



Description

The ST2304 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

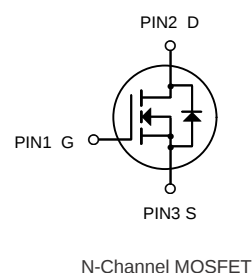
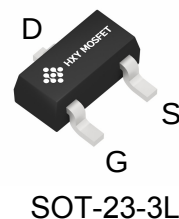
General Features

$V_{DS} = 30V$ $I_D = 5.8A$

$R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$

Application

Battery protection
Load switch
Uninterruptible power supply



Ordering Information

Product ID	Pack	Brand	Qty(PCS)
ST2304	SOT-23-3L	HXY MOSFET	3000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

symbol	parameter	limit	unit
V_{DS}	Drain-source voltage	30	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current-continuous ^a @Tj=125°C -pulse ^d	5.8	A
I_{DM}		20	A
I_S	Drain-source Diode forward current	5.8	A
P_D	Maximum power dissipation	1.4	W
T_j	Operating junction Temperature range	-55—150	°C
$R_{th JA}$	Thermal Resistance junction-to ambient	100	°C/W



Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
Zero gate voltage drain current	IDSS	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-body leakage	IGSS	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8	1.4	2.2	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5A	-	24	28	mΩ
		V _{GS} =4.5V, I _D =4A		26	32	
Forward transconductance	g _{fs}	V _{GS} =5V, I _D =5A	-	33	-	S
Input capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V f=1.0MHz		255		pF
Output capacitance	COSS			45		
Reverse transfer capacitance	CRSS			35		
Turn-on delay time	t _{D(ON)}	V _{DS} =15V V _{GS} =10V R _L =2.6 ohm R _{GEN} =3ohm	-	4.5	-	ns
Rise time	t _r		-	2.5	-	
Turn-off delay time	t _{D(OFF)}		-	14.5	-	
Fall time	t _f		-	3.5	-	
Total gate charge	Q _g	V _{DS} =15V, I _D =5.8A V _{GS} =10V	-	5.2	-	nC
Gate-source charge	Q _{gs}		-	0.85	-	
Gate-drain charge	Q _{gd}		-	1.3	-	
Diode forward voltage	V _{SD}	V _{GS} =0V, I _S =1A	-	0.76	1.16	V

Notes:

- 1、surface mounted on FR4 board, t≤10sec
- 2、pulse test: pulse width≤300μs, duty≤2%
- 3、guaranteed by design, not subject to production testing



Typical Performance Characteristics

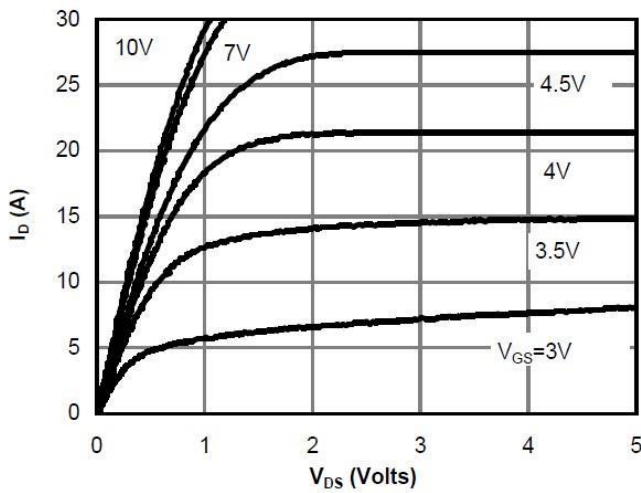


Fig 1: On-Region Characteristics

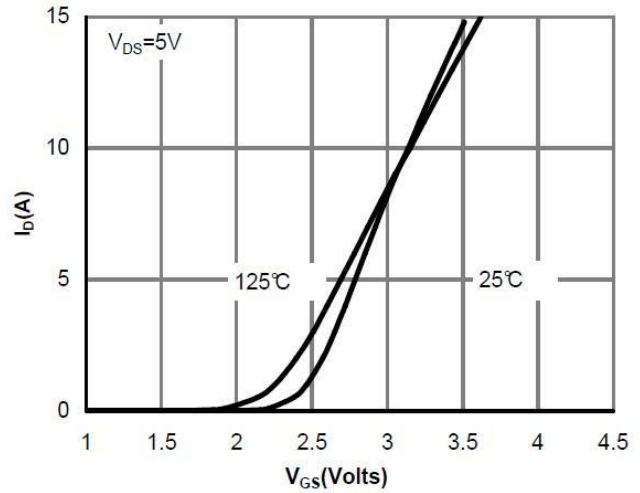


Figure 2: Transfer Characteristics

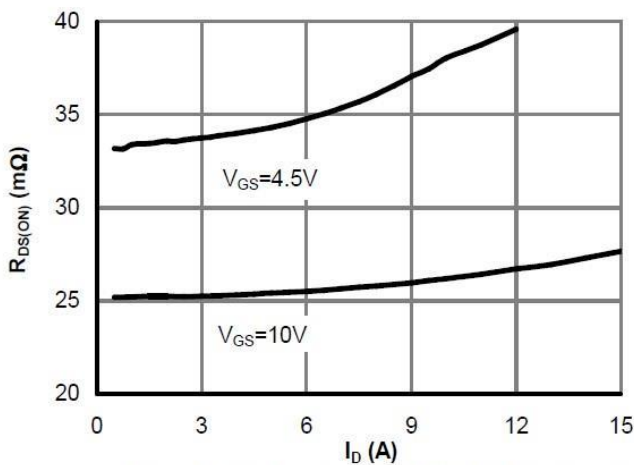


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

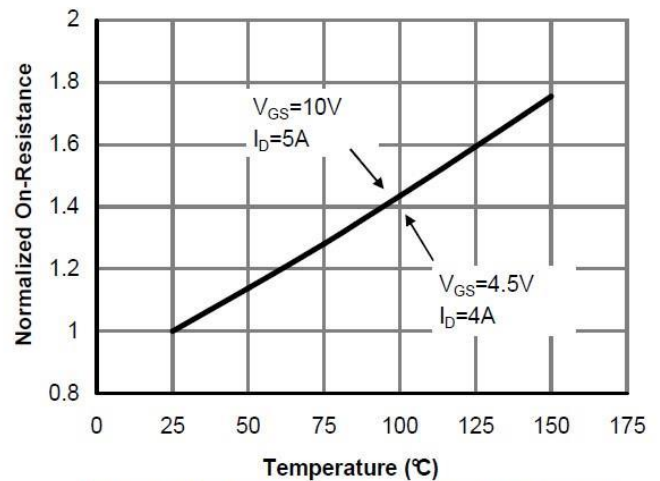


Figure 4: On-Resistance vs. Junction Temperature

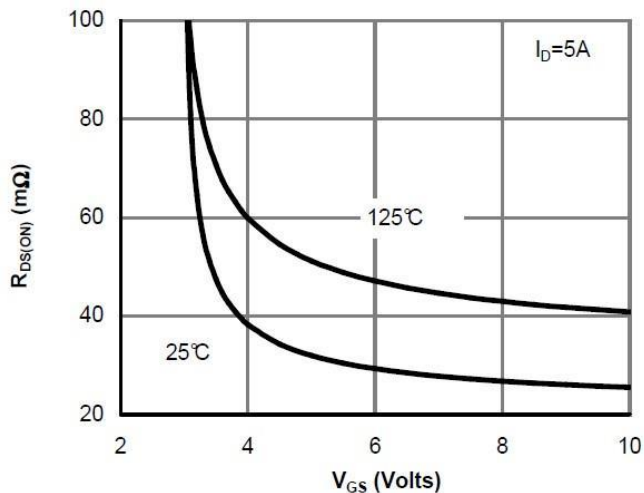


Figure 5: On-Resistance vs. Gate-Source Voltage

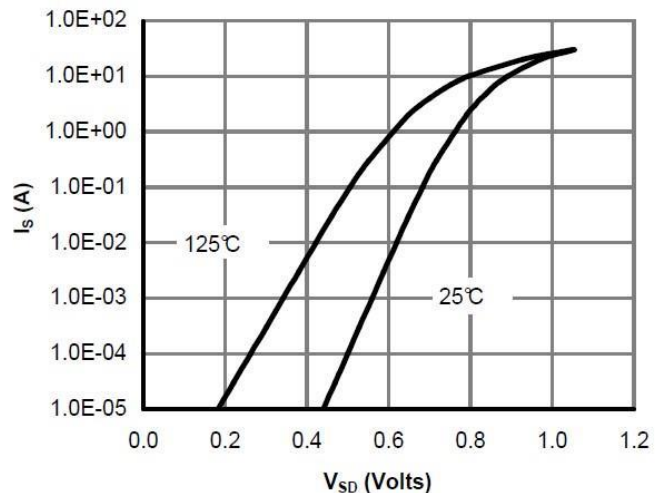


Figure 6: Body-Diode Characteristics

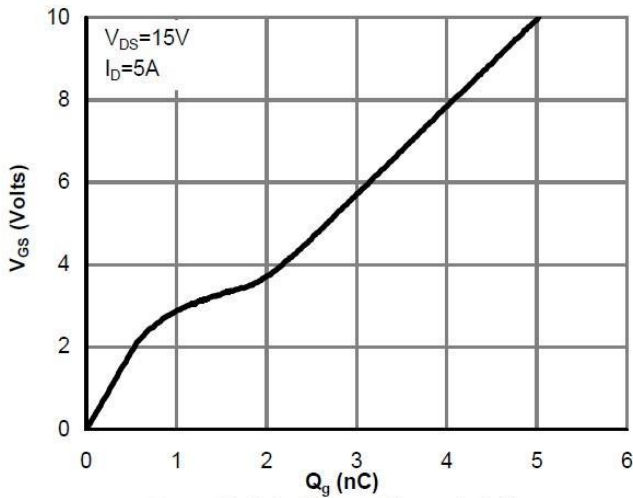


Figure 7: Gate-Charge Characteristics

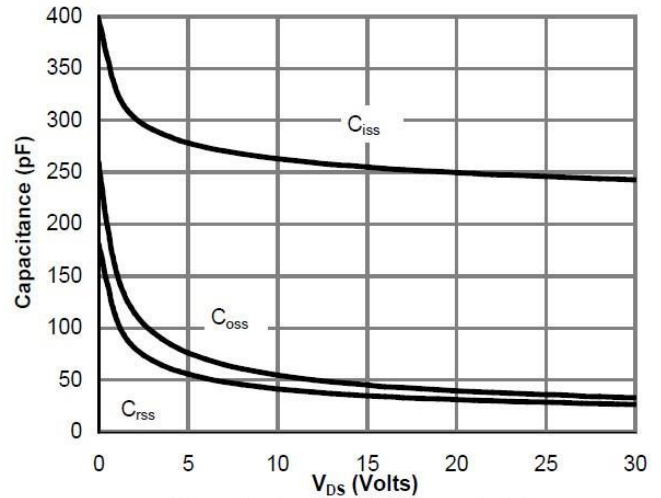


Figure 8: Capacitance Characteristics

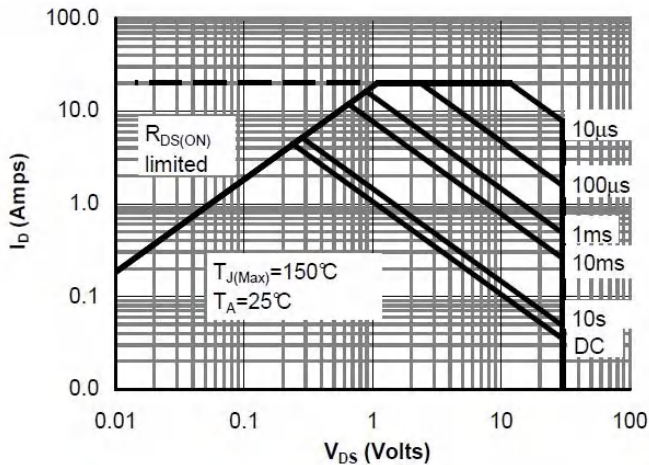


Figure 10: Maximum Forward Biased Safe Operating Area

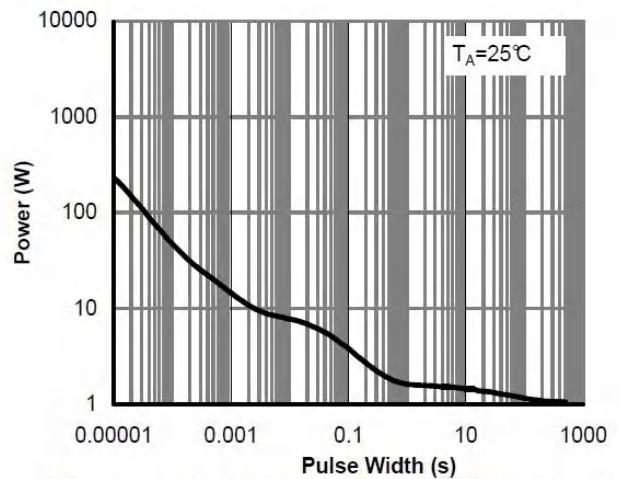


Figure 11: Single Pulse Power Rating Junction-to-Ambient

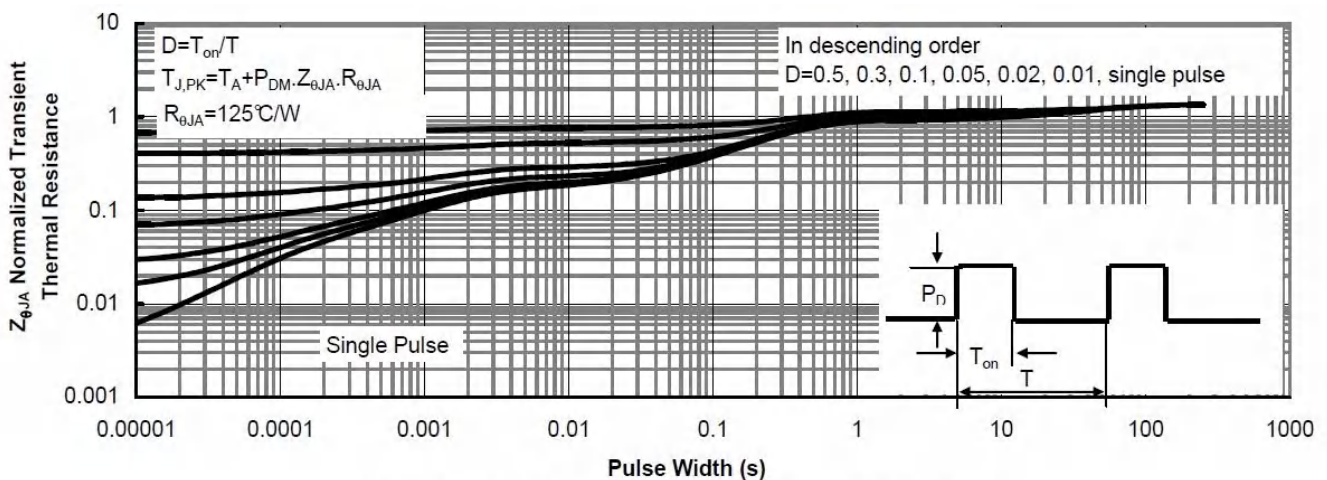
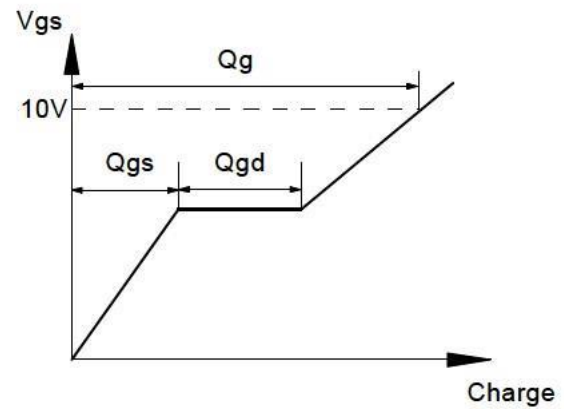
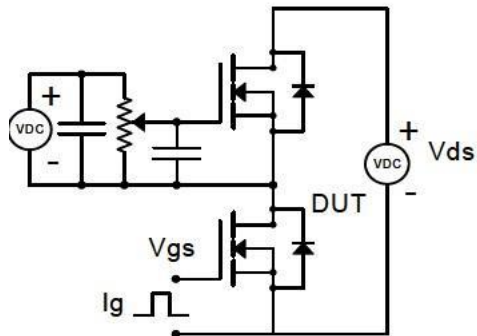


Figure 12: Normalized Maximum Transient Thermal Impedance

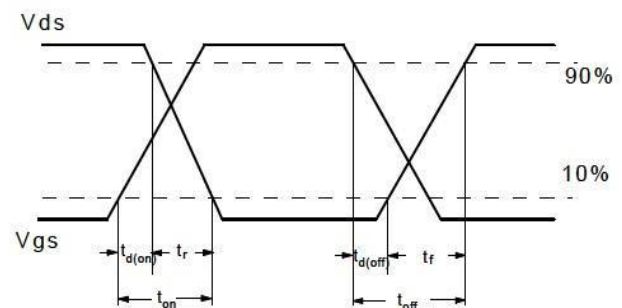
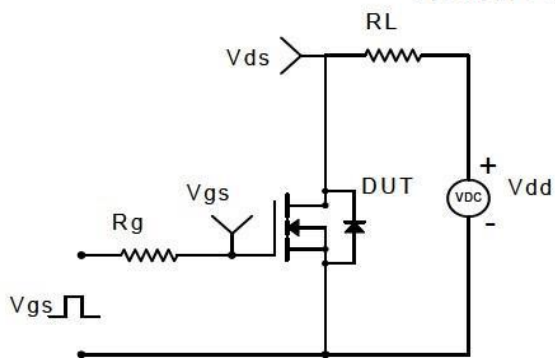


Gate Charge Test Circuit & Waveform

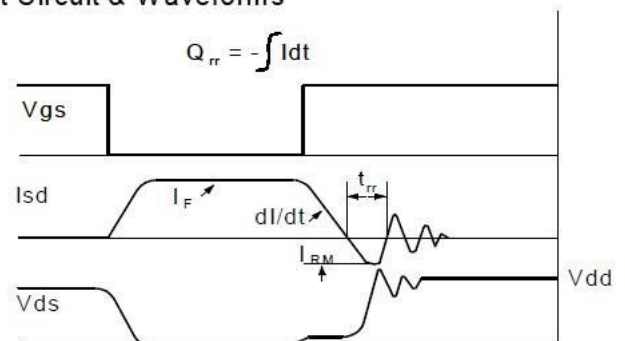
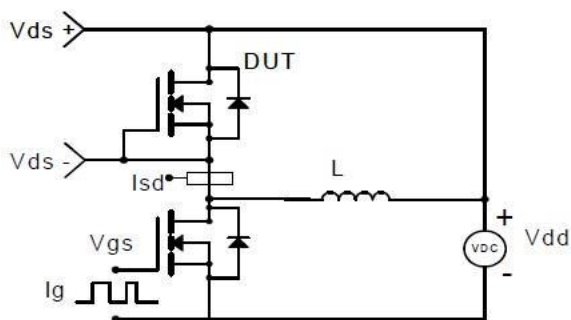


Resistive Switching Test Circuit & Waveforms

Resistive Switching Test Circuit & Waveforms

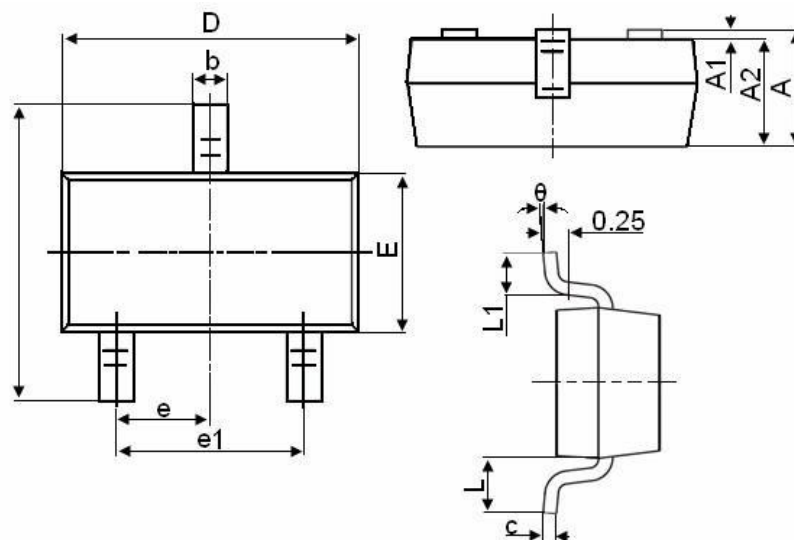


Diode Recovery Test Circuit & Waveforms





SOT-23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°



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