

Description

Features

- Trench LV MOSFET technology
- Fast switching
- High density cell design for low $R_{ds(on)}$

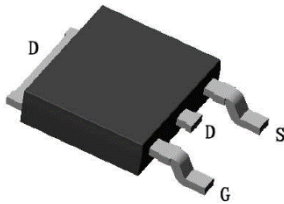
Application

- Load Switch
- High current load application
- Battery management

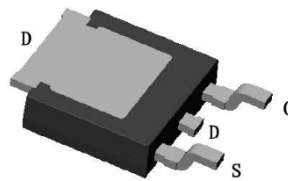
V_{DS}	20	V
$R_{ds(on),typ}@V_{gs}=4.5V$	2.8	$m\Omega$
$R_{ds(on),typ}@V_{gs}=2.5V$	4	$m\Omega$
I_D	90	A



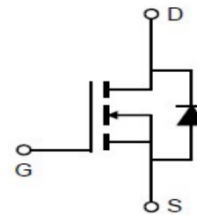
Top View



Bottom View



Pin Configuration



Package Marking and Ordering Information

Part	Marking	Package	Packing	Reel Size	Tape Width	Qty
CMT2090U	T2090U	TO252	Reel	NA	NA	2500pcs

Key Performance Parameters

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_{D@Tc=25^{\circ}C}$	Continuous Drain Current, $V_{GS}=4.5V$	90	A
$I_{D@Tc=100^{\circ}C}$	Continuous Drain Current, $V_{GS}=4.5V$	59	A
I_{DM}	Pulsed Drain Current ¹	360	A
EAS	Single Pulse Avalanche Energy ⁴	252	mJ
$PD@Tc=25^{\circ}C$	Total Power Dissipation	67	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_j	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ	Max	Units
R _{θJA}	Thermal Resistance Junction-Ambient	47	52	°C/W
R _{θJC}	Thermal Resistance Junction-Case	1.65	1.85	°C/W

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
BVDSS	Drain-Source Breakdown Voltage	20	--	--	V	V _{GS} =0V, I _D =250uA
RDS(ON)	Static Drain-Source On-Resistance	--	2.8	4	mΩ	V _{GS} =4.5V, I _D =30A
		--	4	6		V _{GS} =2.5V, I _D =20A
V _{GS(th)}	Gate Threshold Voltage	0.5	0.95	1.2	V	V _{GS} =V _{DS} , I _D =250uA
IDSS	Drain-Source Leakage Current	--	--	1	uA	V _{DS} =20V, V _{GS} =0V, T _J =25°C
		--	--	10	uA	V _{DS} =20V, V _{GS} =0V, T _J =125°C
IGSS	Gate-Source Leakage Current	--	--	±100	nA	V _{GS} =±12V, V _{DS} =0V
g _{fs}	Forward Transconductance	--	12	--	S	V _{DS} =10V, I _D =15A
R _g	Gate Resistance	--	2.3	--	Ω	V _{DS} =0V, V _{GS} =0V, f=1MHz
Q _g	Total Gate Charge (10V) ^{2,3}	--	50	--	nC	V _{DS} =10V, V _{GS} =4.5V, I _D =30A
Q _{gs}	Gate-Source Charge ^{2,3}	--	4.1	--		
Q _{gd}	Gate-Drain Charge ^{2,3}	--	16	--		
T _{d(on)}	Turn-On Delay Time ^{2,3}	--	9	--	ns	V _{DD} =10V, V _{GS} =4.5V, R _G =1.8Ω I _D =30A
T _r	Rise Time ^{2,3}	--	34	--		
T _{d(off)}	Turn-Off Delay Time ^{2,3}	--	62	--		
T _f	Fall Time ^{2,3}	--	50	--		
C _{iss}	Input Capacitance	--	3800	--	pF	V _{DS} =10V, V _{GS} =0V, f=1MHz
C _{oss}	Output Capacitance	--	518	--		
C _{rss}	Reverse Transfer Capacitance	--	467	--		

Diode Characteristics

Symbol	Parameter	Conditions	Typ	Max	Units
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	--	90	A
I _{sm}	Pulsed Source Current		--	360	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =5A, T _J =25°C	--	1.1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.
4. The EAS test condition is V_{DD}=15V, V_{GS}=4.5V, L=0.5mH.

Typical Performance Characteristics

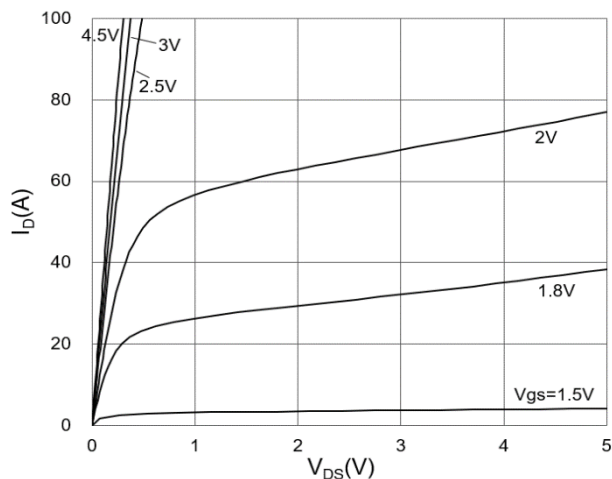
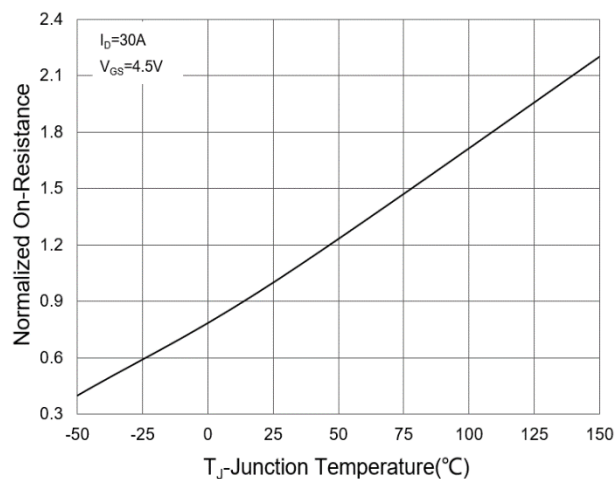
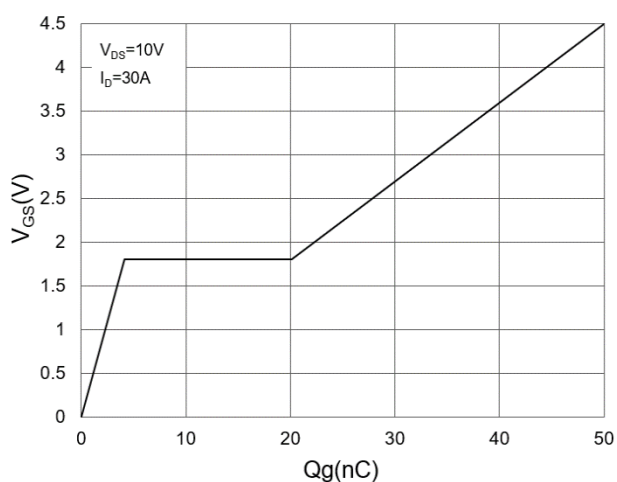
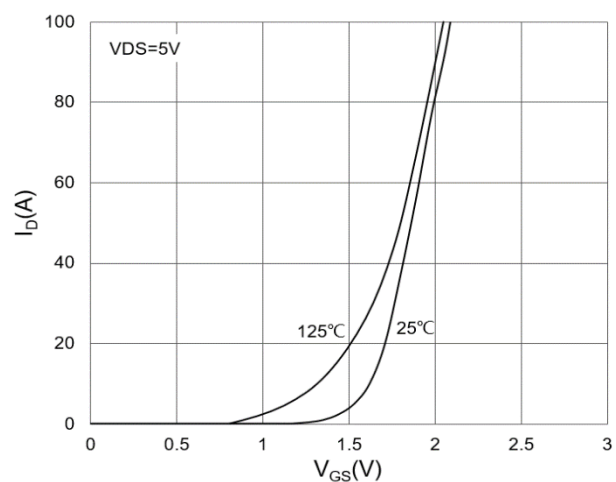
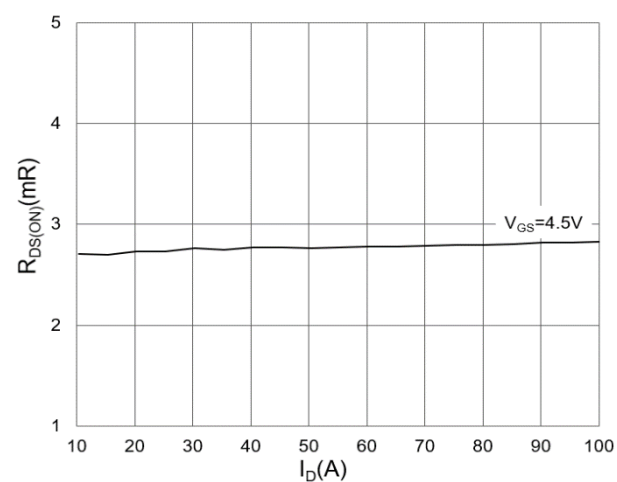
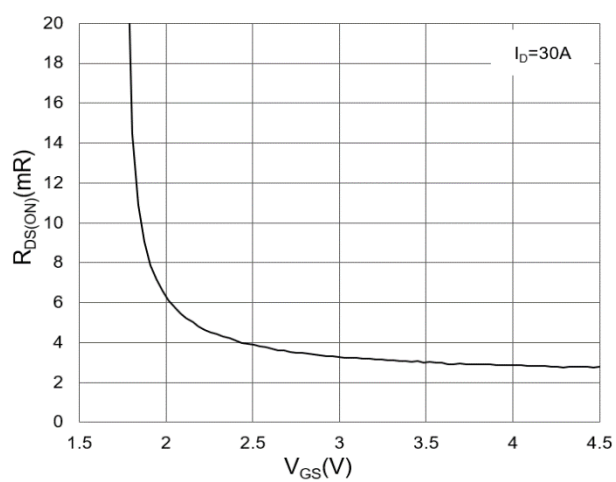
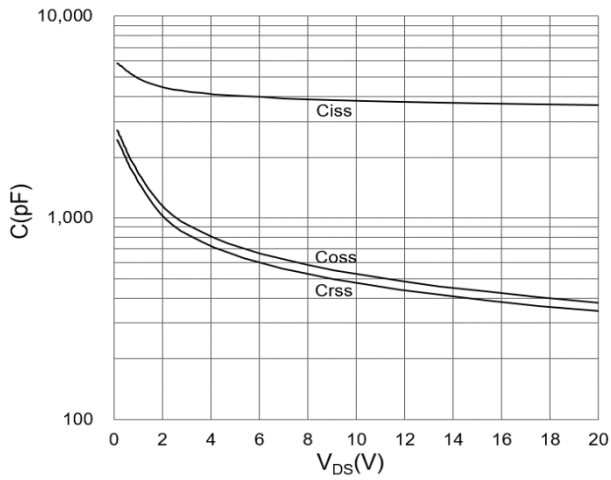
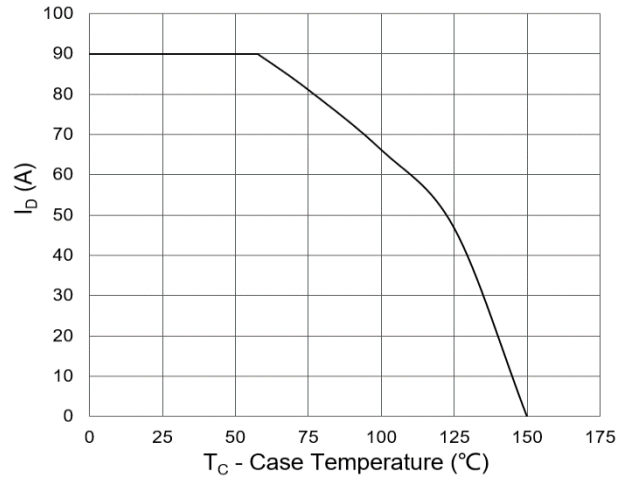
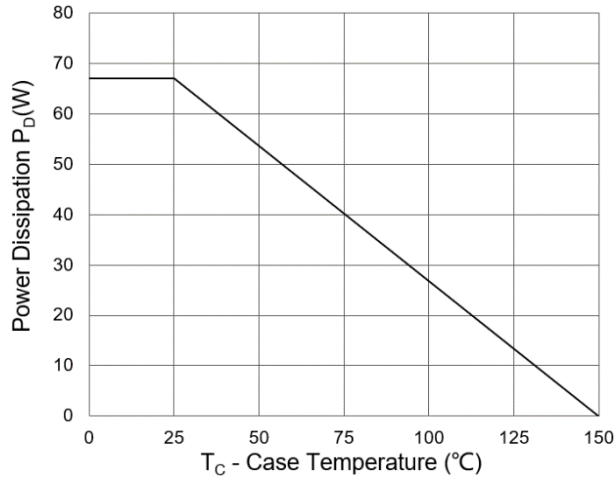
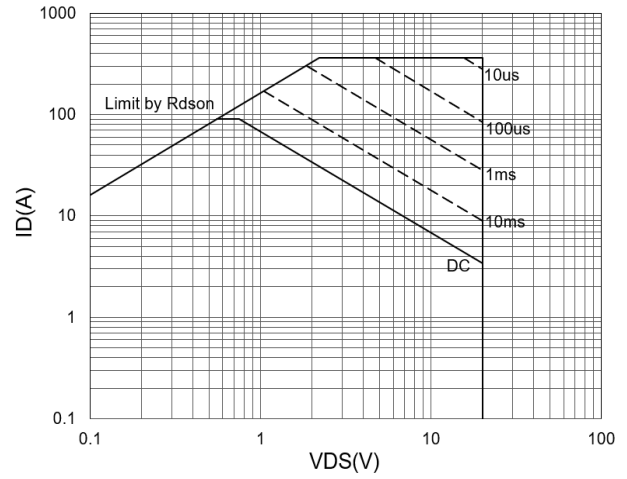
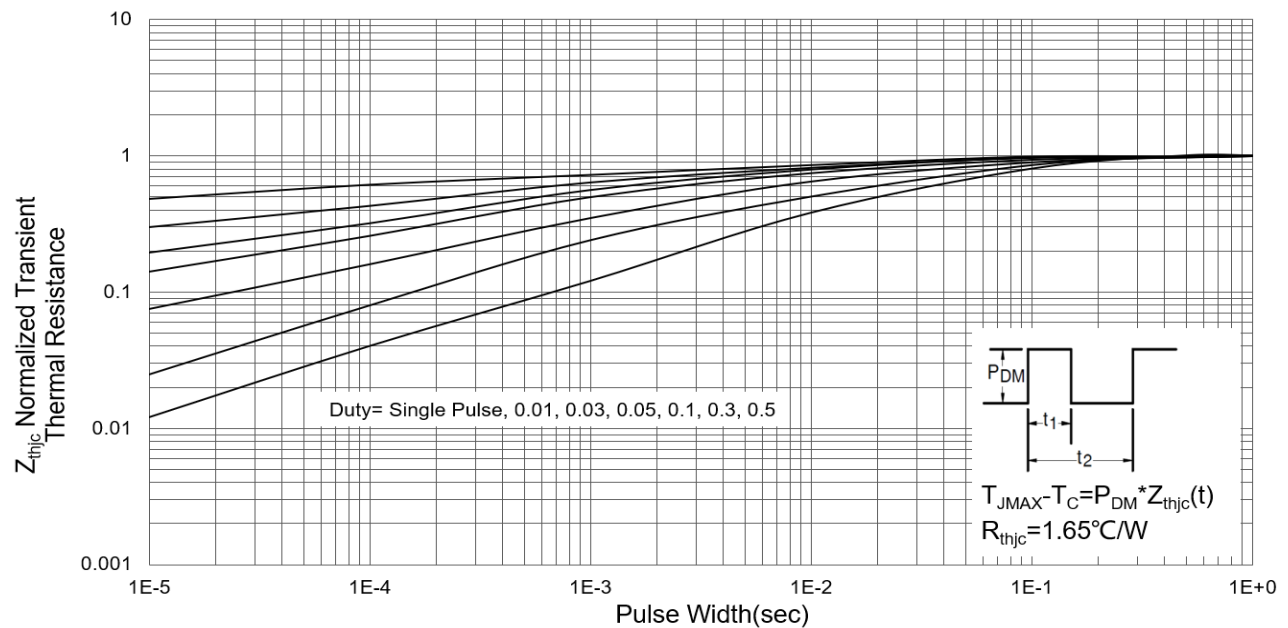
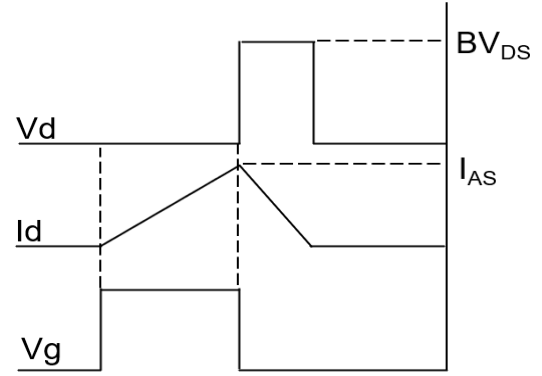
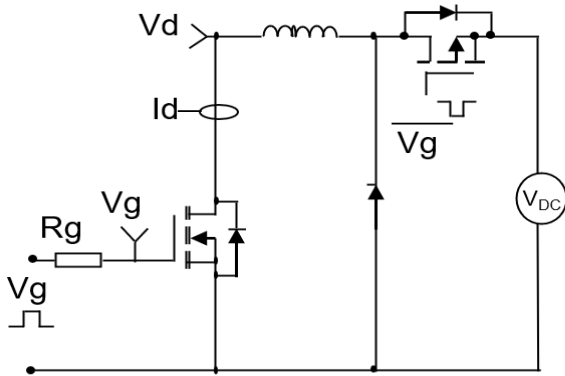
Fig1 Output Characteristics

Fig2 Normalized $R_{DS(on)}$ vs T_J

Fig3 Gate Charge Waveform

Fig4 Transfer Characteristics

Fig5 $R_{DS(on)}$ vs. Drain Current and Gate Voltage

Fig6 $R_{DS(on)}$ vs. Gate Voltage


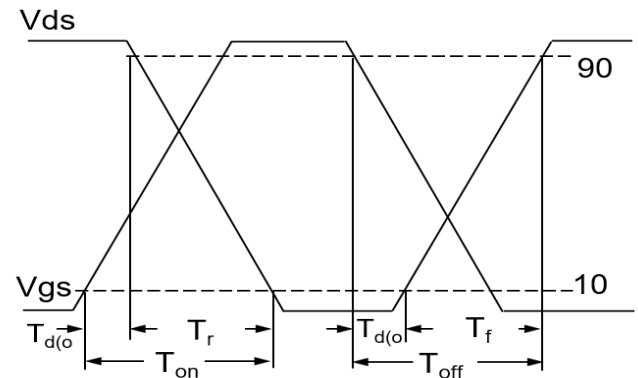
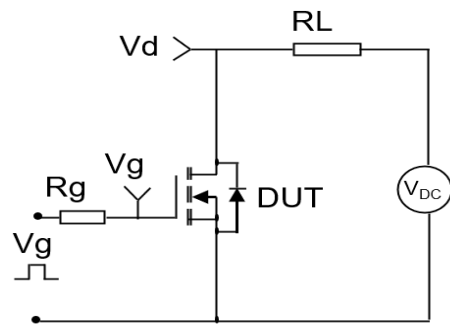
Fig7 Capacitance Characteristics

Fig8 Drain Current Derating

Fig9 Power Dissipation

Fig10 Maximum Safe Operation Area

Fig11 Normalized Transient Impedance


Test Circuit & Waveform

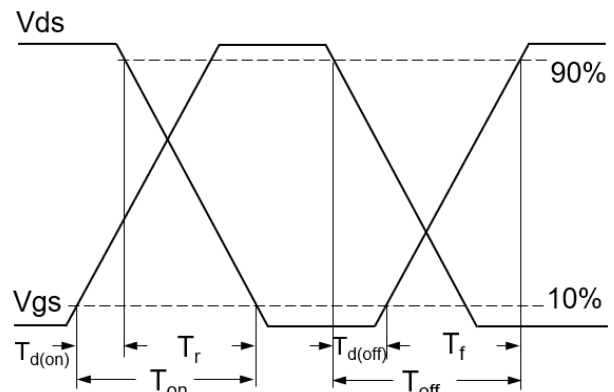
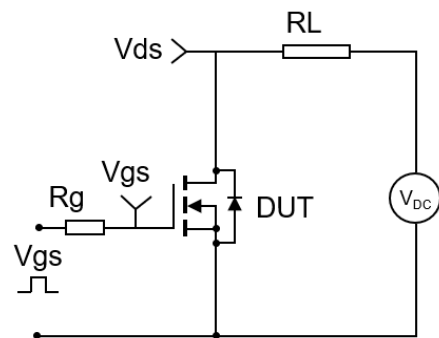
1. Unclamped Inductive Switching Test Circuit & Waveforms



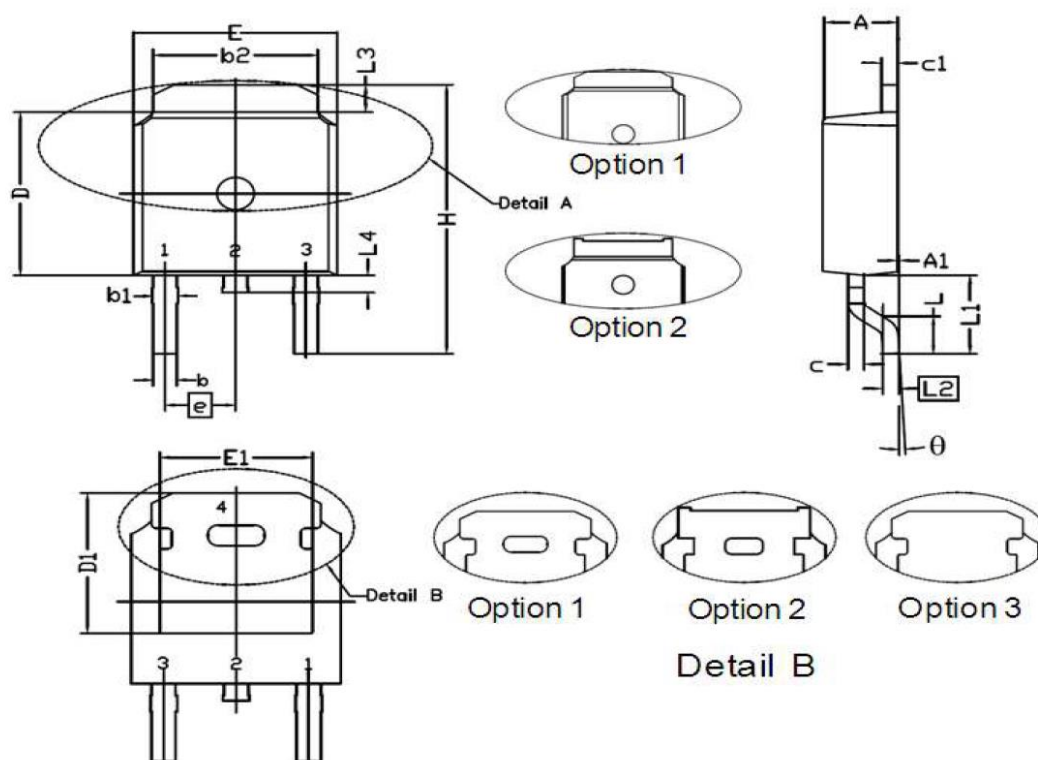
2. Gate Charge Test Circuit & Waveform



3. Resistive Switching Time Circuit & Waveform



TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
A1	0.00	0.15	0.000	0.006
b	0.60	0.91	0.024	0.036
b1	0.65	1.15	0.026	0.045
b2	5.00	5.64	0.197	0.222
c	0.45	0.61	0.018	0.024
c1	0.36	0.66	0.014	0.026
D	5.80	6.30	0.228	0.248
D1	5.21	--	0.205	--
e	2.29 BSC.		0.090 BSC.	
E	6.30	6.90	0.248	0.272
E1	4.40	--	0.173	--
H	9.40	10.48	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.92 REF		0.115 REF	
L2	0.508 BSC.		0.020 BSC.	
L3	0.72	1.35	0.028	0.053
L4	0.60	1.20	0.024	0.047
θ	0°	10°	0°	10°