P-channel Enhancement Mode Power MOSFET

Features

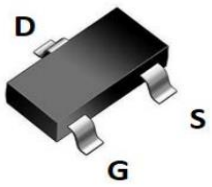
- Halogen free; RoHS compliant
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Pb free plating
- 100% UIS TESTED!
- 100% ΔVds TESTED!

Product Summary

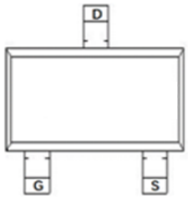
Parameters	Value	Unit
V_{DSS}	-20	V
$V_{GS(th)\_Typ}$	-0.7	V
I_D(@V_{GS}=-10V)	-2.5	A
$R_{DS(ON)\_Typ}$ @V_{GS}=-4.5V	80	mΩ
$R_{DS(ON)\_Typ}$ @V_{GS}=-2.5V	110	mΩ

Applications

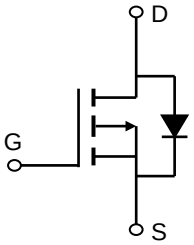
- Load Switch
- PWM Application
- Power Management



SOT23-3 Top View



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK2301	2301	SOT23	Reel	N/A	N/A	3000

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_C = 25°C	I_D	-2.5	A
	T_C = 100°C		-1.6	
Pulsed Drain Current		I_{DM}	-10	A
Power Dissipation		P_D	1.0	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	125	℃/W
Operating Junction and Storage Temperature Range		T_J ,T_{stg}	-55 to 150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = -250uA	-20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -20V, V_{GS} =0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±12V			±100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250uA	-0.4	-0.7	-1.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-2.5A		80	104	mΩ
		V_{GS} =-2.5V, I_D =-1.5A		110	154	mΩ
Dynamic characteristics ④⑤						
Input capacitance	C_{iss}	V_{DS} =-10V,V_{GS} =0V f =1MHz		248		pF
Output capacitance	C_{oss}			42		
Reverse transfer capacitance	C_{rss}			31		
Switching characteristics ④⑤						
Total gate charge	Q_g	V_{GS}=0 to -4.5V V_{DS}=-10V, I_D=-2.5A		2.9		nC
Gate-source charge	Q_{gs}			0.45		
Gate-drain charge	Q_{gd}			0.75		
Turn-on delay time	$t_{d(on)}$	V_{DD}=-10V,R_L=5Ω V_{GS}=-4.5V,R_{GEN}=3Ω		9.8		ns
Turn-on rise time	t_r			4.9		
Turn-off delay time	$t_{d(off)}$			20.5		
Turn-off fall time	t_f			7		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=-2.5A			-1.2	V
Continuous drain-source diode forward current	I_S ①				-2.5	A
Pulsed drain-source diode forward current	I_{SM} ②				-10	A

Notes:

1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2.Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Typical Performance Characteristics

Figure1: Output Characteristics

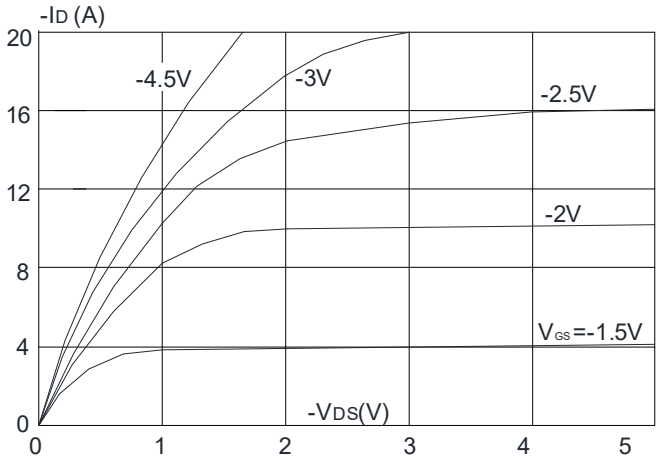


Figure 2: Typical Transfer Characteristics

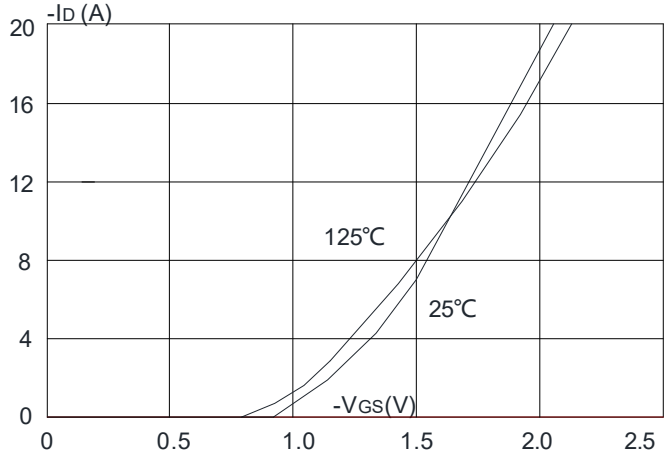


Figure 3: On-resistance vs. Drain Current

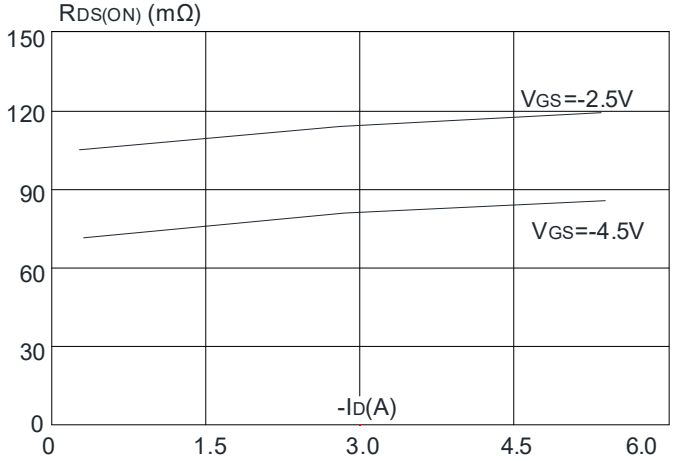


Figure 4: Body Diode Characteristics

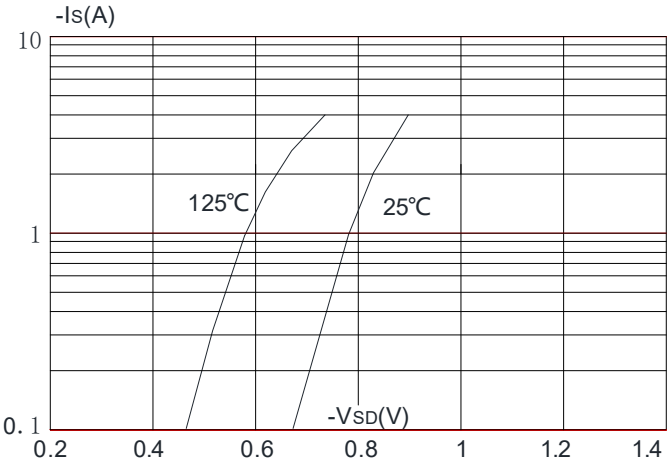


Figure 5: Gate Charge Characteristics

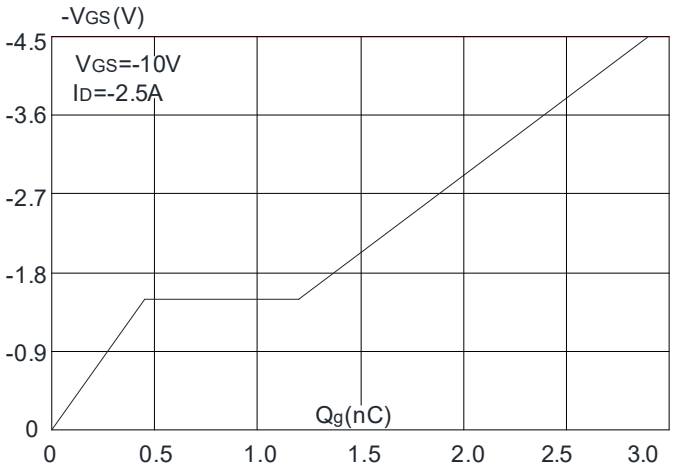
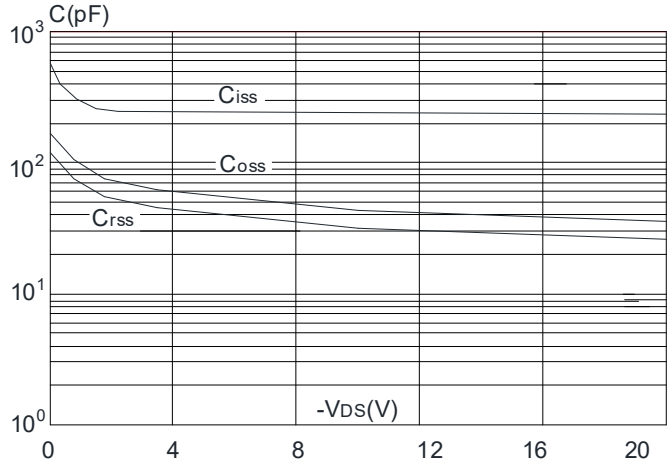


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

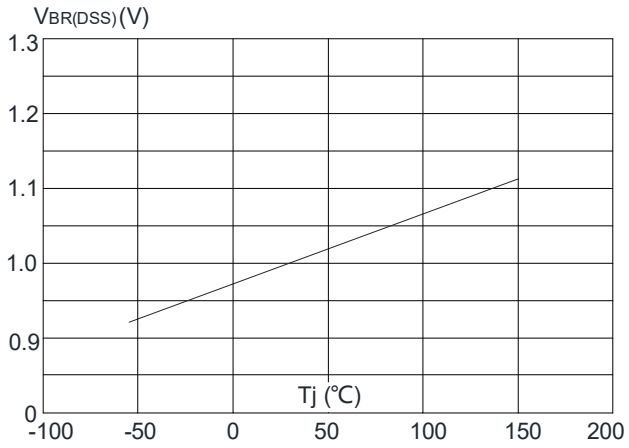


Figure 8: Normalized on Resistance vs. Junction Temperature

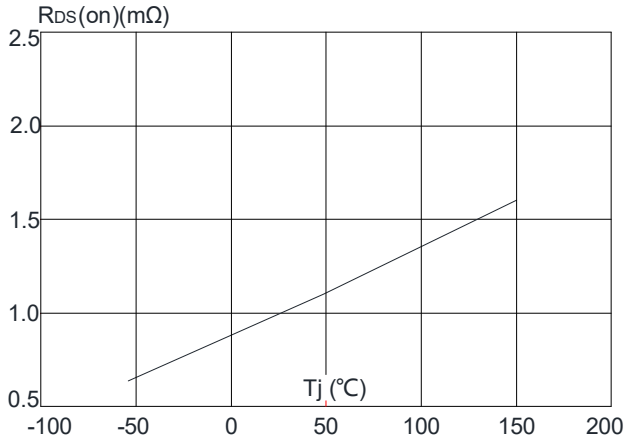


Figure 9: Maximum Safe Operating Area

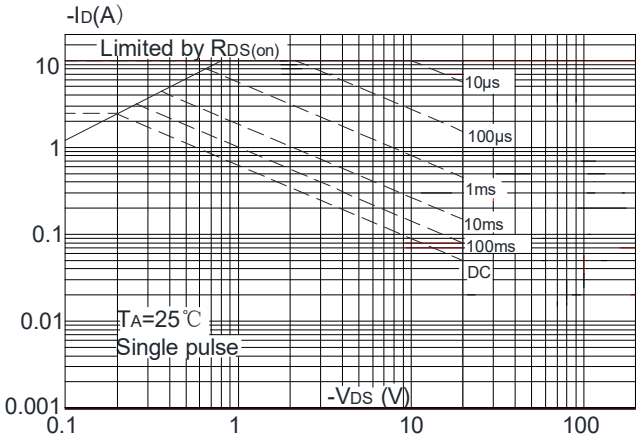


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

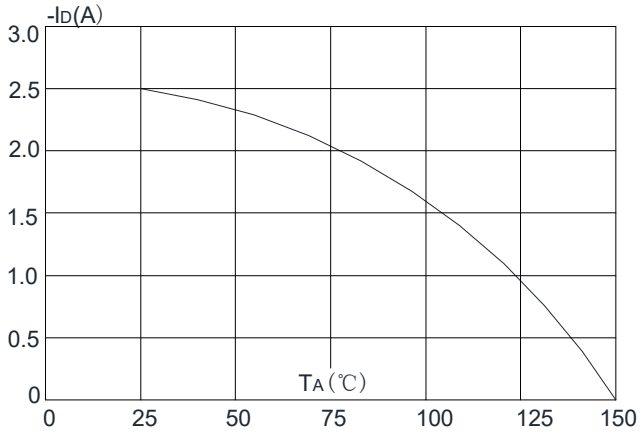
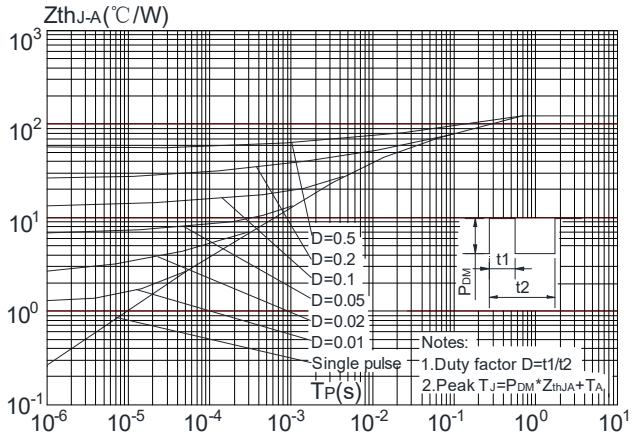
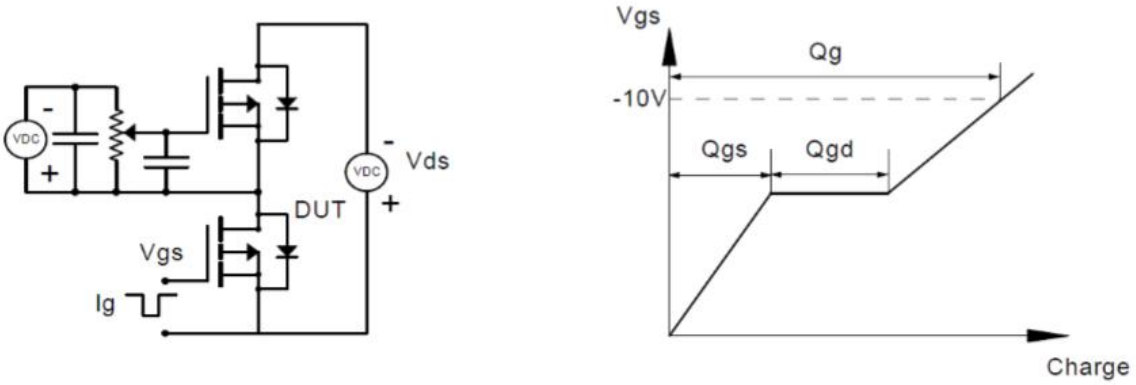


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

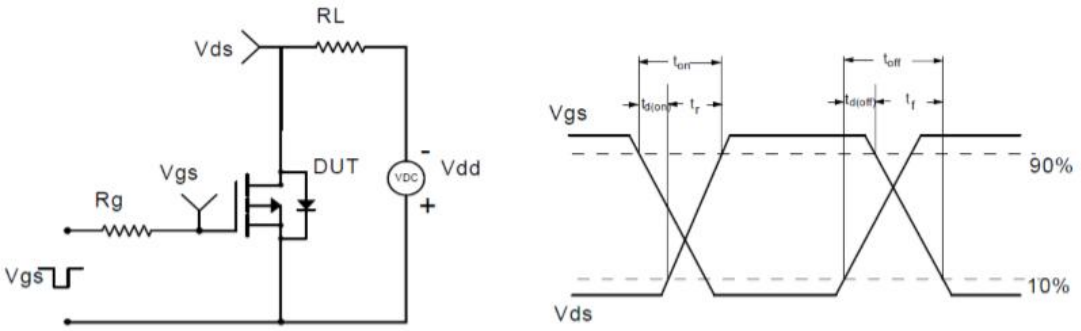


Test Circuit

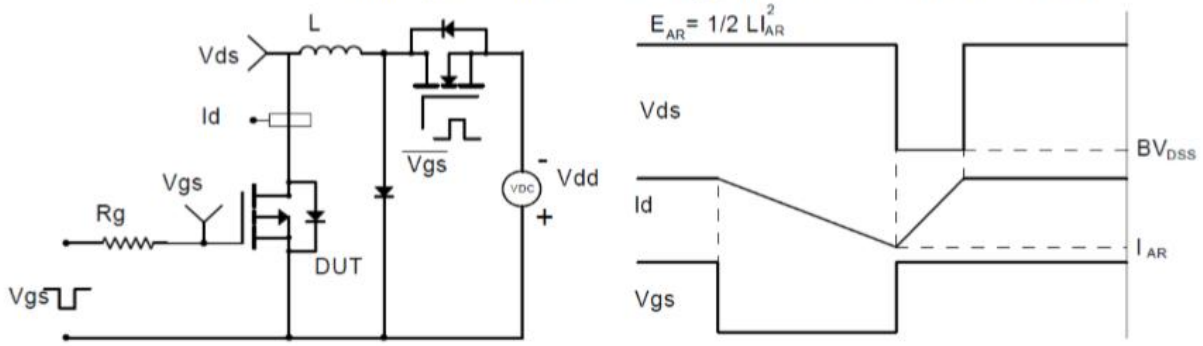
Gate Charge Test Circuit & Waveform



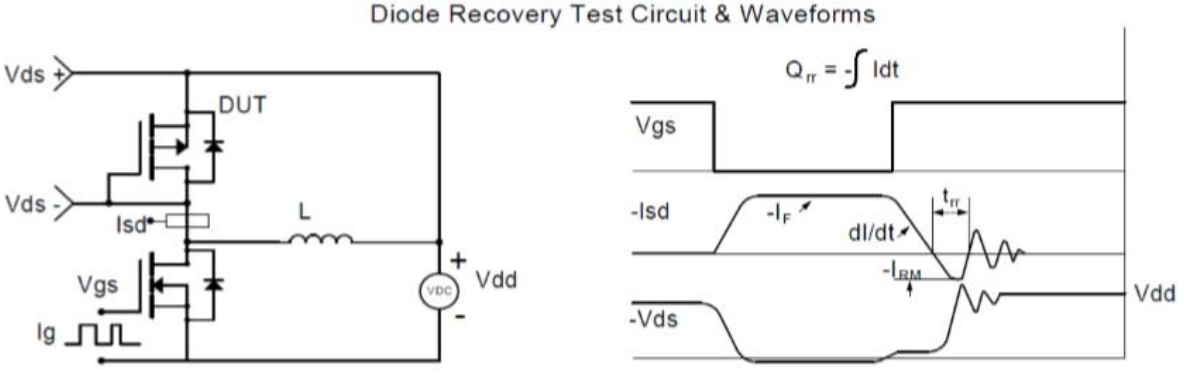
Resistive Switching Test Circuit & Waveforms



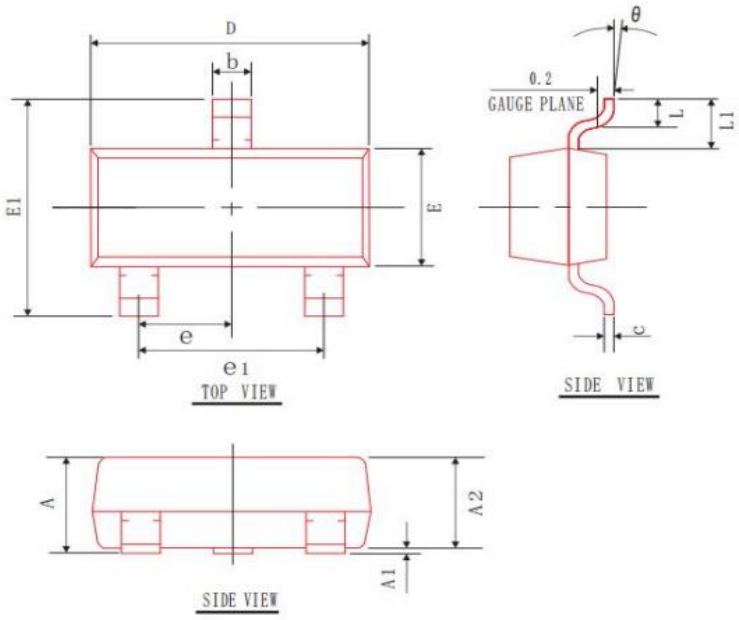
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Mechanical Data(SOT-23-3L)



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

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		
e1	1.90 REF		