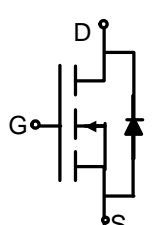
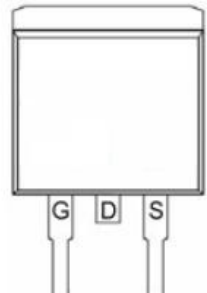
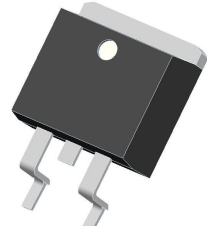


FH1806B

N-Channel Trench Power MOSFET

<p>Description</p> <p>These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.</p>	<p>General Features</p> <ul style="list-style-type: none"> ◆ $V_{DSS}=60V$, $I_D=90A$ $R_{DS(ON)}=7.9m\Omega$ (MAX) @$V_{GS}=10V$ ◆ Improved dv/dt capability ◆ Fast switching ◆ 100% EAS Guaranteed ◆ Green device available <p>Applications</p> <ul style="list-style-type: none"> ◆ Motor Drives ◆ UPS ◆ DC DC Converter
<p>TO-263</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Schematic diagram</p> </div> <div style="text-align: center;">  <p>Marking and pin assignment</p> </div> <div style="text-align: center;">  <p>TO-263 top view</p> </div> </div>	

Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	60	V
Continuous drain current ($T_c = 25^\circ C$)	I_D	90	A
Continuous drain current ($T_c = 100^\circ C$)		57	A
Pulsed drain current ¹⁾	I_{DM}	360	A
Gate-Source voltage	V_{GSS}	± 20	V
Avalanche energy ²⁾	E_{AS}	144	mJ
Power Dissipation ($T_c = 25^\circ C$)	P_D	125	W
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ C$
Operating Junction Temperature Range	T_J	55 to +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Static characteristics							
Drain source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=250\mu\text{A}$	60			V	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.8	1.3	1.8	V	
Drain-source leakage current	I_{DSS}	$V_{DS}=60\text{V}, V_{GS}=0\text{V}, T_J = 25^\circ\text{C}$			1	μA	
		$V_{DS}=48\text{V}, V_{GS}=0\text{V}, T_J = 125^\circ\text{C}$	---	---	30	μA	
Gate leakage current, Forward	I_{GSSF}	$V_{GS}=20\text{V}, V_{DS}=0\text{ V}$	---	---	100	nA	
Gate leakage current, Reverse	I_{GSSR}	$V_{GS}= 20\text{V}, V_{DS}=0\text{ V}$			100	nA	
Drain source on state resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=30\text{A}$	---	6.5	7.9	m Ω	
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$	---	7.6	9.5	m Ω	
Forward transconductance	g_s	$V_{DS} = 5\text{V}, I_D=30\text{A}$		92		S	
Dynamic characteristics							
Input capacitance	C_{iss}	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $F = 1\text{MHz}$	---	3752	---	pF	
Output capacitance	C_{oss}			269			
Reverse transfer capacitance	C_{rss}			206			
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30\text{V}, V_{GS}=10\text{V}, I_D =25\text{A}$	---	16.5	---	ns	
Rise time	t_r			170			
Turn off delay time	$t_{d(off)}$			464			
Fall time	t_f		---	140	---		
Gate resistance	R_g	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F=1\text{MHz}$		2.95		Ω	
Gate charge characteristics							
Gate to source charge	Q_{gs}	$V_{DS}=48\text{V}, I_D=25\text{A},$ $V_{GS}= 10\text{V}$	---	11.7	---	nC	
Gate to drain charge	Q_{gd}			---	13.1		---
Gate charge total	Q_g				69		
Drain-Source diode characteristics and Maximum Ratings							
Continuous Source Current	I_S		---	---	90	A	
Pulsed Source Current ³⁾	I_{SM}		---	---	360	A	
Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}, I_S=20\text{A}, T_J=25^\circ\text{C}$			1.2	V	
Reverse Recovery Time	t_{rr}	$I_S=25\text{A}, di/dt=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$		26.8		ns	
Reverse Recovery Charge	Q_{rr}				29		nC

Notes:

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.5\text{mH}, I_{AS}=24\text{A}, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
- 3: Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$

Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

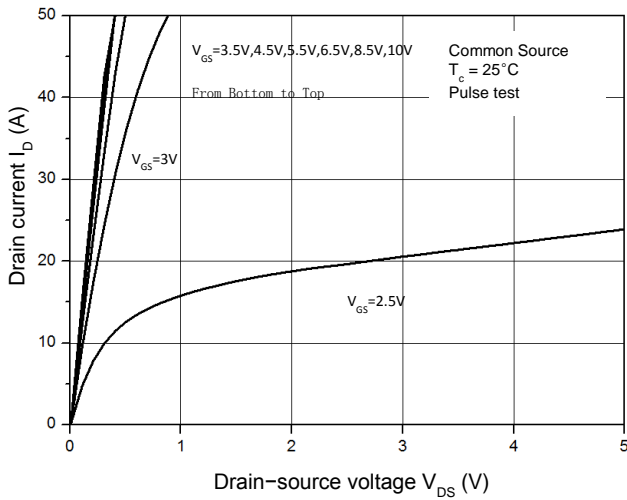


Figure 2. Transfer Characteristics

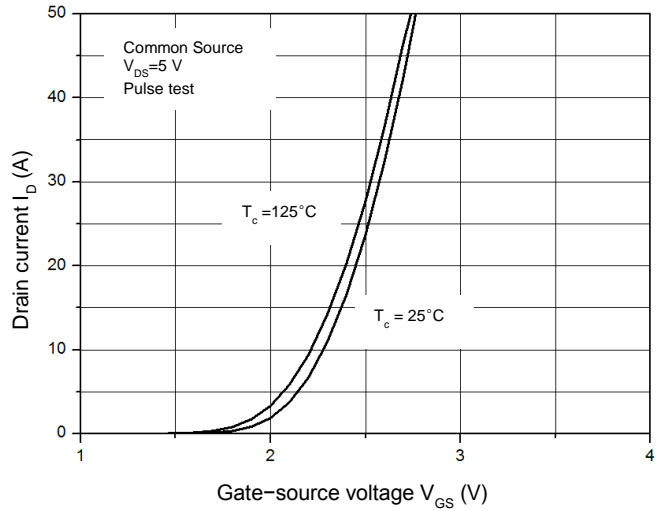


Figure 3. Capacitance Characteristics

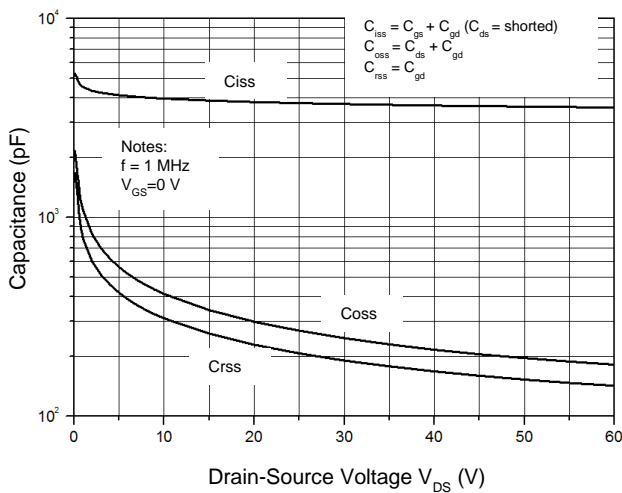


Figure 4. Gate Charge Waveform

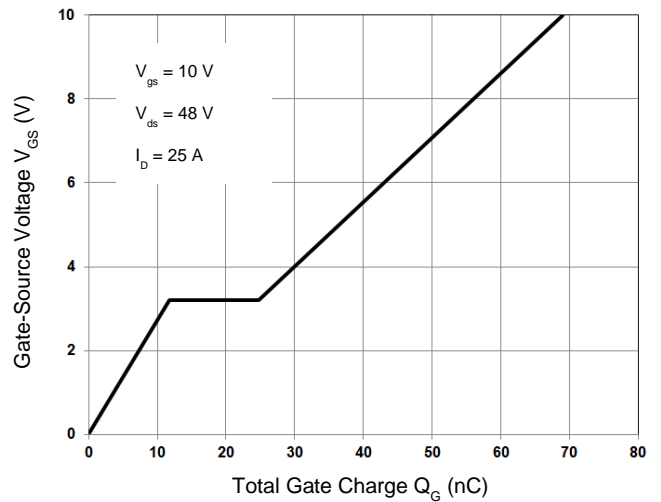


Figure 5. Body-Diode Characteristics

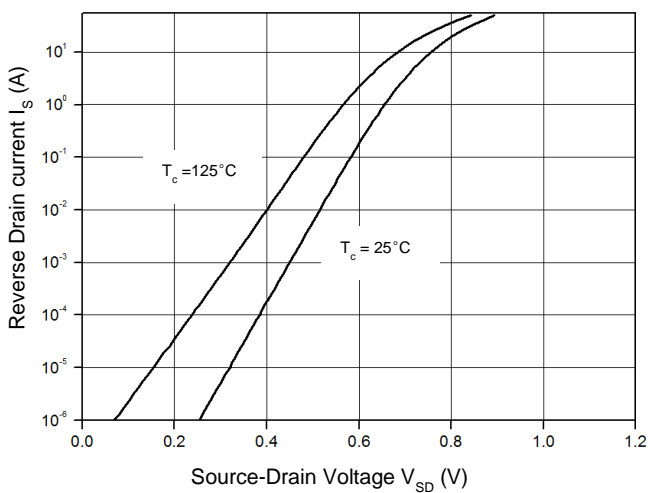


Figure 6. Rds(on)-Drain Current

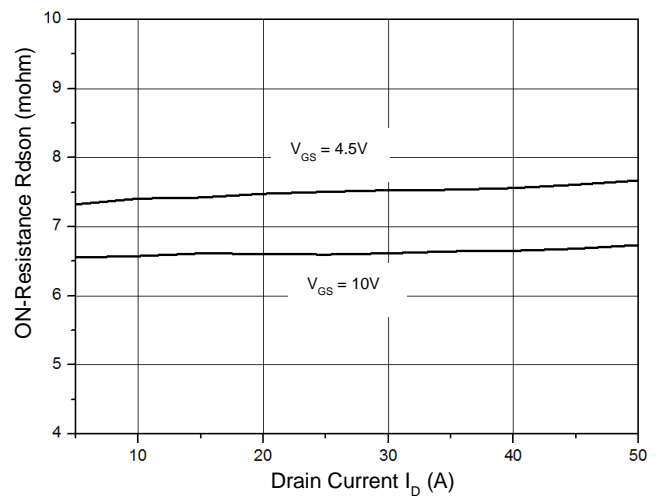


Figure 7. Rdson-Junction Temperature(°C)

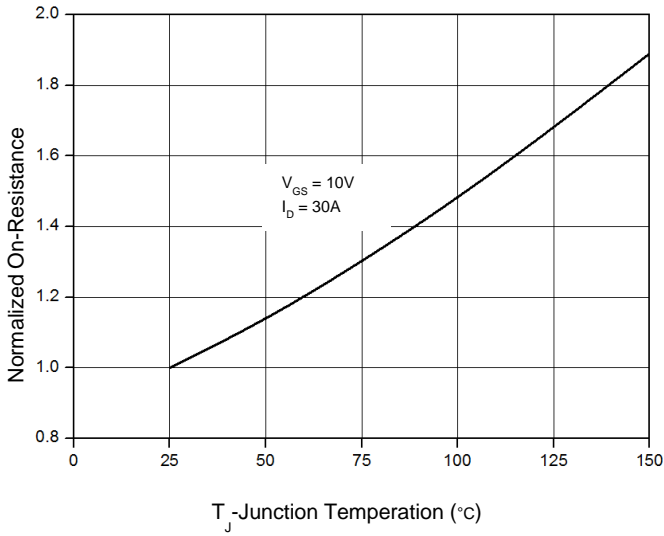


Figure 8. Maximum Safe Operating Area

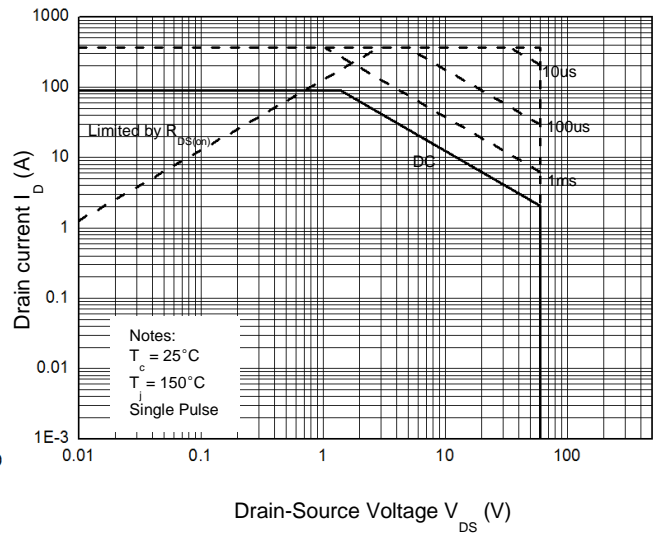
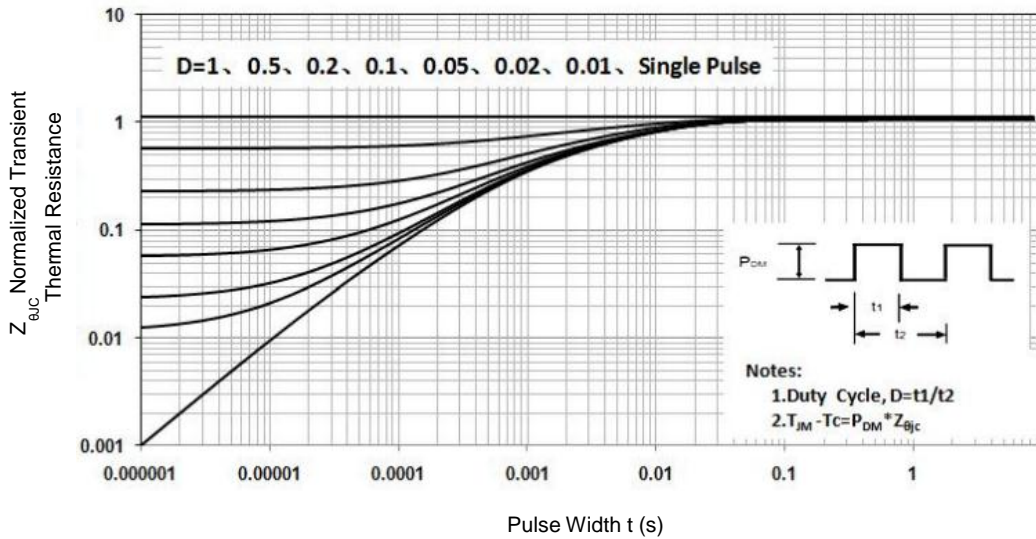


Figure 6. Normalized Maximum Transient Thermal Impedance (RthJC)



Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

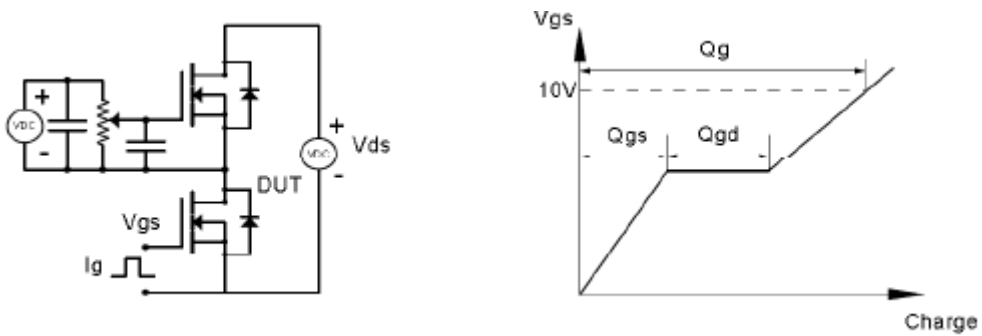


Figure 9. Resistive Switching Test Circuit & Waveforms

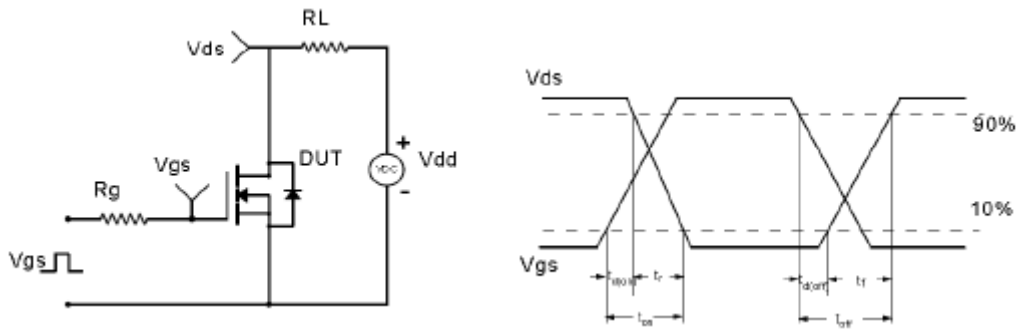


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

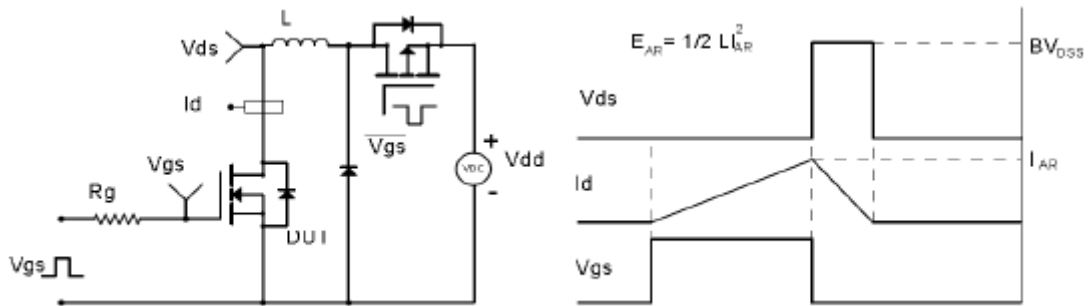
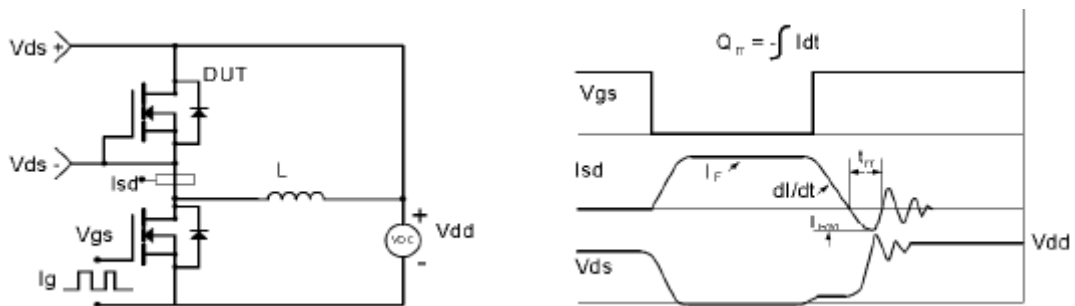
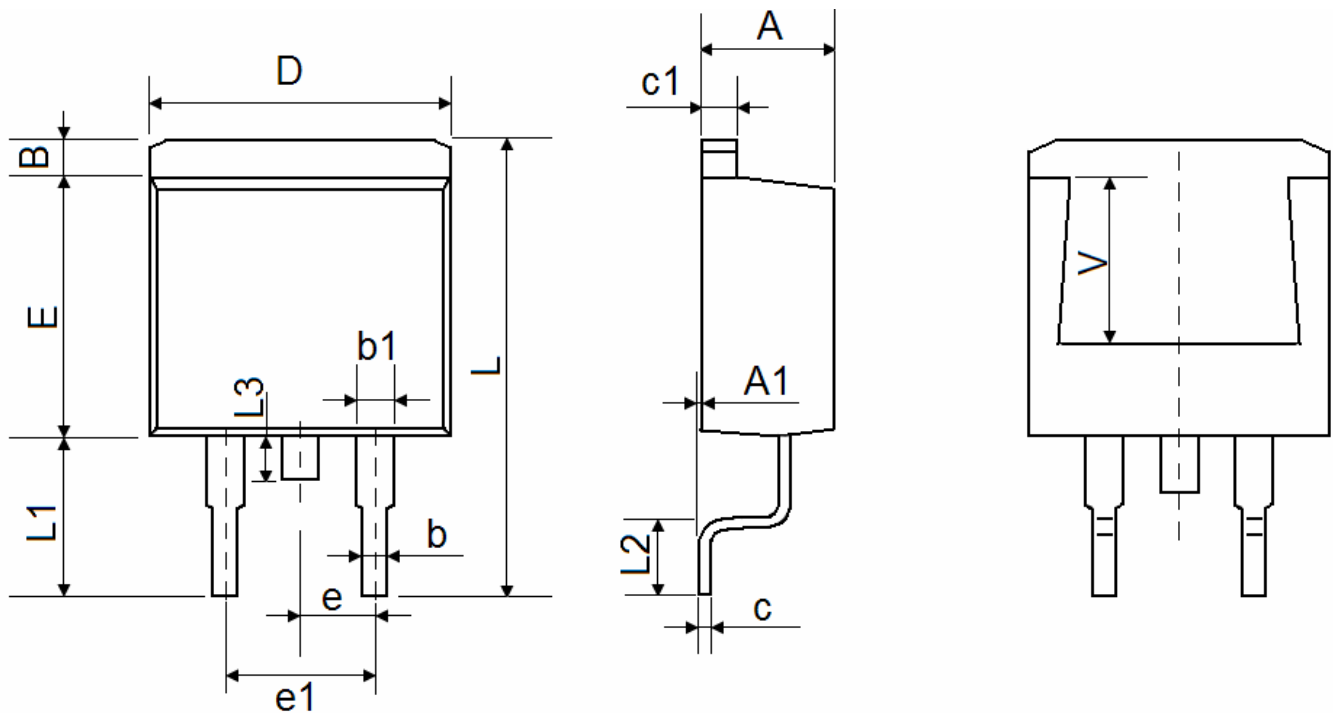


Figure 11. Diode Recovery Circuit & Waveform



Package Information : TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	