



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}	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
-250V	$14\Omega @ V_{GS} = -10V$	-265mA
	$18\Omega @ V_{GS} = -3.5V$	-235mA

Features and Benefits

- High Voltage
- Low On-resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold

Description and Applications

This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

- Earth recall and dialling switches
- Electronic hook switches
- High voltage power MOSFET drivers
- Telecom call routers
- Solid state relays

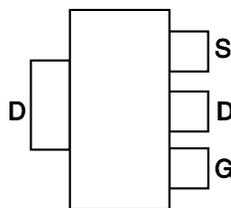
Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish 
- Weight: 0.112 grams (Approximate)

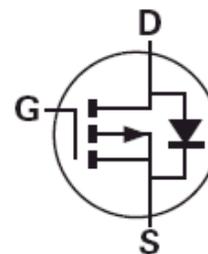
SOT223 (Type DN)



Top View



Pin Out - Top View



Equivalent Circuit

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-250	V
Gate-Source Voltage	V _{GSS}	±40	V
Continuous Drain Current @V _{GS} = 10V; T _A = +25°C (Note 5)	I _D	-265	mA
@V _{GS} = 10V; T _A = +70°C (Note 5)		-212	
Pulsed Drain Current (Note 7)	I _{DM}	-1	A
Continuous Source Current (Body Diode)	I _S	-0.265	A
Pulsed Source Current (Body Diode)	I _{SM}	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation at T _A = +25°C (Note 5)	P _D	2.0	W
Linear Derating Factor		16	
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	63	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	105	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-250	—	—	V	V _{GS} = 0V, I _D = -1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-500	nA	V _{DS} = -250V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±40V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	-0.8	-1.5	-2.0	V	V _{DS} = V _{GS} , I _D = -1mA
Static Drain-Source On-Resistance (Note 8)	R _{DS(ON)}	—	10	14	Ω	V _{GS} = -10V, I _D = -200mA
		—	13	18	Ω	V _{GS} = -3.5V, I _D = -100mA
Forward Transconductance (Note 10)	g _{fs}	80	200	—	mS	V _{DS} = -10V, I _D = -0.15A
Diode Forward Voltage (Note 8)	V _{SD}	—	—	0.97	V	I _S = -200mA, V _{GS} = 0V, T _J = +25°C
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 10)	C _{iss}	—	82	—	pF	V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance (Note 10)	C _{oss}	—	16	—	pF	
Reverse Transfer Capacitance (Note 10)	C _{rss}	—	5	—	pF	
Total Gate Charge (Notes 9 & 10)	Q _g	—	3	—	nC	V _{GS} = -10V, V _{DS} = -25V I _D = -200mA
Gate-Source Charge (Notes 9 & 10)	Q _{gs}	—	0.3	—	nC	
Gate-Drain Charge (Notes 9 & 10)	Q _{gd}	—	0.5	—	nC	
Turn-On Delay Time (Notes 9 & 10)	t _{D(ON)}	—	1.5	—	ns	V _{DD} = -30V, I _D = -200mA, V _{GS} = -10V, R _G = 50Ω
Turn-On Rise Time (Notes 9 & 10)	t _r	—	4.2	—	ns	
Turn-Off Delay Time (Notes 9 & 10)	t _{D(OFF)}	—	27	—	ns	
Turn-Off Fall Time (Notes 9 & 10)	t _f	—	10	—	ns	
Reverse Recovery Time (Note 10)	t _{RR}	—	80	—	ns	I _F = -1A, di/dt = 100A/μs, T _J = +25°C
Reverse Recovery Charge (Note 10)	Q _{RR}	—	230	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300μs - pulse width limited by maximum junction temperature.
 - Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
 - Switching characteristics are independent of operating junction temperature.
 - For design aid only, not subject to production testing.

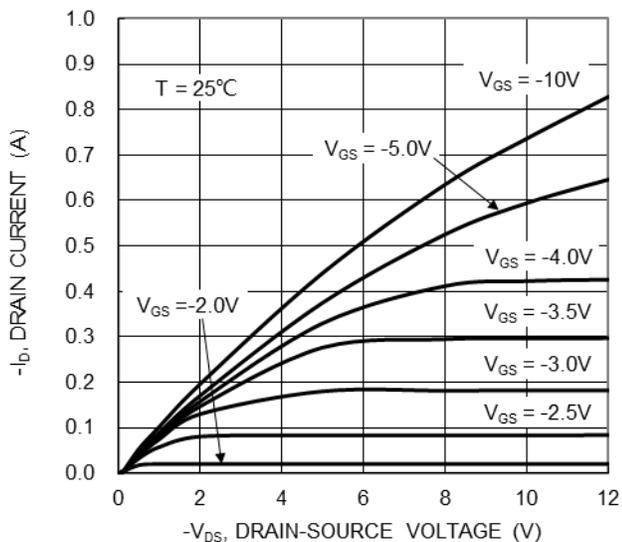


Figure 1. Typical Output Characteristic

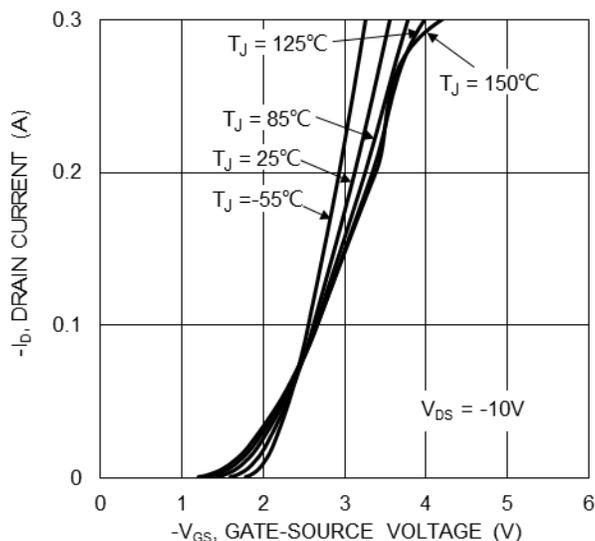


Figure 2. Typical Transfer Characteristic

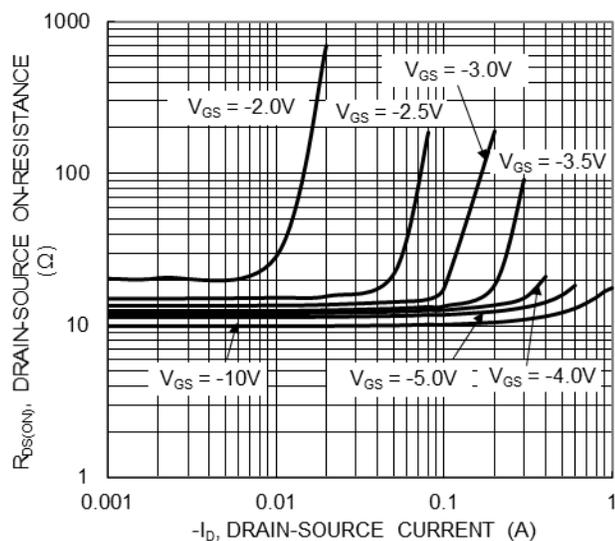


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

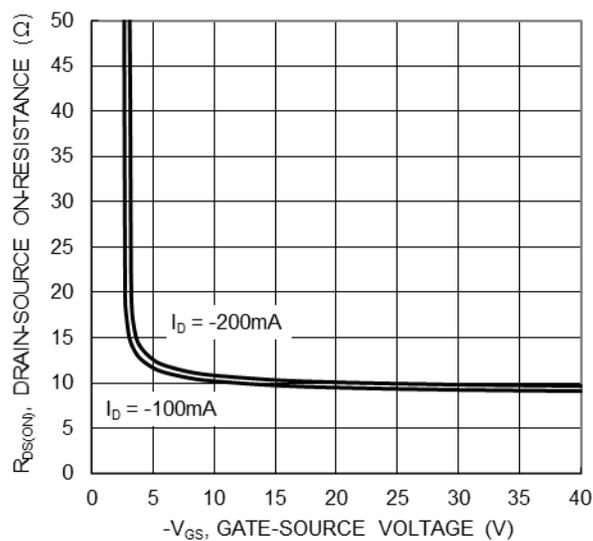


Figure 4. Typical Transfer Characteristic

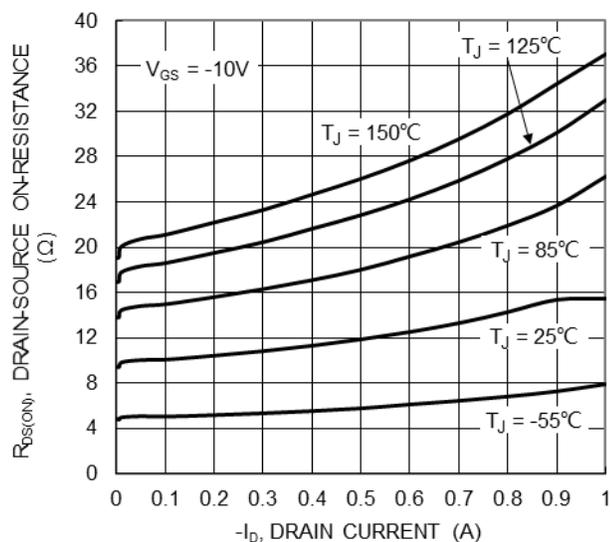


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

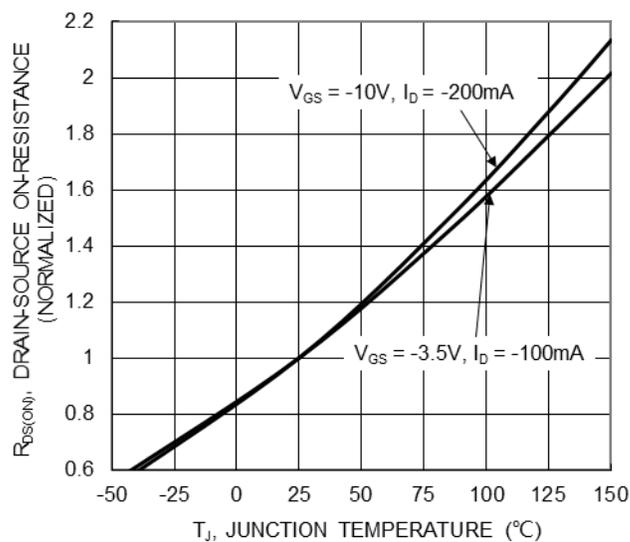
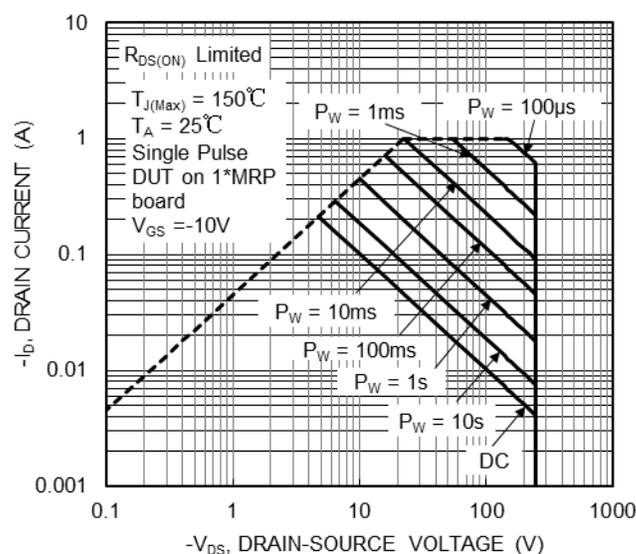
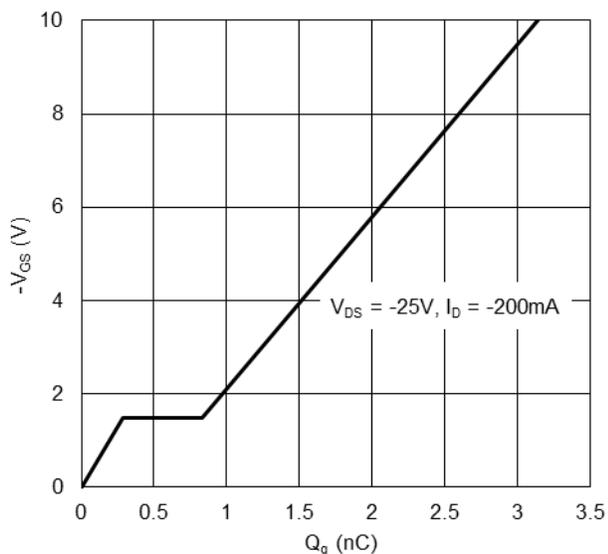
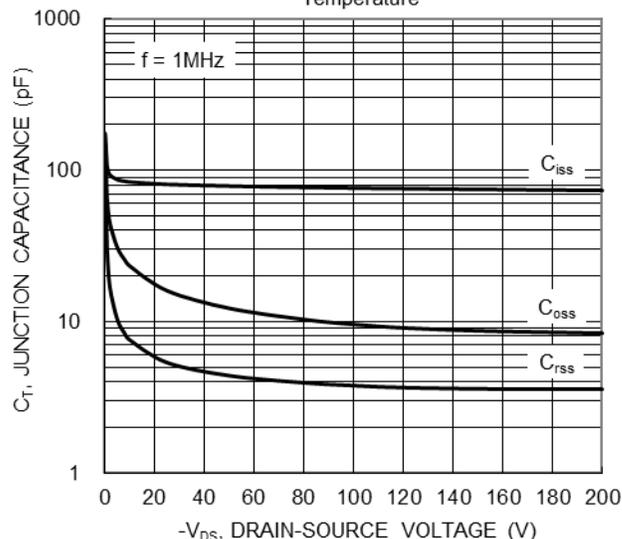
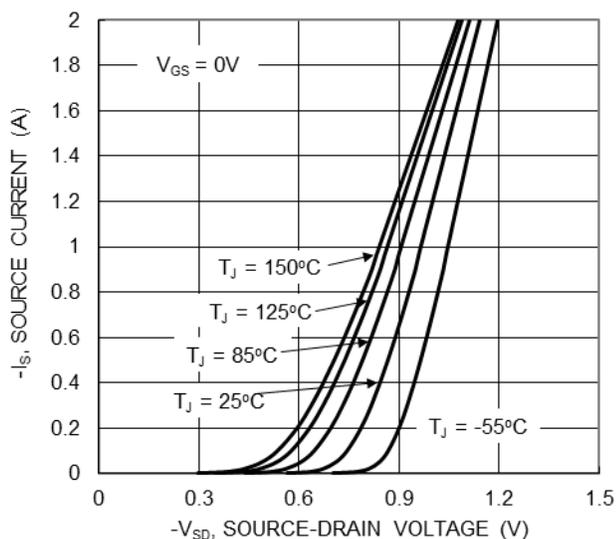
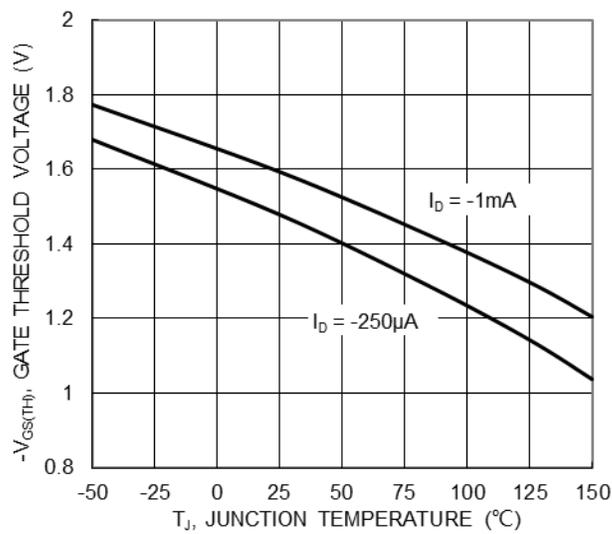
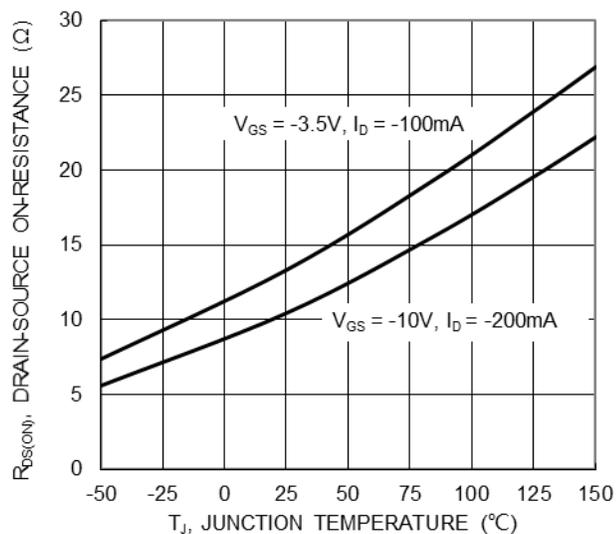


Figure 6. On-Resistance Variation with Temperature



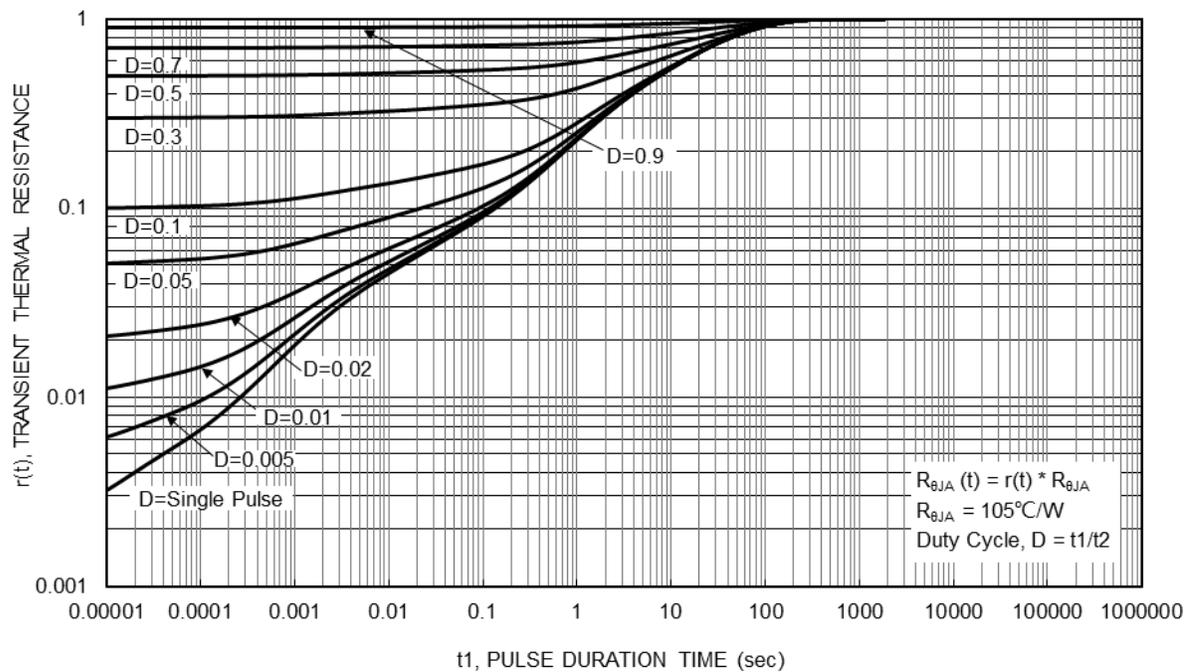
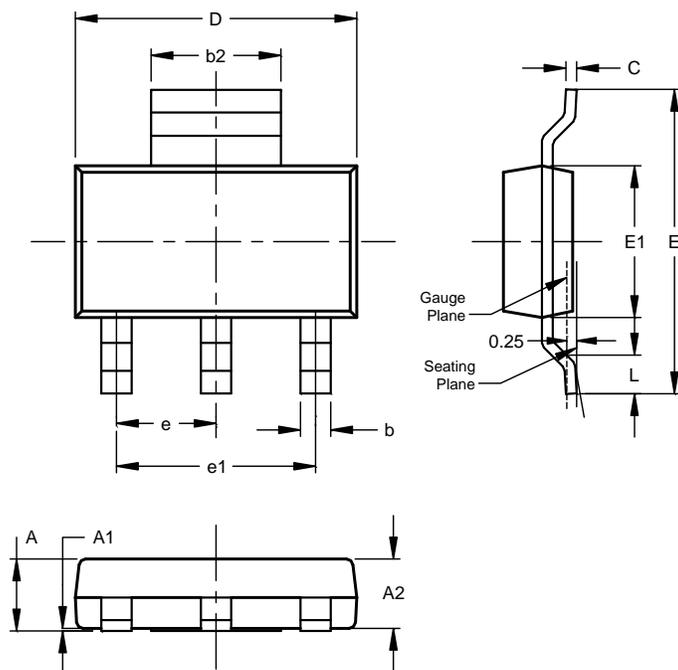


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

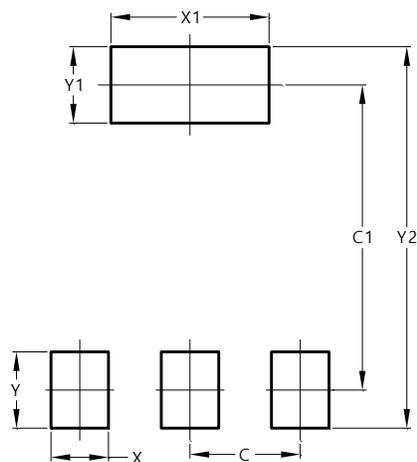
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Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

SOT223 (Type DN)



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00