优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Product Summary

BV_{DSS}	$R_{DS(ON)}$ MAX	I_D T_A = +25°C
-30V	32mΩ @ V_{GS} = -10V	-5.8A
	50mΩ @ V_{GS} = -4.5V	-4.6A

Description

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC converters
- Power management functions
- Backlighting

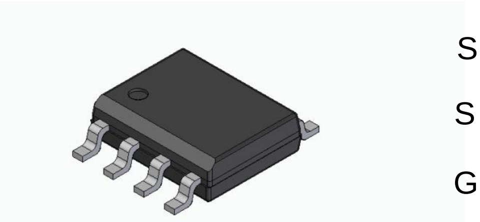
Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

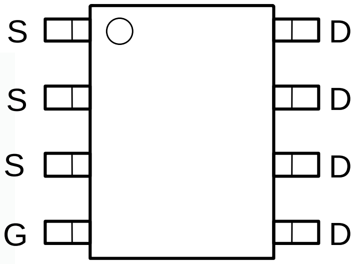
Mechanical Data

- Package: SO-8
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Plated over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram Below
- Weight: 0.072 grams (Approximate)

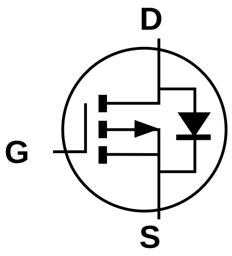
SO-8



Top View



Top View
Pin-Out



Equivalent Circuit

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = -10V	T_A = +25°C T_A = +70°C	I_D	-5.8 -4.6	A
Pulsed Drain Current (10µs Pulse, Duty cycle = 1%)		I_{DM}	-40	A
Avalanche Current (Note 7) L = 0.1mH		I_{AS}	-17	A
Avalanche Energy (Note 7) L = 0.1mH		E_{AS}	15	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.2	W
	T_A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	100	°C/W
	t < 10s		58	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.6	W
	T_A = +70°C		1.0	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	77	°C/W
	t < 10s		45	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	10	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	μA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-2.4	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	19	32	mΩ	V_{GS} = -10V, I_D = -7A
			28	50		V_{GS} = -4.5V, I_D = -5A
Diode Forward Voltage	V_{SD}	—	-0.75	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	931	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	120	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	102	—	pF	
Gate Resistance	R_g	—	23	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -10V)	Q_g	—	19.3	—	nC	V_{DS} = -15V, I_D = -7A
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	9.7	—	nC	V_{DS} = -15V, I_D = -7A
Gate-Source Charge	Q_{gs}	—	2.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	3.6	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.2	—	ns	V_{DS} = -15V, V_{GS} = -10V, R_L = 2.15Ω, R_{GEN} = 3Ω
Turn-On Rise Time	t_R	—	11.5	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	55.8	—	ns	
Turn-Off Fall Time	t_F	—	30.8	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	13.6	—	ns	I_S = -7A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{RR}	—	3.4	—	nC	I_S = -7A, dI/dt = 100A/μs

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

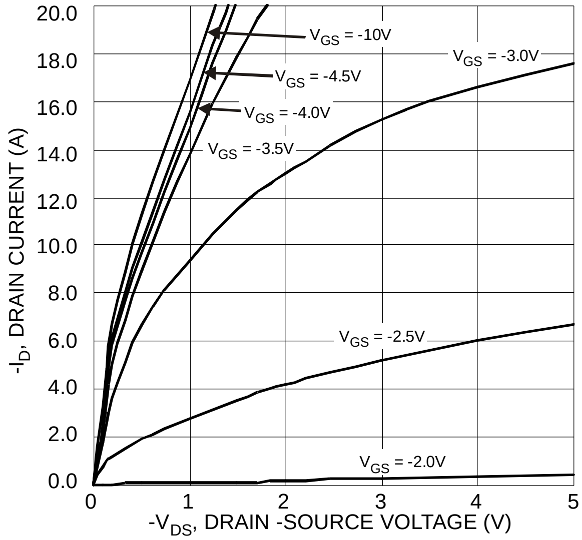


Figure 1 Typical Output Characteristics

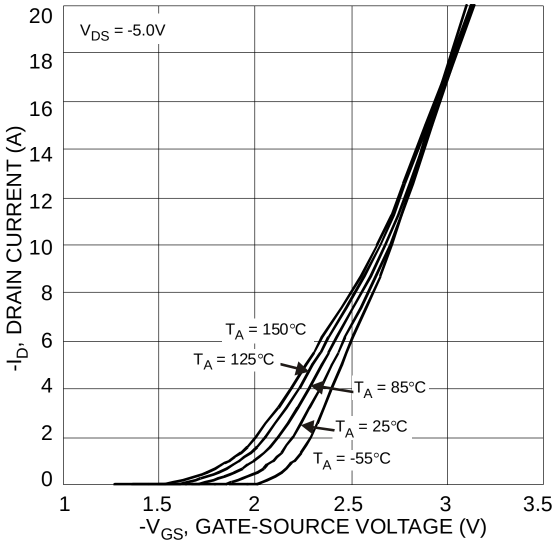


Figure 2 Typical Transfer Characteristics

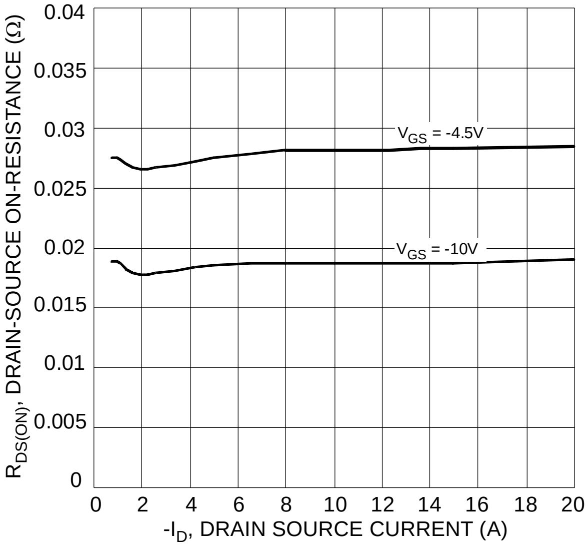


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

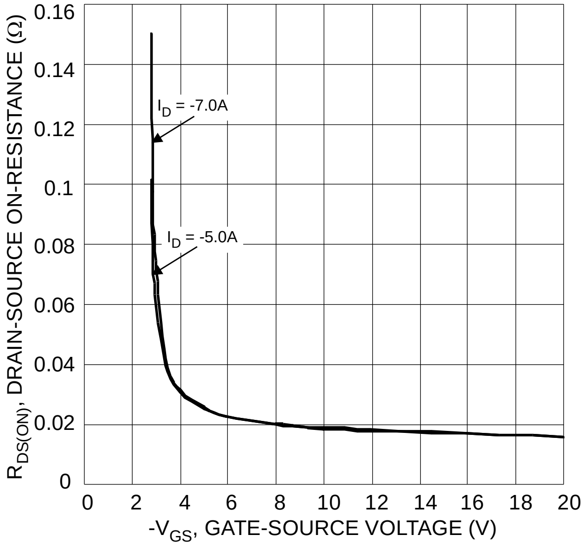


Figure 4 Typical Transfer Characteristics

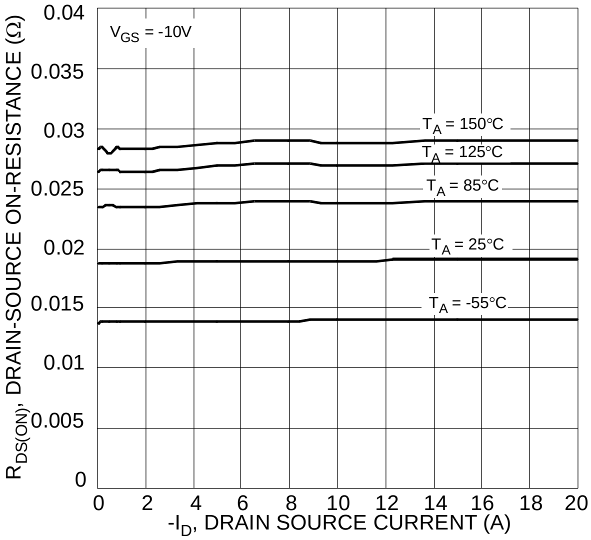


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

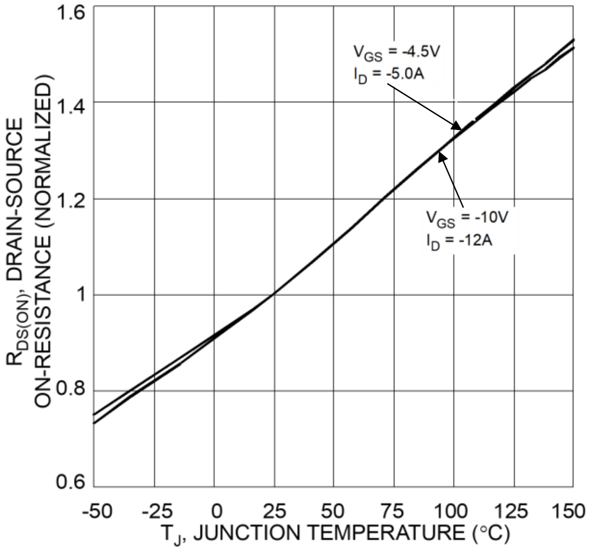


Figure 6 On-Resistance Variation with Temperature

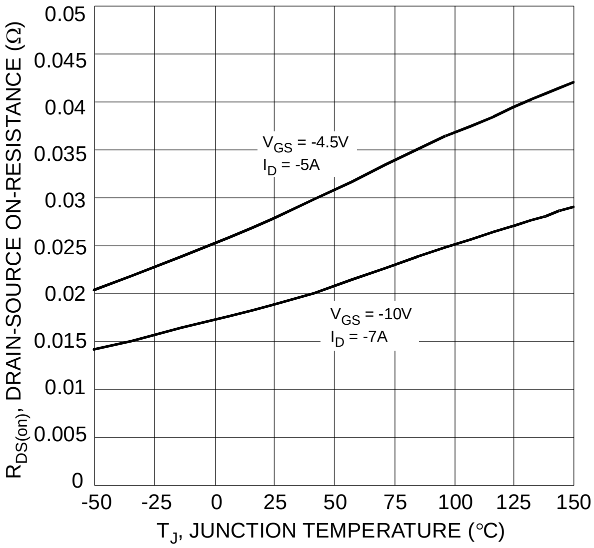


Figure 7 On-Resistance Variation with Temperature

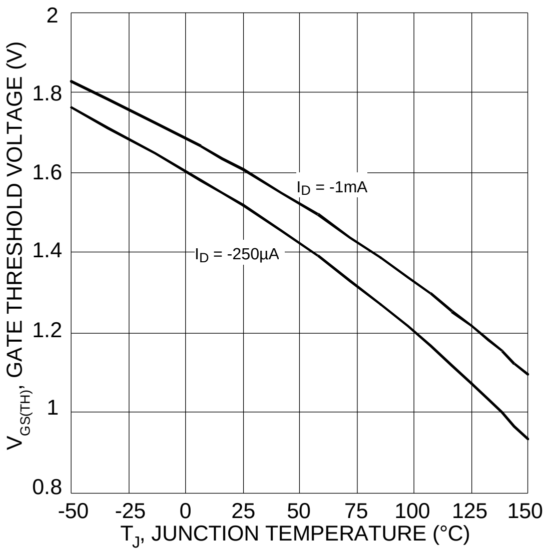


Figure 8 Gate Threshold Variation vs. Junction Temperature

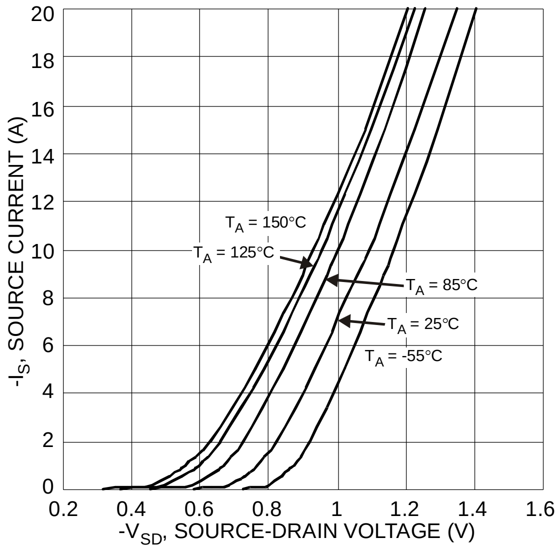


Figure 9 Diode Forward Voltage vs. Current

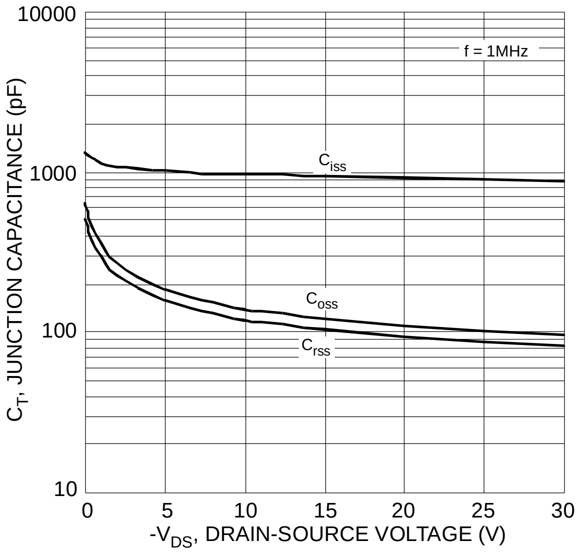


Figure 10 Typical Junction Capacitance

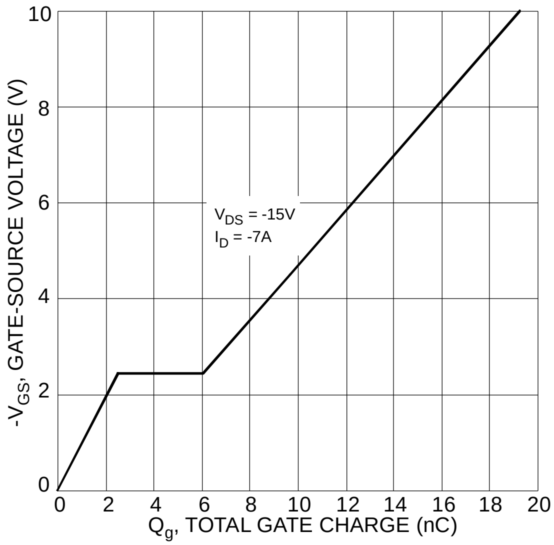


Figure 11 Gate-Charge Characteristics

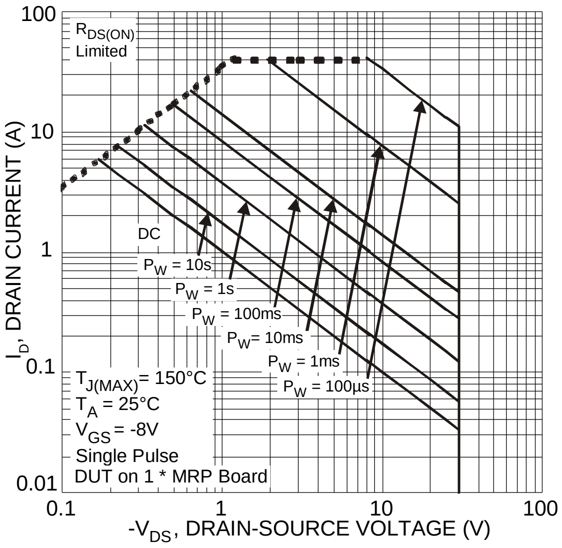


Figure 12 SOA, Safe Operation Area

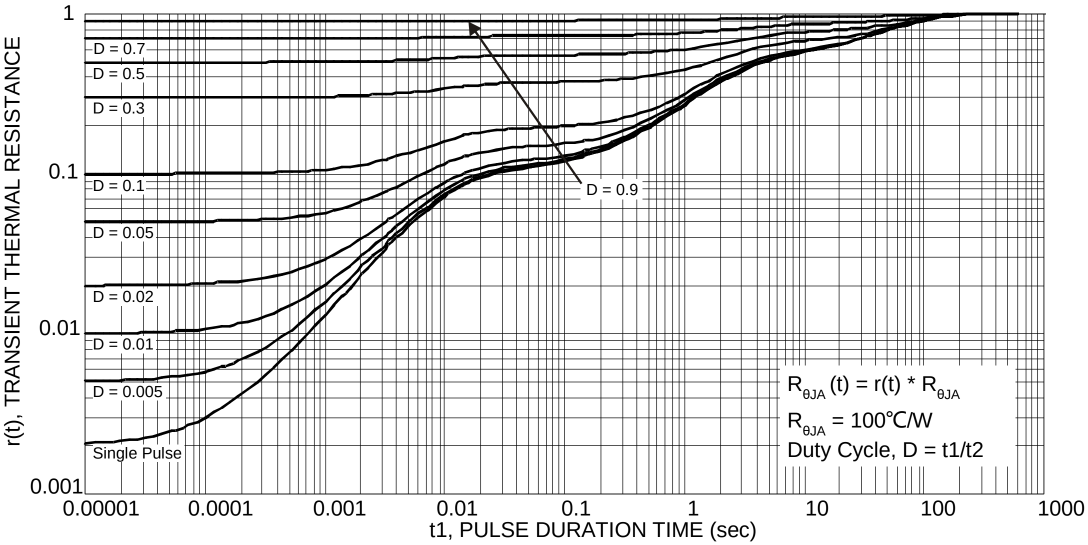
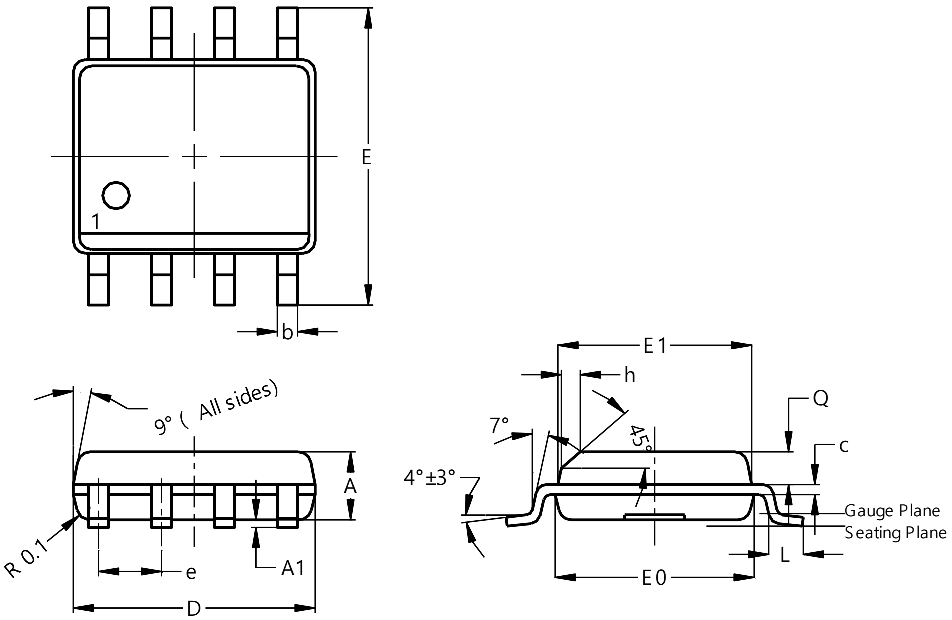


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

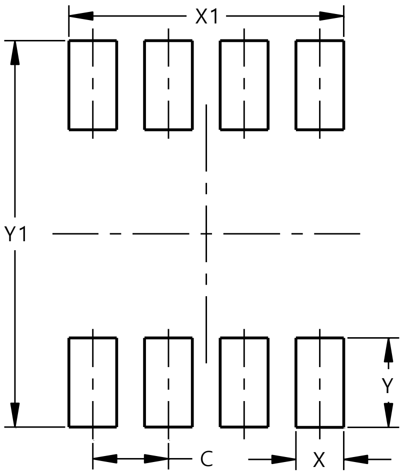
SO-8



SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50