

SQ3400

数据手册

N-Channel Enhancement Mode Field Effect Transistor

N-Channel Enhancement Mode Field Effect Transistor

Description

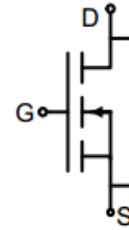
The SQ3400 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

General Features

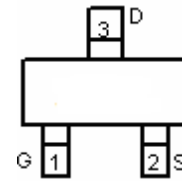
- $V_{DS} = 30V, I_D = 5.8A$
 $R_{DS(ON)} < 59m\Omega @ V_{GS}=2.5V$
 $R_{DS(ON)} < 45 m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 41 m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin Assignment



SOT-23 top view

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ($V_{GS} = -4.5V, T_c = 25^\circ C$)	I_D	5.8	A
Pulsed Drain Current	I_{DM}	30	A
Maximum Power Dissipation @Ta=25 °C	P_D	1.3	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	89	°C/W

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BVDSS	VGS= 0V, IBD B= -250μA	30		-	V
Zero Gate Voltage Drain Current	IDSS	VDS = -24V, VBGS B= 0V	-	-	1	μA
Gate-Body Leakage Current	IBGSS	VGS = ±12V, VDS = 0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	VGS(th)	VDS= VGS, IDS= -250μA	0.6	0.8	1.4	V
Drain-Source On-State Resistance	RDS(ON)	VGS= 10V, IBDS= 4.2A	-	22	35	mΩ
		VGS= 4.5V, IBDS= 4A	-	26	41	
		VBGSB =2.5V, IBDS B= 2A	-	35	57	
Forward Transconductance	gFS	VDS =5V, IBD B=5A	2	8	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	Ciss	VDS=15V , VGS = 0V, F =1.0MHz	-	680	-	pF
Output Capacitance	Coss		-	108	-	
Reverse Transfer Capacitance	Crss		-	72	-	
Switching Characteristics (Note 4)						
Turn-on Delay Time	Td(on)	VDS=15V , ID=1A, RL=15Ω VGS =10V , RG= 2.5Ω	-	4	-	ns
Turn-on Rise Time	Tr		-	5	-	
Turn-Off Delay Time	Td(OFF)		-	27	-	
Turn-Off Fall Time	Tf		-	5	-	
Total Gate Charge	QBgB	VDS=15V, ID=4.9A, VGS=10V	-	10	-	nC
Gate-Source Charge	QBgsB		-	2	-	
Gate-Drain Charge	QBgdB		-	3	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	VSD	IBS =5.8A, VGS=0V Tj = 25 °C	-	0.78	1.2	V
Diode Forward Current (Note 2)	IS		-	-	5.8	A

Notes:

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

Typical Electrical and Thermal Characteristics

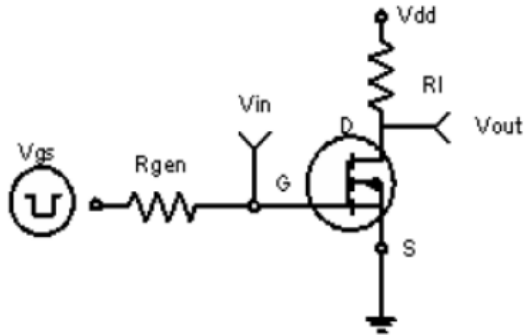


Figure 1: Switching Test Circuit

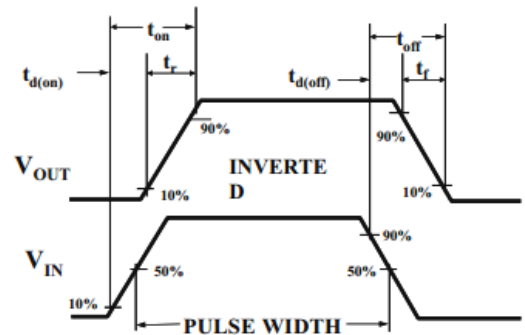


Figure 2: Switching Waveforms

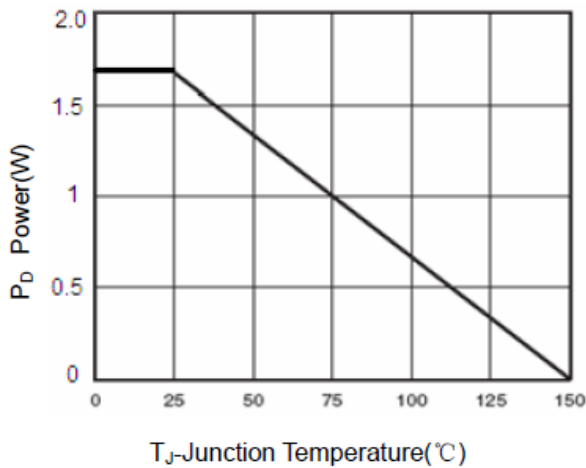


Figure 3 Power Dissipation

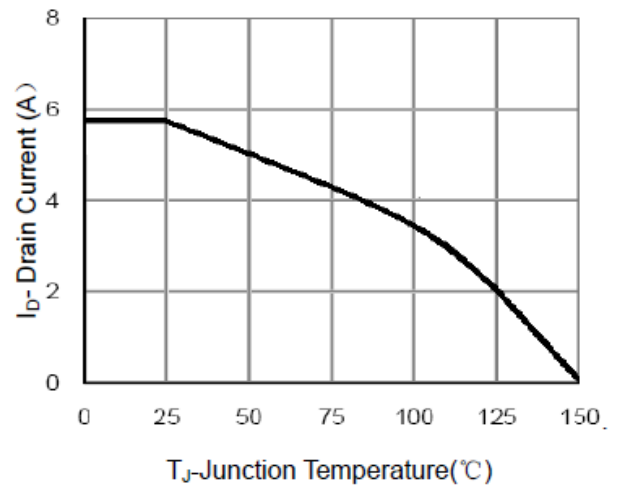


Figure 4 Drain Current

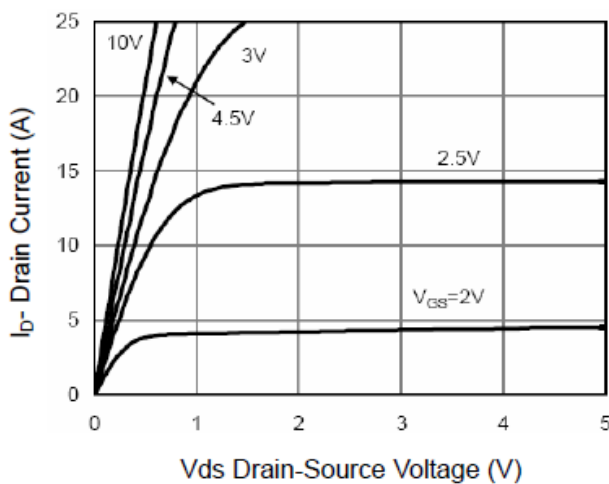


Figure 5 Output Characteristics

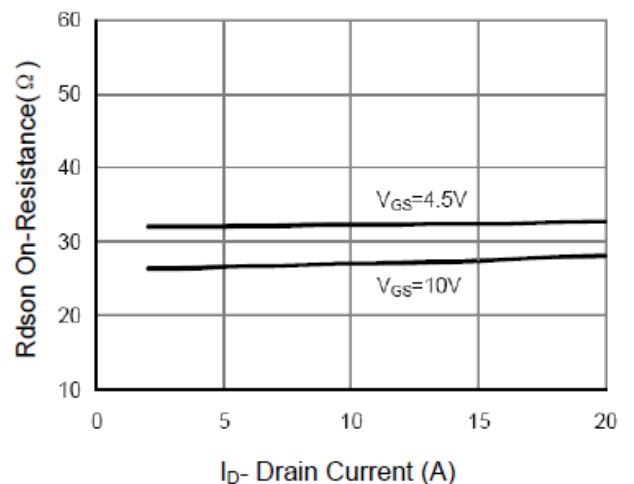


Figure 6 Drain-Source On-Resistance

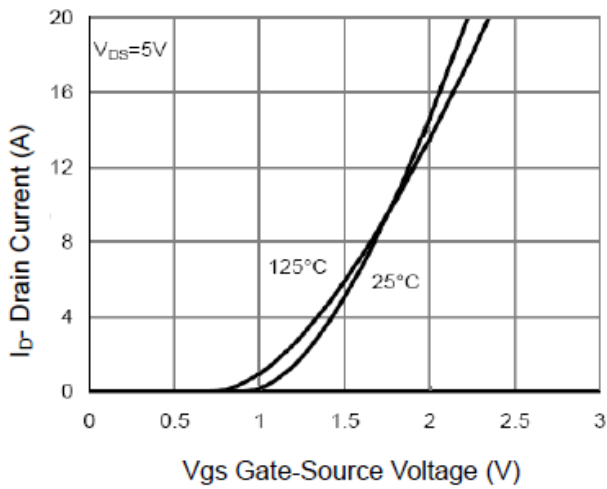


Figure 7 Transfer Characteristics

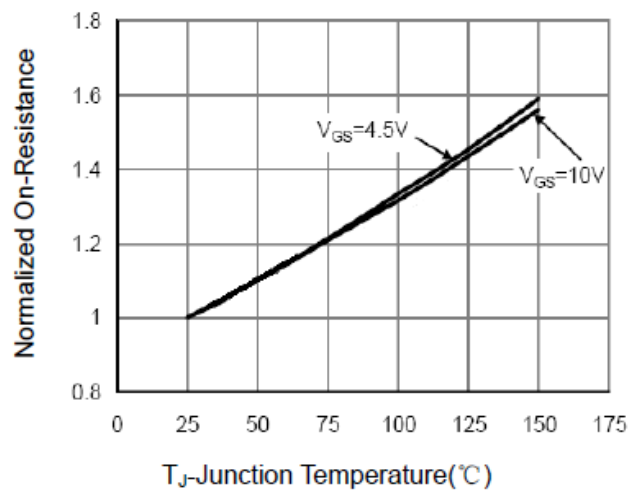


Figure 8 Drain-Source On-Resistance

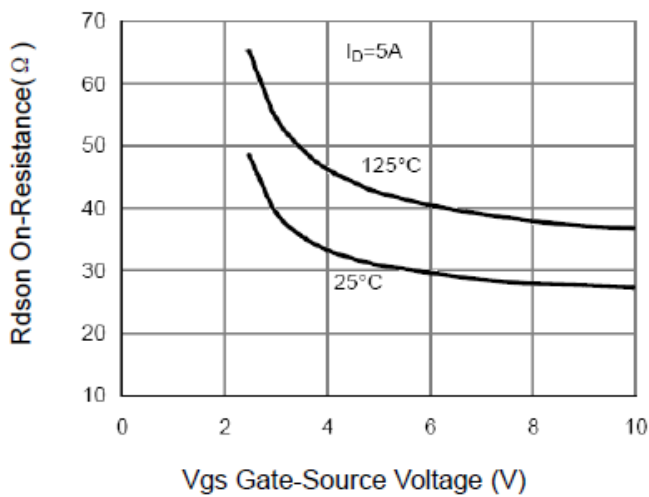


Figure 9 Rdson vs Vgs

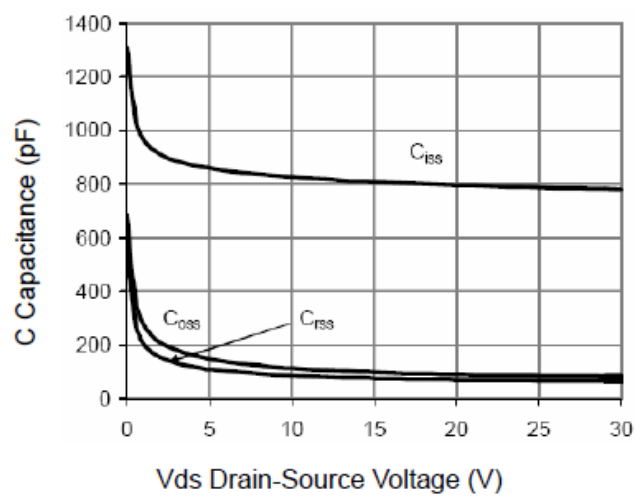


Figure 10 Capacitance vs Vds

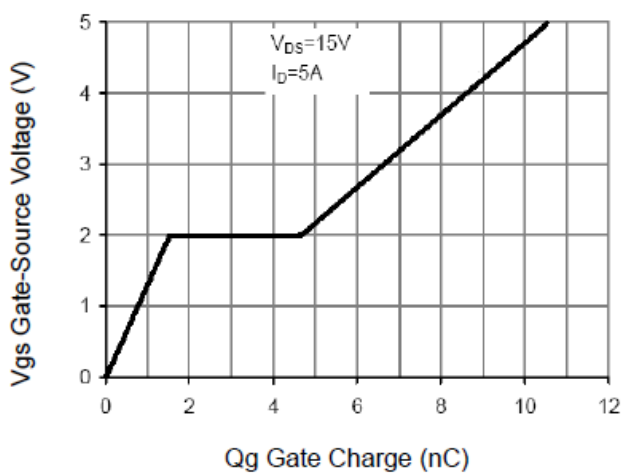


Figure 11 Gate Charge

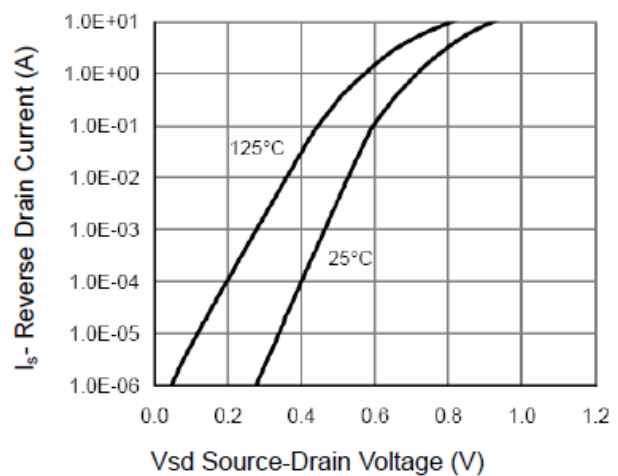


Figure 12 Source-Drain Diode Forward

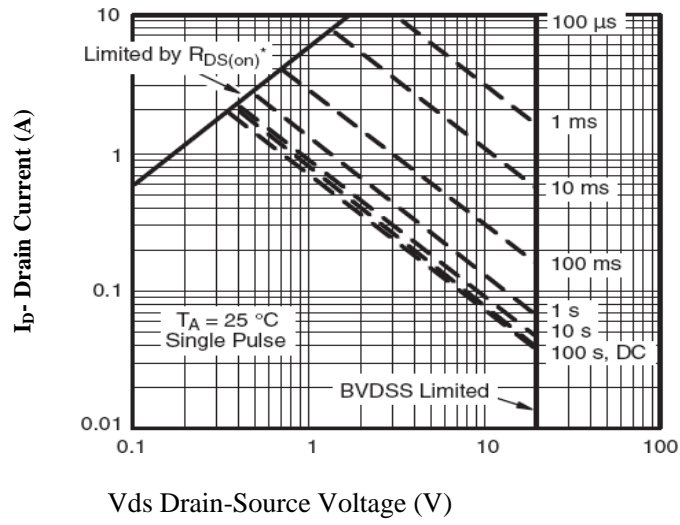


Figure 13 Safe Operation Area

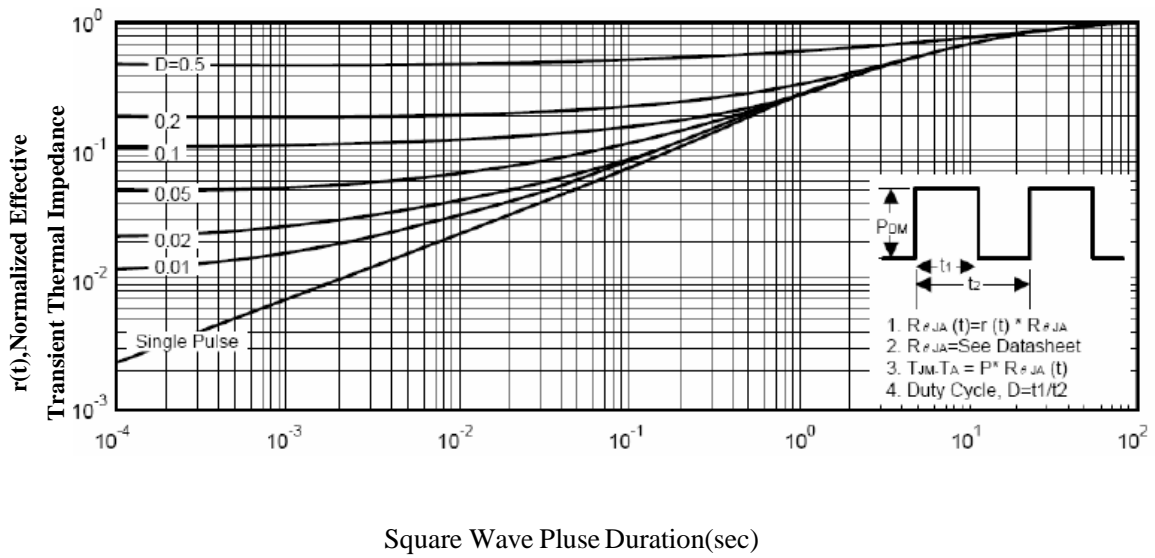
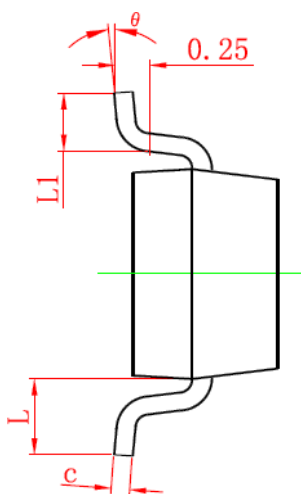
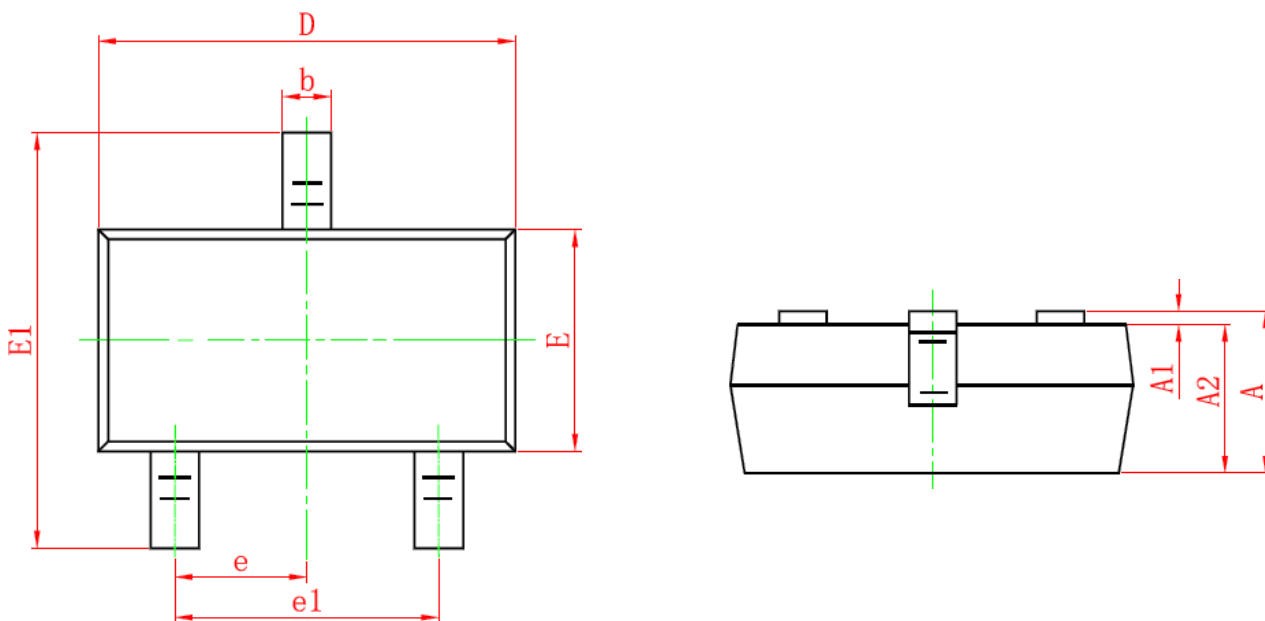


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information

Dimensions in Millimeters (UNIT:mm)



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes

- All dimensions are in millimeters.
 - Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
 - Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
 - Dimension L is measured in gauge plane.
- Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

修改记录

版本	日期	描述
Ver1.00	2020-08-25	第一版

HOLYCHIP 公司保留对以下所有产品在可靠性、功能和设计方面的改进作进一步说明的权利。HOLYCHIP 不承担由本手册所涉及的产品或电路的运用和使用所引起的任何责任，HOLYCHIP 的产品不是专门设计来应用于外科植入、生命维持和任何 HOLYCHIP 产品产生的故障会对个体造成伤害甚至死亡的领域。如果将 HOLYCHIP 的产品用于上述领域，即使这些是由 HOLYCHIP 在产品设计和制造上的疏忽引起的，用户应赔偿所有费用、损失、合理的人身伤害或死亡所直接或间接所产生的律师费用，并且用户保证 HOLYCHIP 及其雇员、子公司、分支机构和销售商与上述事宜无关。

芯圣电子

2020 年 8 月