GOOD-ARK SEMICONDUCTOR

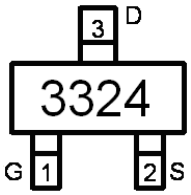
SSF3324

30V N-Channel MOSFET

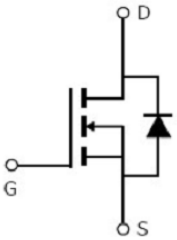
Main Product Characteristics

V_{DSS}	30V
$R_{DS(on)}$	26.5mΩ (typ.)
I_D	5.8A ①

SOT-23



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Ideal for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature
- Lead Free

Description

The SSF3324 utilizes the latest trench processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in power switching applications and a wide variety of other applications.

Absolute Max Ratings (T_A=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	5.8 ①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	4.2 ①	
I_{DM}	Pulsed Drain Current ②	23	
P_D @T_C = 25°C	Power Dissipation	1.4	W
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

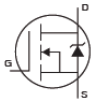
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient (t ≤ 10s) ③	—	90	°C/W

Electrical Characteristics (T_A=25°C unless otherwise specified)

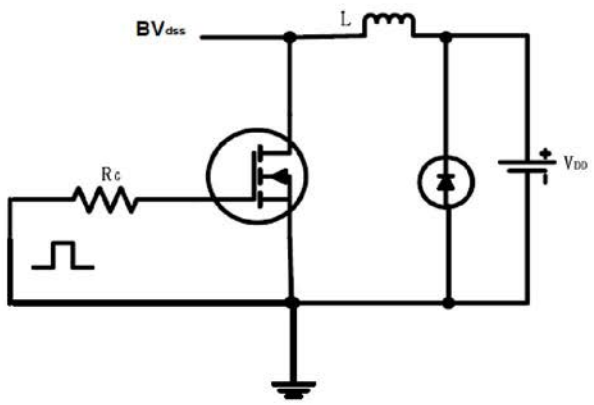
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	V_{GS} = 0V, I_D = 250μA
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	26.5	35	mΩ	V_{GS}=4.5V,I_D = 2A
		—	43.7	—		T_J = 125°C
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	31.1	40	mΩ	V_{GS}=2.5V,I_D=1.5A
		—	50.2	—		T_J = 125°C
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	44.9	50	mΩ	V_{GS}=1.8V,I_D=1A
		—	62.1	—		T_J = 125°C
$V_{GS(th)}$	Gate Threshold Voltage	0.7	—	1.4	V	V_{DS} = V_{GS}, I_D = 250μA
		—	0.63	—		T_J = 125°C
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	V_{DS} = 24V,V_{GS} = 0V
		—	—	50		T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} =12V
		—	—	-100		V_{GS} = -12V
Q_g	Total Gate Charge	—	10	—	nC	I_D = 5.8A,
Q_{gs}	Gate-to-Source Charge	—	2	—		V_{DS}=15V,
Q_{gd}	Gate-to-Drain("Miller") Charge	—	3	—		V_{GS} = 4.5V
$t_{d(on)}$	Turn-on Delay Time	—	3	—	ns	V_{GS}=10V, V_{DS} =15V, R_{GEN}=3Ω,
t_r	Rise Time	—	5	—		
$t_{d(off)}$	Turn-Off Delay Time	—	26	—		
t_f	Fall Time	—	4	—		
C_{iss}	Input Capacitance	—	1245	—	pF	V_{GS} = 0V,
C_{oss}	Output Capacitance	—	85	—		V_{DS} =15V,
C_{rss}	Reverse Transfer Capacitance	—	70	—		f = 1MHz

Source-Drain Ratings and Characteristics

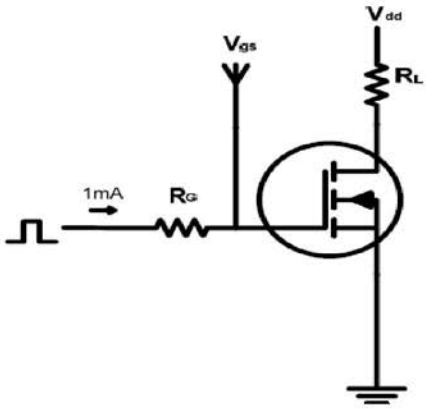
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	5.8 ①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	23	A	
V_{SD}	Diode Forward Voltage	—	0.72	1.2	V	I_S=1A, V_{GS}=0V

Test Circuits and Waveforms

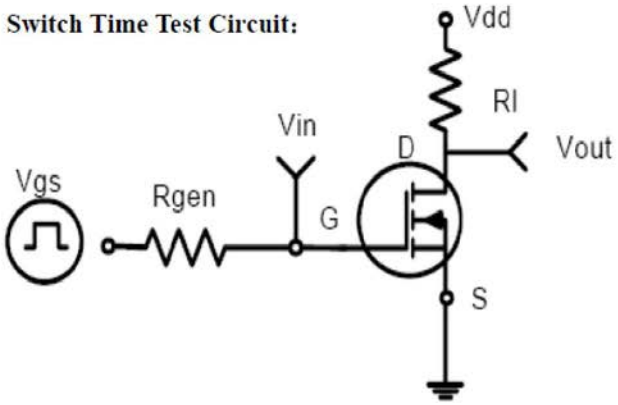
EAS test circuits:



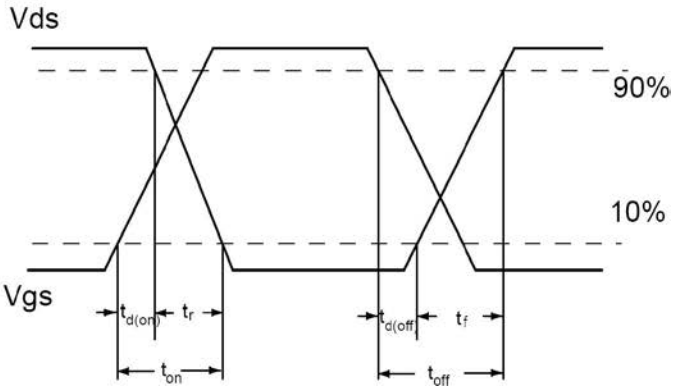
Gate charge test circuit:



Switch Time Test Circuit:



Switching waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max junction temperature.

③The value of $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C

Typical Electrical and Thermal Characteristics

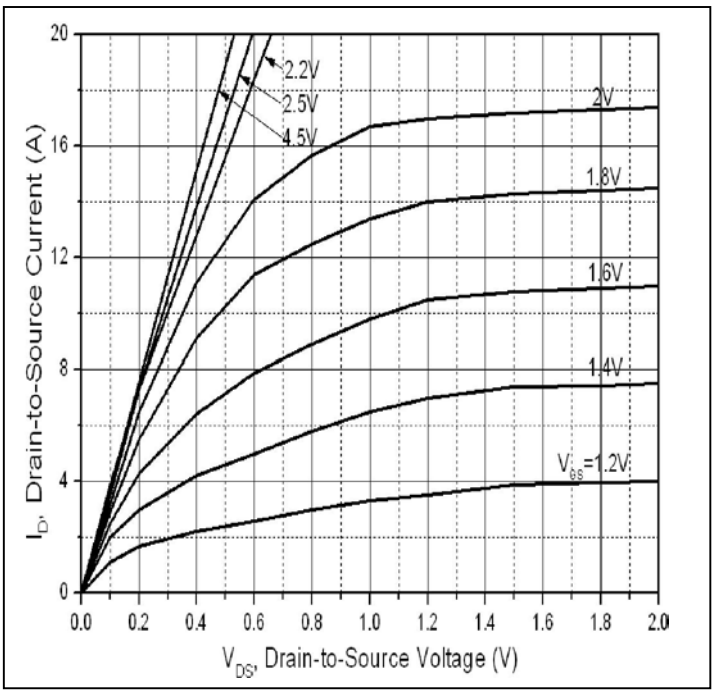


Figure 1. Typical Output Characteristics

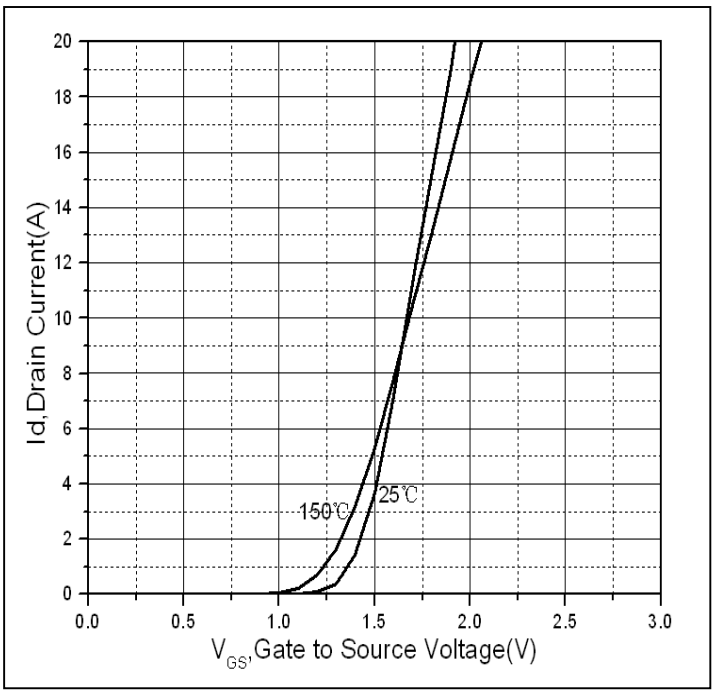


Figure 2. Typical Transfer Characteristics

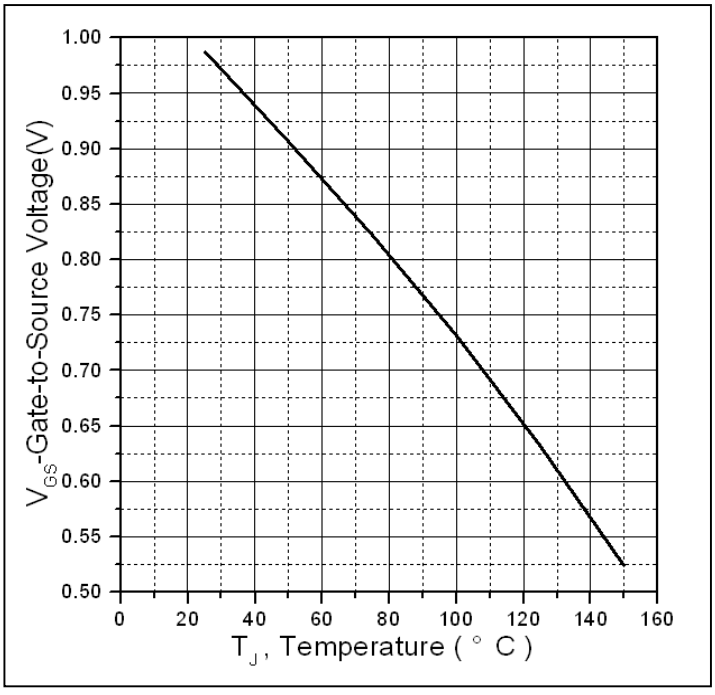


Figure 3. Gate to Source Cut-off Voltage

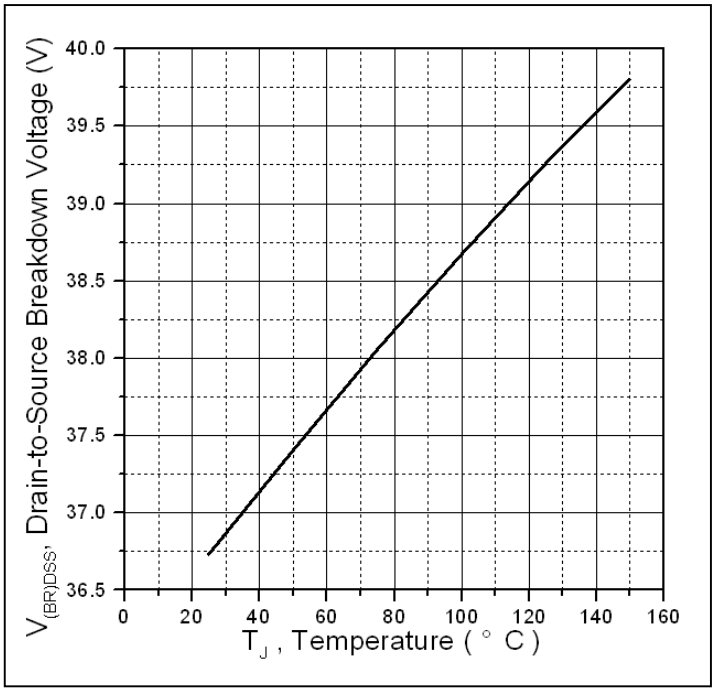


Figure 4. Drain-to-Source Breakdown Voltage vs. Temperature

Typical Electrical and Thermal Characteristics

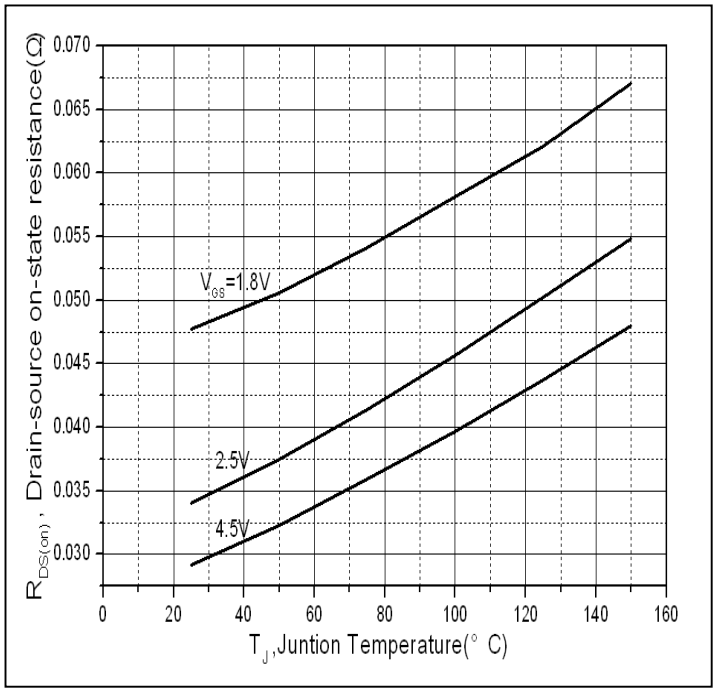


Figure 5. Normalized On-Resistance Vs. Case Temperature

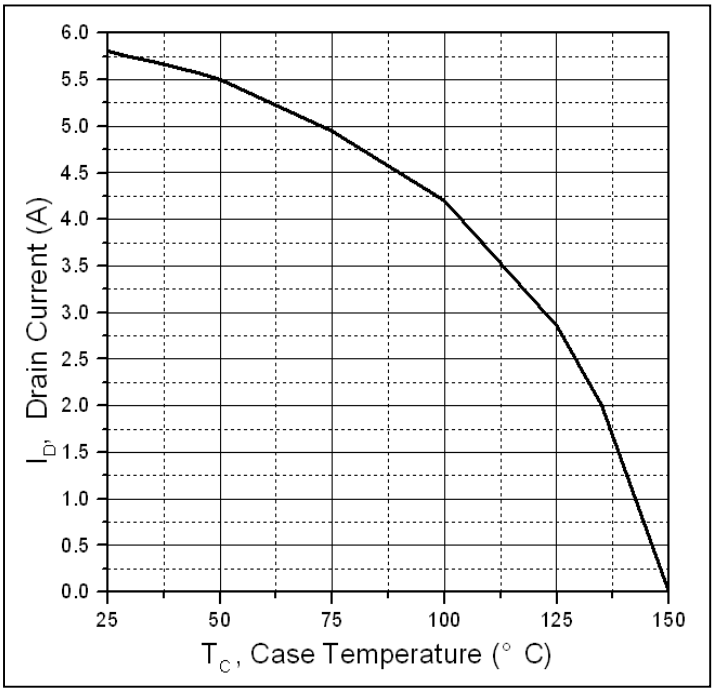


Figure 6. Maximum Drain Current Vs. Case Temperature

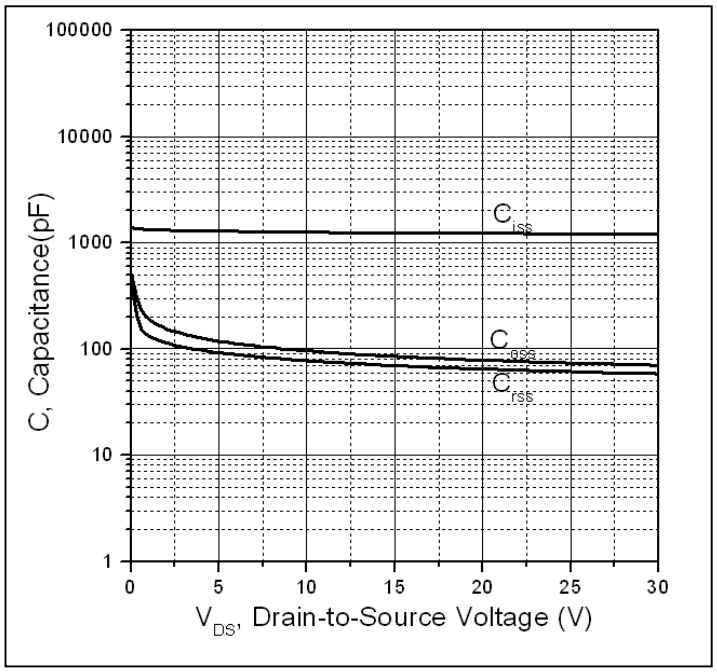


Figure 7. Typical Capacitance Vs. Drain-to-Source Voltage

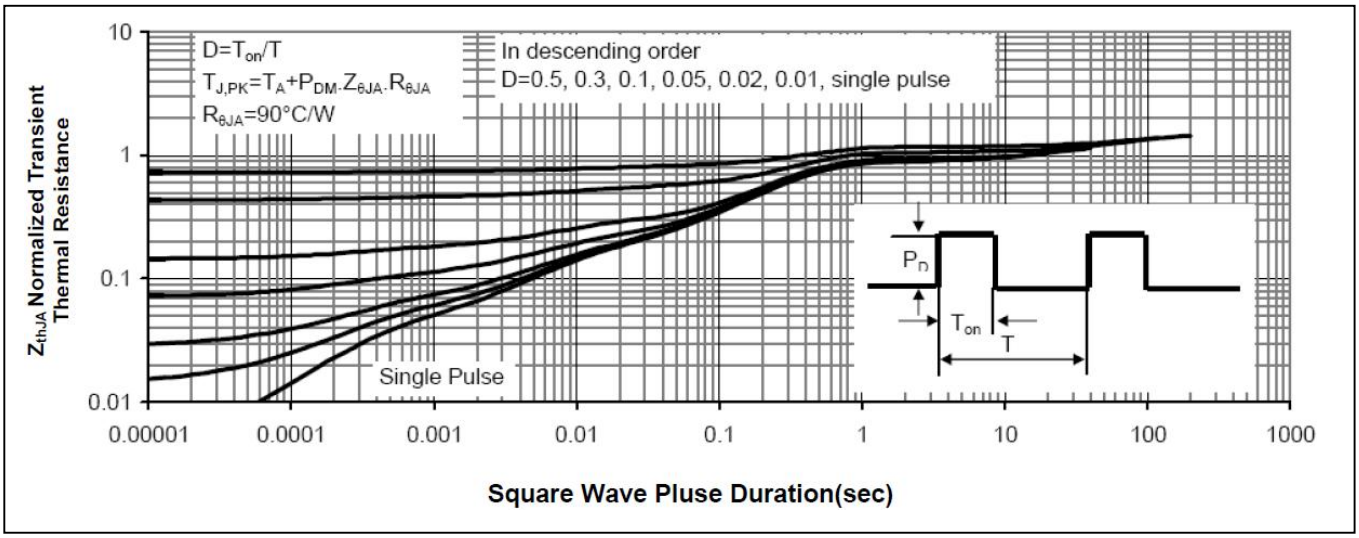
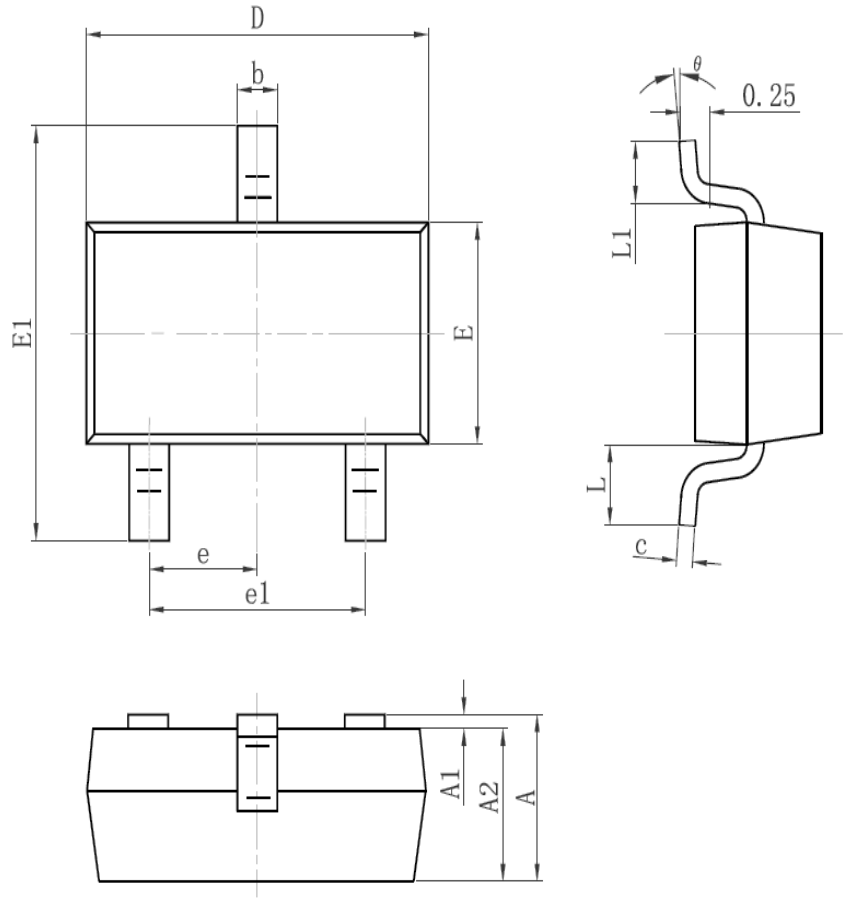


Figure 8. Normalized Maximum Transient Thermal Impedance

Mechanical Data

SOT-23 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters		Dimension 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	0.95TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.55REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0^0	8^0	0^0	8^0

Ordering and Marking Information

Device Marking: 3324

Package (Available)
SOT-23
Operating Temperature Range
C : -55 to 150 °C

Devices per Unit

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-23	3000	10	30000	4	120000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperatue Reverse Bias(HTRB)	T_J=125°C to 150°C @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperatue Gate Bias(HTGB)	T_J=150°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices