

-55V, -75A P-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

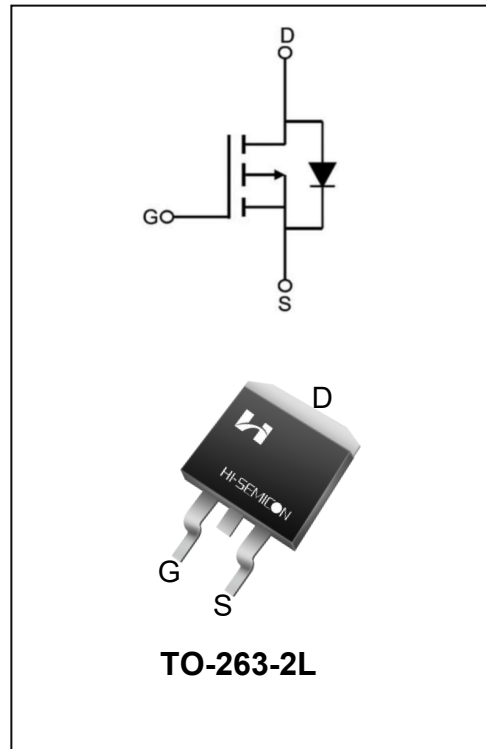
The SFA75P55 use advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety applications.

Features

- ◆ $V_{DS}=-55V, I_D=-75A$
- ◆ $R_{DS(on)}$
TYP:14.5mΩ@ $V_{GS}=-10V$

Applications

- ◆ Power faction correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFA75P55	TO-263-2L	SFA75P55	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	-55	V
Gate-Source Voltage		V _{GS}	±20	V
Drain Current	T _C = 25°C	I _D	-75	A
	T _C = 100°C		-52	
Drain Current Pulsed (Note 1)		I _{DM}	-300	A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	200	W
			1.6	W/°C
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	930	mJ
Operation Junction Temperature Range		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	0.75	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDS}	V _{GS} =0V, I _D =-250μA	-55	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-55V, V _{GS} =0V	--	--	-1.0	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-20V, V _{DS} =0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =-250μA	-2.0	--	-4.0	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-37.5A	--	14.5	20	mΩ
Dynamic Characteristics						
Gate Resistance	R _g	V _{GS} =0V, f=1.0MHZ		1.5		Ω
Input Capacitance	C _{iss}	V _{DS} =-25V V _{GS} =0 f=1.0MHZ	--	3400	--	pF
Output Capacitance	C _{oss}		--	1400	--	
Reverse Transfer Capacitance	C _{rss}		--	640	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-28V, V _{GS} =-10V R _G =2.5Ω, I _D =-38A (Note 3.4)	--	17.8	--	ns
Turn-on Rise Time	t _r		--	100.4	--	

Turn-off Delay Time	$t_{d(off)}$	$V_{DD}=-28V, V_{GS}=-10V$ $R_G=2.5\Omega, I_D=-38A$ (Note 3.4)	--	61.2	--	ns
Turn-off Fall Time	t_f		--	95.5	--	
Total Gate Charge	Q_g	$V_{DS}=-44V, I_D=-38A$ $V_{GS}=-10V$ (Note 3.4)	--	180	--	nc
Gate-Source Charge	Q_{gs}		--	32	--	
Gate-Drain Charge	Q_{gd}		--	96	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-75	A
Pulsed Source Current	I_{SM}		--	--	-300	
Diode Forward Voltage	V_{SD}	$I_S=-38A, V_{GS}=0V$	--	-0.9	1.2	V
Reverse Recovery Time	T_{rr}	$I_F=-38A, V_R=-10V,$ $dI_F/dt=-100A/\mu S$	--	89	--	ns
Reverse Recovery Charge	Q_{rr}		--	230	--	μC

1. Pulse width limited by maximum junction temperature
2. $L=1mH, V_{DD}=-30V, V_G=-10V, R_G=25\Omega$, starting $T_J=25^\circ C$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature

Typical Performance Characteristics

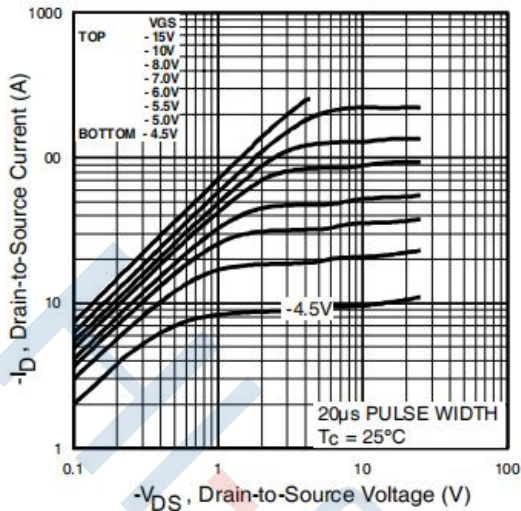


Fig 2. Typical Output Characteristics

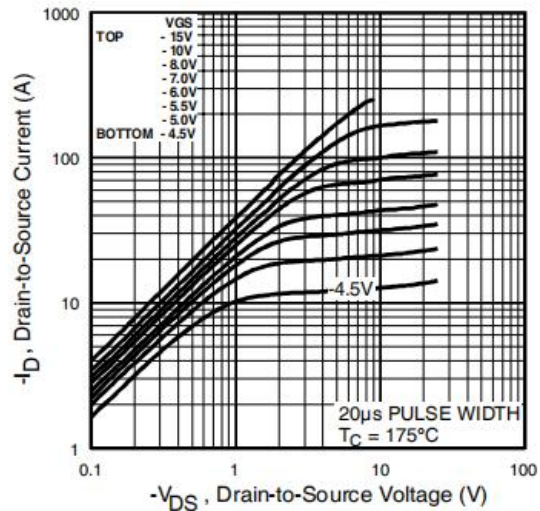


Fig 3. Typical Output Characteristics

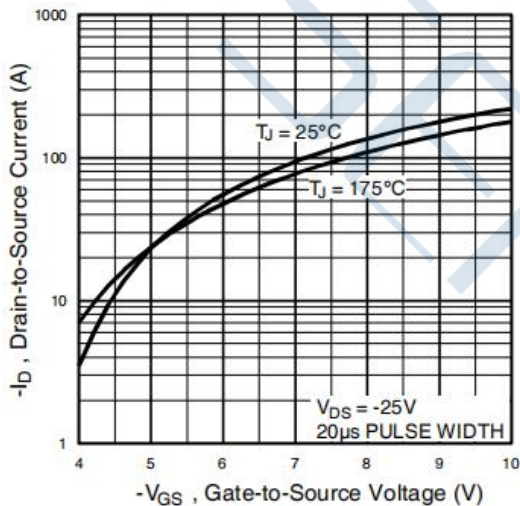


Fig 4. Typical Transfer Characteristics

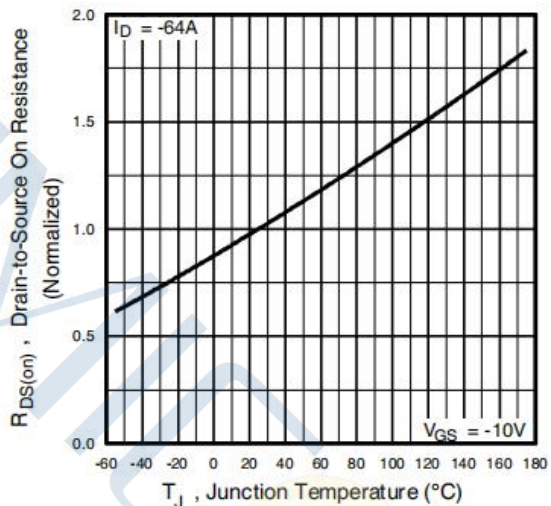


Fig 5. Normalized On-Resistance Vs. Temperature

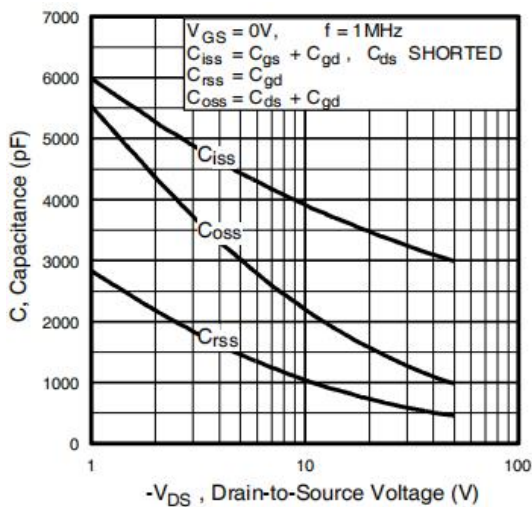


Fig 6. Typical Capacitance Vs. Drain-to-Source Voltage

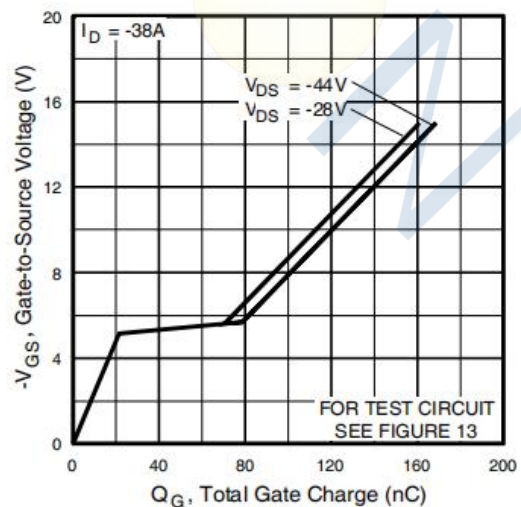


Fig 7. Typical Gate Charge Vs. Gate-to-Source Voltage

Typical Performance Characteristics

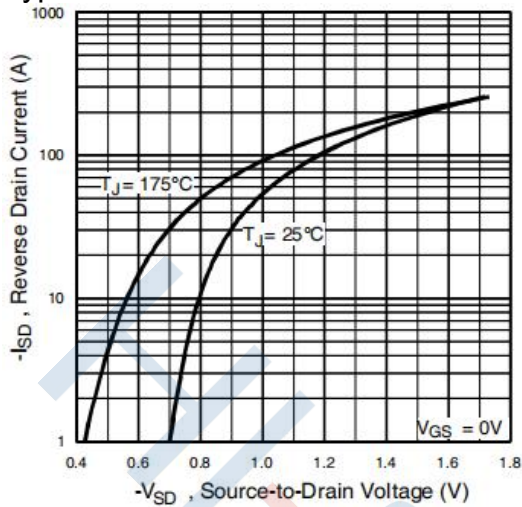


Fig 8. Typical Source-Drain Diode Forward Voltage

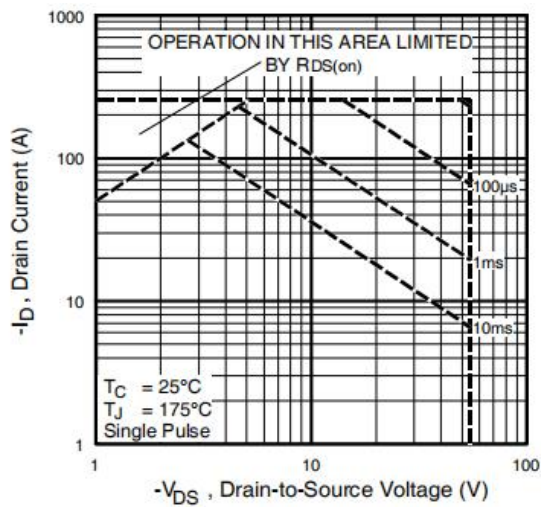


Fig 9. Maximum Safe Operating Area

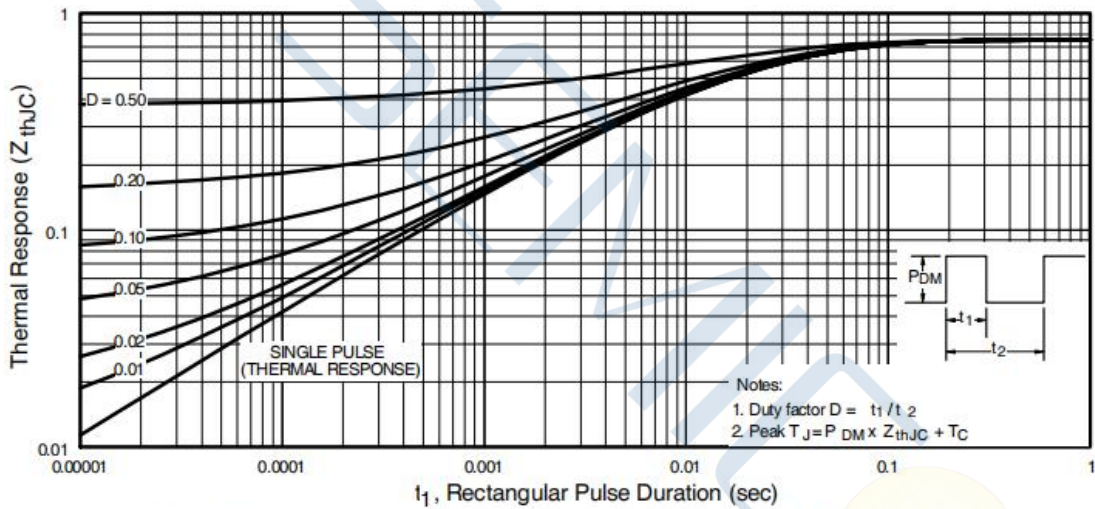


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

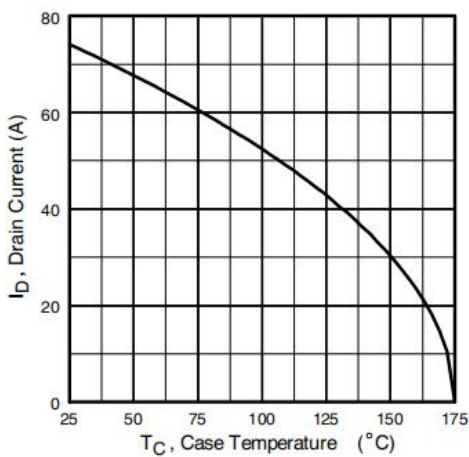
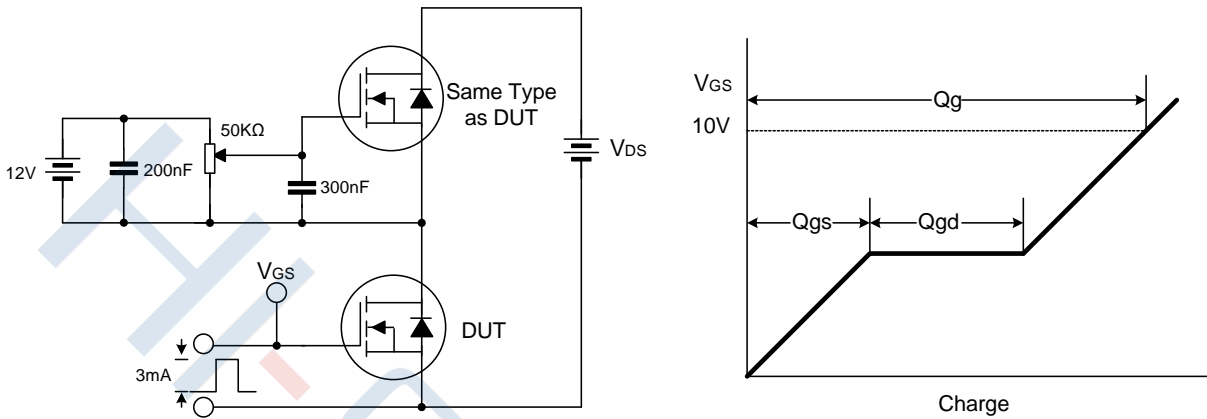


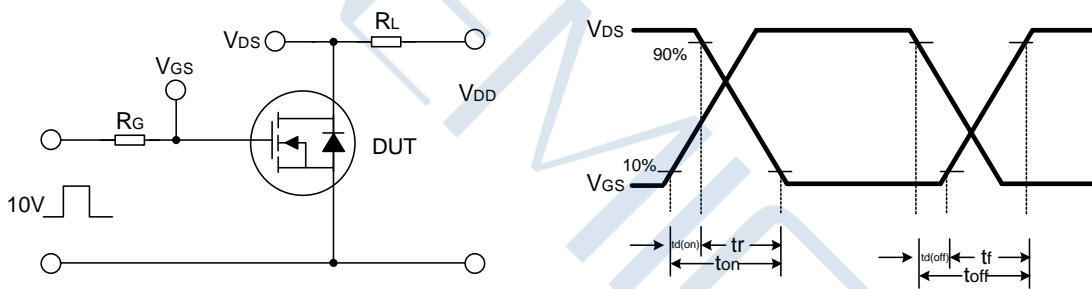
Fig 11. Maximum Drain Current Vs. Case Temperature

Test Circuit

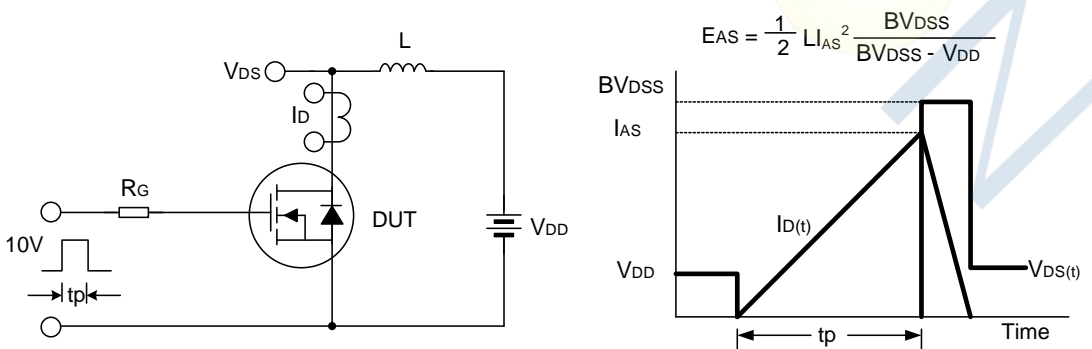
Gate Charge Test Circuit & Waveform



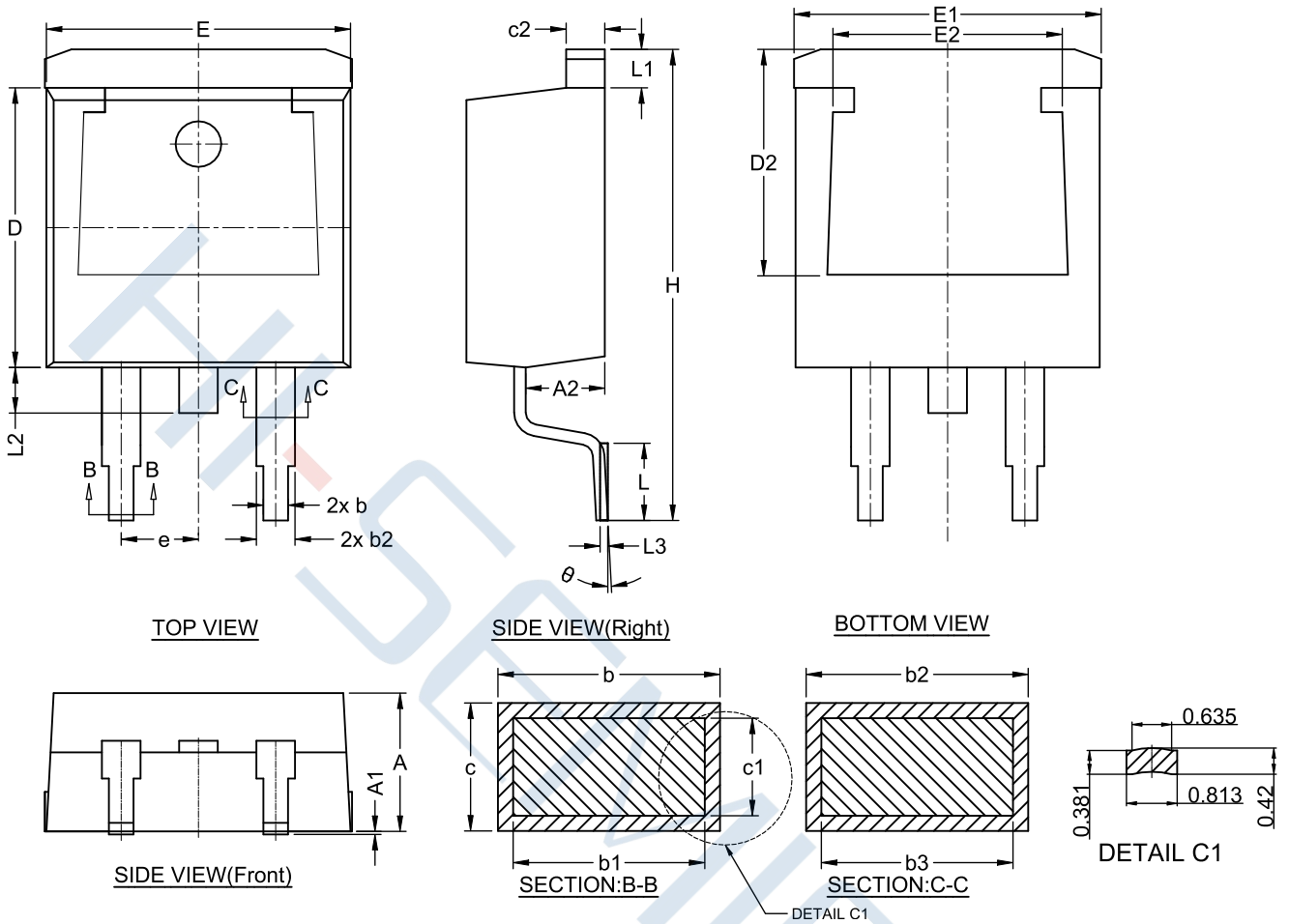
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-263-3L



DIM SYMBOL	MIN.	NOM.	MAX.
A	4.450	4.550	4.650
A1	0.000	—	0.150
A2	2.500	2.600	2.700
b	0.753	0.853	0.953
b1	0.713	0.813	0.913
b2	1.210	1.310	1.410
b3	1.170	1.270	1.370
c	0.330	0.421	0.521
c1	0.281	0.381	0.481
c2	1.210	1.310	1.410
D	9.100	9.200	9.300
D2	7.215	7.415	7.615
E	9.900	10.000	10.100
E1	9.900	10.100	10.300
E2	7.341	7.541	7.741
e	2.540 BSC.		
H	15.300	15.500	15.700
L	2.340	2.540	2.740
L1	1.066	1.266	1.466
L2	1.400	1.500	1.600
L3	0.254 BSC.		
θ	0°	---	5°

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