N-Channel Trench Power MOSFET

General Description

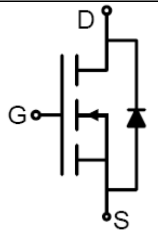
The CS3400A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

Features

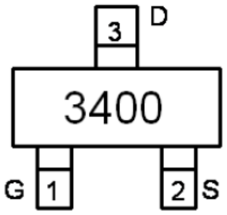
- V_{DS} = 30V,ID =5.8A
  $R_{DS(ON)}$ < 30mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 40mΩ @ V_{GS} =4.5V
  $R_{DS(ON)}$ < 55mΩ @ V_{GS} =2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

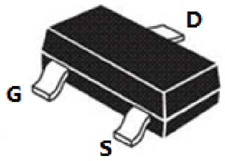
- PWM applications
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



SOT-23 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3400	CS3400A	SOT-23	Ø180mm	8mm	3000 units

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V）	30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±12	V
I_D	Drain Current-Continuous	5.8	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed **(Note 1)**	30	A
P_D	Maximum Power Dissipation	1.3	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

Table 2. Thermal Characteristic

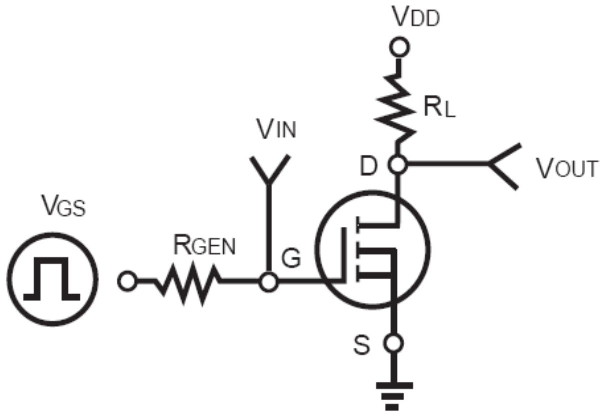
Symbol	Parameter	Value	Unit
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	96	℃/W

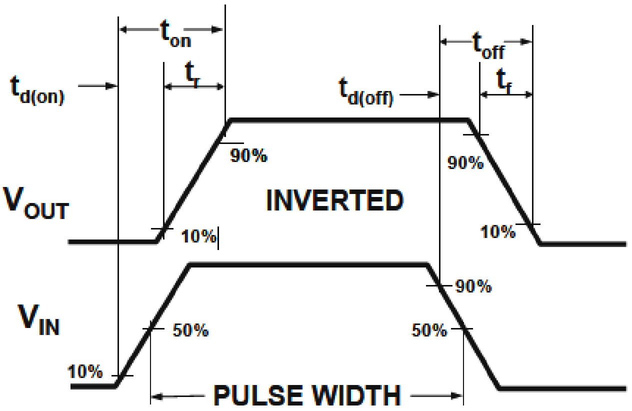
Table 3. Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.6	0.9	1.4	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=4.2A	2	8		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=4.2A		22	30	mΩ
		V_{GS}=4.5V, I_D=4A		26	40	mΩ
		V_{GS}=2.5V, I_D=2A		35	55	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		680		pF
C_{oss}	Output Capacitance			108		pF
C_{rss}	Reverse Transfer Capacitance			72		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V,I_D=1A,R_L=15Ω V_{GS}=10V,R_G=2.5Ω		4		nS
t_r	Turn-on Rise Time			5		nS
$t_{d(off)}$	Turn-Off Delay Time			27		nS
t_f	Turn-Off Fall Time			5		nS
Q_g	Total Gate Charge	V_{DS}=15V,I_D=4.9A, V_{GS}=10V		10		nC
Q_{gs}	Gate-Source Charge			2		nC
Q_{gd}	Gate-Drain Charge			3		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				5.8	A
V_{SD}	Forward on Voltage**(Note 1)**	V_{GS}=0V,I_S=1A		0.78	1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Switch Time Test Circuit and Switching Waveforms：





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

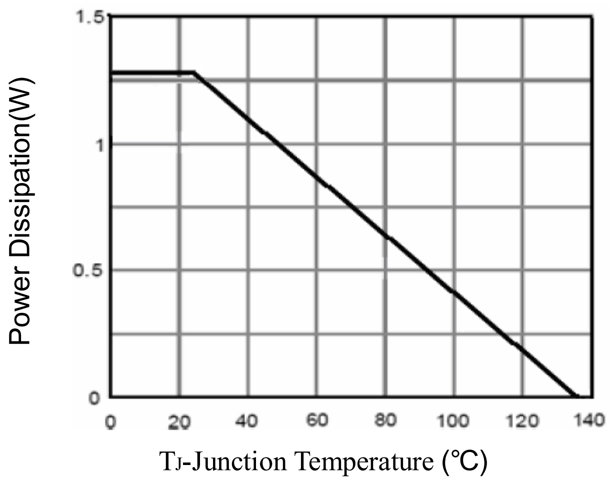


Figure2. Drain Current

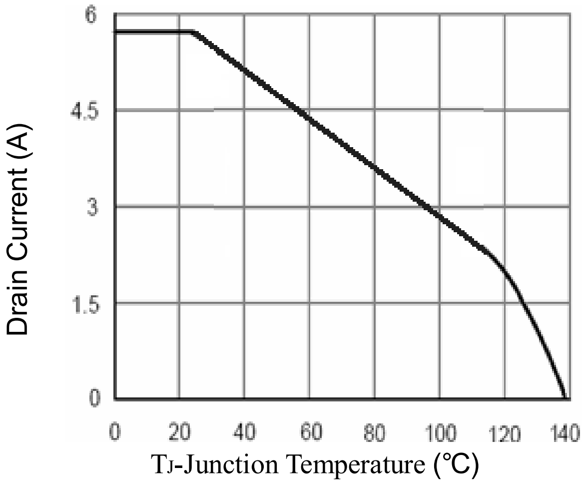


Figure3. Output Characteristics

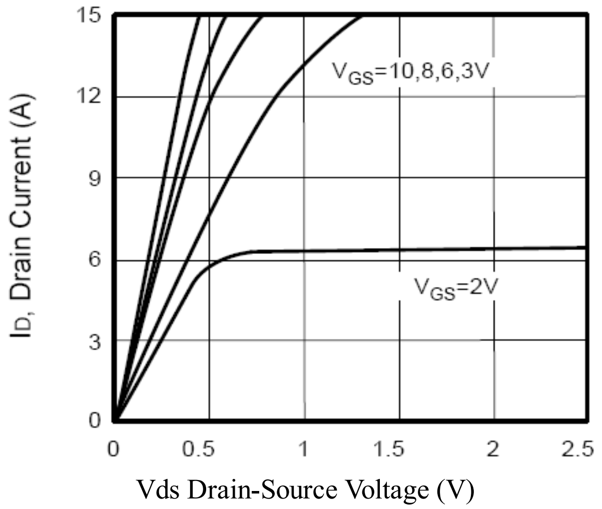


Figure4. Transfer Characteristics

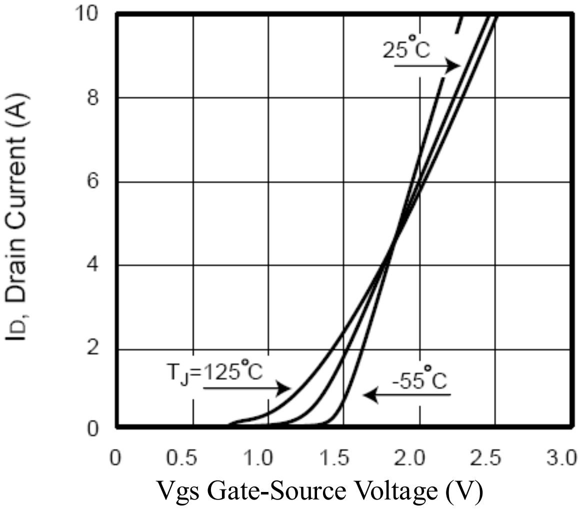


Figure5. Capacitance

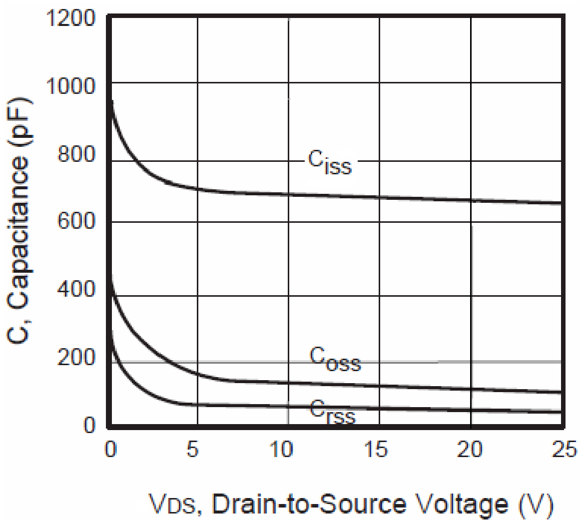


Figure6. $R_{DS(ON)}$ vs Junction Temperature

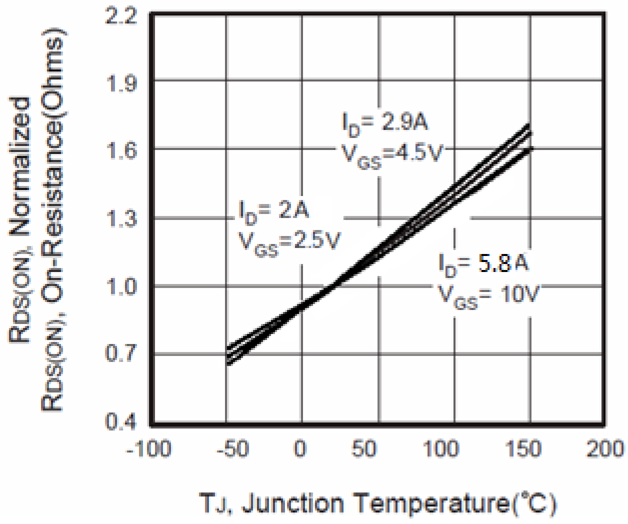


Figure7. Max BV_{DSS} vs Junction Temperature

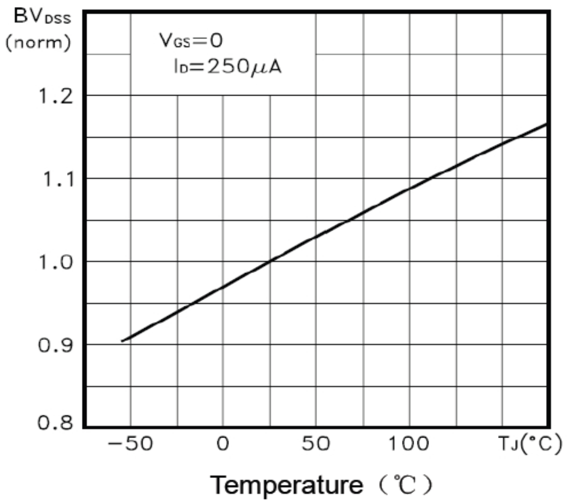


Figure8. $V_{GS(th)}$ vs Junction Temperature

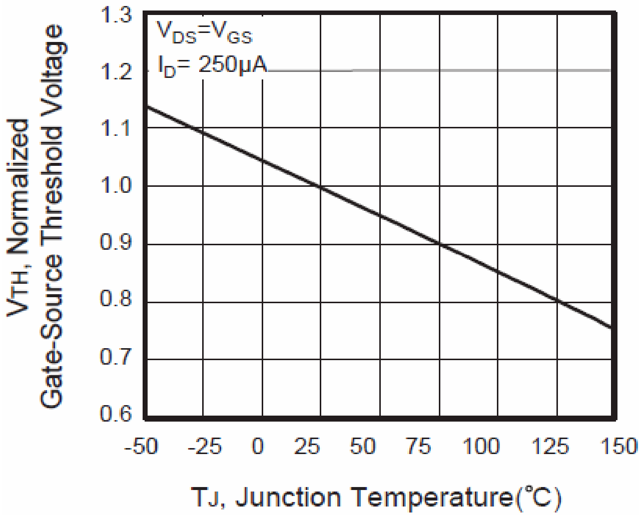


Figure9. Gate Charge Waveforms

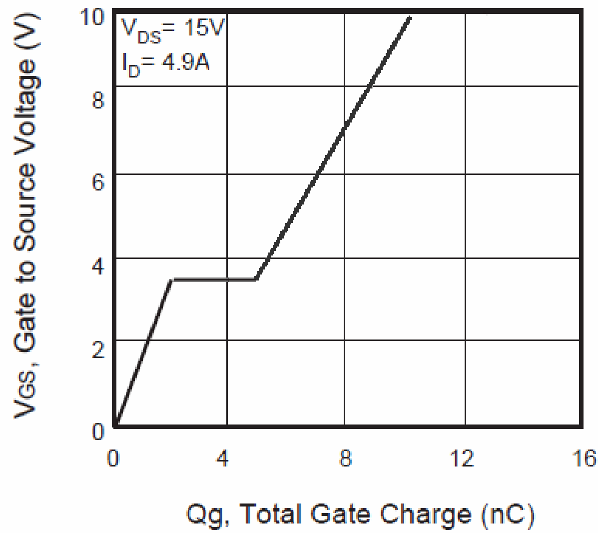


Figure10. Maximum Safe Operating Area

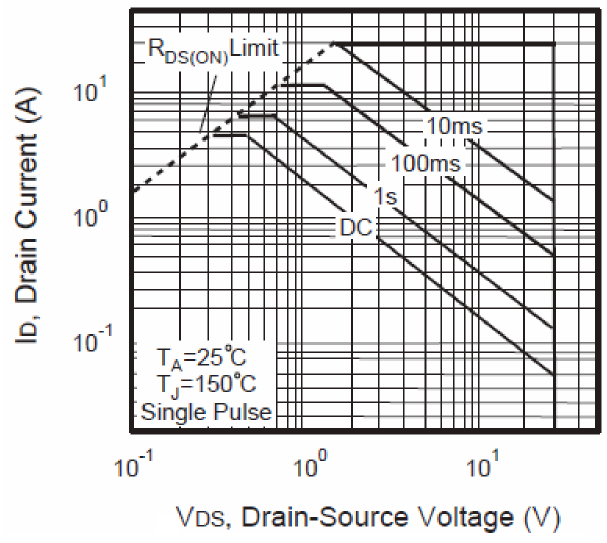
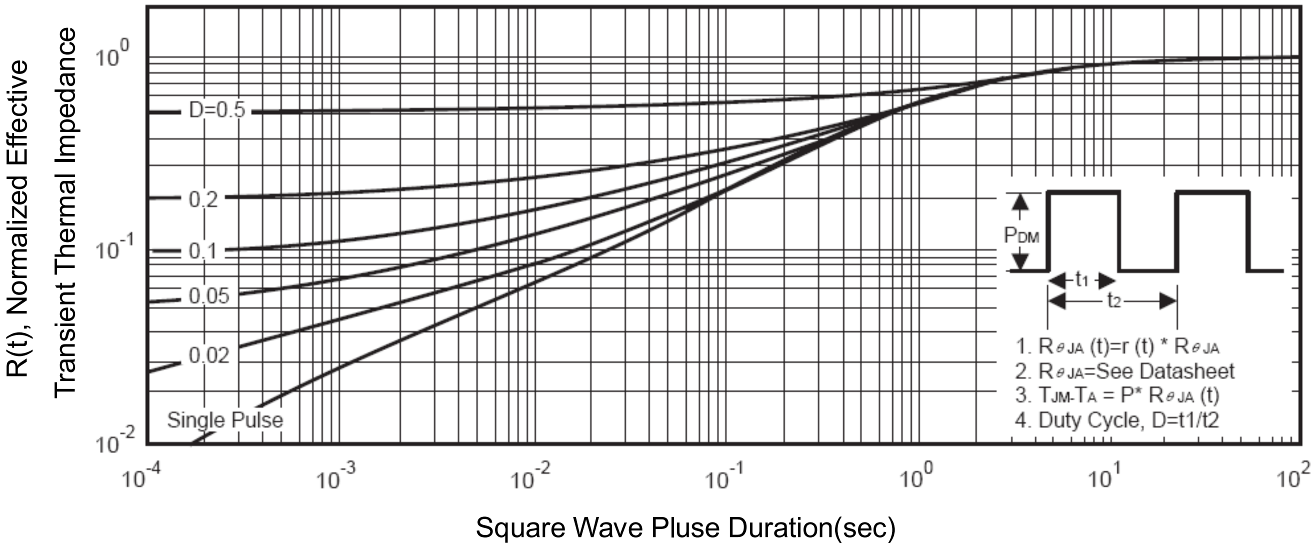
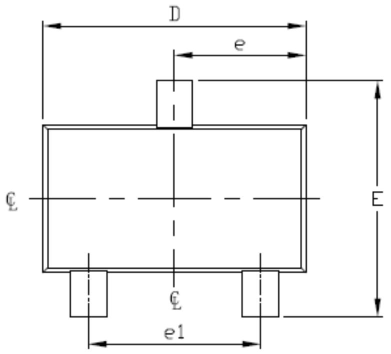
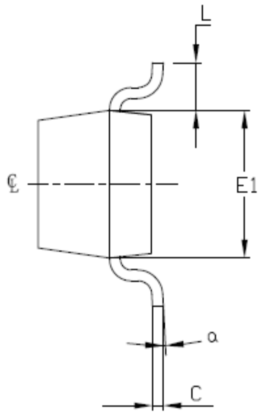


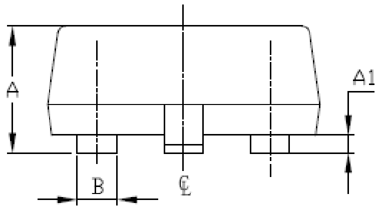
Figure11. Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information







COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	0.9	1.0	1.1
A1	0.00	0.06	0.1
B	0.3	0.4	0.5
C	0.07	0.09	0.18
D	2.8	2.9	3.04
E	2.1	2.33	2.64
E1	1.2	1.3	1.4
e	1.4	1.45	1.5
e1	1.80	1.90	2.00
L	0.45	0.54	0.63
α	0°	2.5°	7°