

**SuperMOS – SOT-23 30V  $V_{DSS}$ , 19m $\Omega$   $R_{DS(ON)}$ , 6.0A  $I_D$  N-channel MOSFET**

**1. Description**

The CJ3400-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product CJ3400-ES is Pb-free.

**2. Features**

- 30V,  $R_{DS(ON)}=19m\Omega$ (Typ),  $V_{GS}=10V$
- $R_{DS(ON)}=25m\Omega$ (Typ),  $V_{GS}=4.5V$
- Use trench MOSFET technology
- High density cell design for low  $R_{DS(on)}$
- Material : Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

**3. Applications**

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**4. Ordering Information**

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
CJ3400-ES	SOT-23	R0	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

**5. Pin Configuration and Functions**

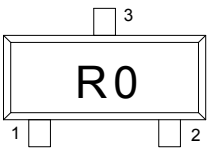
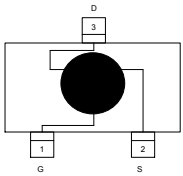
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

Table-2 Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$BV_{DSS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>a</sup>	$T_A=25^{\circ}C$	6.0	A
	$T_A=70^{\circ}C$	4.6	
Maximum Power Dissipation <sup>a</sup>	$T_A=25^{\circ}C$	1.4	W
	$T_A=70^{\circ}C$	0.9	
Pulsed Drain Current <sup>c</sup>	$I_{DM}$	30	A
Operating Junction Temperature	$T_J$	150	°C
Lead Temperature	$T_L$	260	°C
Storage Temperature Range	$T_{stg}$	-55 to 150	°C

### Thermal resistance ratings

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance <sup>a</sup>	$t \leq 10$ s	$R_{\theta JA}$	75	90	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	43	70	

Note:

- a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper
- b Surface mounted on FR4 board using minimum pad size, 1oz copper
- c Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu s$ , Duty Cycle=1%

## Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.6	1.0	1.3	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6.0A$		19.0	28.0	m $\Omega$
		$V_{GS}=4.5V, I_D=5.0A$		25.0	33.0	
		$V_{GS}=2.5V, I_D=3.0A$		33.0	51.0	
Forward Trans conductance	$g_{FS}$	$V_{DS}=5.0V, I_D=5.8A$		7.8	15	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, f=1MHz, V_{DS}=10V$		550		pF
Output Capacitance	$C_{OSS}$			62		
Reverse Transfer Capacitance	$C_{RSS}$			48		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=5.8A$		6.7		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.75		
Gate-to-Source Charge	$Q_{GS}$			1.65		
Gate-to-Drain Charge	$Q_{GD}$			1.78		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=4.5V, V_{DS}=10V, R_L=10\Omega, R_G=6\Omega$		3.8		ns
Rise Time	$t_r$			13.0		
Turn-Off Delay Time	$t_{d(OFF)}$			14.2		
Fall Time	$t_f$			2.0		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1.0A$		0.75	1.5	V

## 7. Typical Characteristic

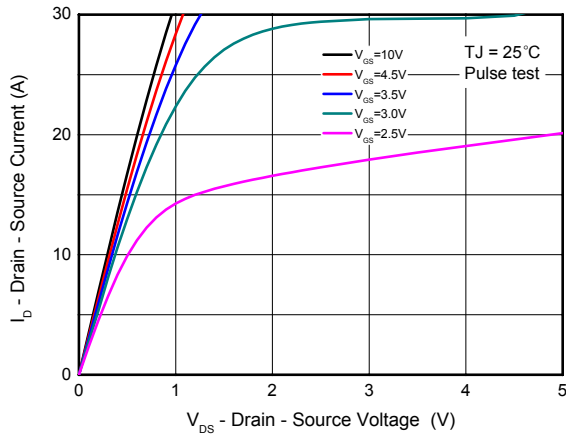


Figure 1. Typ. Output

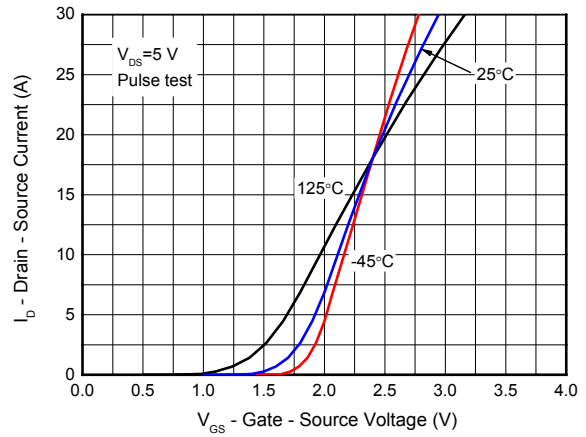


Figure 2. Transfer Characteristics

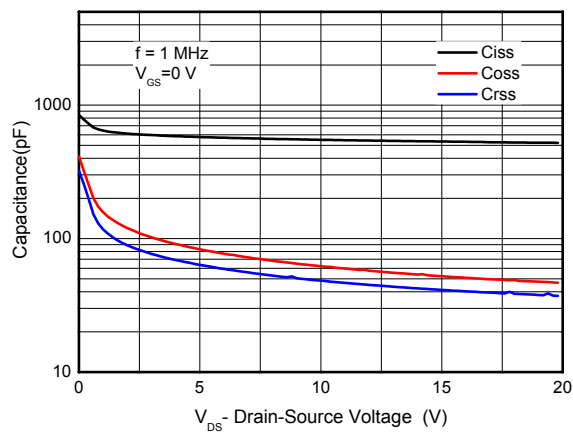


Figure 3. Capacitance Characteristics

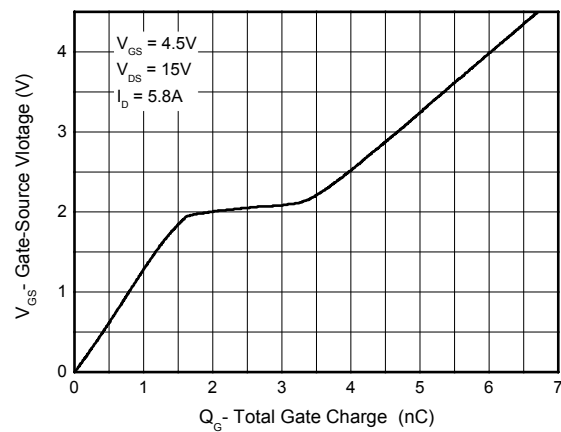


Figure 4. Gate Charge Waveform

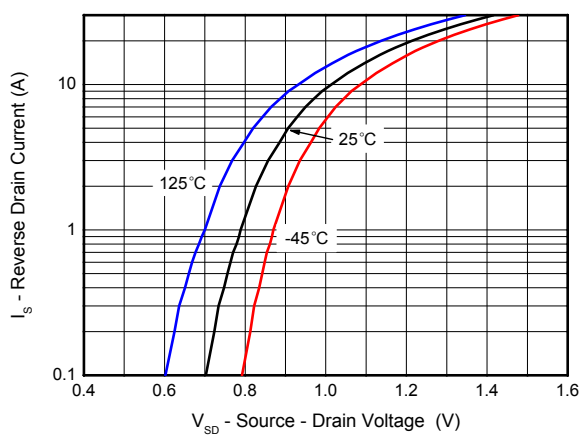


Figure 5. Body-Diode Characteristics

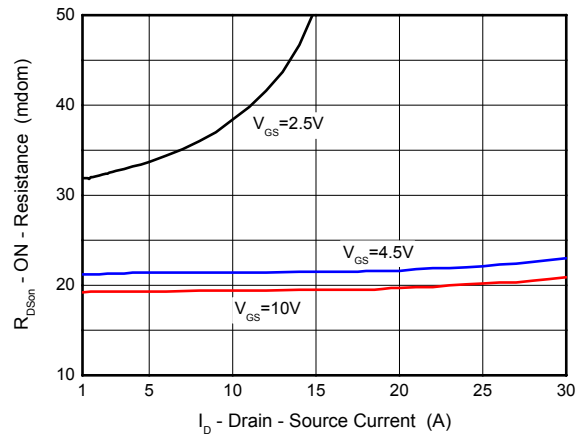


Figure 6.  $R_{ds(on)}$ -Drain Current

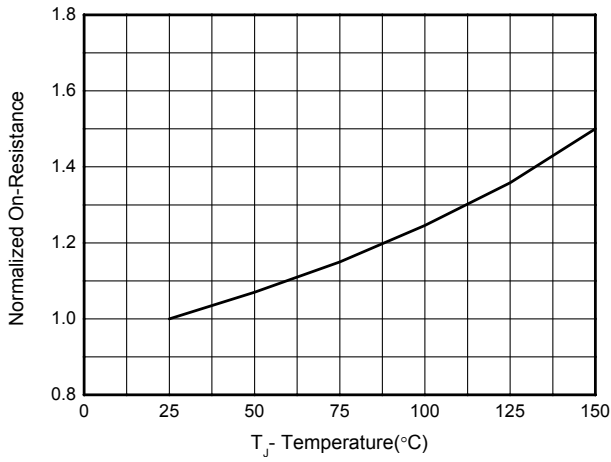


Figure 7. Rdson-Junction Temperature(°C)

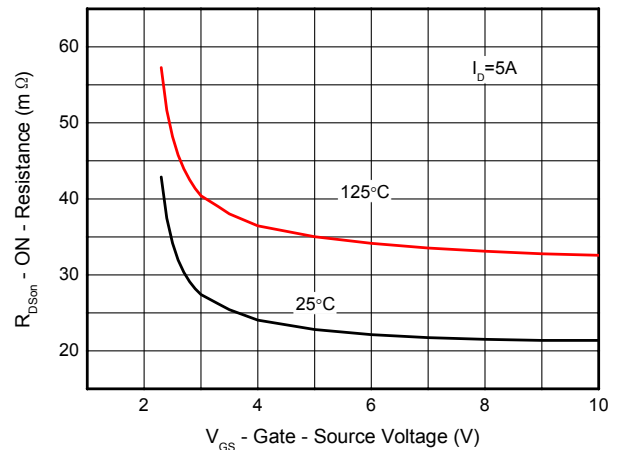


Figure 8: On-Resistance vs. Gate-Source

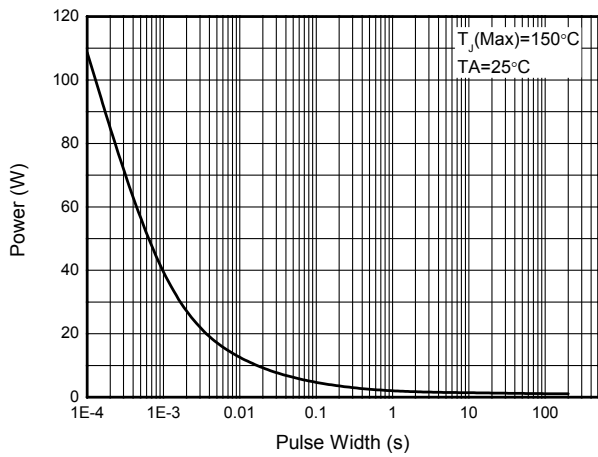


Figure 9: Single Pulse Power Rating Junction-to-Ambient (Note E)

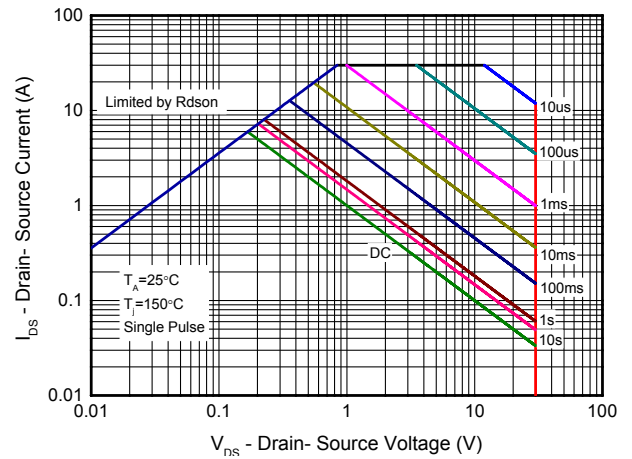
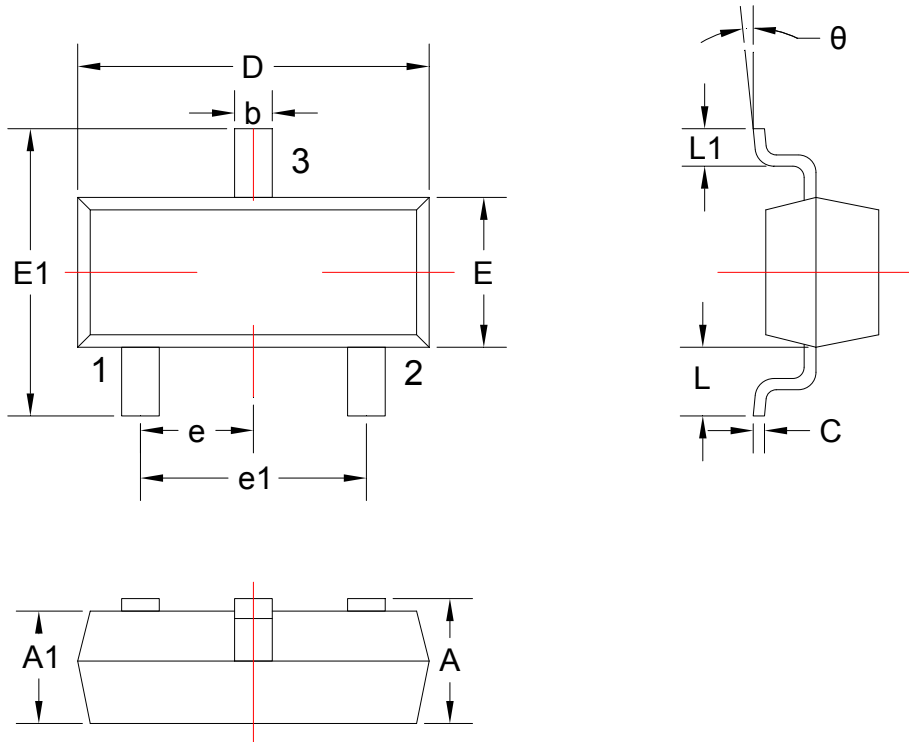
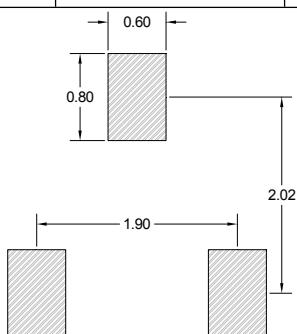


Figure 10. Maximum Safe Operation Area

**8. Dimension and Patterns (SOT-23)**



Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	0.900	1.150	E1	2.250	2.550
A1	0.900	1.050	e	0.950TYP	
b	0.300	0.500	e1	1.800	2.000
c	0.080	0.150	L	0.550REF	
D	2.800	3.00	L1	0.300	0.500
E	1.200	1.400	$\theta$	0°	8°



**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference only
4. Unit: mm

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