650V N-Channel Super-Junction MOSFET

Features

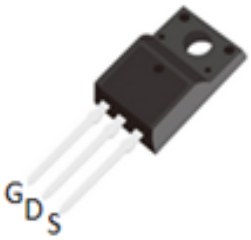
- Much lower On-resistance RDS(ON)
- LowCrss
- Fast switching
- Improved dv/dt capability
- Electrostatic Discharge (ESD)

Applications

- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Charger
- Power Supply

Product Summary

VDS	650	V
RDS(on),Typ.@VGS=10V	341	mΩ
ID	11	A



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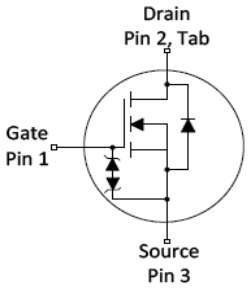


Schematic Diagram

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	650	V
I_D	Drain Current - Continuous (T_C = 25℃)	11	A
	- Continuous (T_C = 100℃)	7.9	A
I_{DM}	Drain Current - Pulsed (Note 1)	44	A
V_{GSS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy	300	mJ
P_D	Power Dissipation (T_C = 25℃)	118	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.15	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	℃

* Drain current limited by maximum junction temperature.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =650 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 520V, T_C = 125℃	--	--	10	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0 V	--	--	1	uA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-1	uA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	2.0	3.0	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 3.4A	--	341	360	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	780	-	pF
C_{oss}	Output Capacitance		--	597	-	pF
C_{rss}	Reverse Transfer Capacitance		--	17.4	-	pF
RG	Gate resistance	F = 1.0 MHz,Open drain	--	3.8	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS}= 10 V, V_{DS}=400 V, R_G = 25Ω ,I_D=4A	--	16	--	ns
t_r	Turn-On Rise Time		--	35	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	75	--	ns
t_f	Turn-Off Fall Time		--	38	--	ns
Q_g	Total Gate Charge	V_{DS} = 400 V, I_D =4A, V_{GS} = 10V	--	18.9	--	nC
Q_{gs}	Gate-Source Charge		--	2.54	--	nC
Q_{gd}	Gate-Drain Charge		--	6.09	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	11	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	44	A
V_{SD}	Drain to Source Diode Forward Voltage,V_{GS} = 0V, I_{SD} =3A,T_J = 25℃		0.32	0.8	1.2	V
t_{rr}	Body Diode Reverse Recovery Time， I_F =3.4A,dI/dt=100A/μs		--	208	--	nS
Q_{rr}	Body Diode Reverse Recovery Charge， I_F =3.4A,dI/dt=100A/μs		--	2.9	--	nC

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J =25℃, V_{DD} =50V, V_G =10V, R G =25Ω, L=0.5mH,
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Electrical Characteristics Diagrams

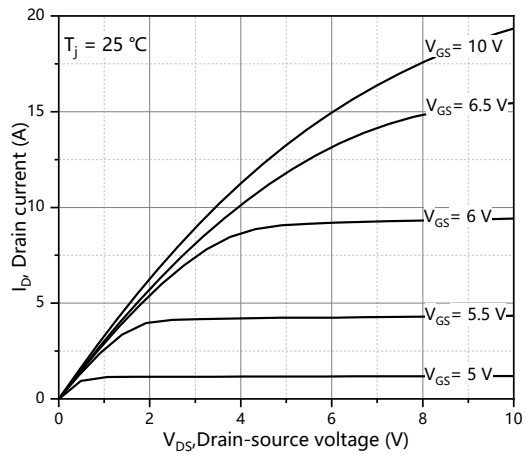


Figure 1. Typ. output characteristics

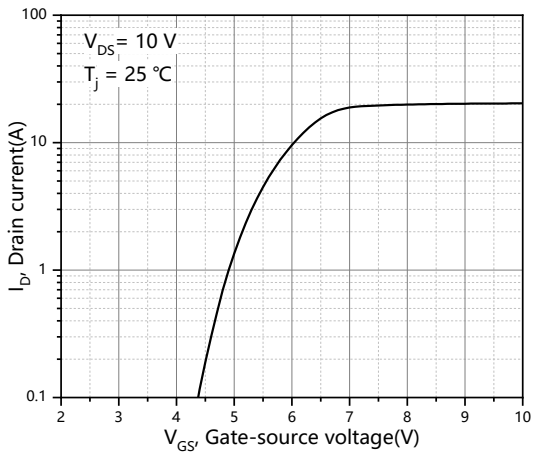


Figure 2. Typ. transfer characteristics

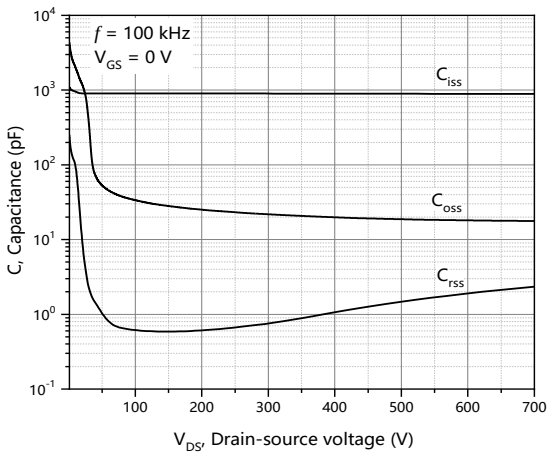


Figure 3. Typ. capacitances

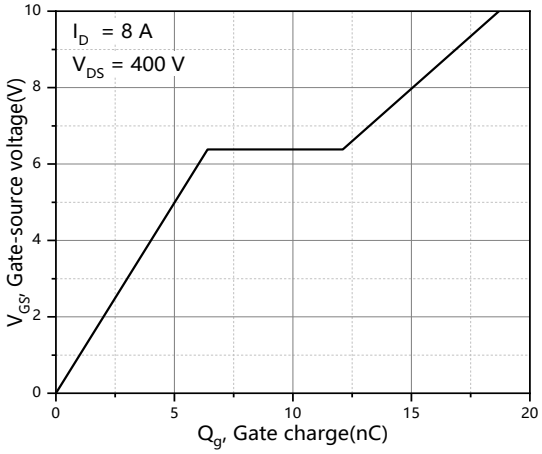


Figure 4. Typ. gate charge

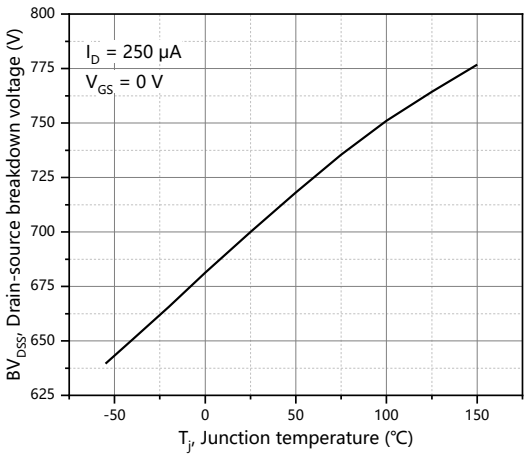


Figure 5. Drain-source breakdown voltage

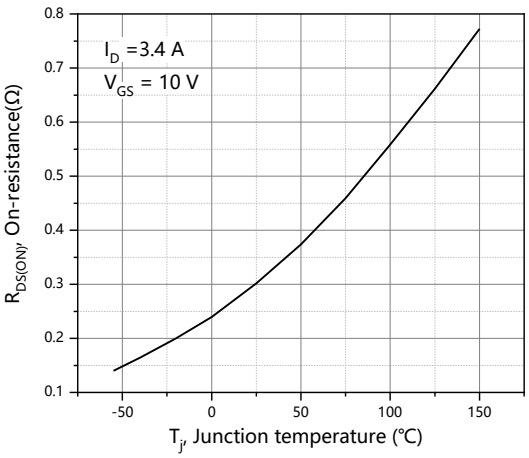


Figure 6. Drain-source on-state resistance

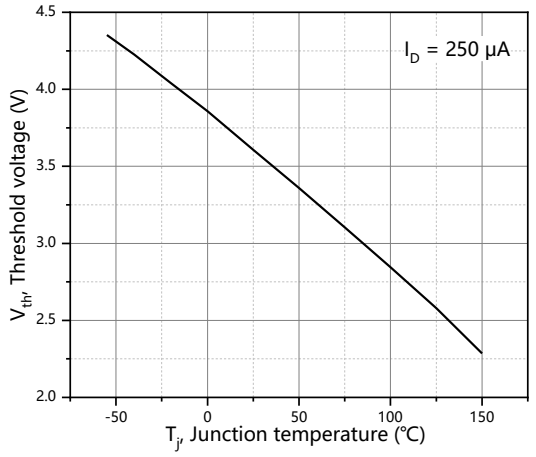


Figure 7. Threshold voltage

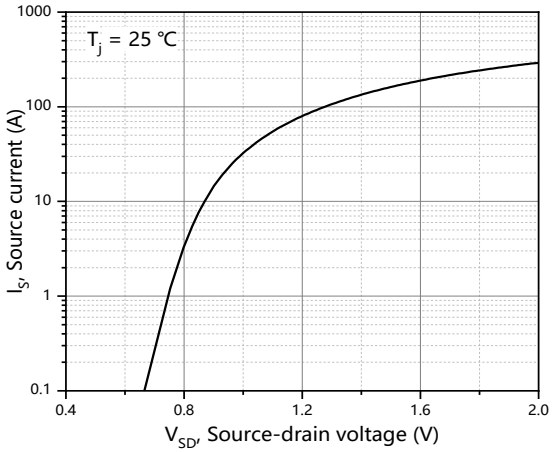


Figure 8. Forward characteristic of body diode

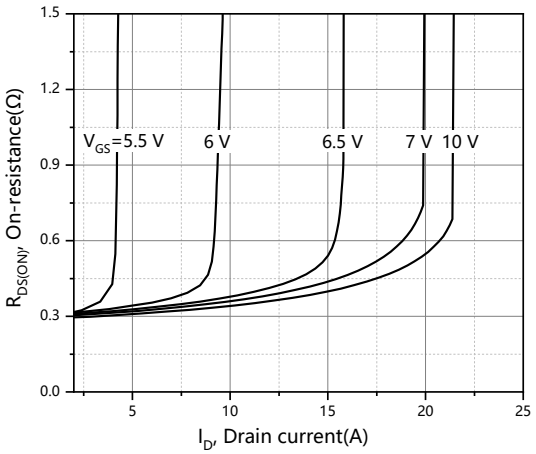


Figure 9. Drain-source on-state resistance

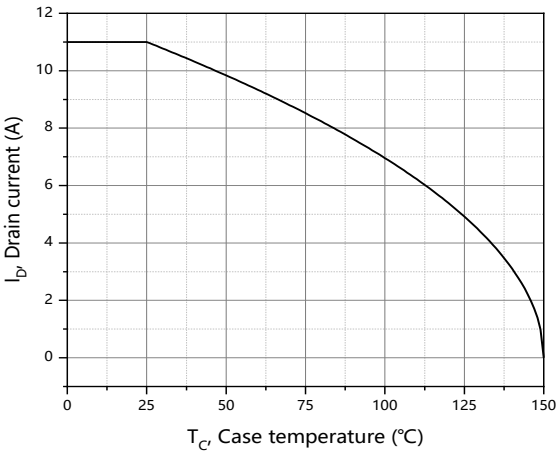


Figure 10. Drain current

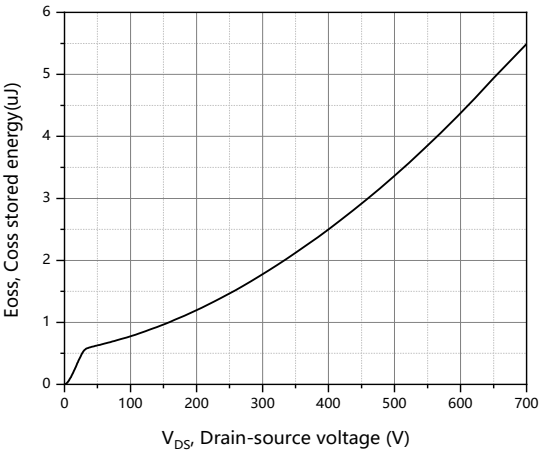


Figure 11. Typ. Coss stored energy

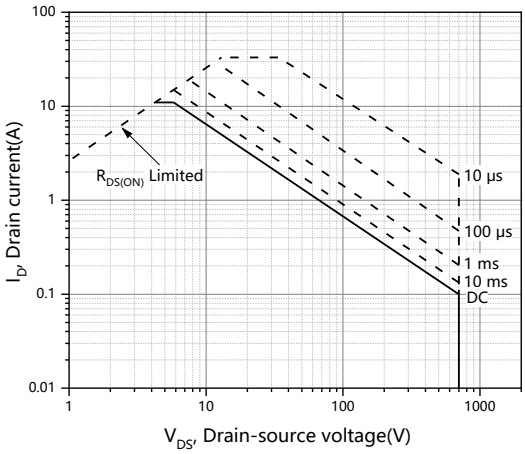


Figure 12. Safe operation area T_C=25 °C

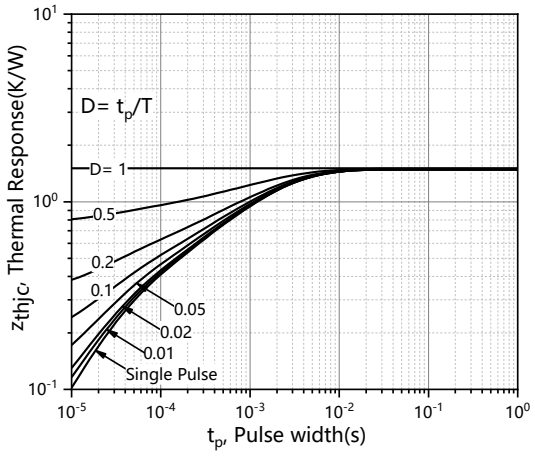


Figure 13. Max. transient thermal impedance

Test circuits and waveforms

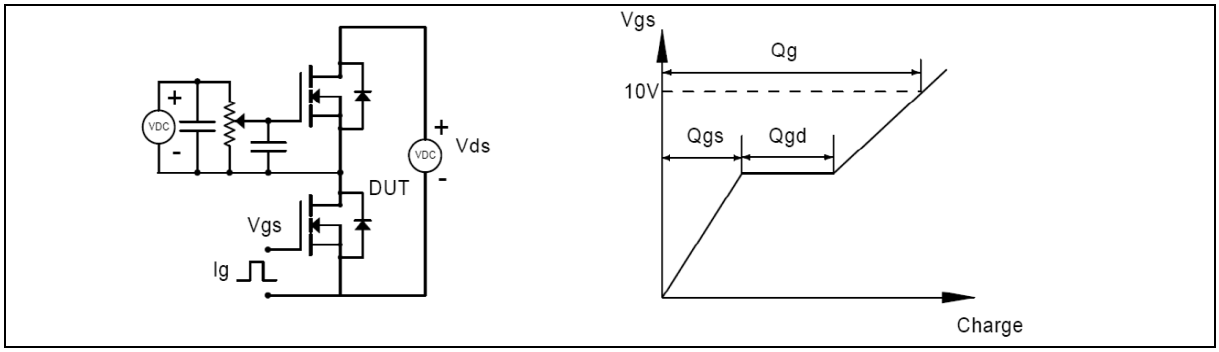


Figure 1. Gate charge test circuit & waveform

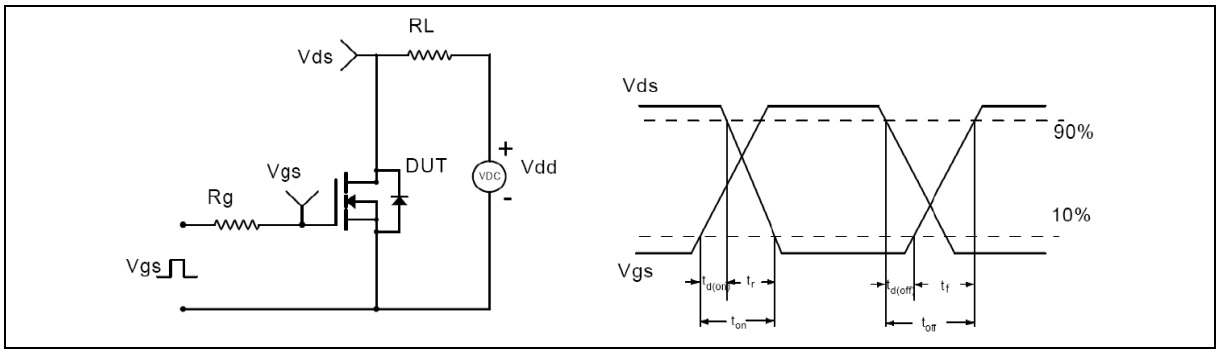


Figure 2. Switching time test circuit & waveforms

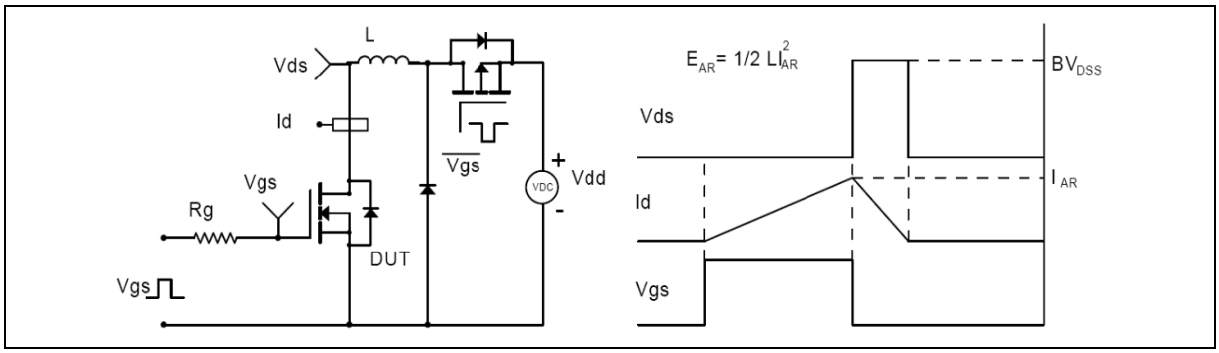


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

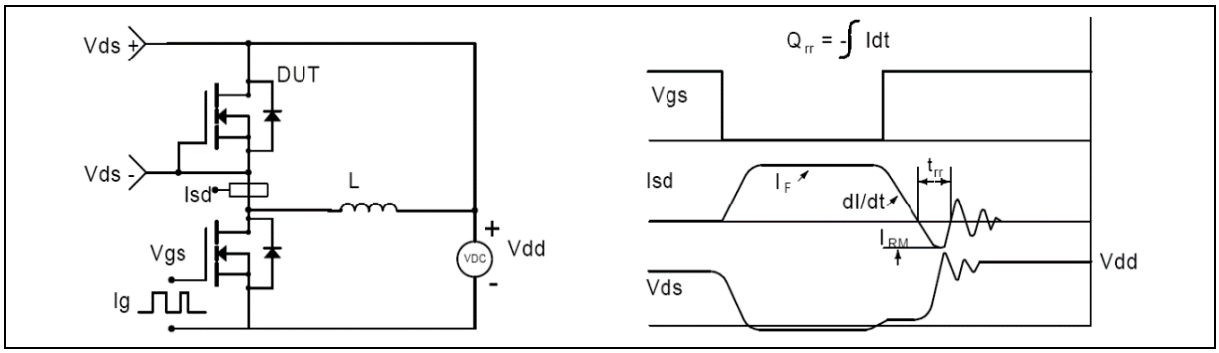
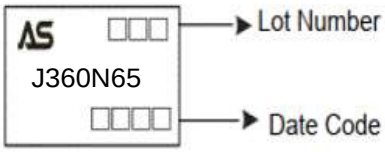


Figure 4. Diode reverse recovery test circuit & waveforms

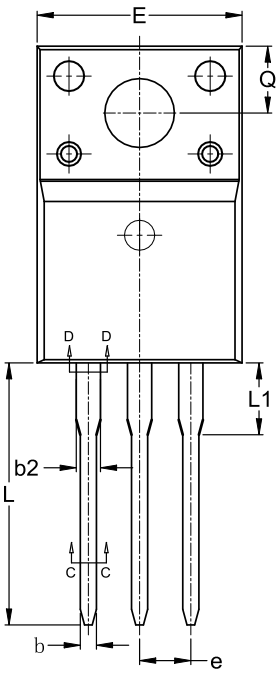
Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASJ360N65F1HE-T	J360N65	TO-220F	Tape&Reel	50/Reel

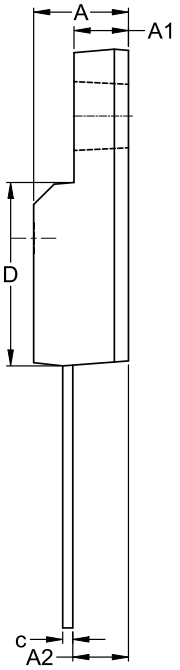
PACKAGE	MARKING
TO-220F	

Package Description

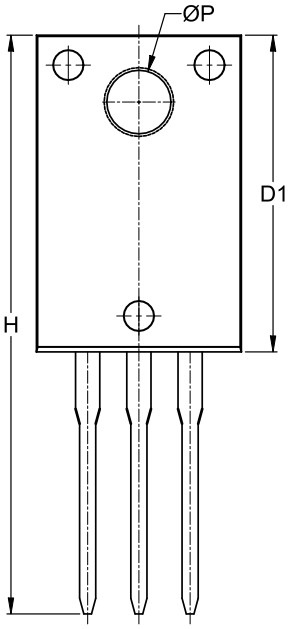
TO-220F



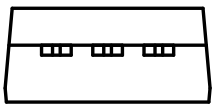
TOP VIEW



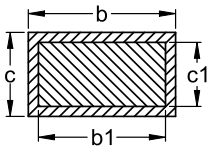
SIDE VIEW(Right)



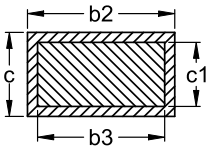
BOTTOM VIEW



SIDE VIEW(Front)



SECTION:C-C



SECTION:D-D

DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.600	4.700	4.800
A1	2.600	2.700	2.800
A2	2.660	2.760	2.860
b	0.740	0.840	0.940
b1	0.700	0.800	0.900
b2	1.140	1.240	1.340
b3	1.100	1.200	1.300
c	0.440	0.540	0.640
c1	0.400	0.500	0.600
D	9.090	9.190	9.290
D1	15.770	15.870	15.970
E	10.060	10.160	10.260
e	2.540 BSC.		
H	28.800	29.000	29.200
L	12.930	13.130	13.330
L1	3.400	3.600	3.800
ØP	3.080	3.180	3.280
Q	3.150	3.350	3.550

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