

DESCRIPTION

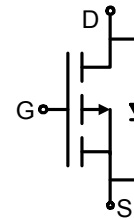
The SSF2305 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 0.5V. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

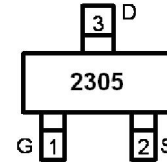
- $V_{DS} = -20V, I_D = -3A$
 $R_{DS(ON)} < 114m\Omega @ V_{GS} = -2.5V$
 $R_{DS(ON)} < 89m\Omega @ V_{GS} = -4.5V$
- High Power and current handling capability
- Lead free product
- Surface Mount Package

APPLICATIONS

- PWM applications
- Load switch
- Power management



Schematic Diagram



Marking and Pin Assignment



SOT23 Top View

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape Width	Quantity
2305	SSF2305	SOT23	-	-	-

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D(25^\circ\text{C})$	-3	A
	$I_D(70^\circ\text{C})$	-1.8	A
	I_{DM}	-10	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	$^\circ\text{C/W}$
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ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.5		-1	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-3A		62	89	mΩ
		V _{GS} =-2.5V, I _D =-2A		88	114	
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-3A		7		S

DYNAMIC CHARACTERISTICS (Note4)

Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, F=1.0MHz		1160		PF
Output Capacitance	C _{oss}			210		PF
Reverse Transfer Capacitance	C _{rss}			125		PF

SWITCHING CHARACTERISTICS (Note 4)

Turn-on Delay Time	t _{d(on)}	V _{DD} =-10V, I _D =-3A V _{GS} =-4.5V, R _{GEN} =3Ω		13.6	27.2	nS
Turn-on Rise Time	t _r			8.6	17.2	nS
Turn-Off Delay Time	t _{d(off)}			73.6	147.2	nS
Turn-Off Fall Time	t _f			34.6	69.2	nS
Total Gate Charge	Q _g	V _{DS} =-10V, I _D =-3A, V _{GS} =-4.5V		9.6	12.7	nC
Gate-Source Charge	Q _{gs}			1.1		nC
Gate-Drain Charge	Q _{gd}			2.6		nC

DRAIN-SOURCE DIODE CHARACTERISTICS

Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-1A			-1.2	V
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NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in² FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

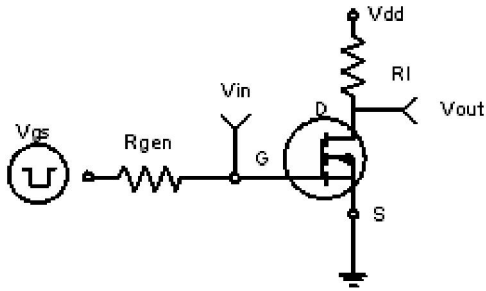


Figure 1: Switching Test Circuit

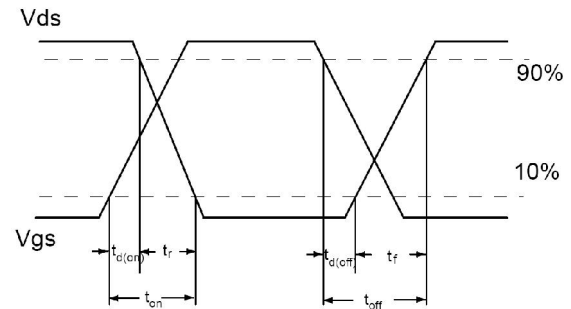


Figure 2: Switching Waveforms

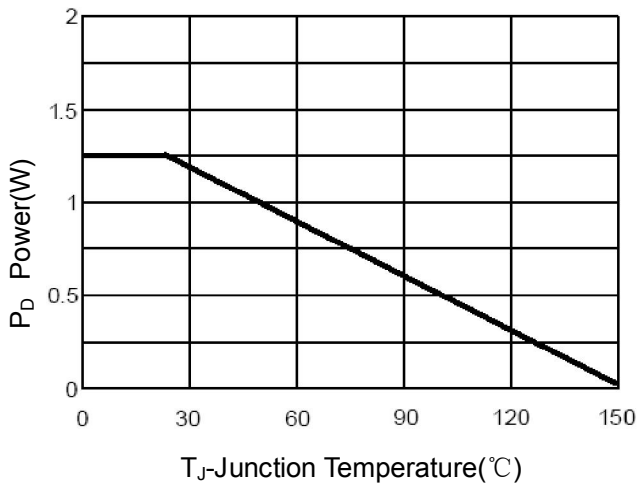


Figure 3 Power Dissipation

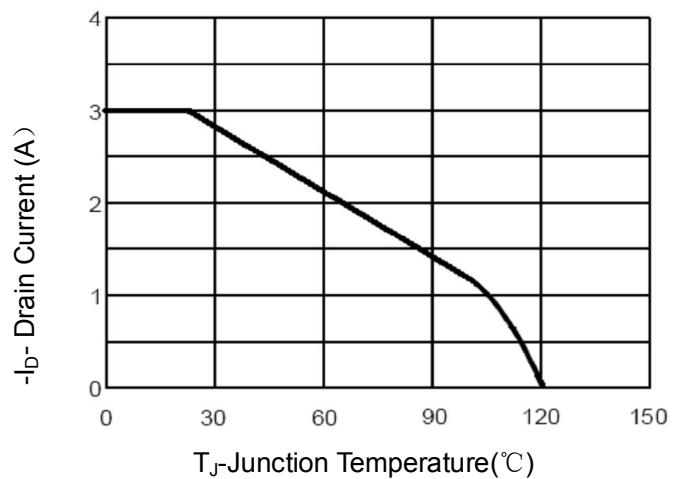


Figure 4 Drain Current

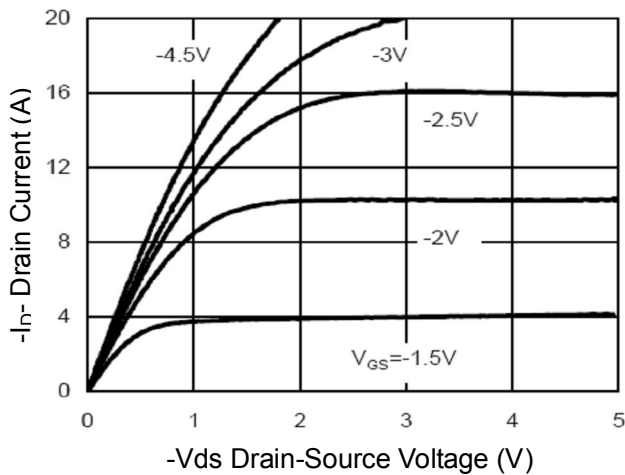


Figure 5 Output CHARACTERISTICS

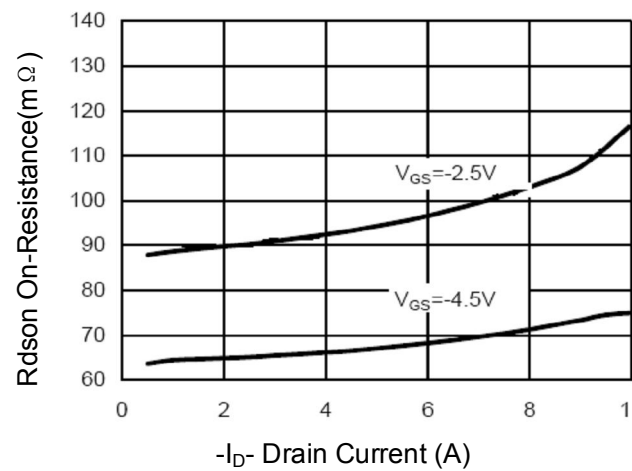


Figure 6 Drain-Source On-Resistance

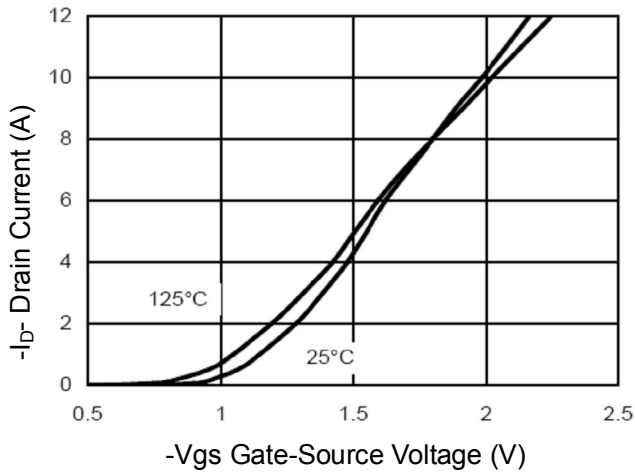


Figure 7 Transfer Characteristics

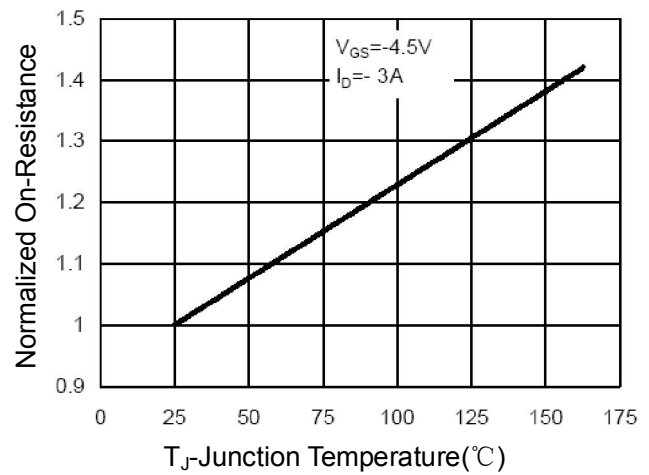


Figure 8 Drain-Source On-Resistance

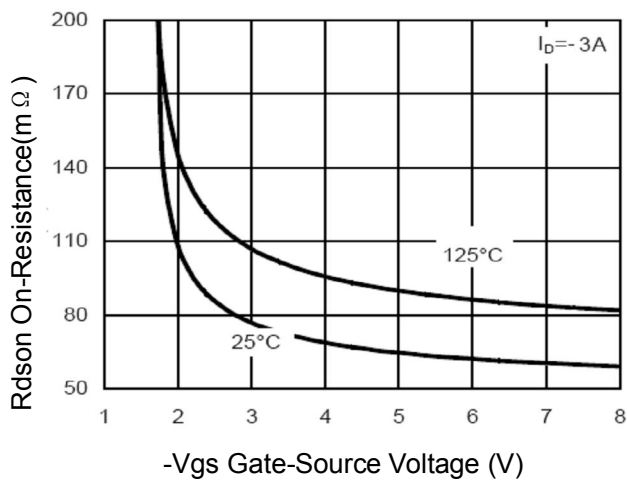


Figure 9 Rdson vs Vgs

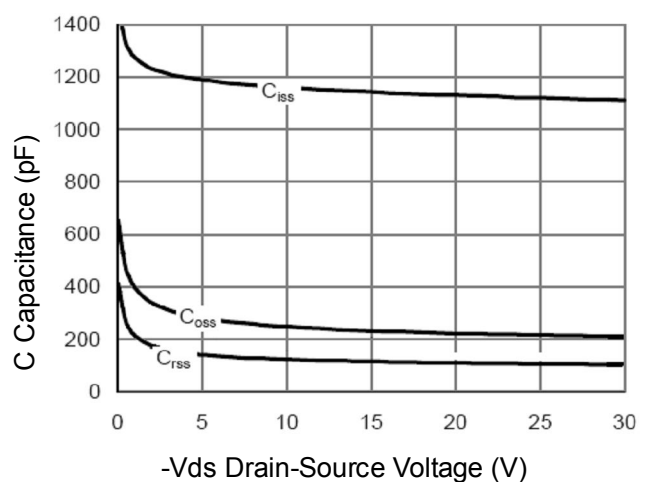


Figure 10 Capacitance vs Vds

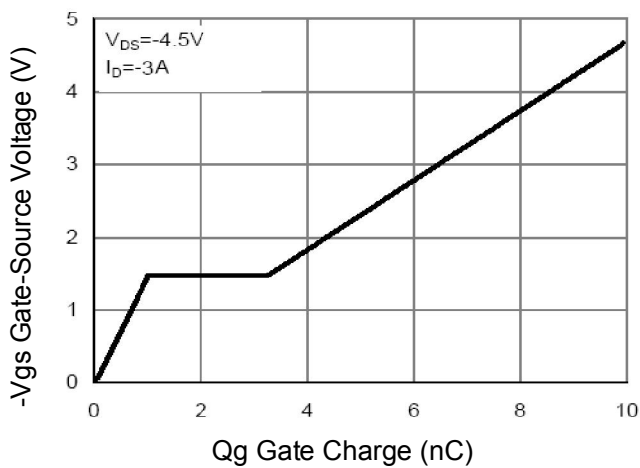


Figure 11 Gate Charge

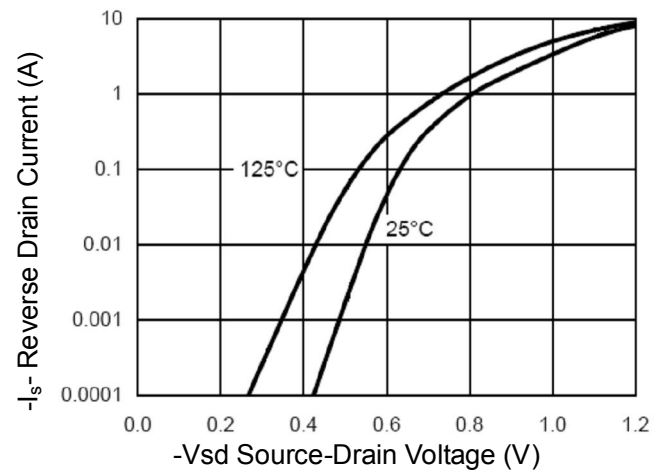


Figure 12 Source- Drain Diode Forward

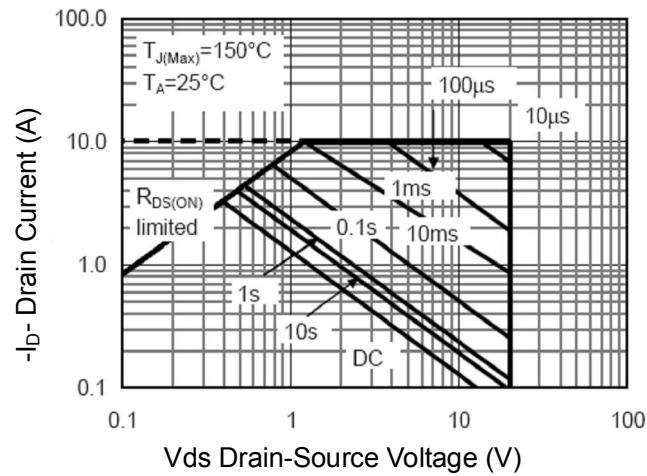


Figure 13 Safe Operation Area

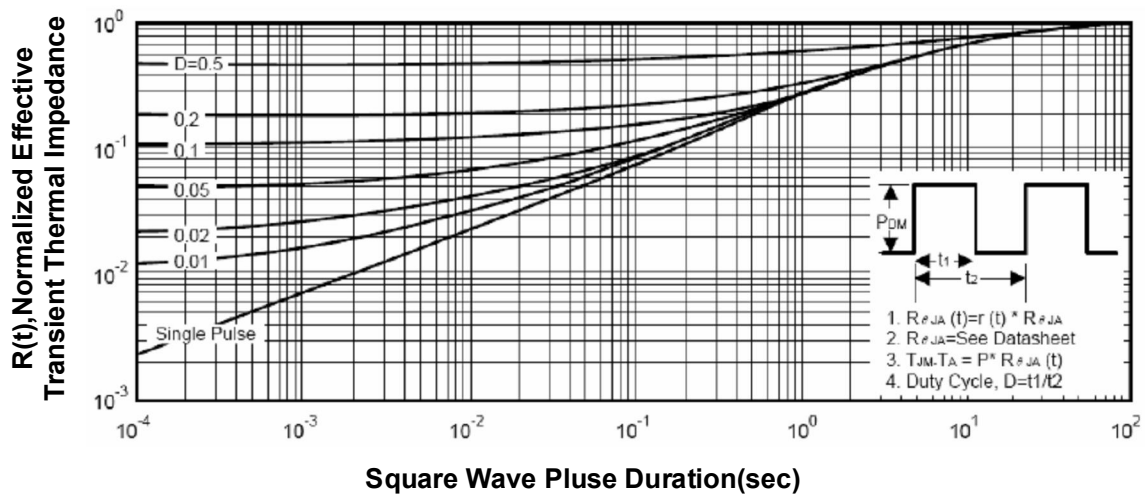
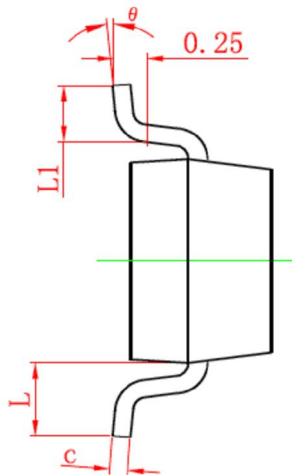
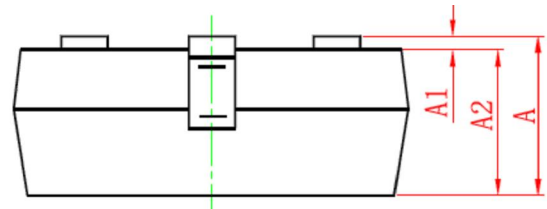
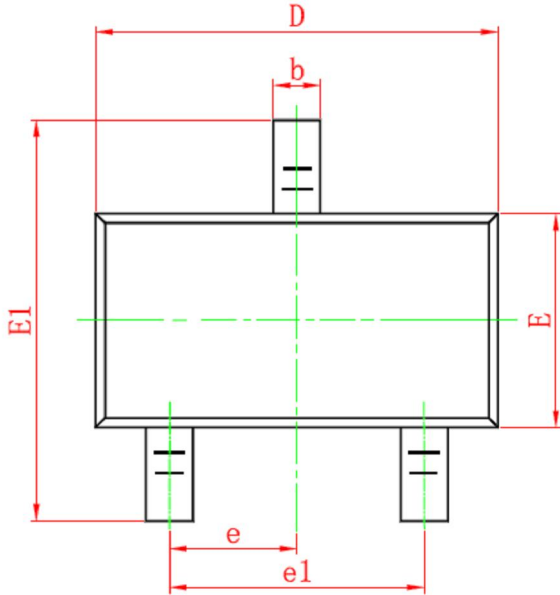


Figure 14 Normalized Maximum Transient Thermal Impedance

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

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