

Description

The 2304 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

General Features

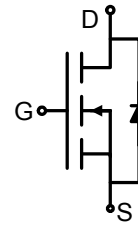
●

V_{DSS}	$R_{DS(ON)}$ @4.5V (Typ)	$R_{DS(ON)}$ @10V (Typ)	I_D
30V	61mΩ	47mΩ	3.6 A

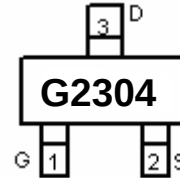
- High power and current handling capability
- RoHS Compliant
- Surface mount package

Application

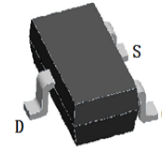
- Battery protection
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



SOT-23

Ordering Information

Part Number	Marking	Case	Packaging
G2304	G2304	SOT-23	3000pcs/Reel

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	3.6	A
Drain Current-Pulsed (Note 1)	I_{DM}	15	A
Maximum Power Dissipation	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	73.5	$^{\circ}\text{C/W}$
--	-----------------	------	----------------------

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA

Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.5	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =3.1A	-	61	73	mΩ
		V _{GS} =10V, I _D =3.6A	-	47	58	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =3.6A	-	11	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	230	-	PF
Output Capacitance	C _{OSS}		-	40	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	17	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, I _D =3.6A V _{GS} =4.5V, R _{GEN} =6Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	50	-	nS
Turn-Off Delay Time	t _{d(off)}		-	10	-	nS
Turn-Off Fall Time	t _f		-	20	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =3.6A, V _{GS} =10V	-	4.0	-	nC
Gate-Source Charge	Q _{gs}		-	0.75	-	nC
Gate-Drain Charge	Q _{gd}		-	0.65	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =2.7A	-	0.8	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	1.6	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

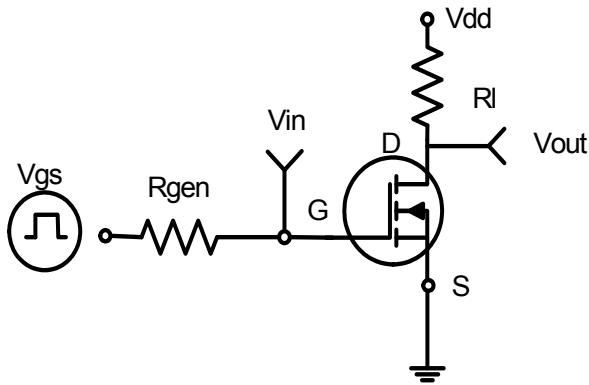


Figure 1: Switching Test Circuit

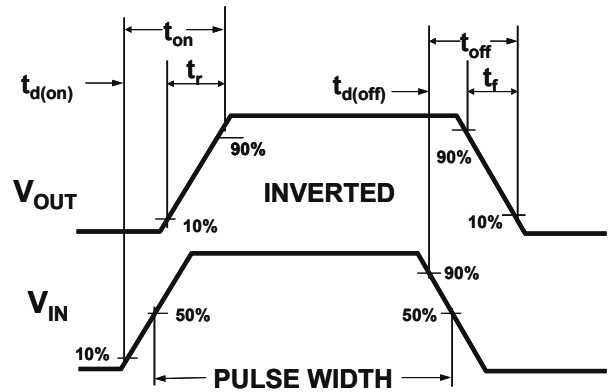


Figure 2: Switching Waveforms

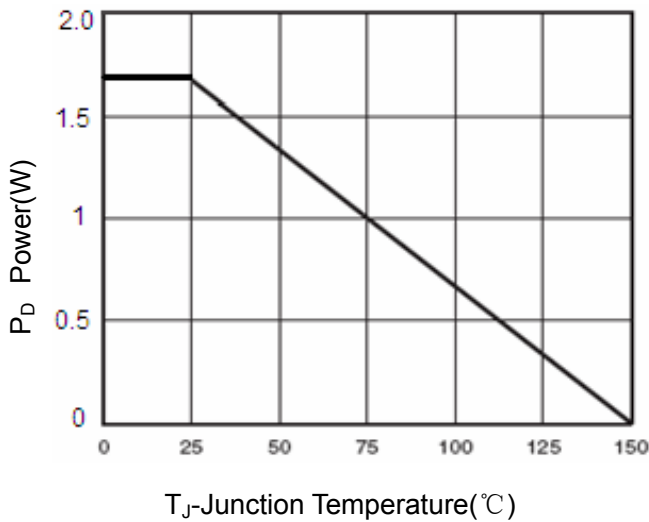


Figure 3 Power Dissipation

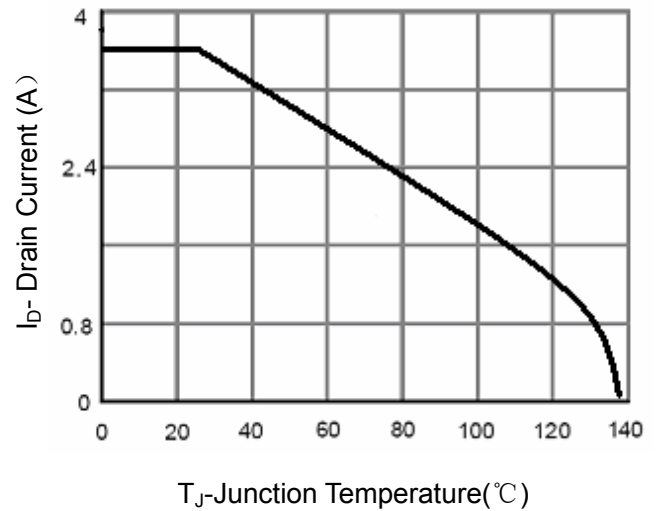


Figure 4 Drain Current

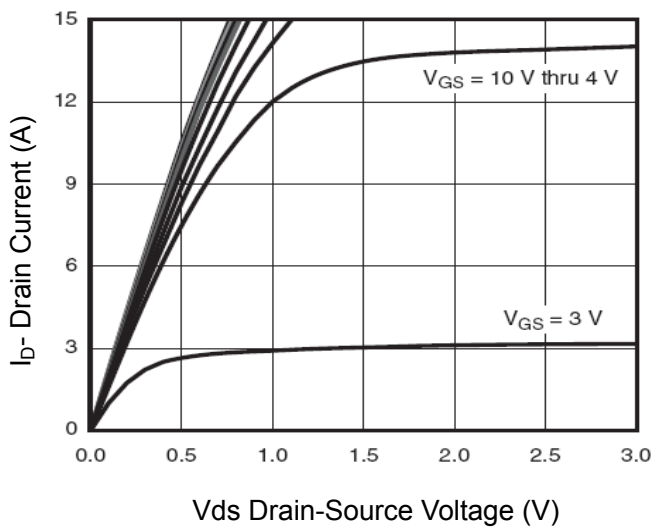


Figure 5 Output Characteristics

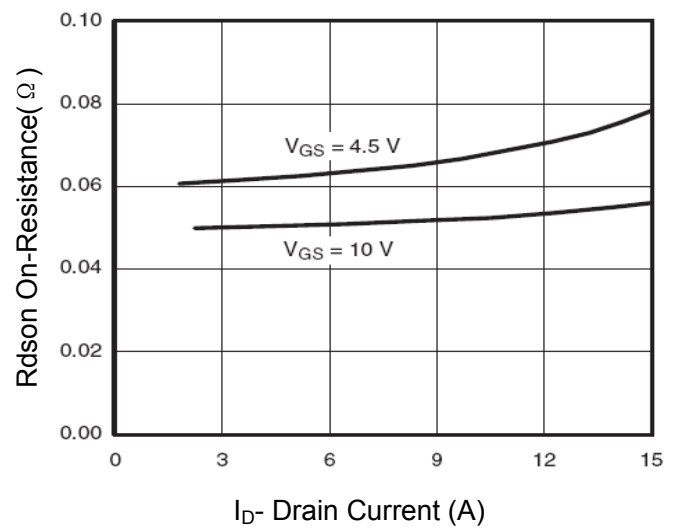


Figure 6 Drain-Source On-Resistance

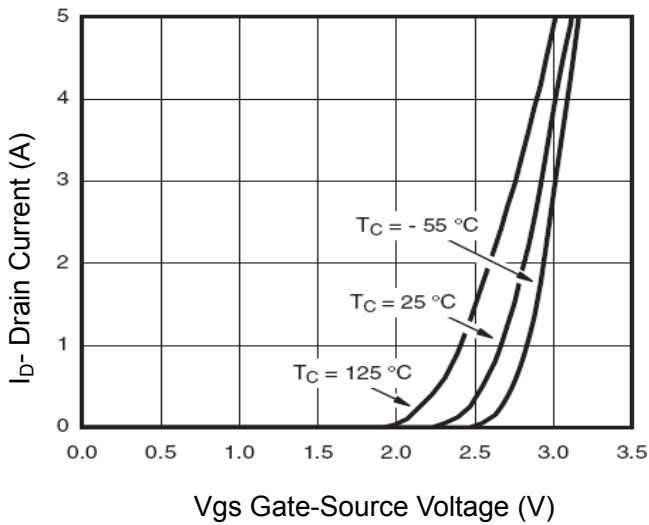


Figure 7 Transfer Characteristics

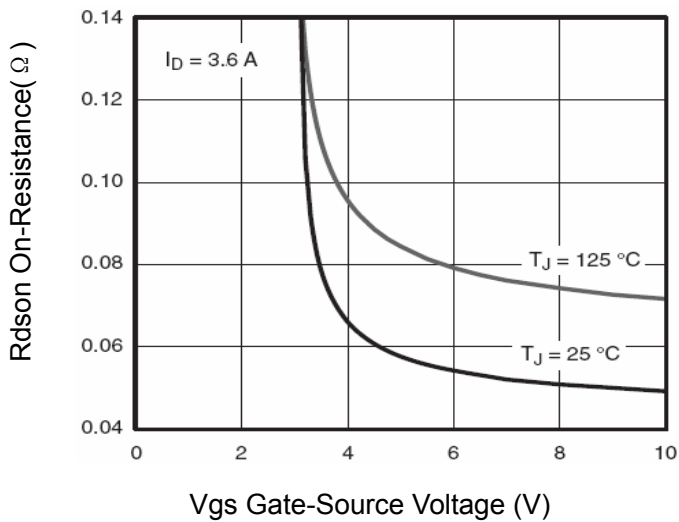


Figure 9 $R_{DS(on)}$ vs V_{GS}

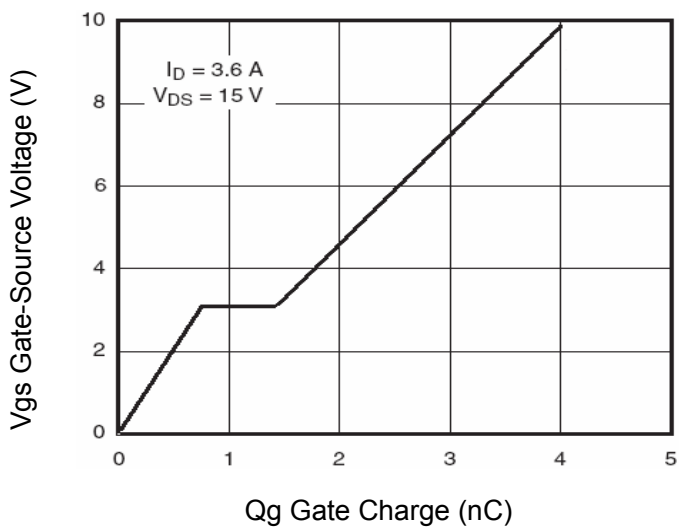


Figure 11 Gate Charge

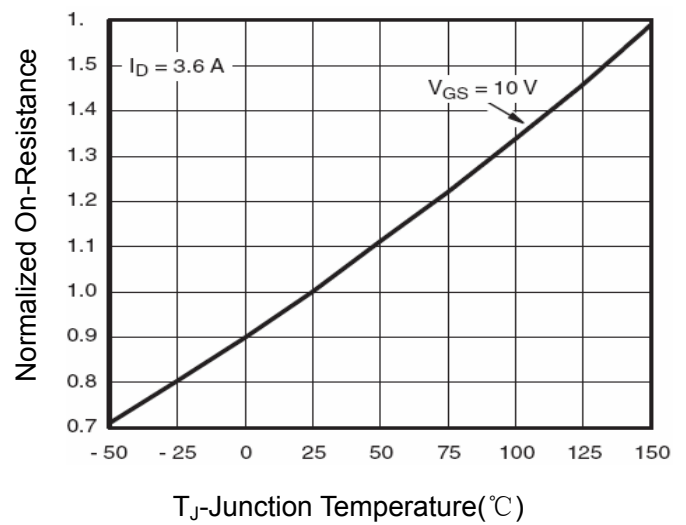


Figure 8 Drain-Source On-Resistance

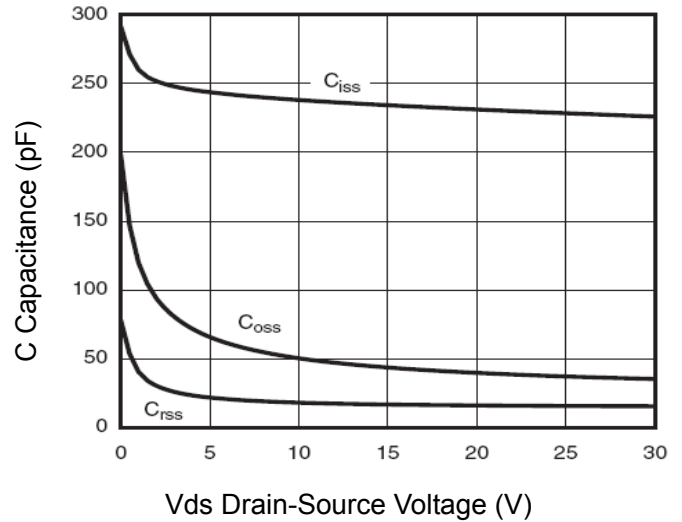


Figure 10 Capacitance vs V_{DS}

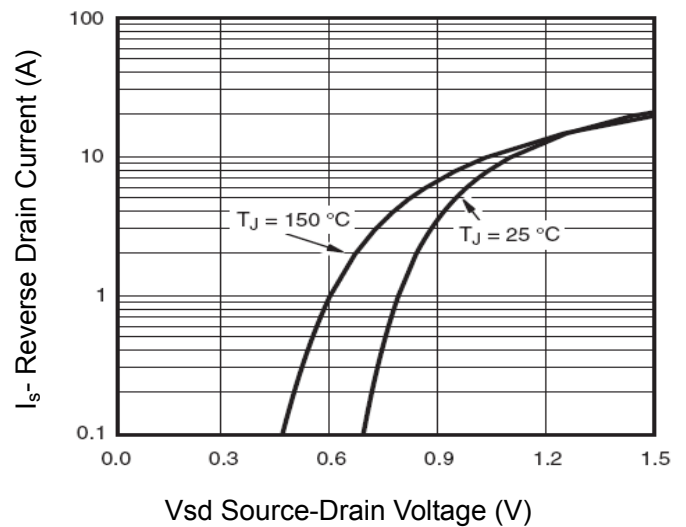


Figure 12 Source- Drain Diode Forward

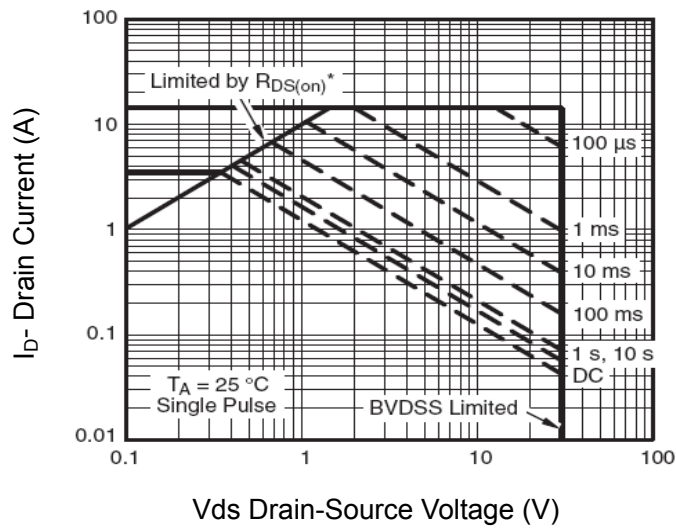


Figure 13 Safe Operation Area

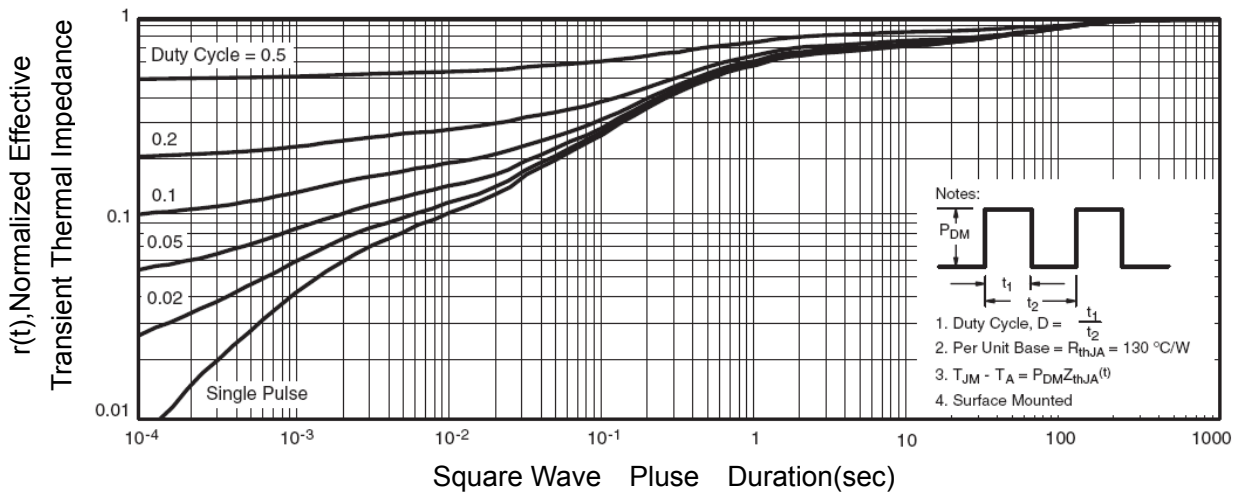
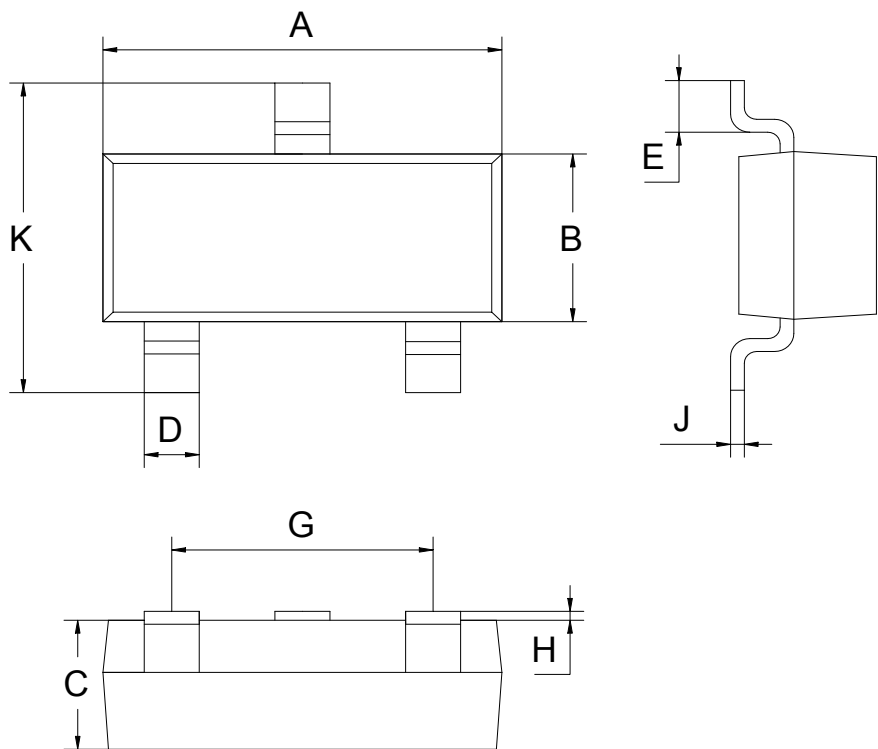


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package information



SOT-23			
Dim	MIN	NOM	MAX
A	2.80	2.90	3.00
B	1.20	1.30	1.40
C	0.90	1.00	1.10
D	0.39	0.40	0.45
E	0.20MIN		
G	1.90REF		
H	0.00	-	0.10
J	0.05	0.10	0.15
K	2.30	2.40	2.50
All Dimensions in mm			