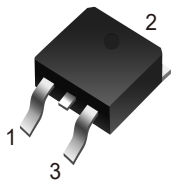
WGD60N02

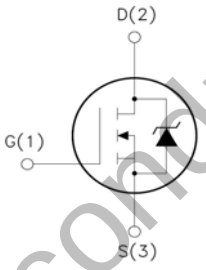
TO-252S

RoHS COMPLIANT



Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=23 nC (Typ.).
- ☐ BVDSS=20 V,I_D=60 A
- ☐ R_{DS}(on) : 6.8mΩ(Max) @V_G=4.5V
- ☐ 100% Avalanche Tested



1.Gate (G)
2.Drain (D)
3.Sourse (S)

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	60	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	39	A
Pulsed Drain Current	I_{DM}	240	A
Maximum Power Dissipation	P_D	37	W
Single pulse avalanche energy (Note 5)	E_{AS}	47.6	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃
	T_L	300	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	4	℃/W

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Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.4	0.65	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=20A	-	5	6.8	mΩ
		V_{GS}=2.5V, I_D=20A	-	6.8	10	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	1800	-	PF
Output Capacitance	C_{oss}		-	290	-	PF
Reverse Transfer Capacitance	C_{rss}		-	275	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	VDS=10V, I_D =25V RG= 3Ω,VGS=4.5 V	-	15	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	nS
Turn-Off Fall Time	t_f		-	21	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=25A, V_{GS}=4.5V	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	nC
Gate-Drain Charge	Q_{gd}		-	7.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_{SD}=30A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	60	A
Diode Forward Current (Note 2)	I_{SM}		-	-	240	A

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Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5 %
4. Guaranteed by design, not subject to production
5. EAS condition：Tj=25℃,V_{DD}=10V,V_G=4.5V, L=0.5mH,Rg=25Ω ,I_{AS} =14V

Typical Electrical and Thermal Characteristics (Curves

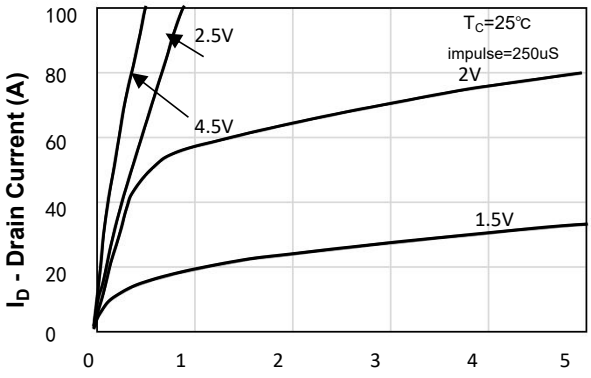


Figure 1. On-Region Characteristics

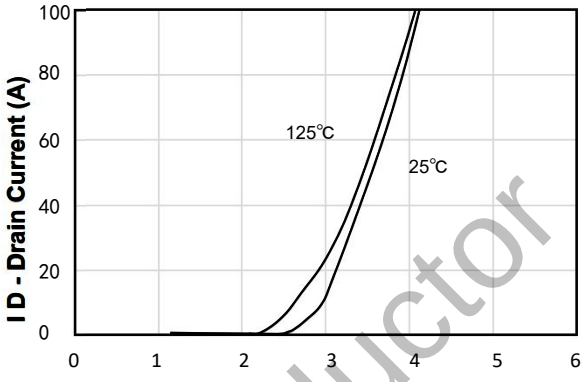


Figure 2. Transfer Characteristics

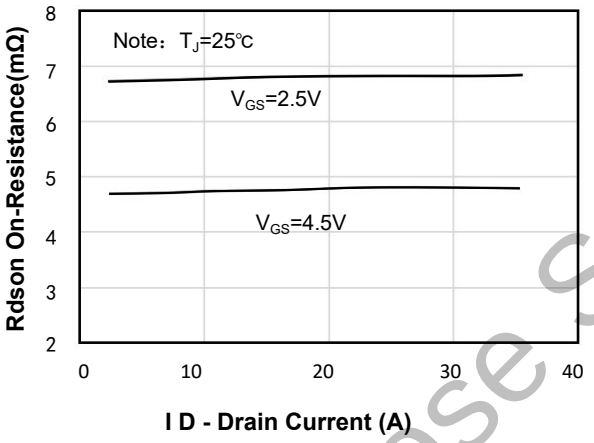


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

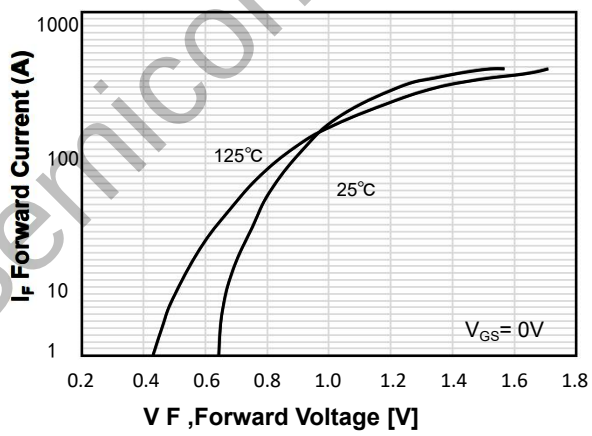


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

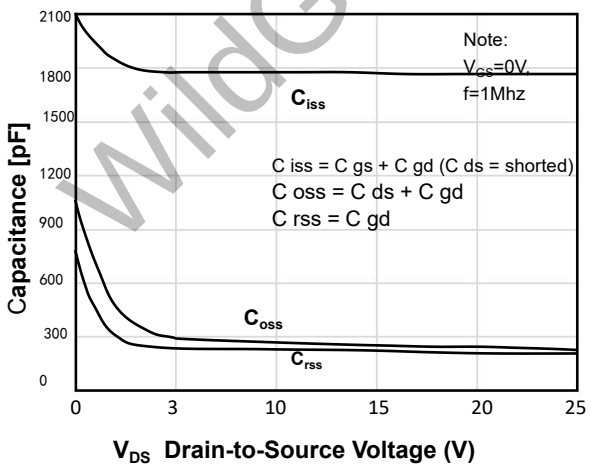


Figure 5. Capacitance Characteristics

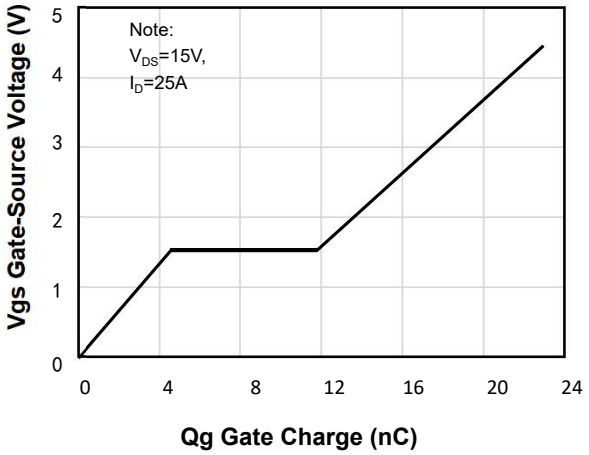


Figure 6. Gate Charge Characteristics

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Typical Electrical and Thermal Characteristics (Curves

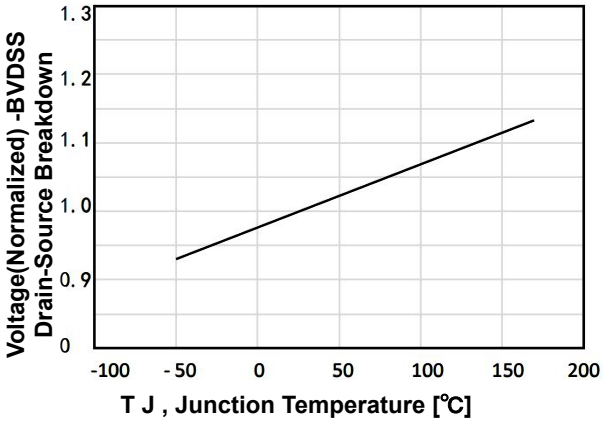


Figure 7. Breakdown Voltage Variation vs Temperature

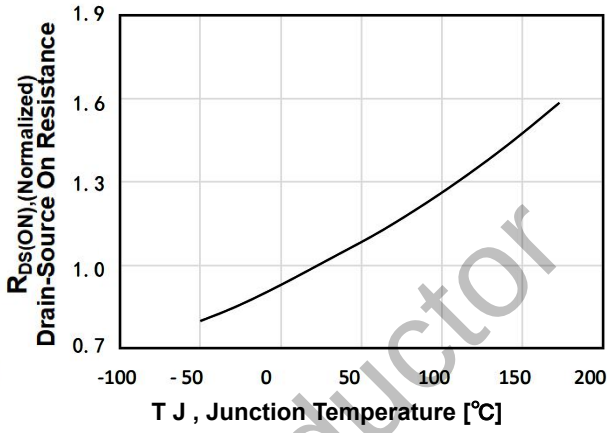


Figure 8. On-Resistance Variation vs Temperature

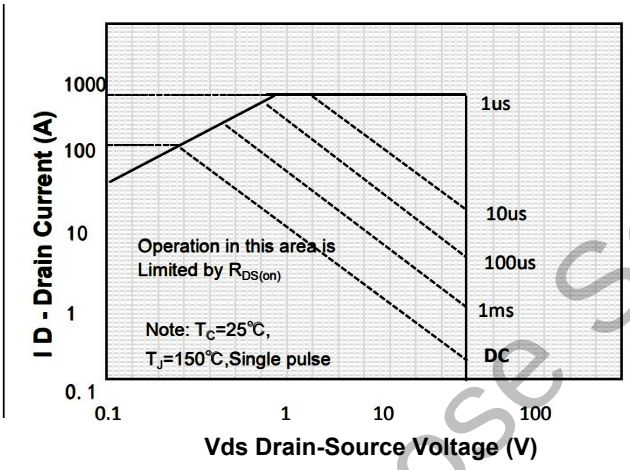


Figure 9. Maximum Safe Operating Area

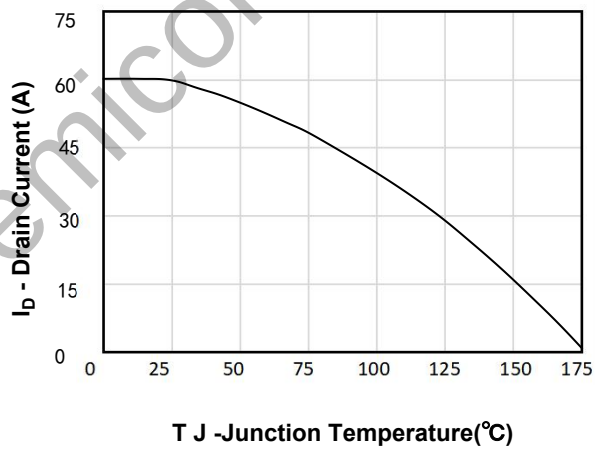


Figure 10. Maximum PContinuous Drain Currentvs Case Temperature

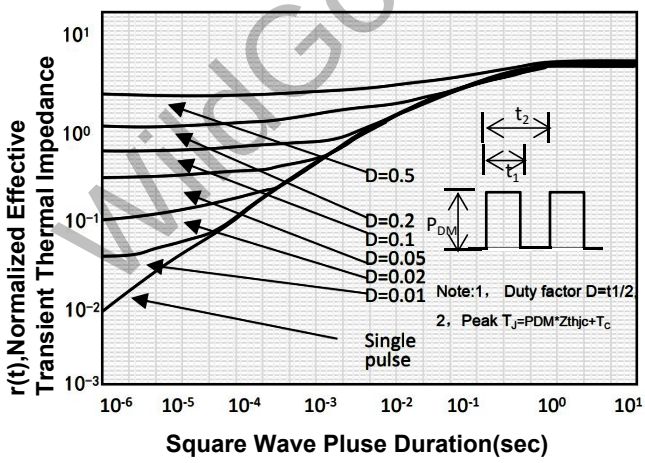
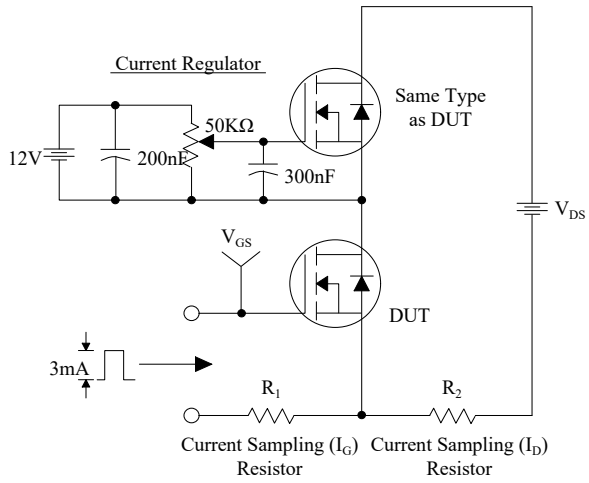
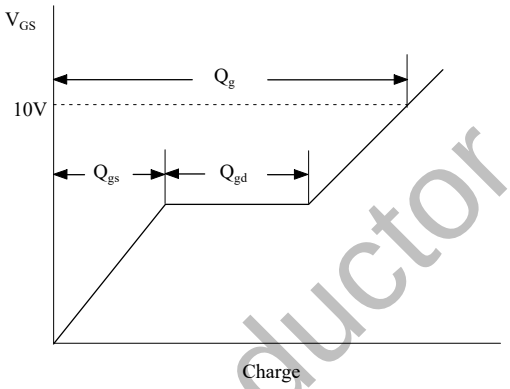


Figure 11. Transient Thermal Response Curve

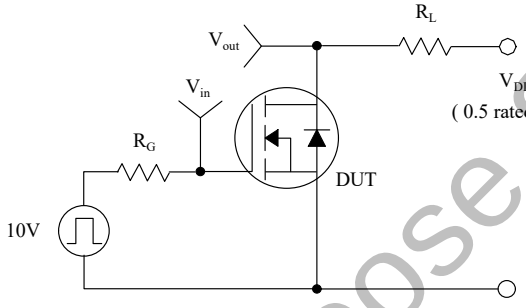
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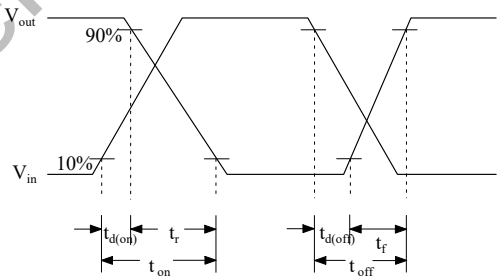
Test Circuit



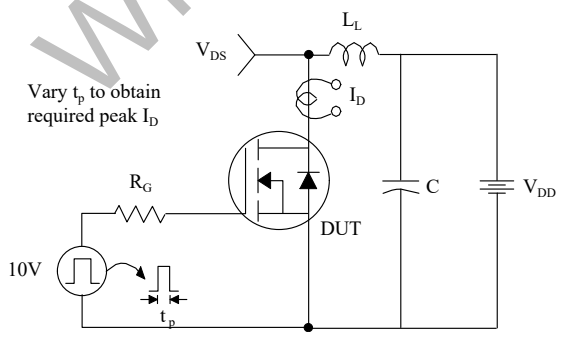


Resistive Switching Test Circuit & Waveforms

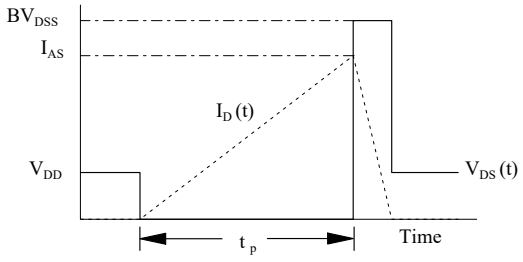




Unclamped Inductive Switching Test Circuit & Waveforms

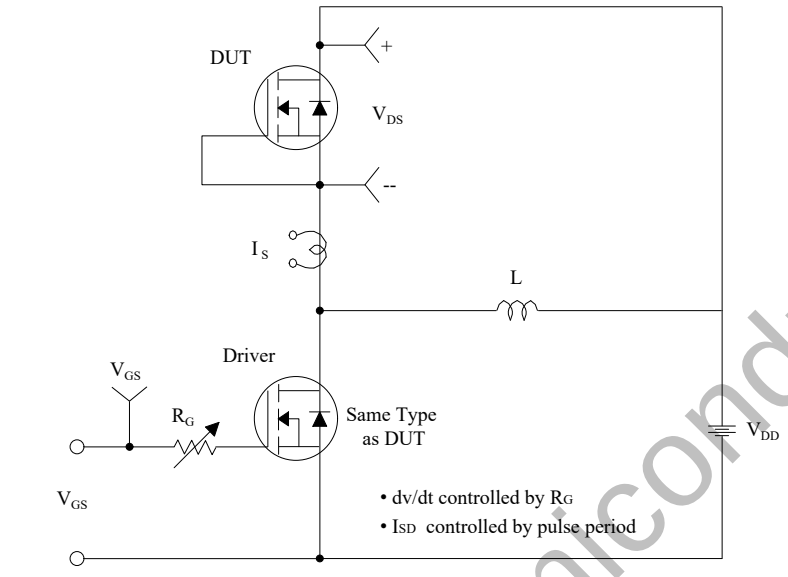


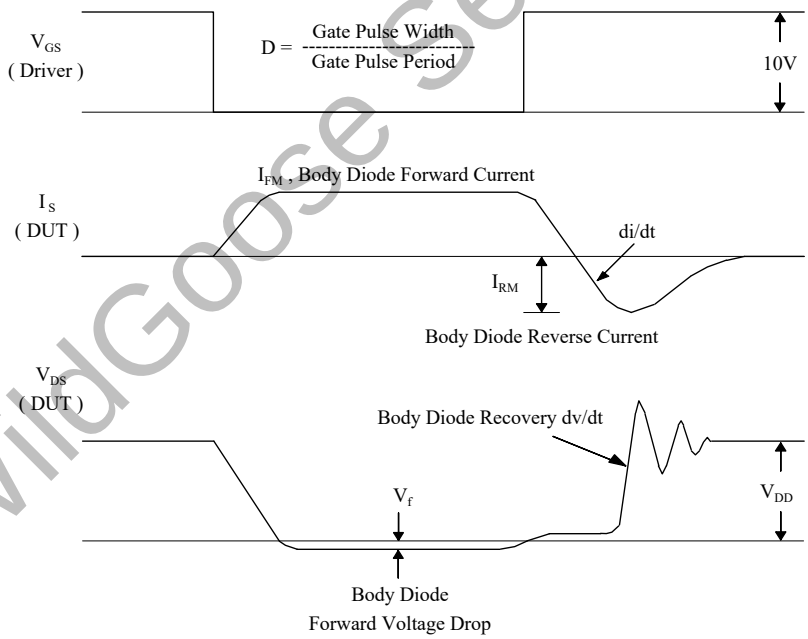
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$



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Peak Diode Recovery dv/dt Test Circuit & Waveforms



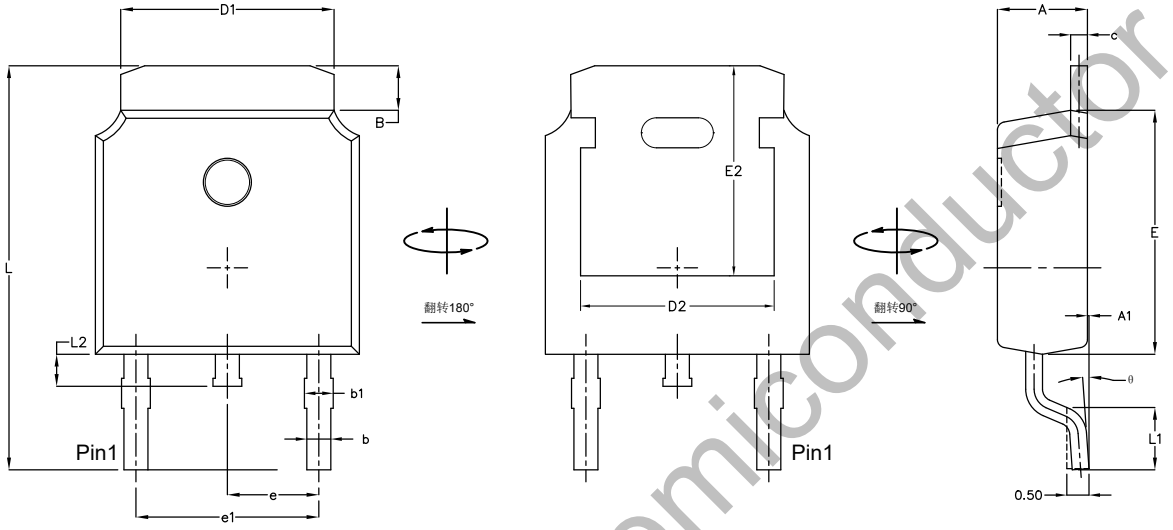


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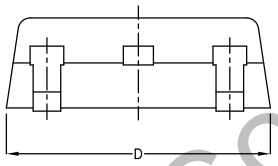
Package Dimension

TO-252S

Unit: mm



TOP—VIEW: BOTTOM: RIGHT—VIEW:



FRONT—VIEW:

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.25	2.30
A1	0.03	0.08	0.13
B	0.85	1.00	1.15
b	0.59	0.69	0.79
b1	0.74	0.84	0.94
c	0.48	0.50	0.52
D	6.55	6.60	6.65
D1	5.23	5.33	5.43
D2	4.74	4.84	4.94
E	6.05	6.10	6.15
E2	5.15	5.25	5.35
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.77	9.97	10.17
L1	1.40	1.50	1.60
L2	0.70	0.80	0.90
θ	0°	3°	6°

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