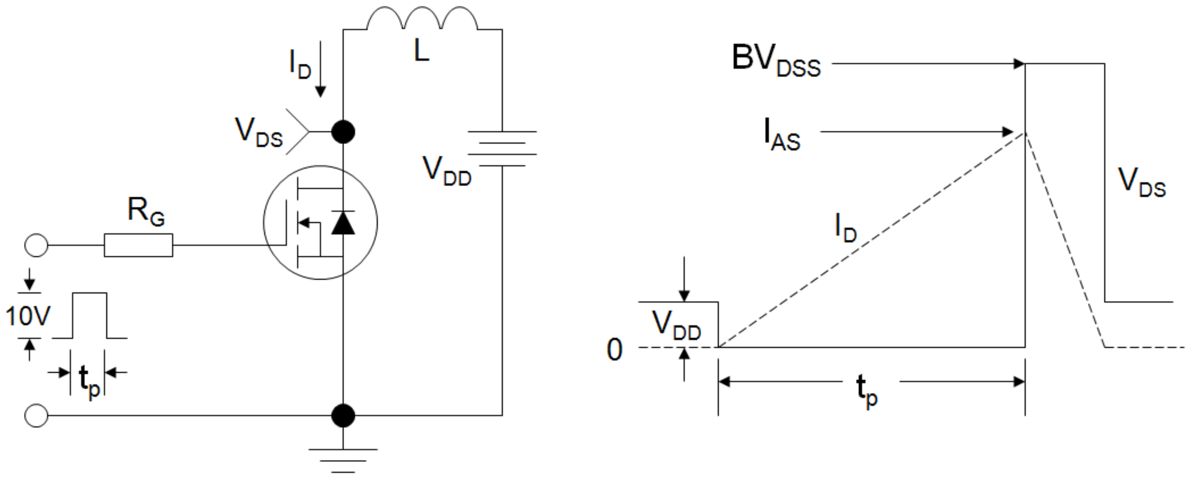


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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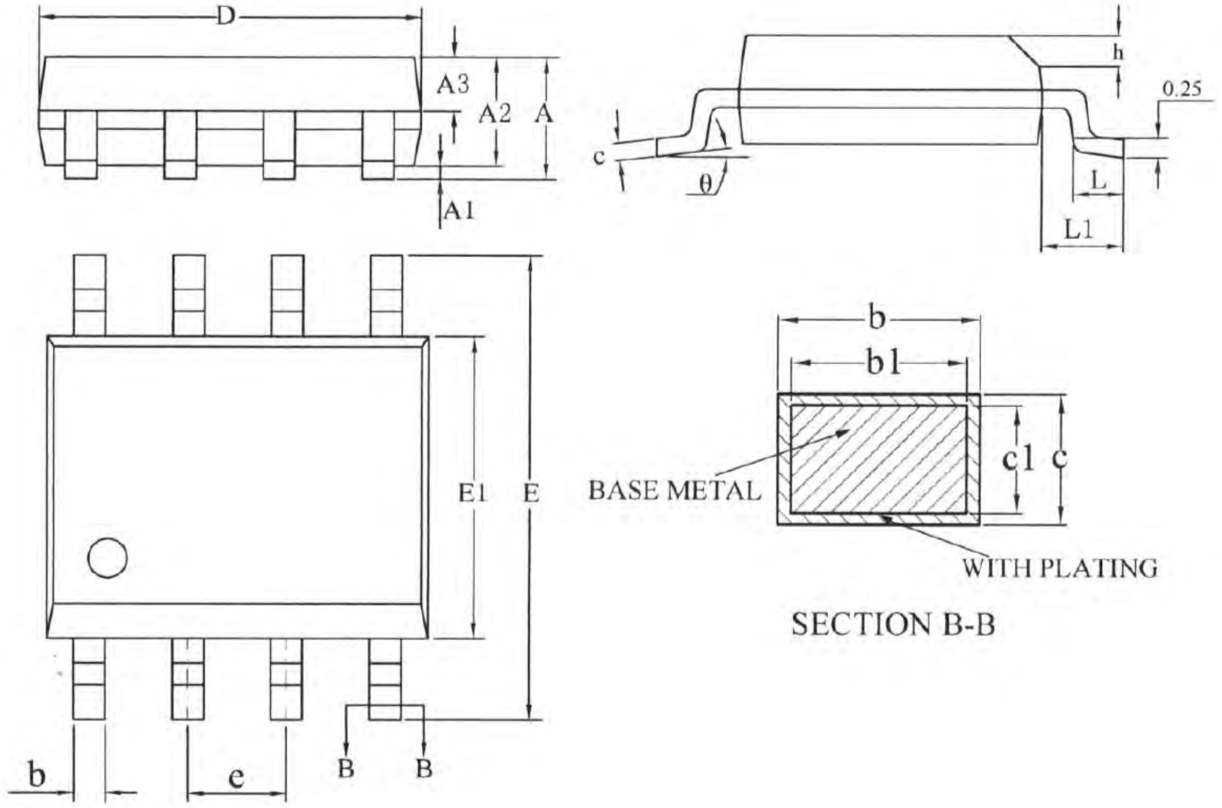

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.48
b1	0.38	0.41	0.43
c	0.21	—	0.26
c1	0.19	0.20	0.21

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	4.70	4.90	5.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05BSC		
θ	0	—	8°

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