

Description

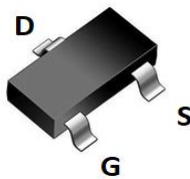
JMT P-channel Enhancement Mode Power MosFET

Features

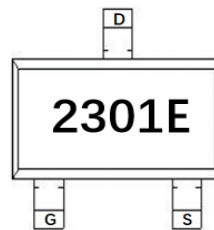
- -20V, -2A
 $R_{DS(ON)} < 114m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 151m\Omega @ V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Applications

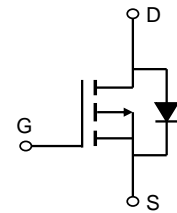
- Load Switch
- PWM Application
- Power Management



SOT-23 Top View



Marking and Pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
2301E	JMTL2301E	TAPING	SOT-23	7"	3000	120000

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	-20	V
V_{GS}	Gate-to-Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	-2
		$T_A = 100^\circ\text{C}$	-1
I_{DM}	Pulsed Drain Current ⁽¹⁾	-8	A
P_D	Power Dissipation	1	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽²⁾	120	$^\circ\text{C/W}$
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$



Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = -250μA, V _{GS} = 0V	-20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} = 0V	-	-	-1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1.0	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = -4.5V, I _D = -2A	-	88	125	mΩ
		V _{GS} = -2.5V, I _D = -1A	-	116	190	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = -10V, f = 1MHz	-	234	-	pF
C _{oss}	Output Capacitance		-	34	-	pF
C _{rss}	Reverse Transfer Capacitance		-	24	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to -4.5V V _{DS} = -10V, I _D = -2A	-	2.4	-	nC
Q _{gs}	Gate Source Charge		-	0.6	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	0.4	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = -4.5V, V _{DD} = -10V I _D = -2A, R _{GEN} = 3Ω	-	5	-	ns
t _r	Turn-On Rise Time		-	18	-	ns
t _{d(off)}	Turn-Off DelayTime		-	79	-	ns
t _f	Turn-Off Fall Time		-	42	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-2	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-8	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = -2A	-	-	-1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F = -2A, di/dt = 100A/us	-	4.4	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	0.6	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
 3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

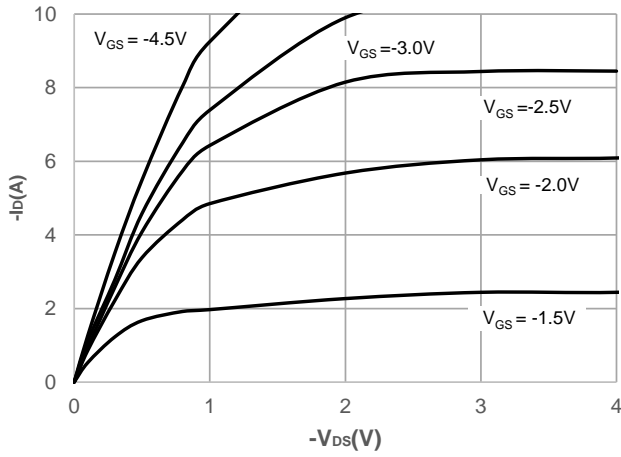


Figure 2: Typical Transfer Characteristics

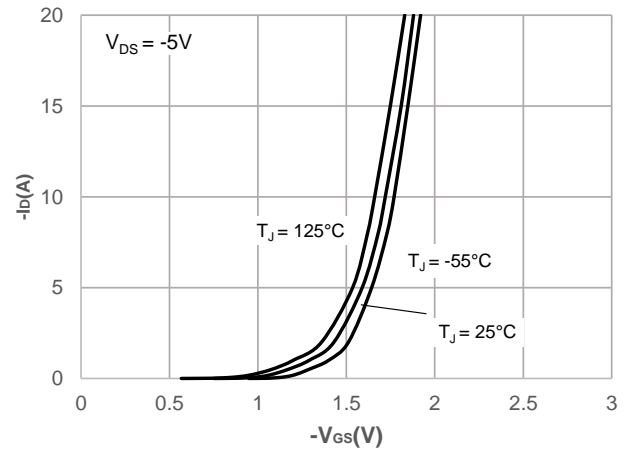


Figure 3: On-resistance vs. Drain Current

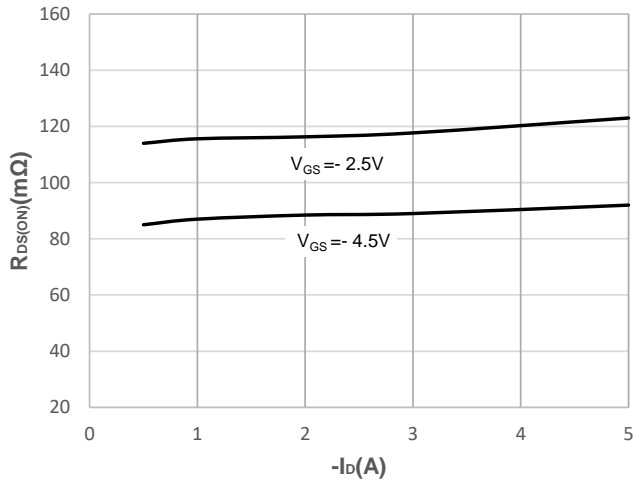


Figure 4: Body Diode Characteristics

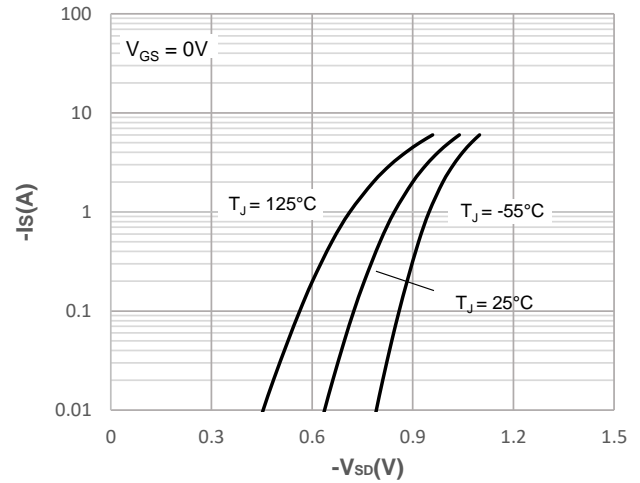


Figure 5: Gate Charge Characteristics

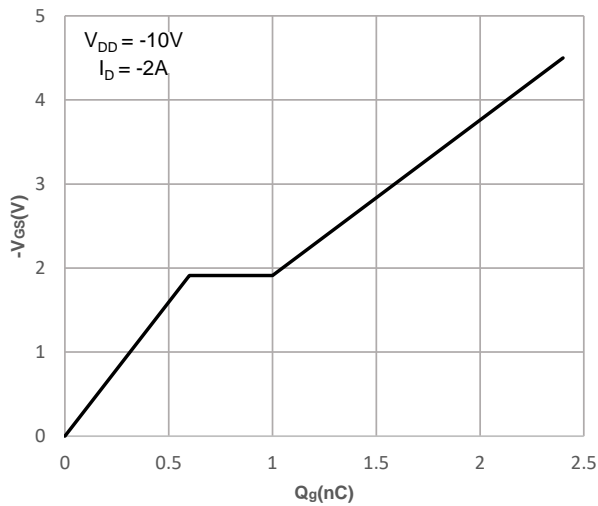
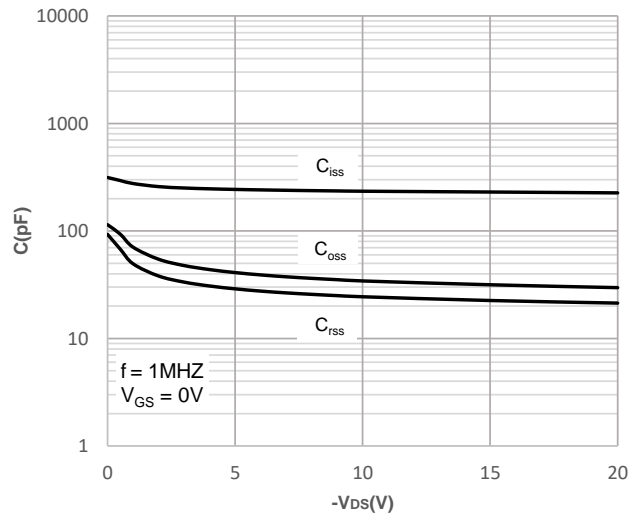


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

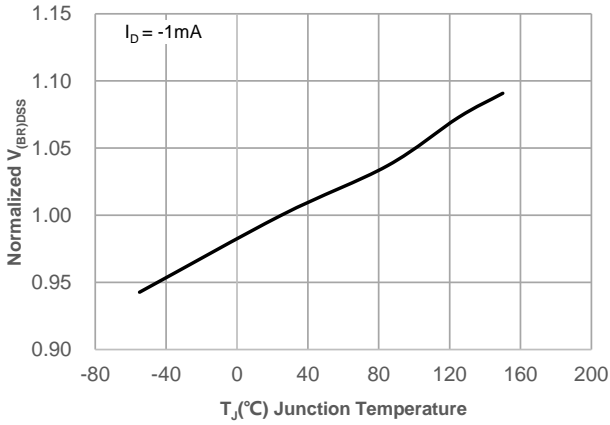


Figure 8: Normalized on Resistance vs. Junction Temperature

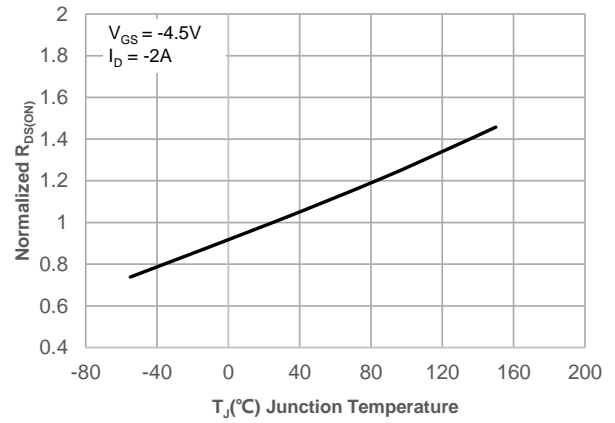


Figure 9: Maximum Safe Operating Area

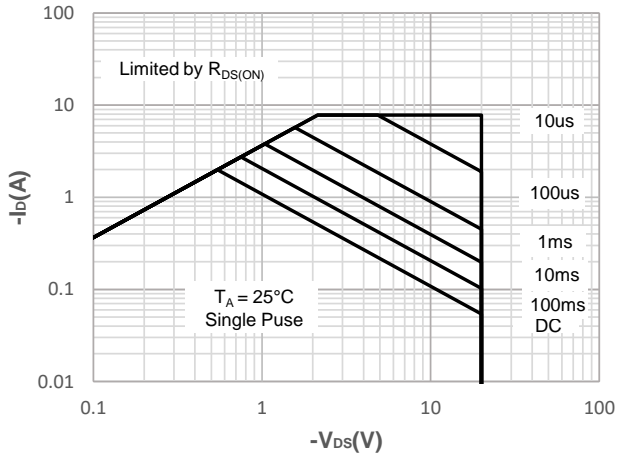


Figure 10: Maximum Continuous Driand Current vs. Ambient Temperature

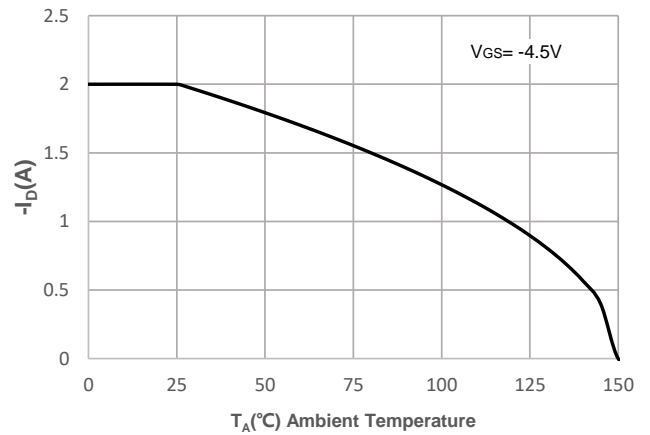


Figure 11: Normalized Maximum Transient Thermal Impedance

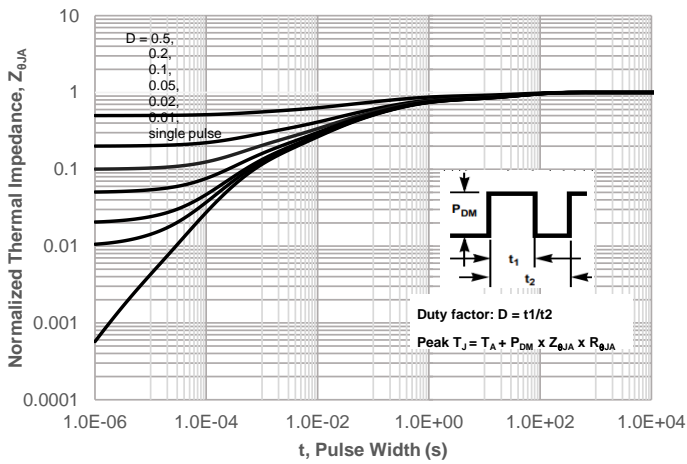
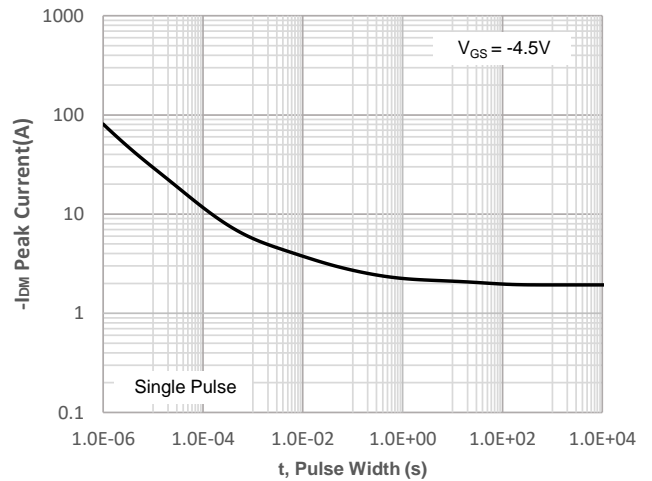


Figure 12: Peak Current Capacity



Test Circuit

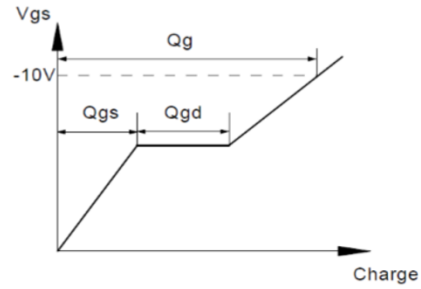
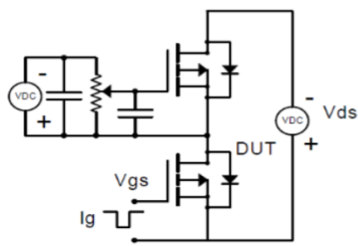


Figure 1: Gate Charge Test Circuit & Waveform

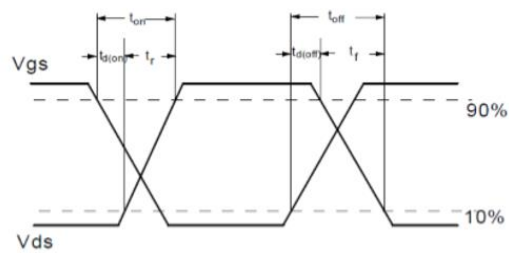
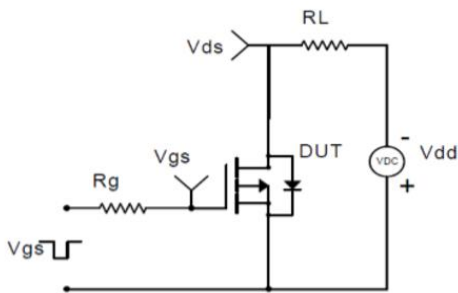


Figure 2: Resistive Switching Test Circuit & Waveform

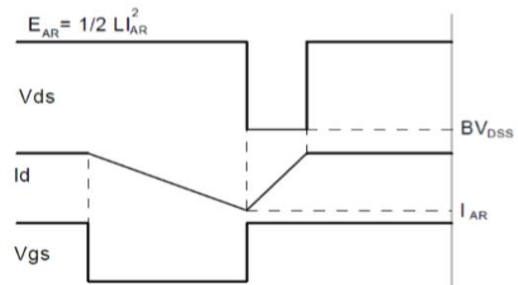
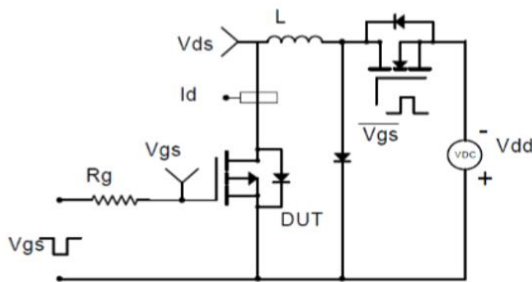


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

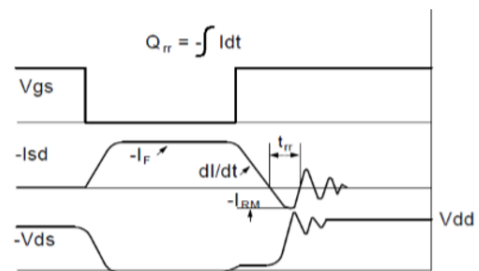
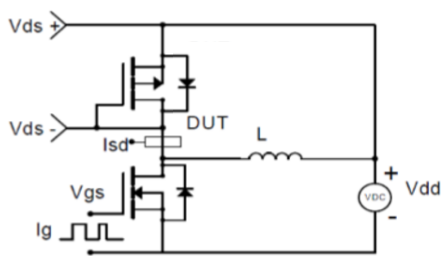
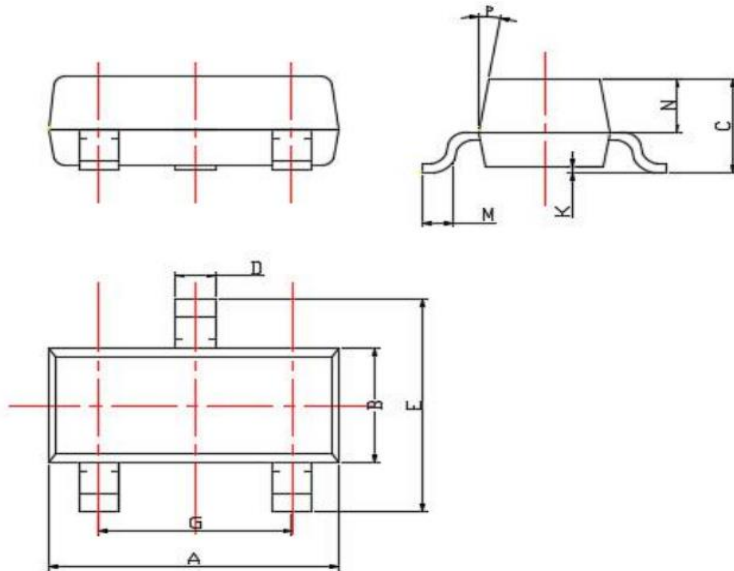


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-23)



DIM	MILLIMETERS
A	2.85~3.04
B	1.30 ± 0.10
C	1.00 ± 0.10
D	0.45 ± 0.05
E	2.25~2.55
G	1.90 ± 0.1
K	0.00~0.10
M	0.20 MIN
N	0.60 ± 0.10
P	7 ± 2°

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