

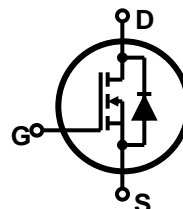
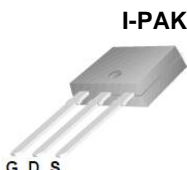
## Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification

$$V_{DSS} = 715 \text{ V @ } T_{jmax}$$

$$I_D = 5.5 \text{ A}$$

$$R_{DS(on)} = 1.6 \text{ } \Omega \text{ (max) @ } V_{GS} = 10 \text{ V}$$



Device	Package	Marking	Remark
TMD6N65/TMU6N65	D-PAK/I-PAK	TMD6N65/TMU6N65	RoHS
TMD6N65G/TMU6N65G	D-PAK/I-PAK	TMD6N65G/TMU6N65G	Halogen Free

## Absolute Maximum Ratings

Parameter	Symbol	TMD6N65(G)/TMU6N65(G)	Unit
Drain-Source Voltage	$V_{DSS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	$T_C = 25 \text{ }^\circ\text{C}$	5.5
		$T_C = 100 \text{ }^\circ\text{C}$	3.46
Pulsed Drain Current (Note 1)	$I_{DM}$	22	A
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	196.6	mJ
Repetitive Avalanche Current (Note 1)	$I_{AR}$	5.5	A
Repetitive Avalanche Energy (Note 1)	$E_{AR}$	12	mJ
Power Dissipation	$P_D$	$T_C = 25 \text{ }^\circ\text{C}$	120
		Derate above $25 \text{ }^\circ\text{C}$	0.96
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	$T_L$	300	$^\circ\text{C}$

\* Limited only by maximum junction temperature

## Thermal Characteristics

Parameter	Symbol	TMD6N65(G)/TMU6N65(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	1.04	$^\circ\text{C/W}$
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	110	$^\circ\text{C/W}$

**Electrical Characteristics :  $T_C=25^\circ\text{C}$ , unless otherwise noted**

Parameter	Symbol	Test condition	Min	Typ	Max	Units
<b>OFF</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	650	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	$\mu\text{A}$
		$V_{DS} = 520\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	$\mu\text{A}$
Forward Gate-Source Leakage Current	$I_{GSSF}$	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
Reverse Gate-Source Leakage Current	$I_{GSSR}$	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

**ON**

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	--	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 2.75\text{ A}$	--	1.28	1.6	$\Omega$
Forward Transconductance <sup>(Note 4)</sup>	$g_{FS}$	$V_{DS} = 30\text{ V}, I_D = 2.75\text{ A}$	--	7.2	--	S

**DYNAMIC**

Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	1177	--	pF
Output Capacitance	$C_{oss}$		--	90	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	5.2	--	pF

**SWITCHING**

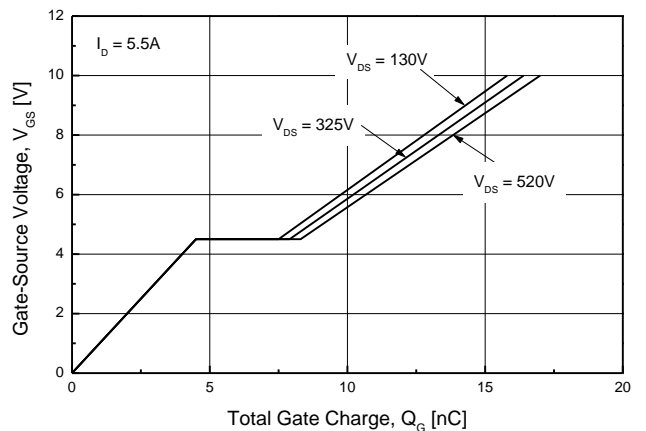
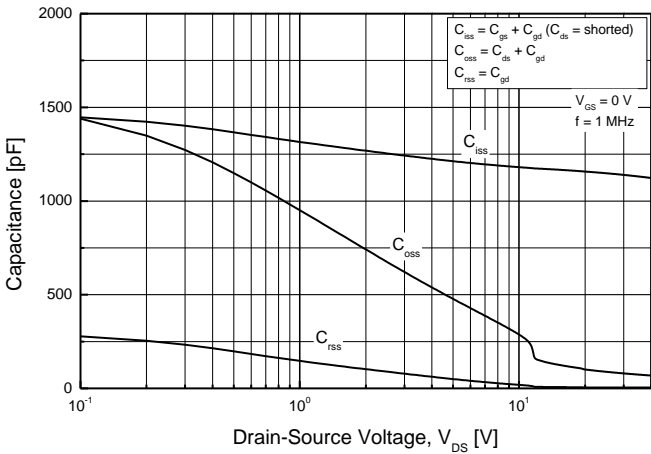
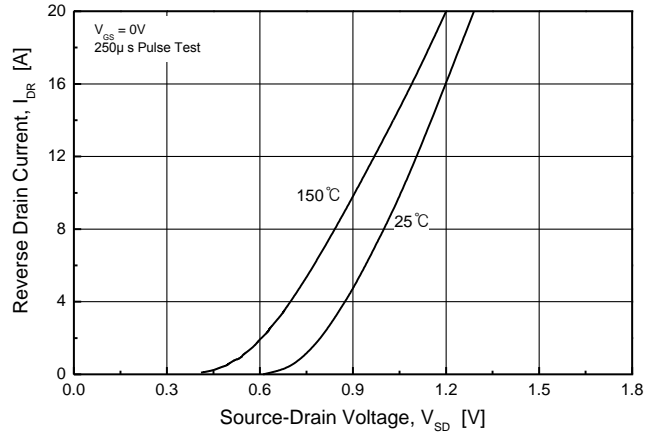
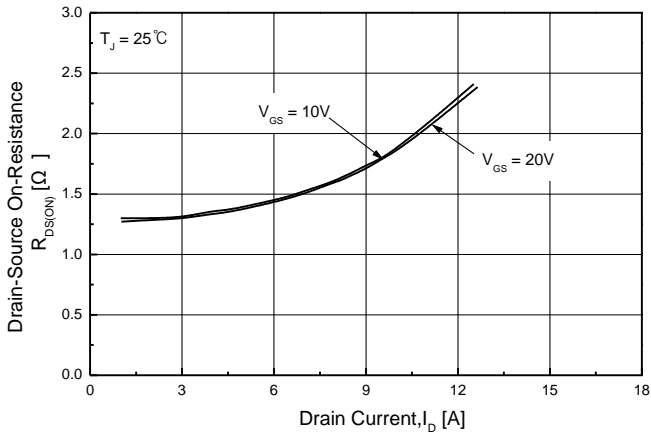
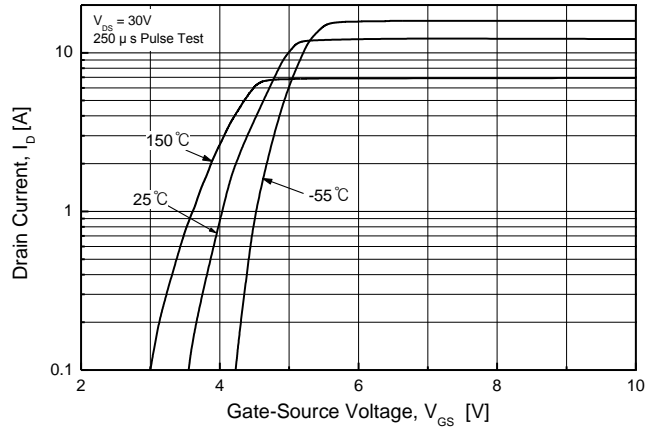
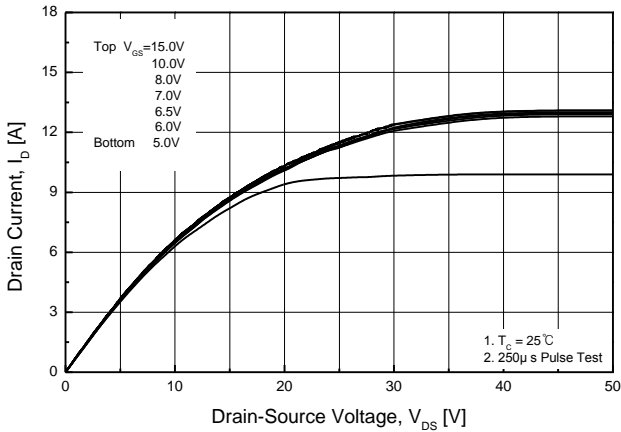
Turn-On Delay Time <sup>(Note 4,5)</sup>	$t_{d(on)}$	$V_{DD} = 325\text{ V}, I_D = 5.5\text{ A},$ $R_G = 25\ \Omega$	--	46	--	ns
Turn-On Rise Time <sup>(Note 4,5)</sup>	$t_r$		--	30	--	ns
Turn-Off Delay Time <sup>(Note 4,5)</sup>	$t_{d(off)}$		--	141	--	ns
Turn-Off Fall Time <sup>(Note 4,5)</sup>	$t_f$		--	56	--	ns
Total Gate Charge <sup>(Note 4,5)</sup>	$Q_g$	$V_{DS} = 520\text{ V}, I_D = 5.5\text{ A},$ $V_{GS} = 10\text{ V}$	--	17	--	nC
Gate-Source Charge <sup>(Note 4,5)</sup>	$Q_{gs}$		--	4.7	--	nC
Gate-Drain Charge <sup>(Note 4,5)</sup>	$Q_{gd}$		--	3.6	--	nC

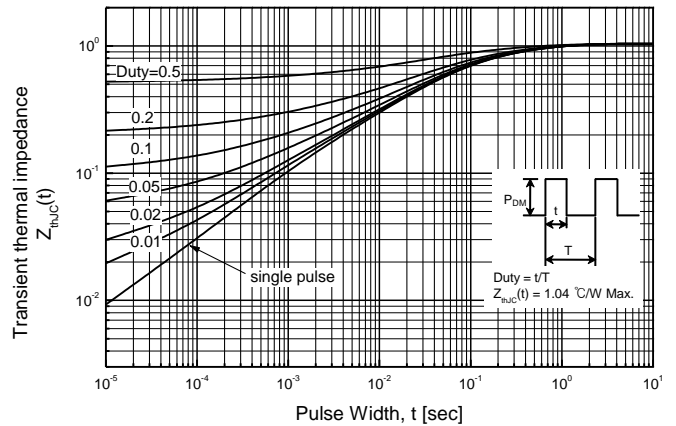
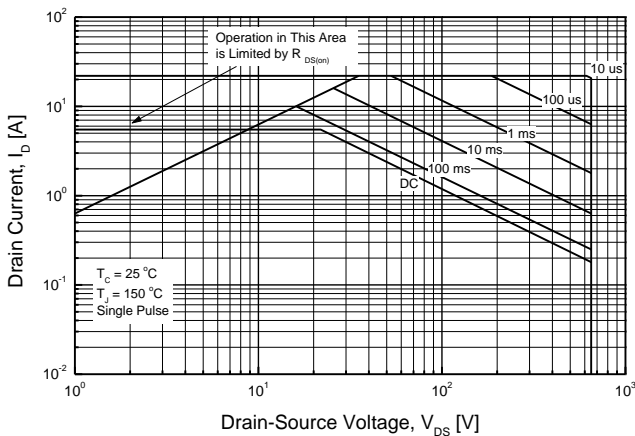
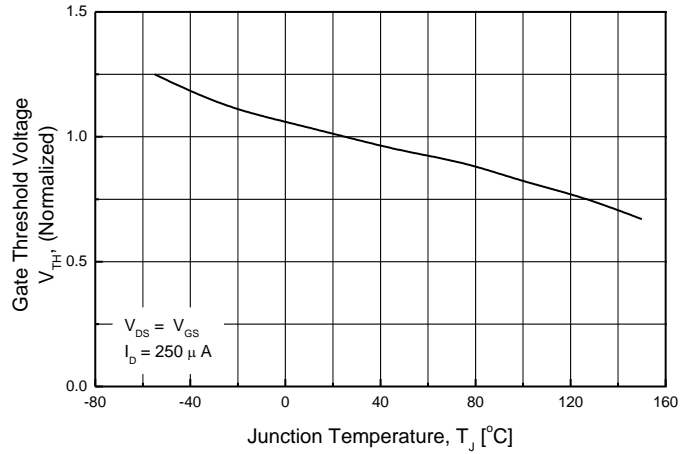
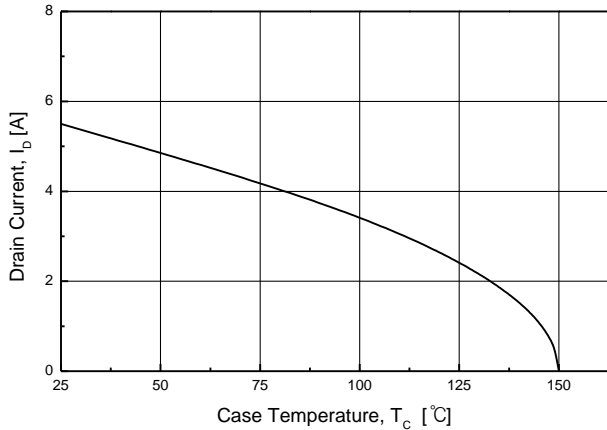
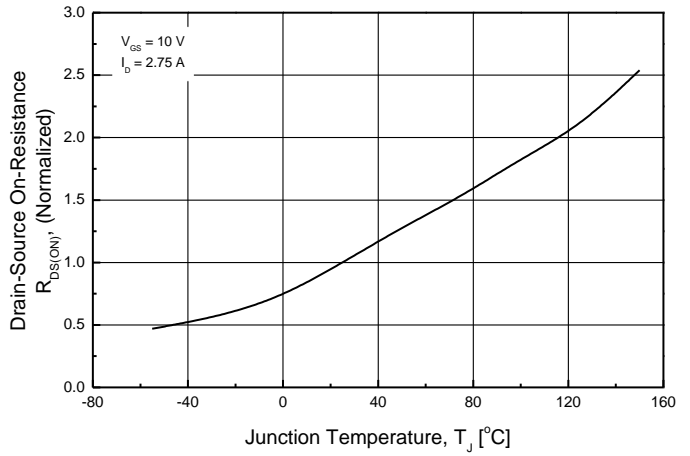
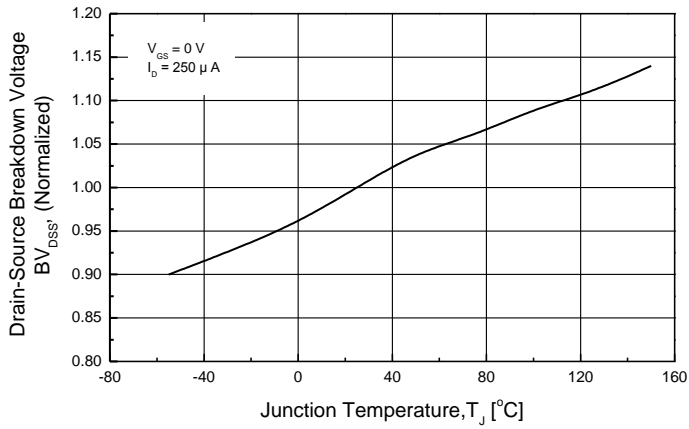
**SOURCE DRAIN DIODE**

Maximum Continuous Drain-Source Diode Forward Current	$I_S$	----	--	--	5.5	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	----	--	--	22	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 5.5\text{ A}$	--	--	1.5	V
Reverse Recovery Time <sup>(Note 4)</sup>	$t_{rr}$	$V_{GS} = 0\text{ V}, I_S = 5.5\text{ A}$ $di_F / dt = 100\text{ A}/\mu\text{s}$	--	342	--	ns
Reverse Recovery Charge <sup>(Note 4)</sup>	$Q_{rr}$		--	2.8	--	$\mu\text{C}$

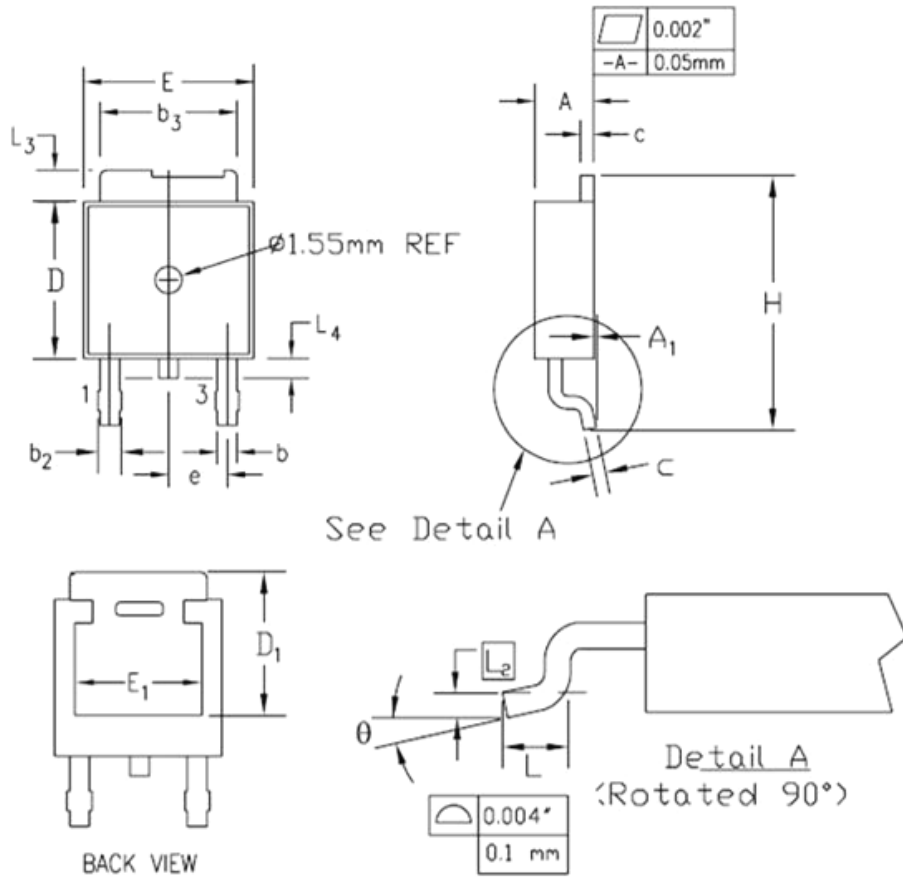
Note :

1. Repeated rating : Pulse width limited by safe operating area
2.  $L=12\text{mH}, I_{AS} = 5.5\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 5.5\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics



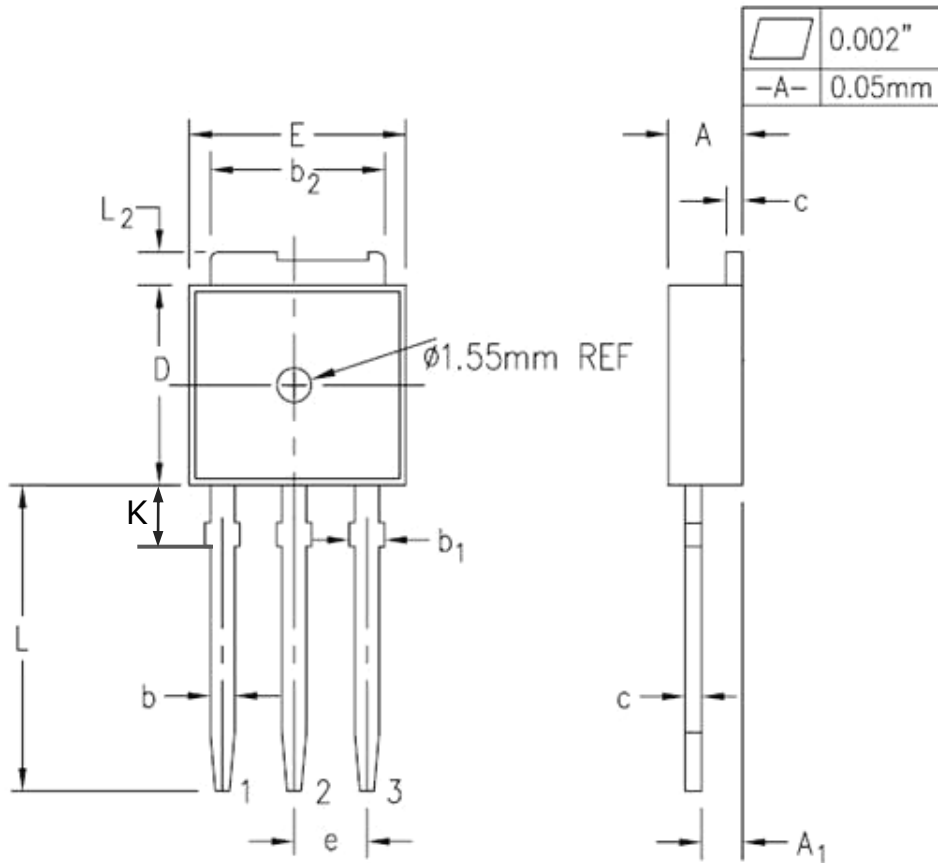


TO-252 (D-PAK) MECHANICAL DATA



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.086	0.094	2.19	2.38	
A <sub>1</sub>	-	0.005	-	0.13	
b	0.025	0.035	0.64	0.89	
b <sub>2</sub>	0.033	0.045	0.84	1.14	
b <sub>3</sub>	0.205	0.215	5.21	5.46	
c	0.018	0.024	0.46	0.61	
D	0.235	0.245	5.97	6.22	
D <sub>1</sub>	0.205	-	5.21	-	2
E	0.250	0.265	6.35	6.73	
E <sub>1</sub>	0.190	-	4.83	-	2
e	0.090 BSC		2.29 BSC		
H	0.380	0.410	9.65	10.41	
L	0.055	0.070	1.40	1.78	4
L <sub>2</sub>	0.020 BSC		0.51 BSC		
L <sub>3</sub>	0.035	0.050	0.89	1.27	
L <sub>4</sub>	0.025	0.040	0.64	1.01	3
$\theta$	0°	8°	0°	8°	

TO-251 (I-PAK) MECHANICAL DATA



SYMBOL	INCHES		MILIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.086	0.094	2.19	2.39	
A1	0.040	0.045	1.02	1.14	
b	0.025	0.035	0.64	0.89	
b1	0.037	0.045	0.95	1.14	
b2	0.205	0.215	5.21	5.46	
c	0.018	0.023	0.46	0.58	
D	0.235	0.245	5.97	6.22	
E	0.250	0.265	6.35	6.73	
e	0.090 TYP.		2.28 TYP.		
L	0.350	0.380	8.89	9.65	
L2	0.035	0.050	0.89	1.27	
K	0.079	0.096	2.00	2.44	