

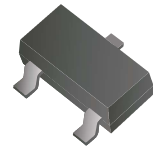
LM2301A



P-Channel MOSFET

RoHS Device

Halogen Free



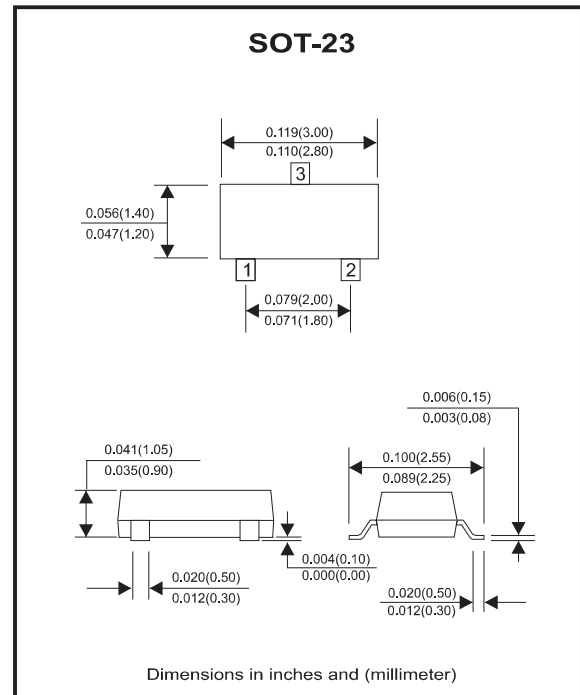
V(BR)DSS	RDS(on)MAX	ID
-20V	112mΩ @ -4.5V	-2.8A
	142mΩ @ -2.5V	

Features

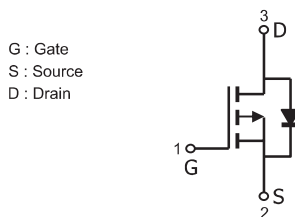
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount package.

Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.



Circuit Diagram



Maximum Ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-source voltage	V _{DS}	-20	V
Gate-source voltage	V _{GS}	±12	V
Drain current-continuous	I _D	-2.8	A
Drain current-pulsed (Note 1)	I _{DM}	-10	A
Maximum power dissipation	P _D	1	W
Operating junction and storage temperature range	T _J , T _{STG}	-55 to 150	°C

Thermal Characteristic

Thermal resistance, junction to ambient (Note 2)	R _{θJA}	125	°C/W
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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	-20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V			±100	nA
On Characteristics (Note 3)						
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -2.8A		80	100	mΩ
		V _{GS} = -2.5V, I _D = -2A		110	150	
Forward transconductance	g _{FS}	V _{DS} = -5V, I _D = -2.8A		9		S
Dynamic Characteristics (Note 4)						
Input capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0, f = 1MHz		405		pF
Output capacitance	C _{oss}			90		
Reverse transfer capacitance	C _{rss}			60		
Switching Characteristics (Note 4)						
Turn-on delay time	t _{d(on)}	V _{DD} = -10V, I _D = -2.8A V _{GS} = -4.5V, R _{GEN} = 3Ω		11		nS
Turn-on rise time	t _r			8		
Turn-off delay time	t _{d(off)}			37		
Turn-off fall time	t _f			23		
Total gate charge	Q _g	V _{DS} = -10V, I _D = -2.8A, V _{GS} = -4.5V		4.5	6	nC
Gate-source charge	Q _{gs}			1.2		
Gate-drain charge	Q _{gd}			1		
Drain-Source Diode Characteristics						
Diode forward voltage (Note 3)	V _{SD}	V _{GS} = 0V, I _S = -0.75A			-1.2	V
Diode forward current (Note 2)	I _S				-2.8	A

Notes: 1. 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.

Typical Electrical and Thermal Characteristics

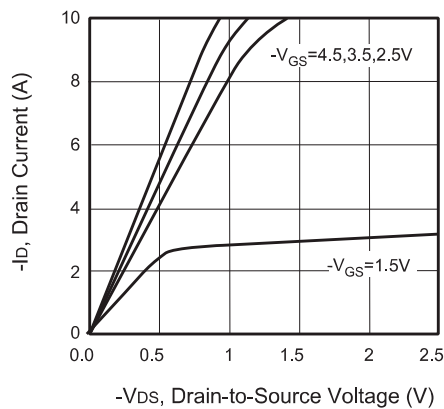


Figure 1. Output Characteristics

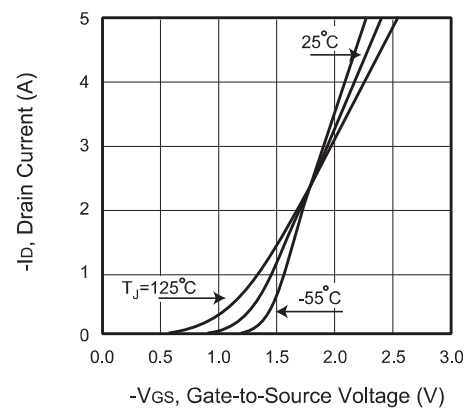


Figure 2. Transfer Characteristics

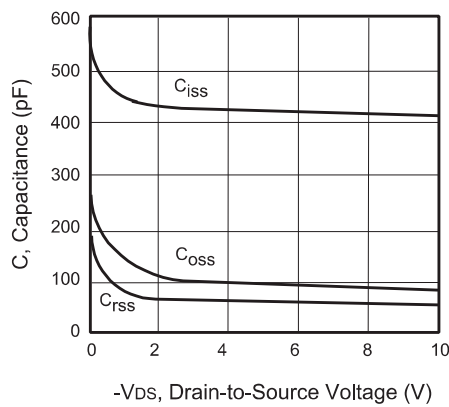


Figure 3. Capacitance

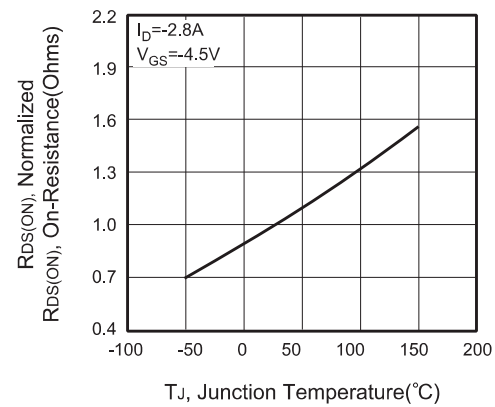


Figure 4. On-Resistance Variation with Temperature

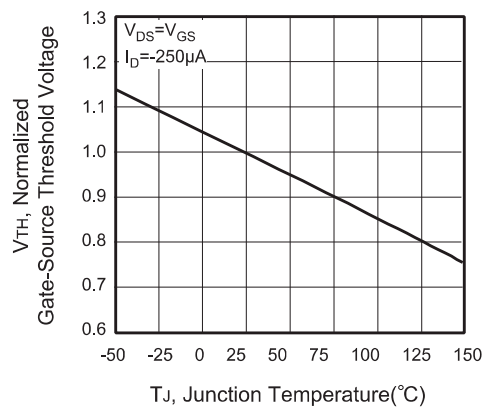


Figure 5. Gate Threshold Variation with Temperature

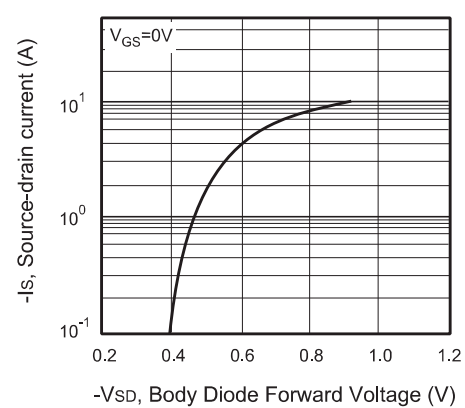


Figure 6. Body Diode Forward Voltage Variation with Source Current

Typical Electrical and Thermal Characteristics

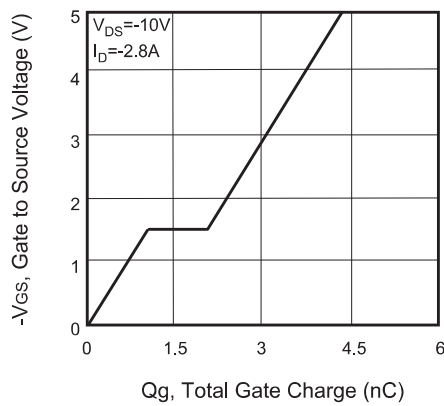


Figure 7. Gate Charge

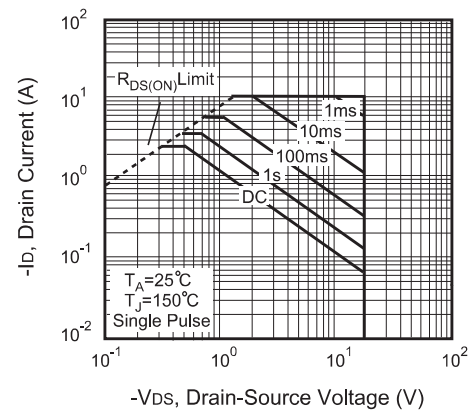


Figure 8. Maximum Safe Operating Area

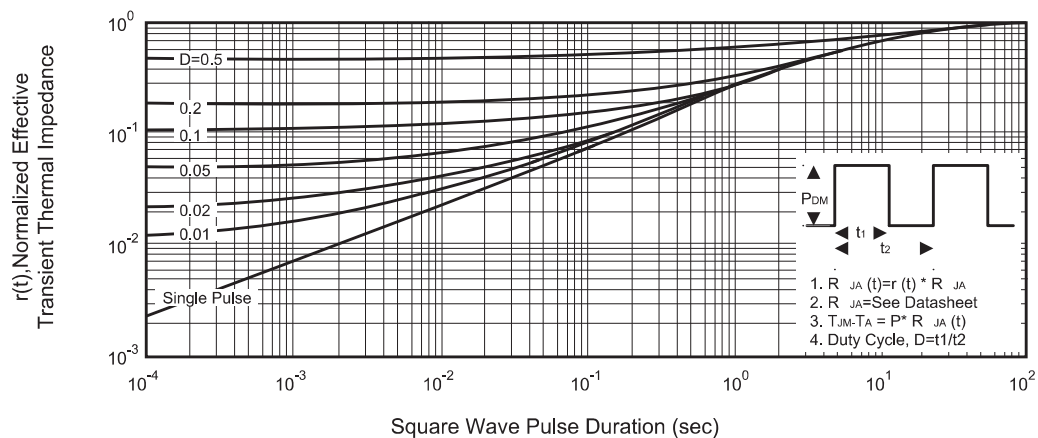


Figure 9. Normalized Thermal Transient Impedance Curve

Figure A: Gate Charge Test Circuit and Waveform

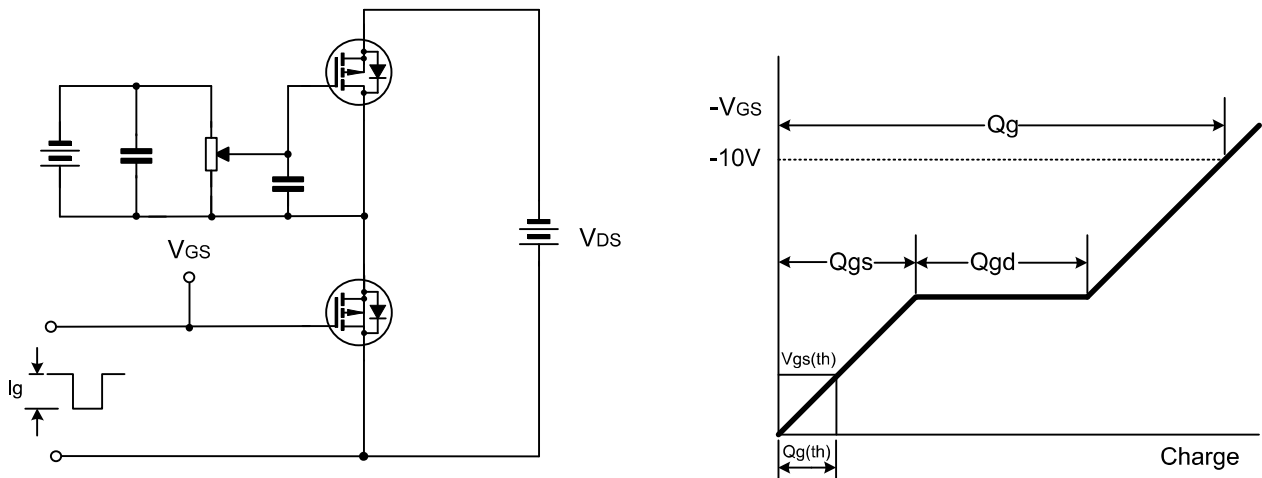


Figure B: Resistive Switching Test Circuit and Waveform

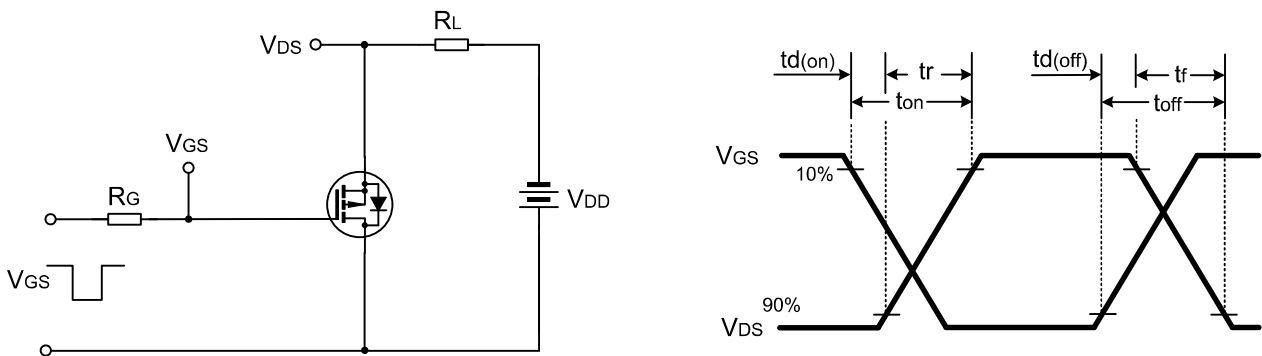
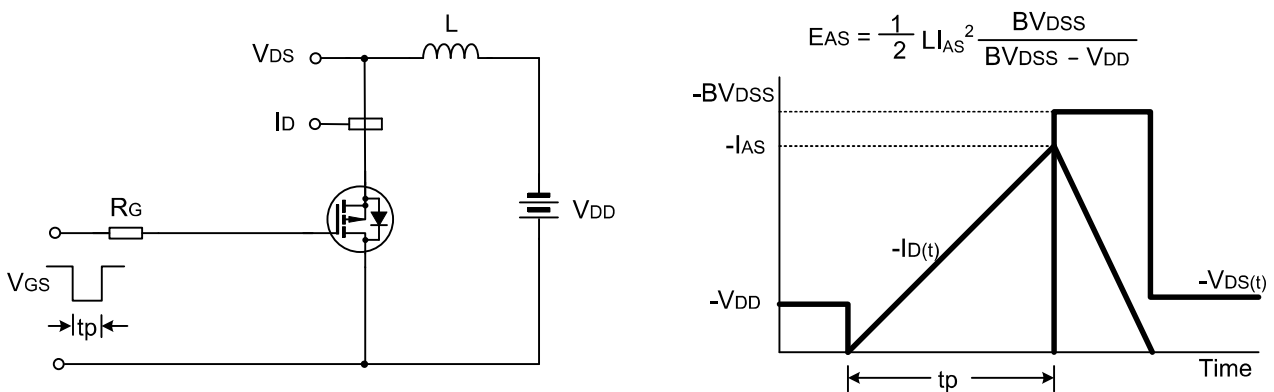
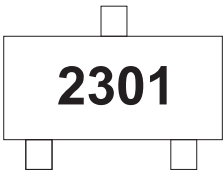


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



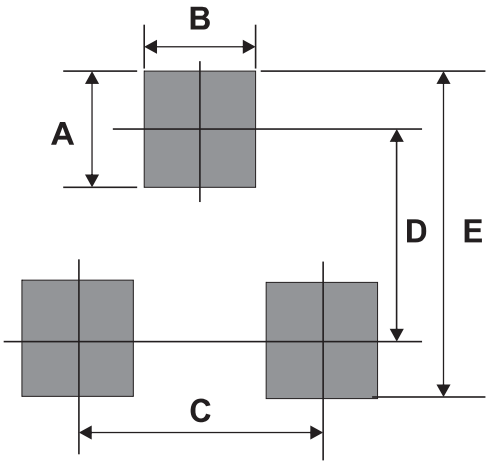
Marking Code

Part Number	Marking Code
LM2301A	2301



Suggested P.C.B. PAD Layout

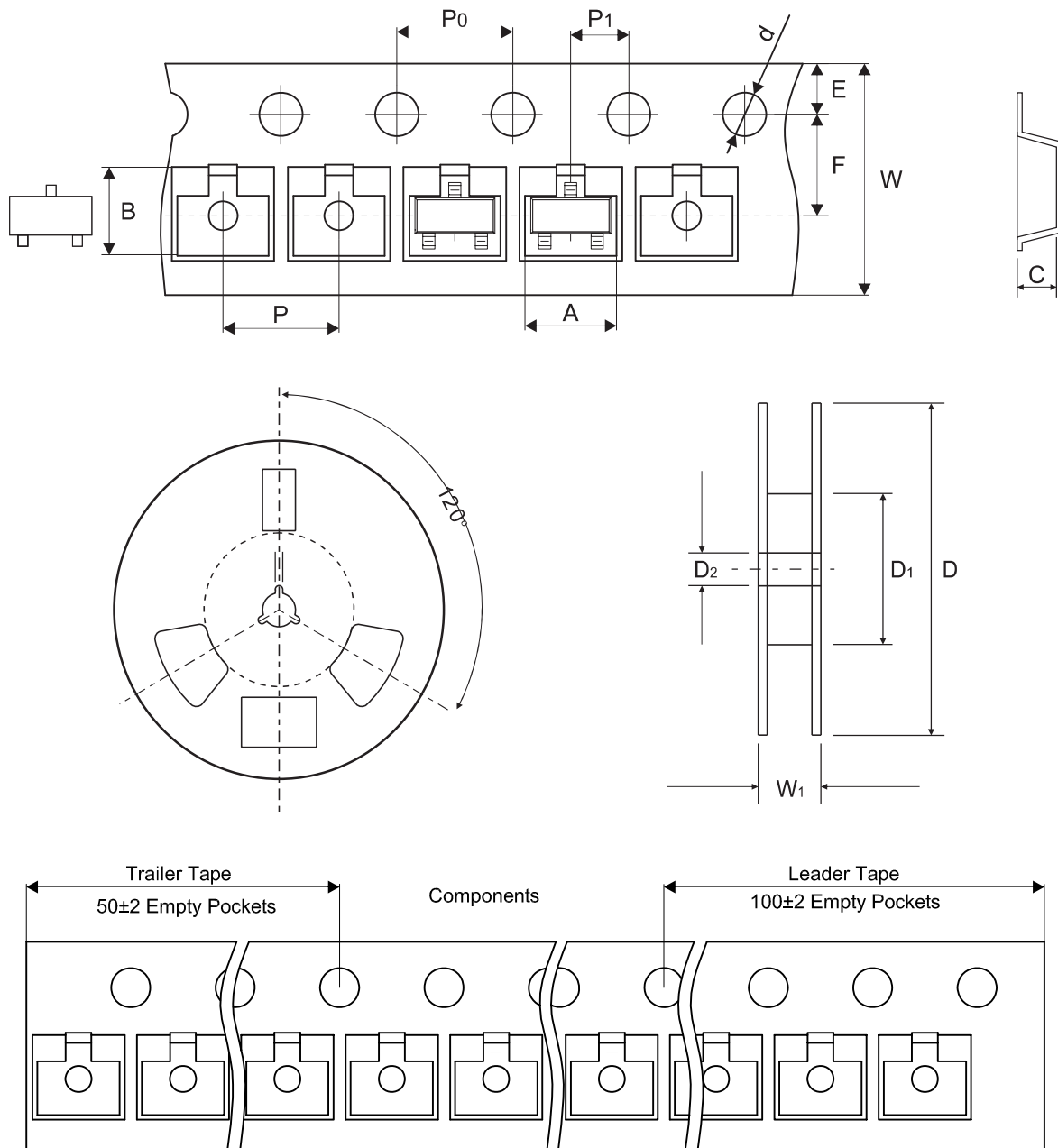
SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	0.60	0.024
C	2.20	0.087
D	2.37	0.093
E	2.97	0.117



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7

Reel Taping Specification



SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	$1.50 + 0.10 - 0.00$	178.00 ± 1.00	54.60 ± 1.00	13.30 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	$0.059 + 0.004 - 0.000$	7.008 ± 0.039	2.150 ± 0.039	0.524 ± 0.039

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	$8.00 + 0.30 - 0.10$	11.10 ± 0.20
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	$0.315 + 0.012 - 0.004$	0.437 ± 0.008

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