
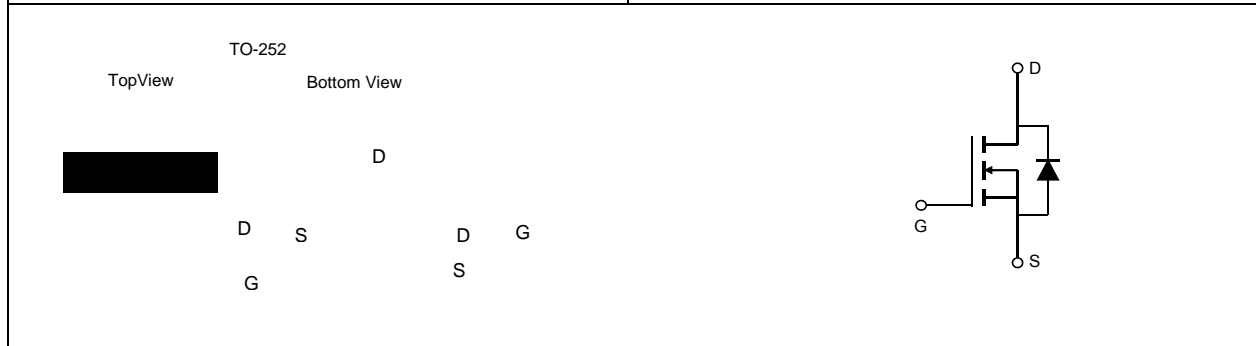


## TMD1606D N-CHANNEL POWER MOSFET

<p><b>General Description</b></p> <p>The TMD1606D uses advanced trench technology and design to provide excellent <math>R_{DS(ON)}</math> with low gate charge. It can be used in a wide variety of applications.</p>	<p><b>Product Summary</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"><math>V_{DS}</math></td> <td style="text-align: right;">60V</td> </tr> <tr> <td><math>I_D</math> (at <math>V_{GS}=10V</math>)</td> <td style="text-align: right;">66A</td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=10V</math>)</td> <td style="text-align: right;">&lt; 12.5m<math>\Omega</math></td> </tr> </table> <p>100% UIS Tested 100% <math>R_g</math> Tested</p> <div style="text-align: right;">  </div>	$V_{DS}$	60V	$I_D$ (at $V_{GS}=10V$ )	66A	$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 12.5m $\Omega$
$V_{DS}$	60V						
$I_D$ (at $V_{GS}=10V$ )	66A						
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 12.5m $\Omega$						



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted				
Symbol	Parameter	Rating	Unit	
Common Ratings ( $T_C=25^\circ C$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage	60	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 25$		
$T_J$	Maximum Junction Temperature	175	°C	
$T_{STG}$	Storage Temperature Range	-55 to 175	°C	
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$	66	A
Mounted on Large Heat Sink				
$I_{DM}$	Pulsed Drain Current *	$T_C=25^\circ C$	250**	A
$I_D$	Continuous Drain Current	$T_C=25^\circ C$	66	A
		$T_C=100^\circ C$	45	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$	64	W
		$T_C=100^\circ C$	32	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.35		°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	110		°C/W
$E_{AS}$	Drain-Source Avalanche Energy	L=0.5mH	200***	mJ

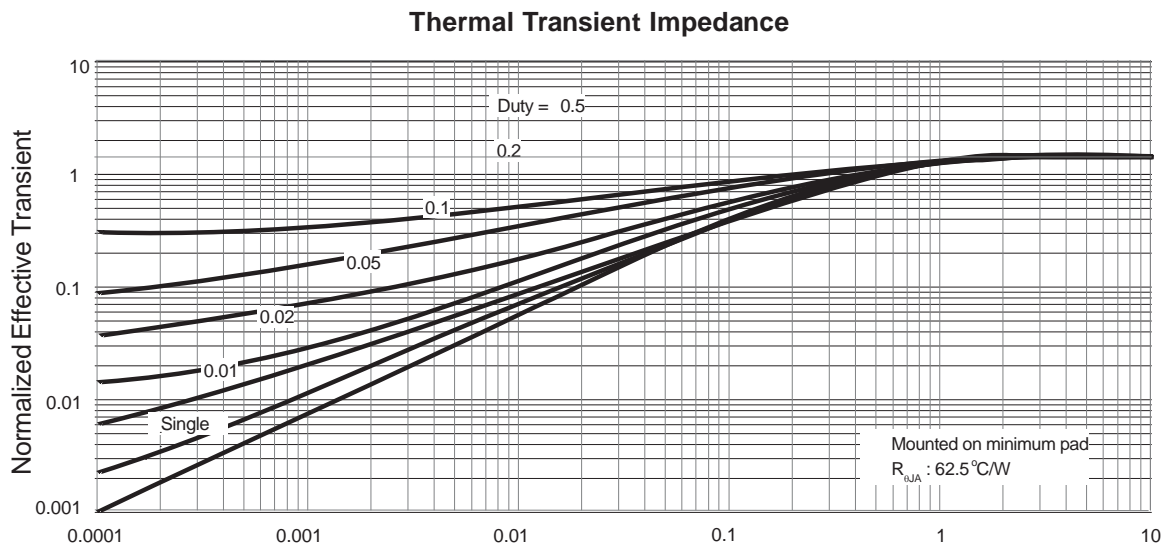
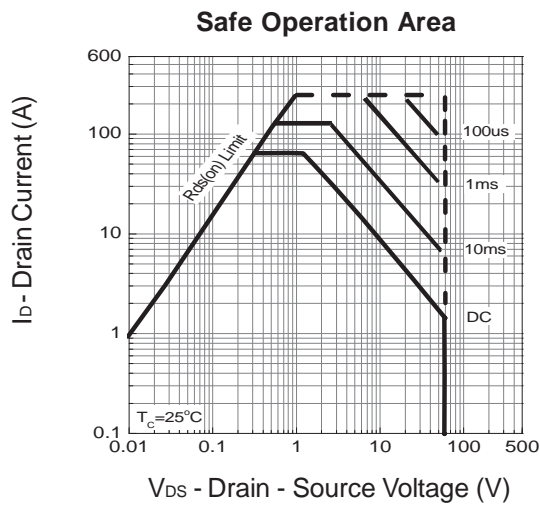
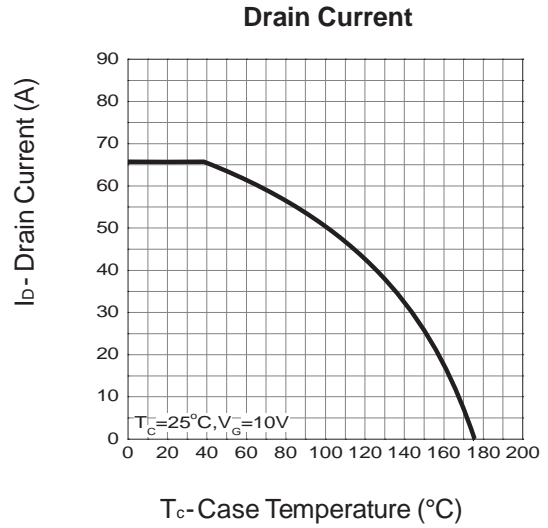
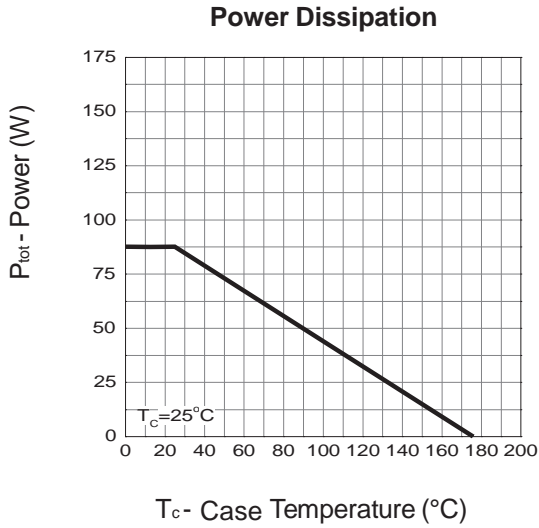
Note j \* Repetitive rating ; pulse width limited by junction temperature  
 \*\* Drain current is limited by junction temperature  
 \*\*\*  $V_D=48V$

! " #

Symbol	Parameter	Test Conditions	TMD1606D			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250 \mu A$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$	-	-	1	$\mu A$
		$T_J=85^\circ C$	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250 \mu A$	2	3	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	$\pm 100$	nA
$R_{DS(ON)}^*$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=33A$	-	10.4	12.5	m $\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^*$	Diode Forward Voltage	$I_{SD}=33A, V_{GS}=0V$	-	0.8	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=33A, di_{SD}/dt=100A/\mu s$	-	33	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	61	-	nC
<b>Dynamic Characteristics</b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	0.9	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Frequency=1.0MHz	-	2040	-	pF
$C_{oss}$	Output Capacitance		-	760	-	
$C_{rss}$	Reverse Transfer Capacitance		-	370	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=30V, R_G=5 \Omega,$ $I_{DS}=33A, V_{GS}=10V,$	-	14	-	ns
$T_r$	Turn-on Rise Time		-	13	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	20	-	
$T_f$	Turn-off Fall Time		-	7	-	
<b>Gate Charge Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=48V, V_{GS}=10V,$ $I_{DS}=33A$	-	51	-	nC
$Q_{gs}$	Gate-Source Charge		-	11	-	
$Q_{gd}$	Gate-Drain Charge		-	17	-	

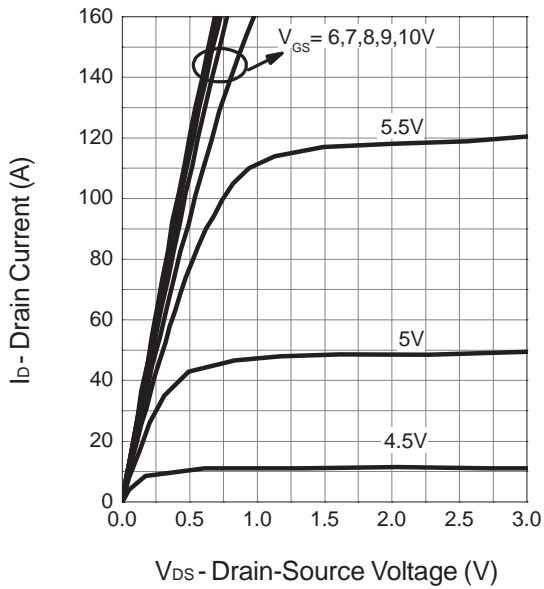
Note \*: Pulse test ; pulse width  $\leq 100 \mu s$ , duty cycle  $\leq 2\%$ .

# Typical Operating Characteristics

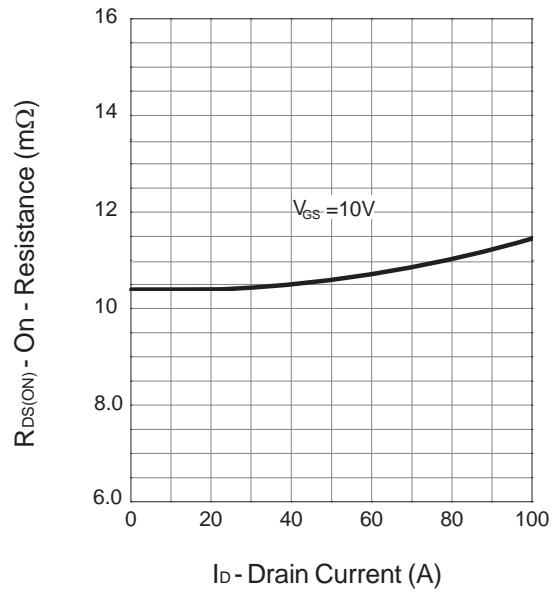


## Typical Operating Characteristics (Cont.)

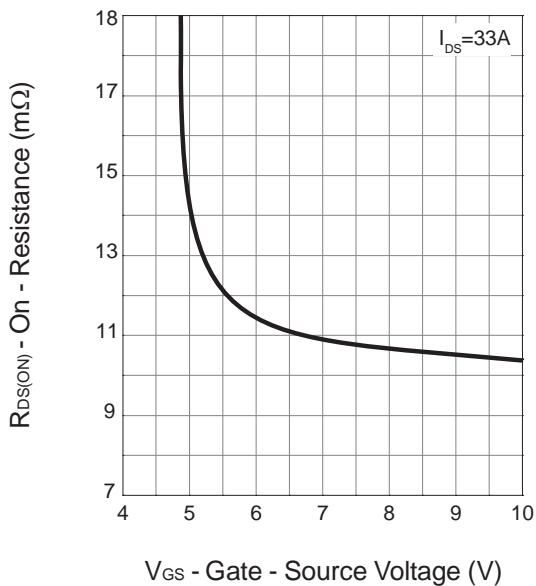
Output Characteristics



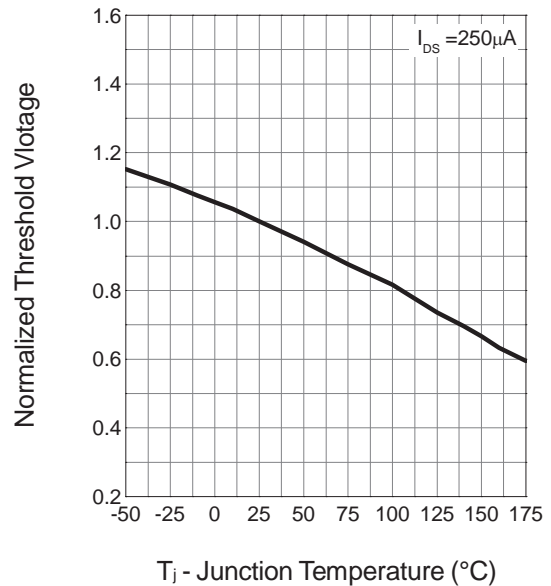
Drain-Source On Resistance



Drain-Source On Resistance

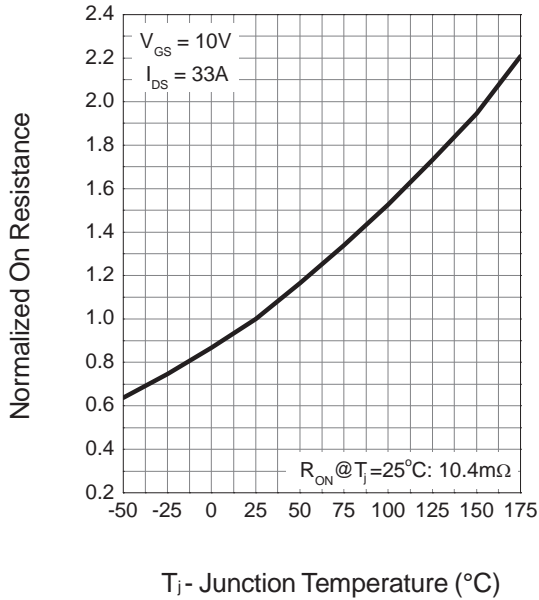


Gate Threshold Voltage

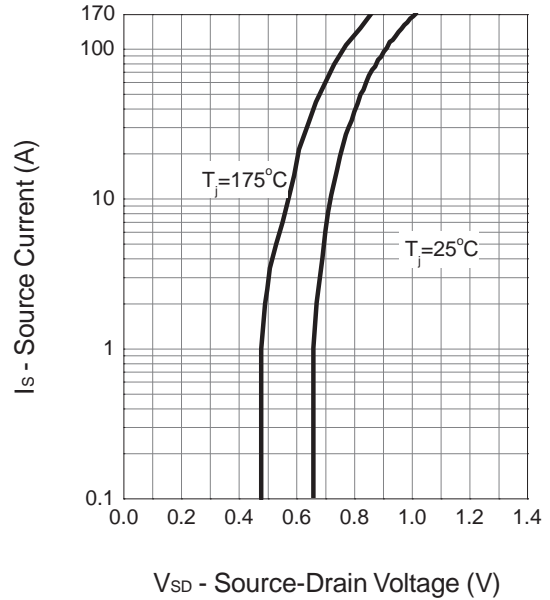


## Typical Operating Characteristics (Cont.)

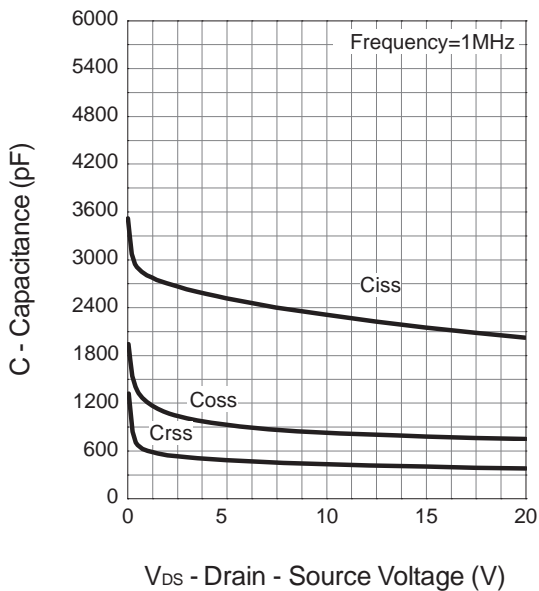
**Drain-Source On Resistance**



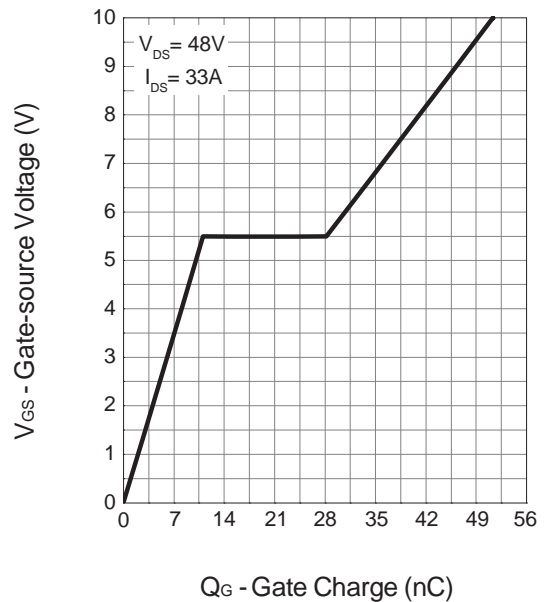
**Source-Drain Diode Forward**



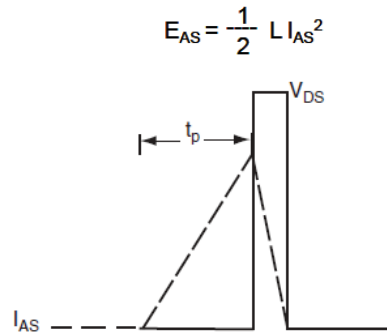
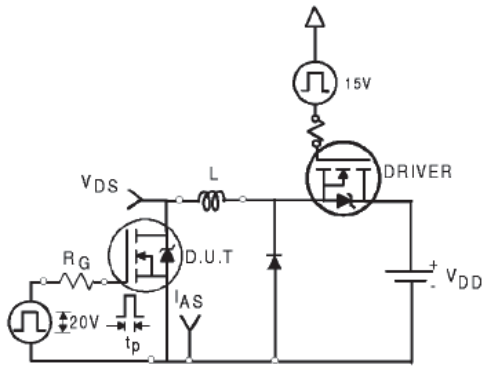
**Capacitance**



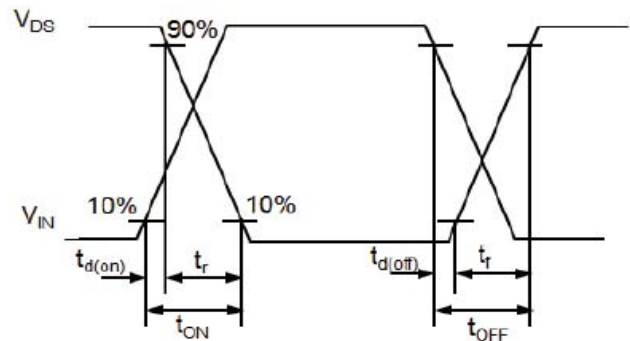
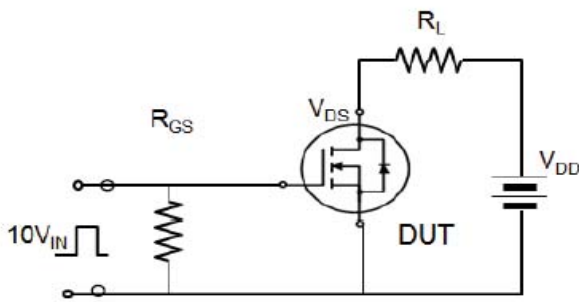
**Gate Charge**



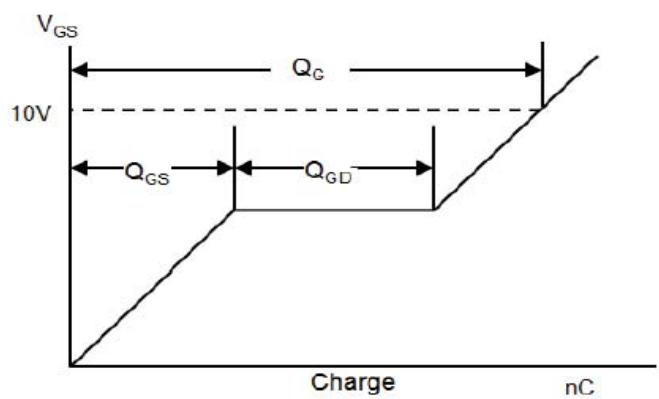
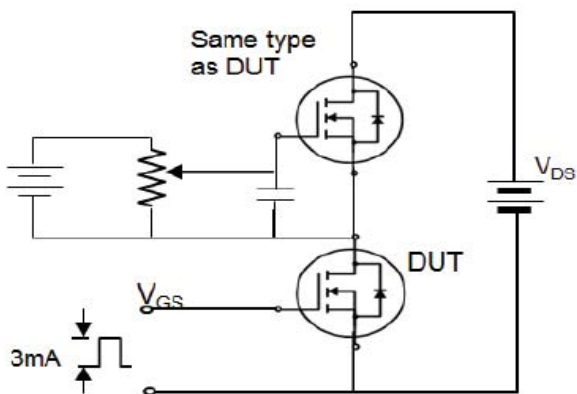
## Avalanche Test Circuit



## Switching Time Test Circuit



## Gate Charge Test Circuit



## TO-252 Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4 83 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
-	1.100	1.300	0.043	0.051
	e	e	e	e
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	