

SOT-23 Plastic-Encapsulate MOSFETS

SI2304

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.055 @ $V_{GS} = 10$ V	2.5
	0.080 @ $V_{GS} = 4.5$ V	2.0

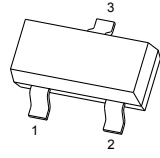
General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter


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2
3

1.GATE
2.SOURCE
3.DRAIN

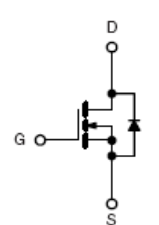
MARKING



A69TF w

*w: week code

Equivalent Circuit



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		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	2.5	A
		$T_A = 70^\circ\text{C}$	2.0	
Pulsed Drain Current ^b	I_{DM}	10		
Continuous Source Current (Diode Conduction) ^a	I_S	1.25		
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	1.25	W
		$T_A = 70^\circ\text{C}$	0.80	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	100	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^c		166	

Notes

- Surface Mounted on FR4 Board, $t \leq 5$ sec.
- Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board.

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SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0		3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}					μA
		$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			1	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 4.5\text{ V}, V_{GS} = 10\text{ V}$	6			A
		$V_{DS} \geq 4.5\text{ V}, V_{GS} = 4.5\text{ V}$	4			
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$			0.055	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 2.0\text{ A}$			0.080	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 4.5\text{ V}, I_D = 2.5\text{ A}$		4.6		S
Diode Forward Voltage	V_{SD}	$I_S = 1.25\text{ A}, V_{GS} = 0\text{ V}$		0.77	1.2	V
Dynamic						
Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 2.5\text{ A}$		2.4	4	nC
Total Gate Charge	Q_{gt}	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$		4.5	10	
Gate-Source Charge	Q_{gs}			0.8		
Gate-Drain Charge	Q_{gd}			1.0		
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		240		pF
Output Capacitance	C_{oss}			110		
Reverse Transfer Capacitance	C_{rss}			17		
Switching						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 15\ \Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_G = 6\ \Omega$		8	20	ns
Rise Time	t_r			12	30	
Turn-Off Delay Time	$t_{d(off)}$			17	35	
Fall-Time	t_f			8	20	

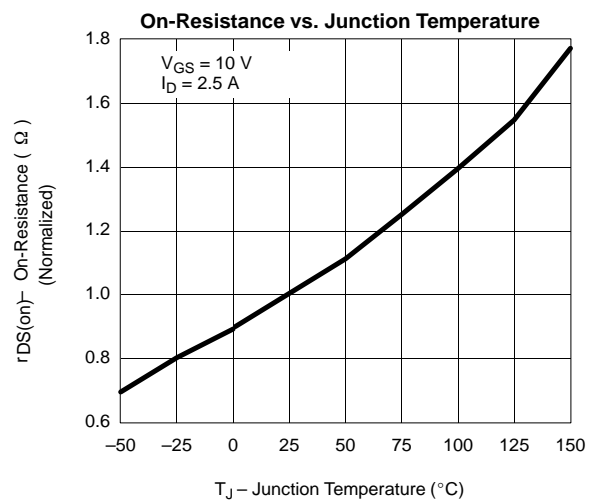
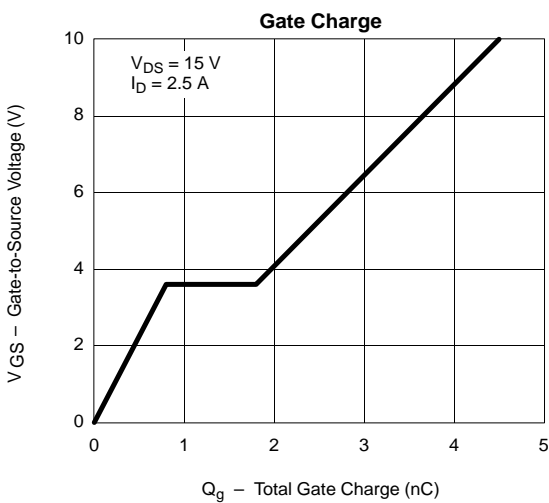
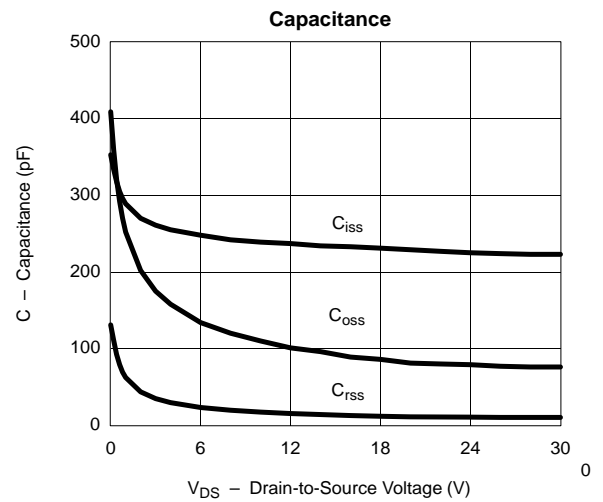
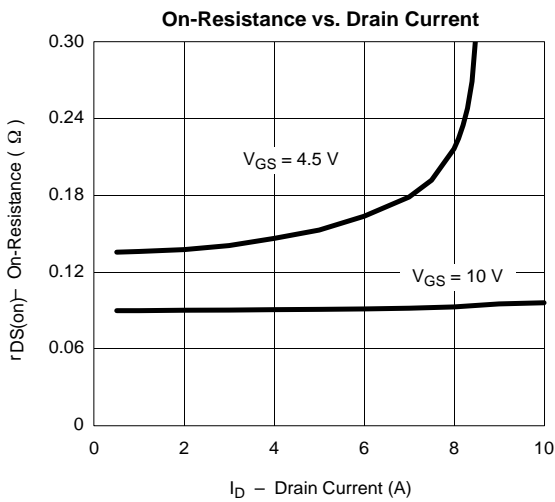
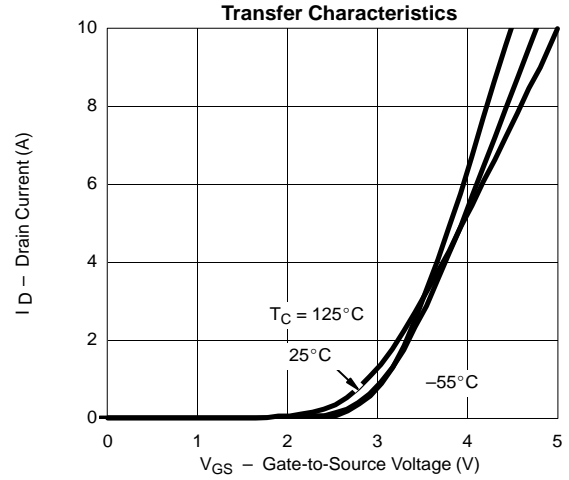
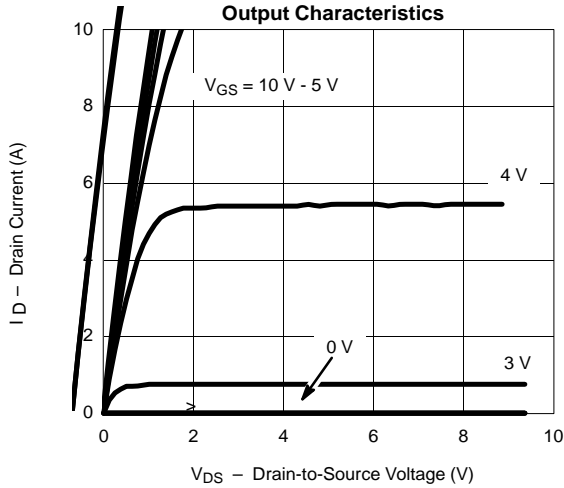
Notes

a. Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.

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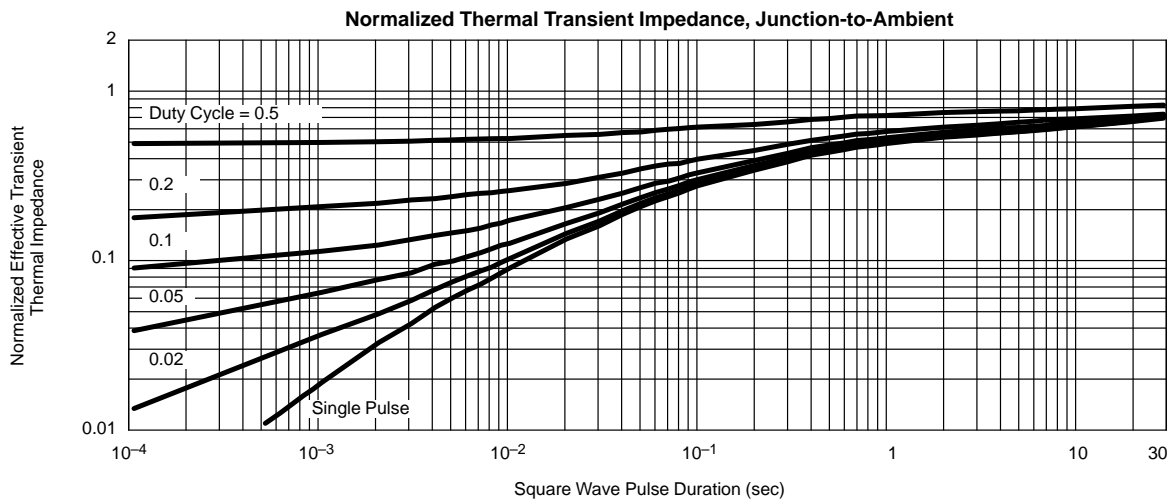
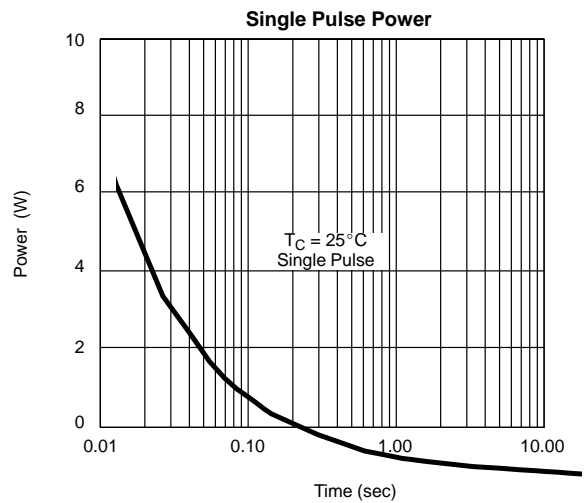
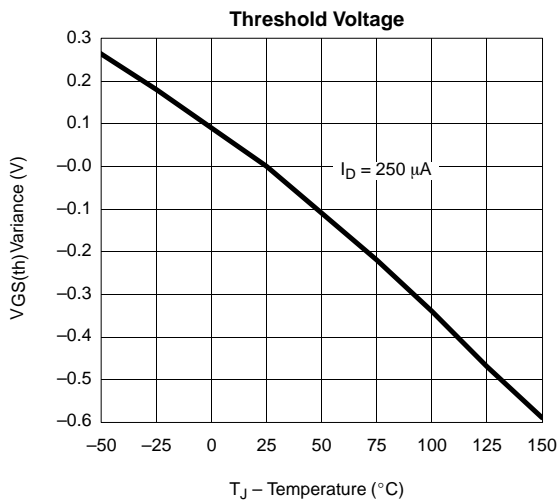
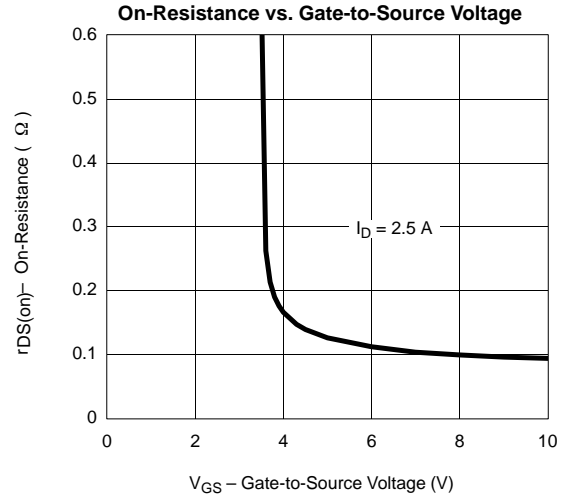
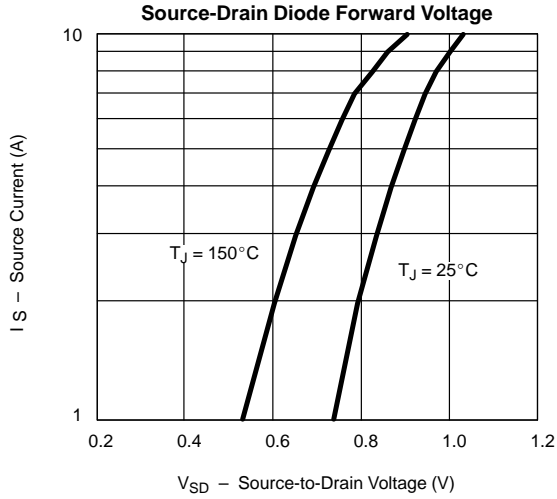
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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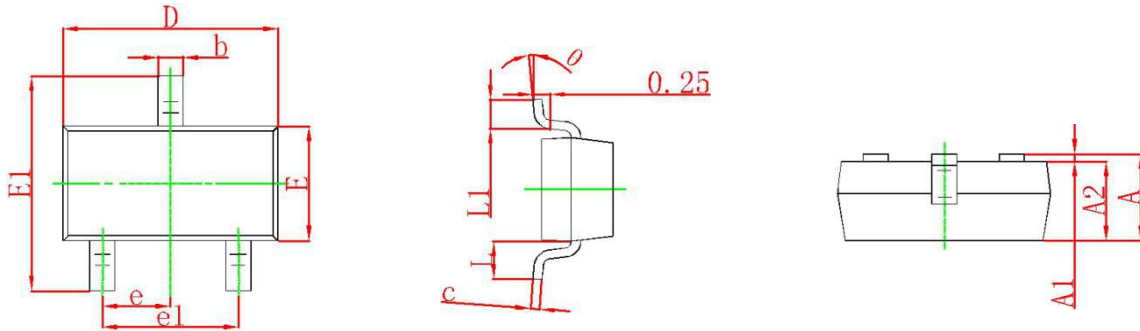
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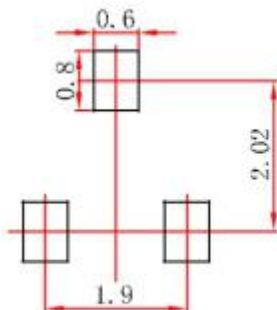
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SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:

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