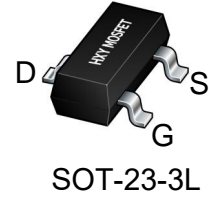




## Description

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.



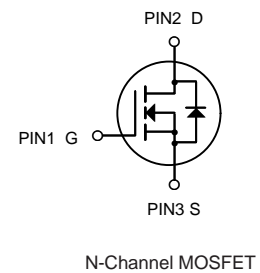
## General Features

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

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

## Application

Battery protection  
Load switch  
Uninterruptible power supply



## Package Marking and 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 <sup>a</sup> @Tj=125°C -pulse <sup>b</sup>	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 <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.8	1.4	2.2	V
Drain-source on-state resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	-	24	28	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		26	32	
Forward transconductance	g <sub>fs</sub>	V <sub>GS</sub> =5V, I <sub>D</sub> =5A	-	33	-	S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz		255		pF
Output capacitance	C <sub>oss</sub>			45		
Reverse transfer capacitance	C <sub>rss</sub>			35		
Turn-on delay time	t <sub>D(ON)</sub>	V <sub>DS</sub> =15V V <sub>GS</sub> =10V R <sub>L</sub> =2.6 ohm R <sub>GEN</sub> =3ohm	-	4.5	-	ns
Rise time	t <sub>r</sub>		-	2.5	-	
Turn-off delay time	t <sub>D(OFF)</sub>		-	14.5	-	
Fall time	t <sub>f</sub>		-	3.5	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =5.8A V <sub>GS</sub> =10V	-	5.2	-	nC
Gate-source charge	Q <sub>gs</sub>		-	0.85	-	
Gate-drain charge	Q <sub>gd</sub>		-	1.3	-	
Diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>s</sub> =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

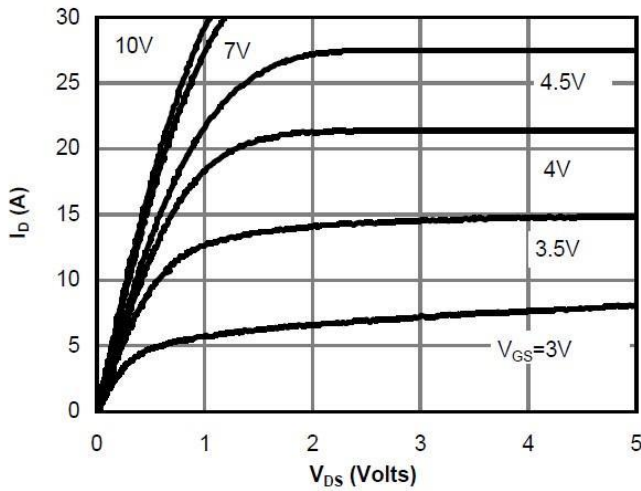


Figure 1: On-Region Characteristics

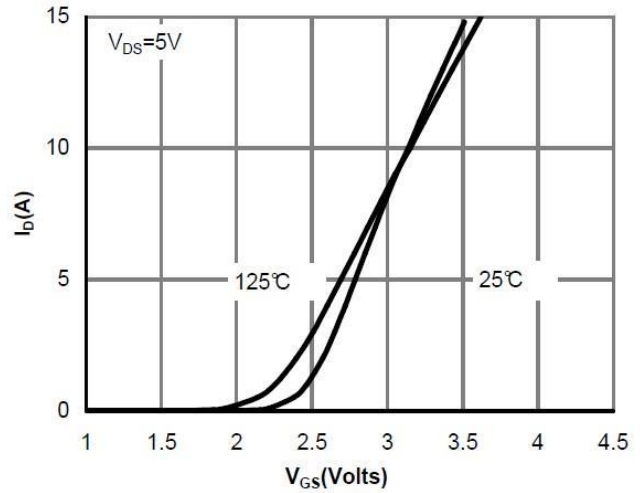


Figure 2: Transfer Characteristics

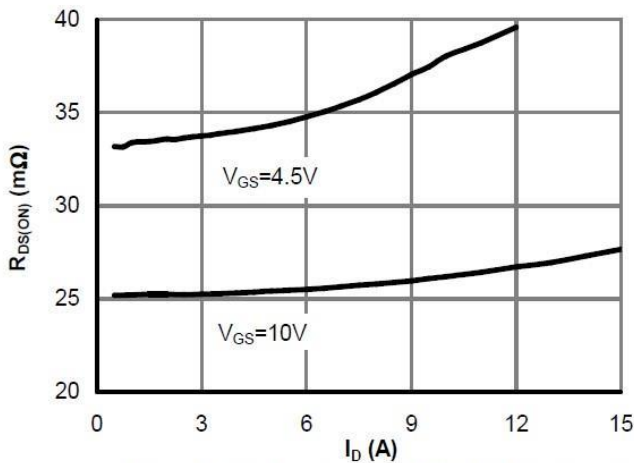


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

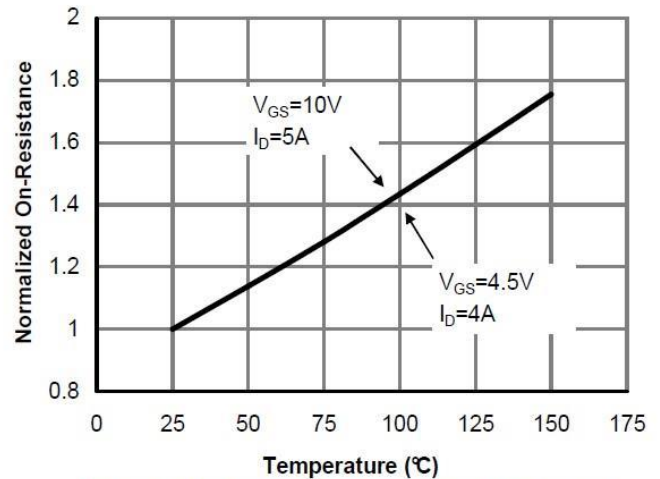


Figure 4: On-Resistance vs. Junction Temperature

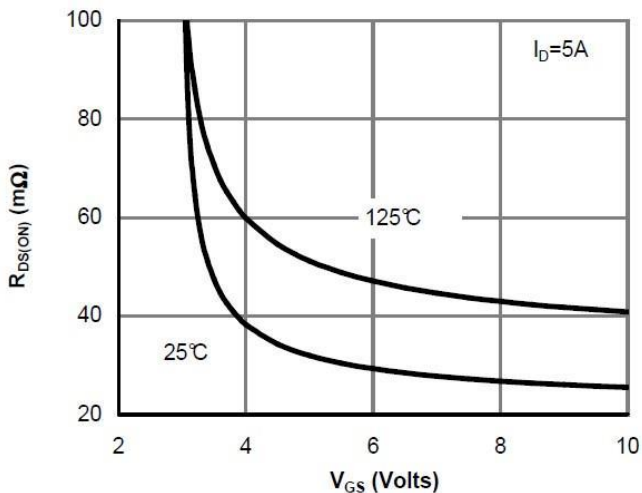


Figure 5: On-Resistance vs. Gate-Source Voltage

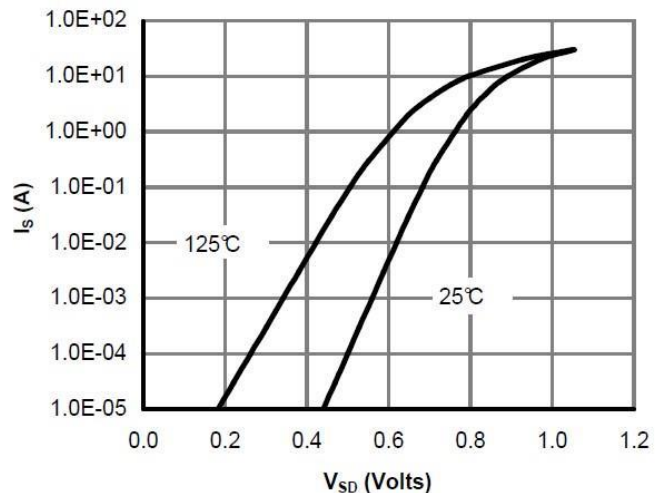


Figure 6: Body-Diode Characteristics

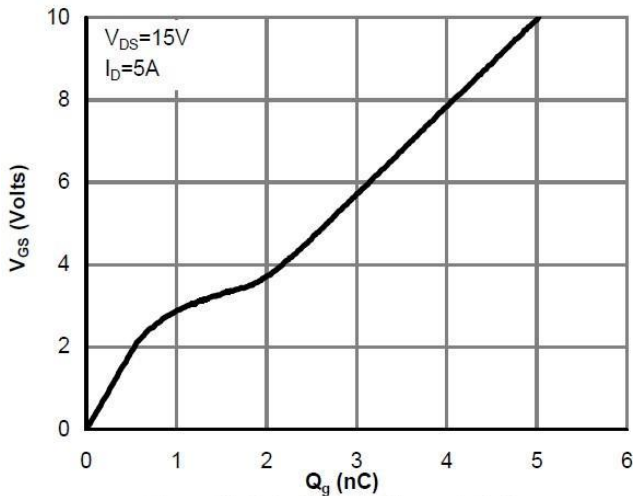


Figure 7: Gate-Charge Characteristics

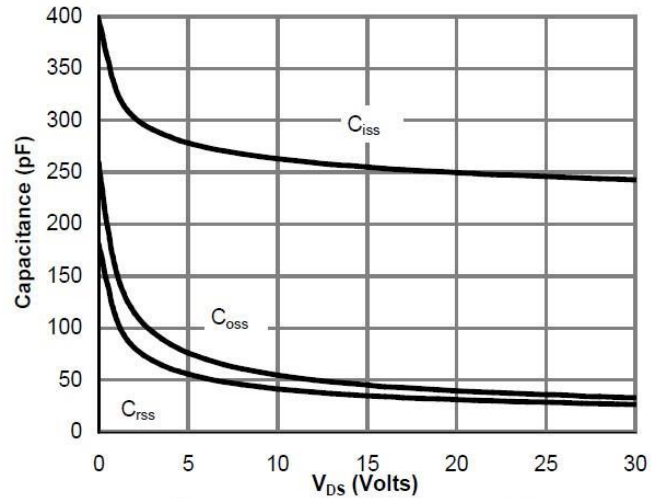


Figure 8: Capacitance Characteristics

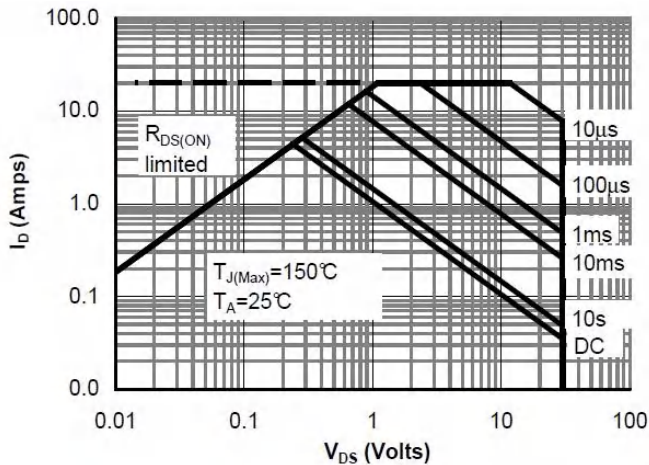


Figure 10: Maximum Forward Biased Safe Operating Area

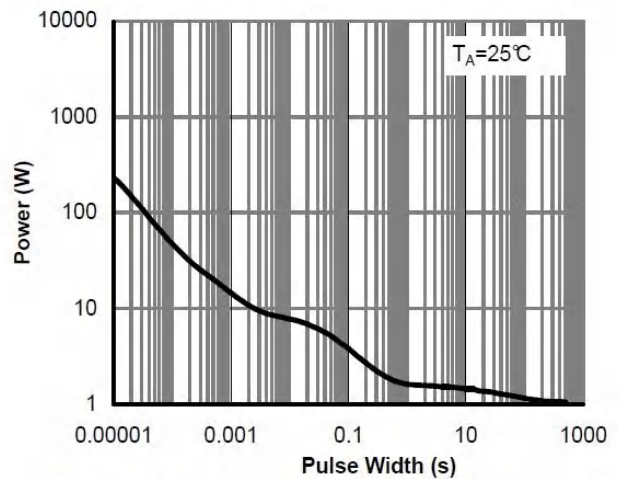


Figure 11: Single Pulse Power Rating Junction-to-Ambient

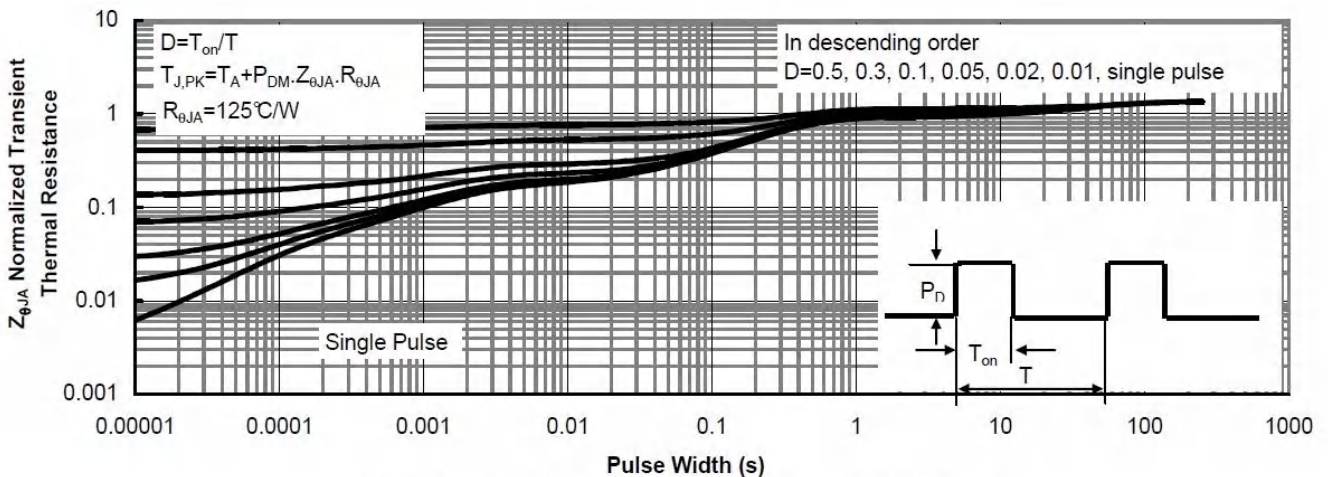
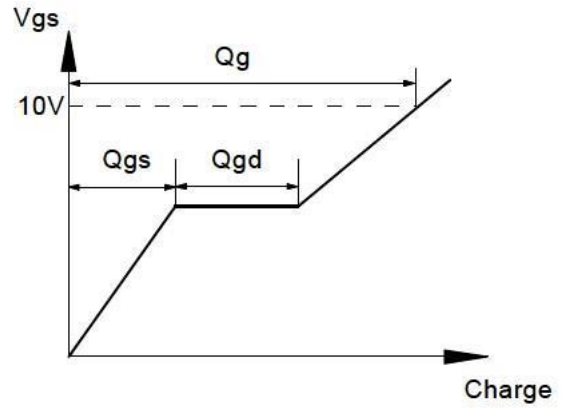
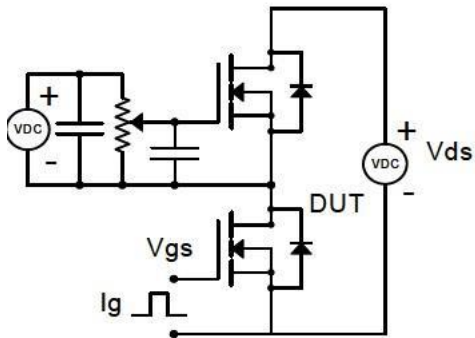


Figure 12: Normalized Maximum Transient Thermal Impedance

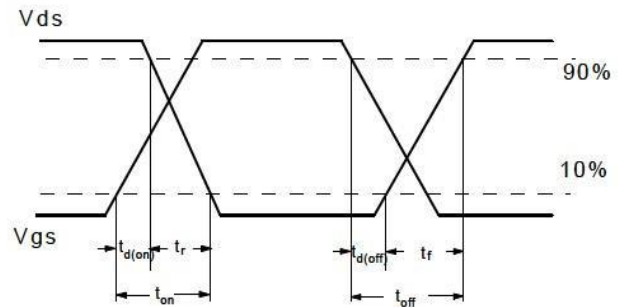
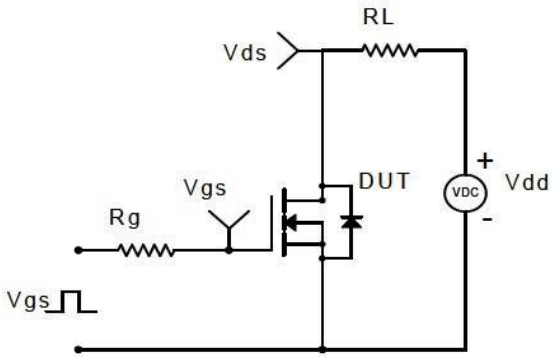


### Gate Charge Test Circuit & Waveform

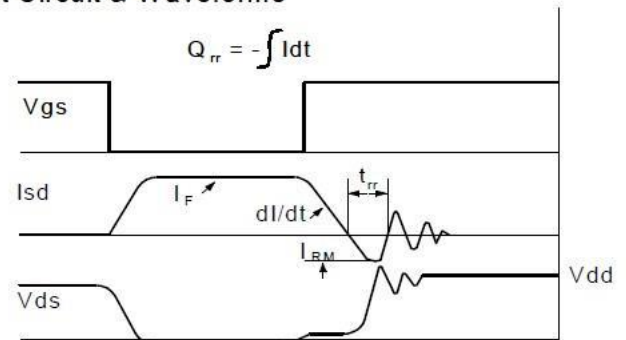
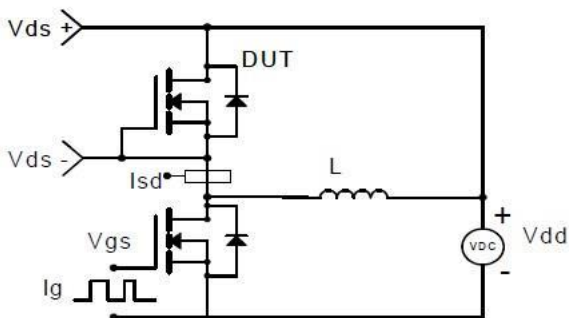


### Resistive Switching Test Circuit & Waveforms

#### Resistive Switching Test Circuit & Waveforms

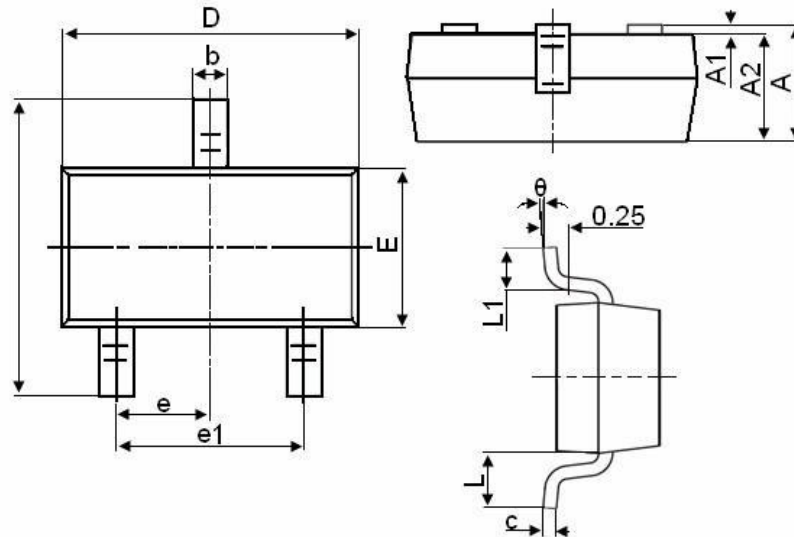


### Diode Recovery Test Circuit & Waveforms





### 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
$\theta$	0°	8°



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