20V N-Channel Enhancement-Mode MOSFET

General Description

The 8205A integrates two N-Channel EnhancementMOSFET Transistor. It uses advanced trenchtechnology and design to provide excellent$R_{DS(ON)}$with lowgate charge. This device is suitable for using in DC-DC conversion, power switch and chargingcircuit.Standard Product 8205A is Pb-free andHalogen-free.

Order Information

8205A □ □ □

- F: Pb-Free
- Package Type:
  - B6: SOT23-6
  - TS: TSSOP-8

Marking Information

Device	Marking	Package	Shipping
8205AB6F		SOT23-6	
8205ATSF		TSSOP-8	

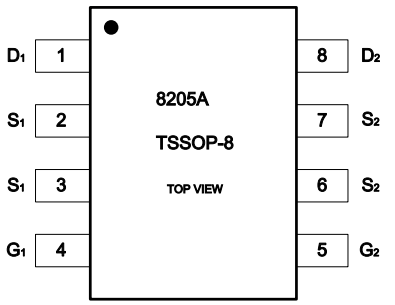
Features

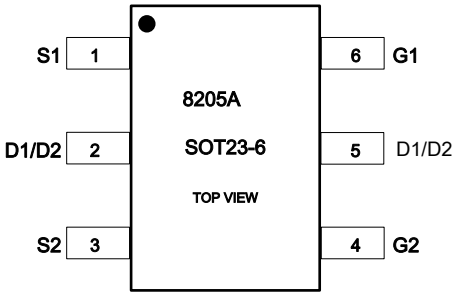
- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trenchtechnology

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Pin Configurations





Absolute Maximum Ratings

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current	TA=25℃	I_D	4.5	A
	TA=70℃		4	
Pulsed Drain Current		I_{DM}	38	
Power Dissipation	TA=25℃	P_D	2	W
	TA=70℃		1.28	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal resistance ratings

Parameter		Symbol	TYP	Unit
Junction-to-Case Thermal Resistance	t ≤ 10s	$R_{\theta JA}$	48	℃/W
Junction-to-Case Thermal Resistance	Steady State		74	℃/W
Maximum Junction-to-Lead	Steady State	$R_{\theta JL}$	32	℃/W

Electrical Characteristics

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V, V_{GS}=0V			1	μA
		T_J=55℃			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=12V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.4	0.75	1.1	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	38			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V,		28	32	mΩ
		I_D=4.5A T_J=60℃		29	34	
		V_{GS}=4.5V, I_D=4A		26	29	
		V_{GS}=4V, I_D=4A		26	30	
		V_{GS}=2.5V, I_D=3A		34	38	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=5A		25		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz	420	525	630	pF
C_{oss}	Output Capacitance		65	95	125	pF
C_{rss}	Reverse Transfer Capacitance		45	75	105	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.8	1.7	2.6	Ω
SWITCHING PARAMETERS						
Q_g (10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=4.5A		12.5		nC
Q_g(4.5V)	Total Gate Charge			6		nC
Q_{gs}	Gate Source Charge			1		nC
Q_{gd}	Gate Drain Charge			2		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=20V, R_L= 2Ω, R_{GEN}=3Ω		3		ns
t_r	Turn-On Rise Time			7.5		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
tf	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=4.5A, dI/dt=100A/μs		14		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=4.5A, dI/dt=100A/μs		6		nC

Typical Characteristics

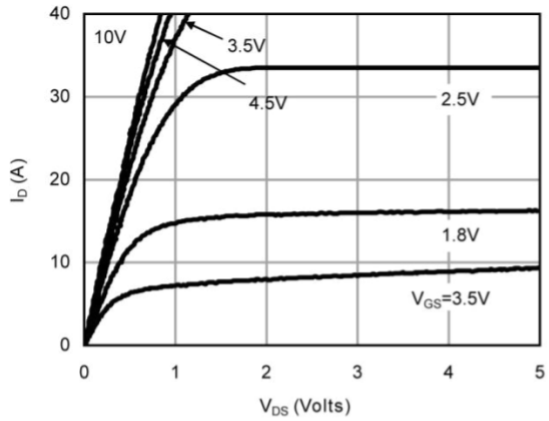


Fig 1: On-Region Characteristics (Note E)

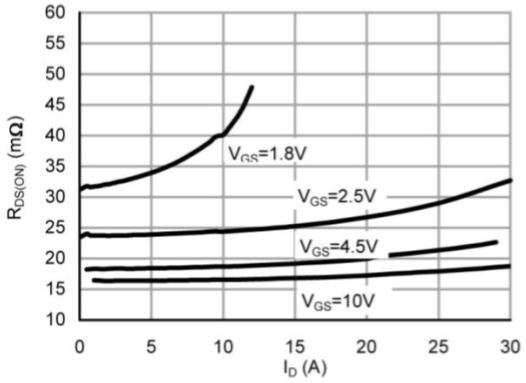


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

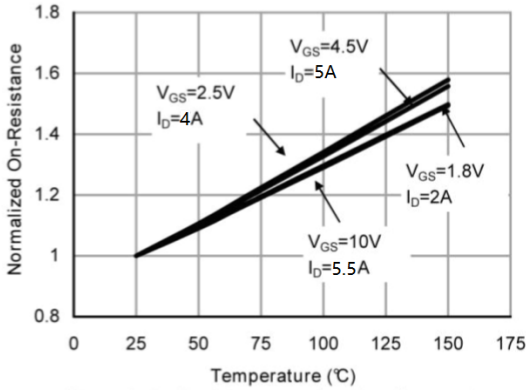


Figure 4: On-Resistance vs. Junction Temperature (Note E)

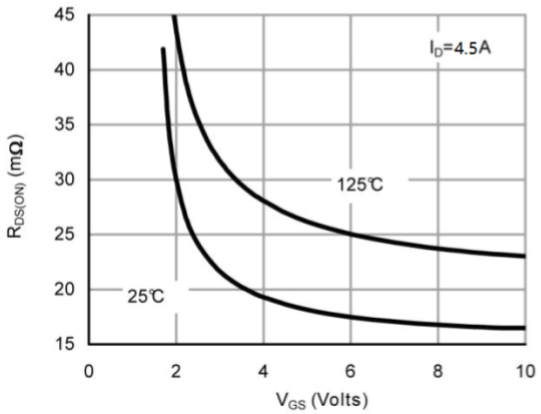


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

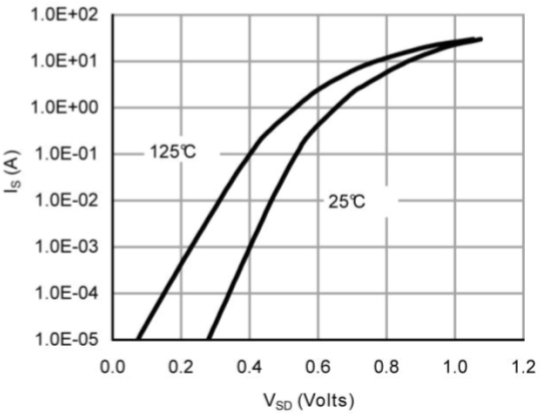


Figure 6: Body-Diode Characteristics (Note E)

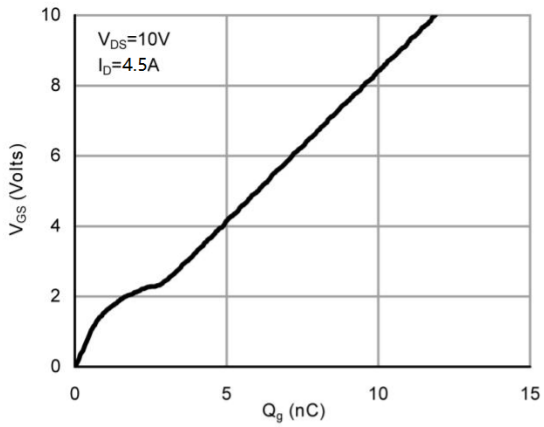


Figure 7: Gate-Charge Characteristics

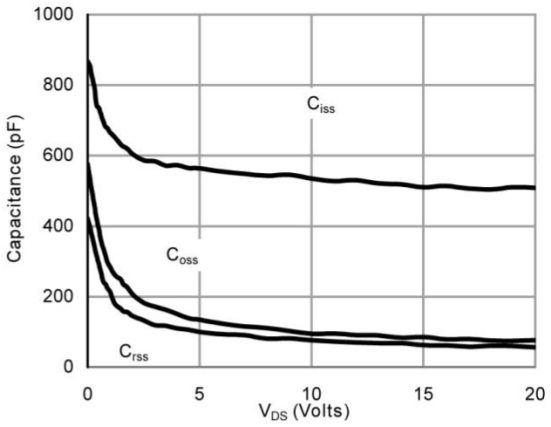


Figure 8: Capacitance Characteristics

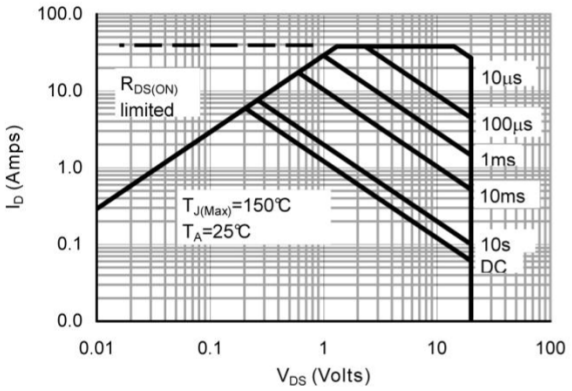


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

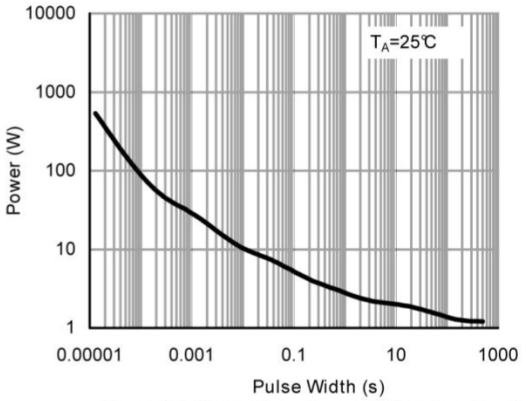


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

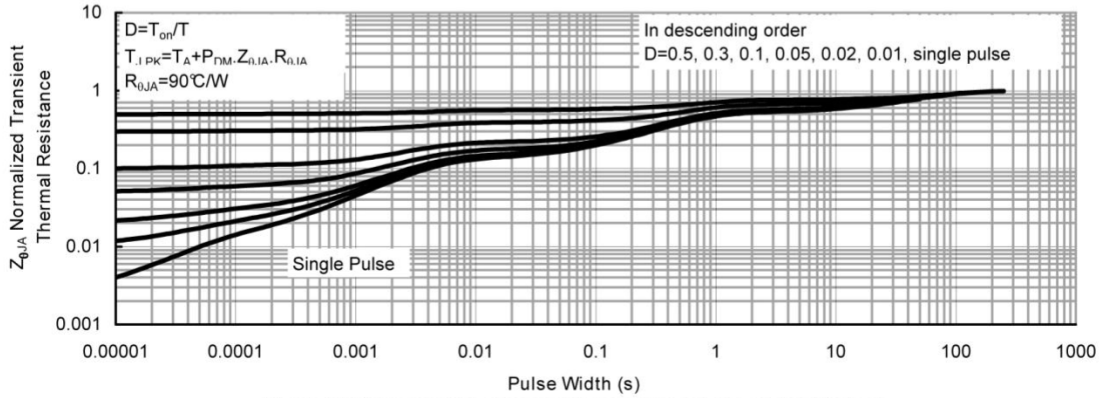
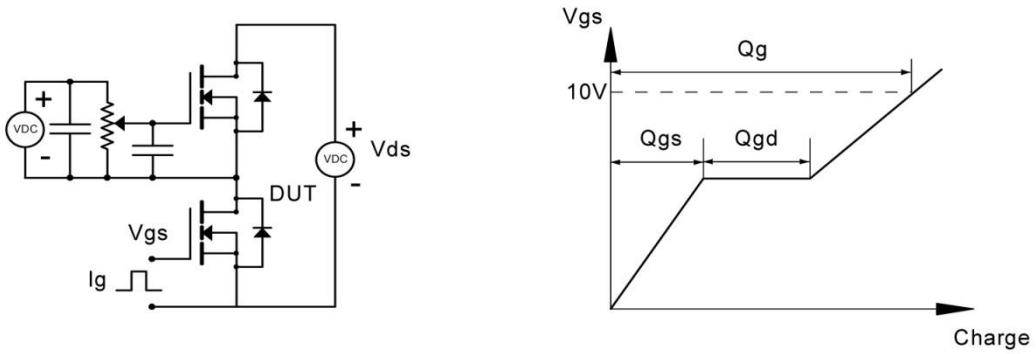
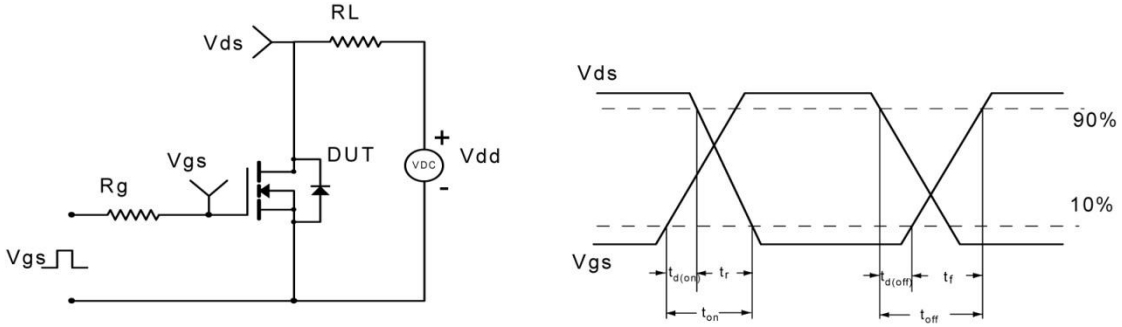


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

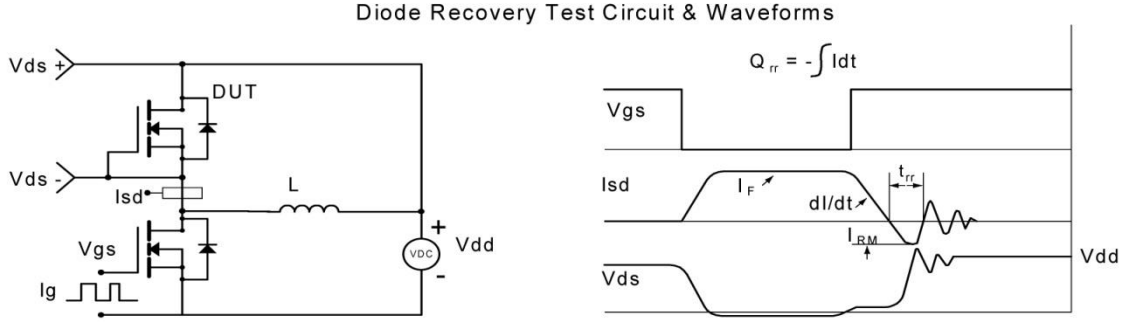
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

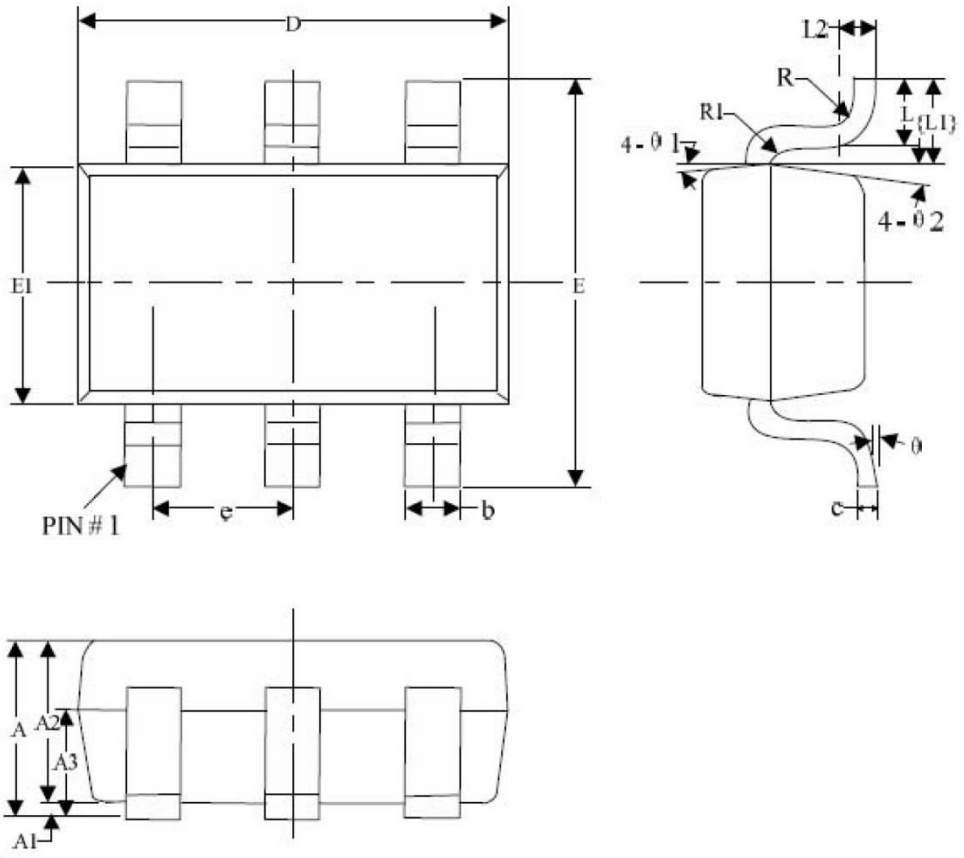


Diode Recovery Test Circuit & Waveforms



Packaging Information

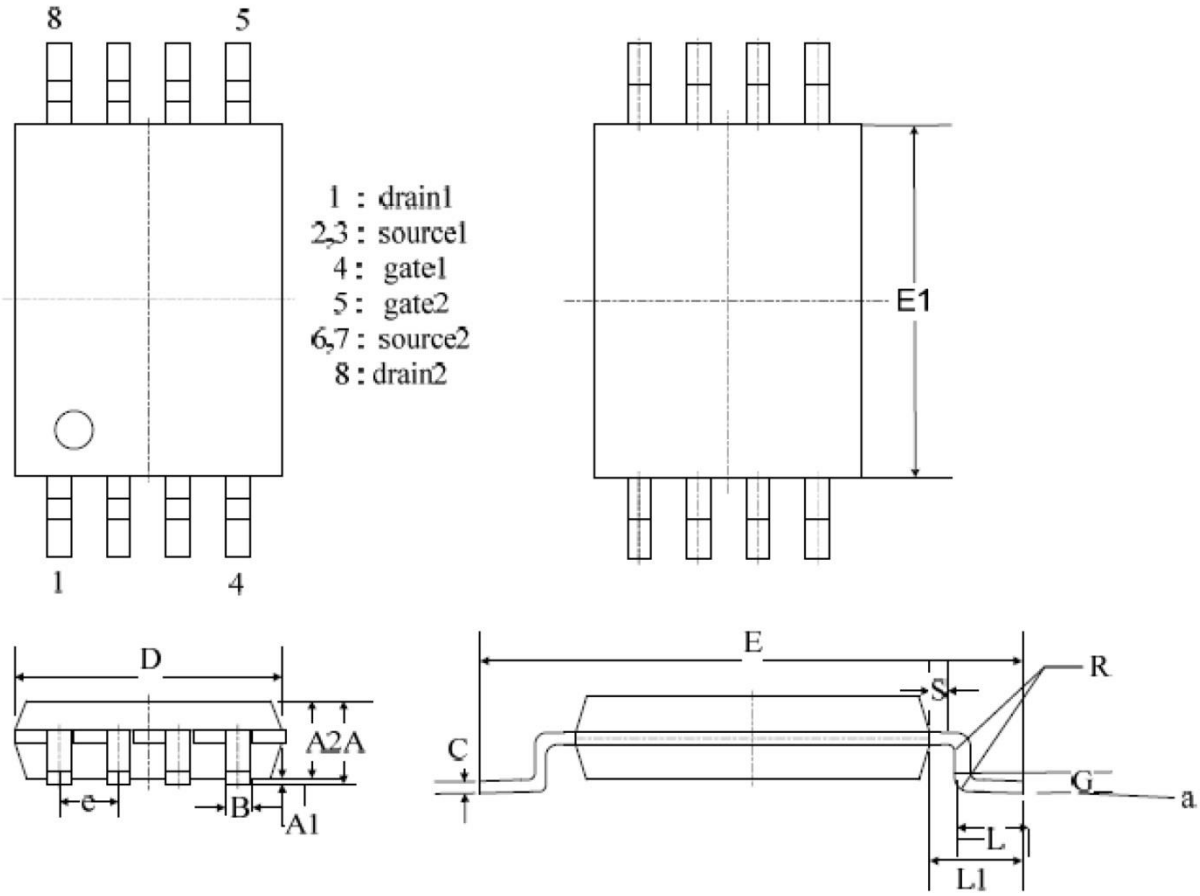
SOT23-6



Dimensions（unit：mm）

SYMBOL	MIN	NOM	MAX		SYMBOL	MIN	NOM	MAX
A	-	-	1.30		e	0.85	0.95	1.05
A1	0	-	0.15		L	0.35	0.45	0.60
A2	0.90	1.10	1.30		L1		0.59REF	
A3	0.60	0.65	0.70		L2		0.25BSC	
b	0.39	-	0.49		R	0.05	-	-
c	0.12	-	0.19		R1	0.05	-	0.02
D	2.85	2.95	3.15		θ	0°	-	8°
E	2.60	2.80	3.00		θ1	3°	5°	7°
E1	1.55	1.65	1.75		θ2	6°	8°	10°

TSSOP-8



DIM		A	A(1)	A(2)	B	C	D	E	E1	e	G	L	L1	a	R	S
MM	Min.	1.05	0.05	0.99	0.19		2.9	6.2	4.3	0.65 BSC	0.254 GAGE PLANE	0.45	0.9	0°	0.09	0.2
	Nom.	1.1	0.1	1.02	0.25	0.127	3	6.4	4.4			0.6	1	4°		
	Max.	1.2	0.15	1.05	0.3		3.2	6.6	4.5			0.75	1.1	8°		