Wuxi Unigroup Microelectronics Co.,Ltd.

60V N-Channel SGT MOSFET

General Description

- **Trench Power SGT technology**
- Very low on-resistance $R_{DS(ON)}$
- Low Gate Charge
- Excellent Gate Charge x $R_{DS(ON)}$ Product

Applications

- High Frequency Switching and Synchronous Rectification

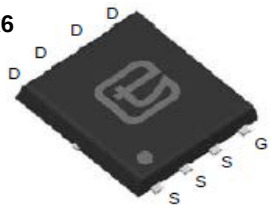
Product Summary

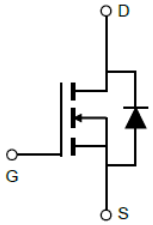
V_{DS}	60V
I_D (at V_{GS}=10V)	45A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 15mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 19mΩ

100% UIS Tested

RoHS

DFN5x6





Part Number	Package Type	Form	Marking
TSG10N06AT	DFN5×6	Tape & Reel	G10N06AT

Absolute Maximum Ratings (T_A =25°C unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [B]	T_C =25°C	I_D	45	A
	T_C =100°C		27	
Pulsed Drain Current [A]		I_{DM}	180	A
Avalanche Current [A]		I_{AS}	20	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	20	mJ
Power Dissipation [C]	T_C =25°C	P_D	56.5	W
	T_C =100°C		35.7	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	2.1	°C/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	50	

Electrical Characteristics(T_J =25ºC unless otherwise noted)

Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250μA,V_{GS} =0V		60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =60V, V_{GS} =0V	T_J =25ºC	--	--	1	μA
			T_J =125ºC	--	--	100	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V		--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA		1.1	--	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =20A		--	12	15	mΩ
		V_{GS} =4.5V, I_D =18A		--	15	19	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =20A		--	100	--	S
V_{SD}	Diode Forward Voltage	I_S =1A, V_{GS} =0V		--	--	1	V
I_S	Maximum Body-Diode Continuous Current [B]			--	--	30	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =30V, f =1MH_Z		--	1134	--	pF
C_{oss}	Output Capacitance			--	123	--	
C_{rss}	Reverse Transfer Capacitance			--	12	--	
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =10V,V_{DS} =30V, I_D =20A		--	21	--	nC
Q_g(4.5V)	Gate Source Charge			--	11	--	
Q_{gs}	Gate Source Charge			--	3.1	--	
Q_{gd}	Gate Drain Charge			--	5.1	--	
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =30V, I_D =20A, R_G =3Ω		--	7	--	ns
t_r	Turn-On Rise Time			--	3	--	
$t_{D(off)}$	Turn-Off Delay Time			--	20	--	
t_f	Turn-Off Fall Time			--	3	--	
t_{rr}	Body Diode Reverse Recovery Time	I_F =20A, di/dt =500A/μs		--	17	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge			--	60	--	nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)}$ =175ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

Typical Characteristics T_J = 25ºC, unless otherwise noted

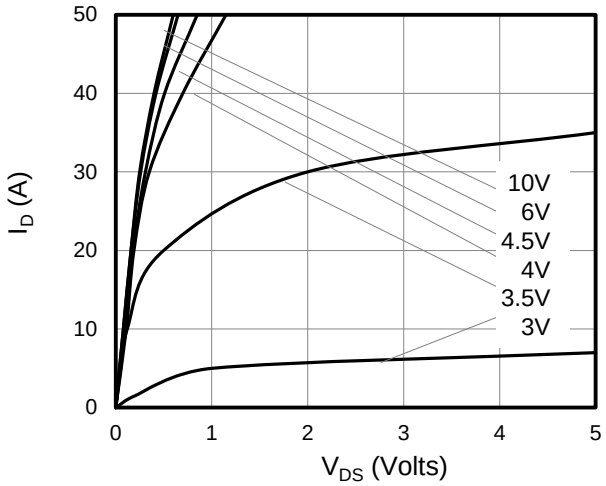


Figure 1: On-Region Characteristics

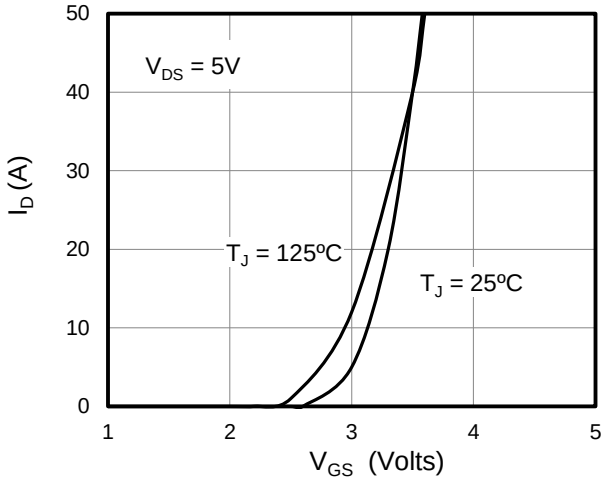


Figure 2: Transfer Characteristics

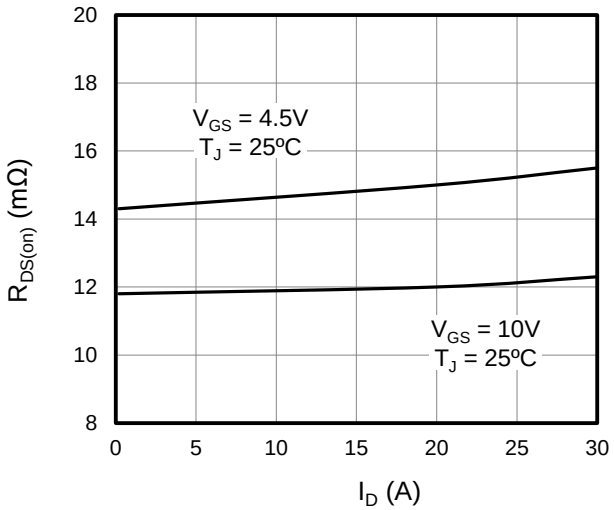


Figure 3: On-Resistance vs. Drain Current

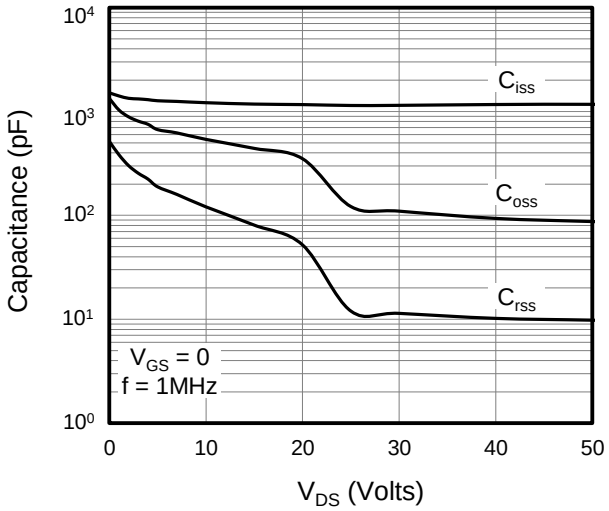


Figure 4: Capacitance Characteristics

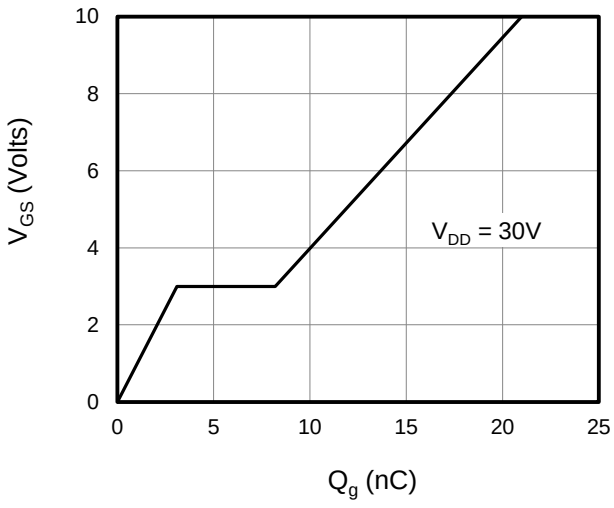


Figure 5: Gate Charge Characteristics

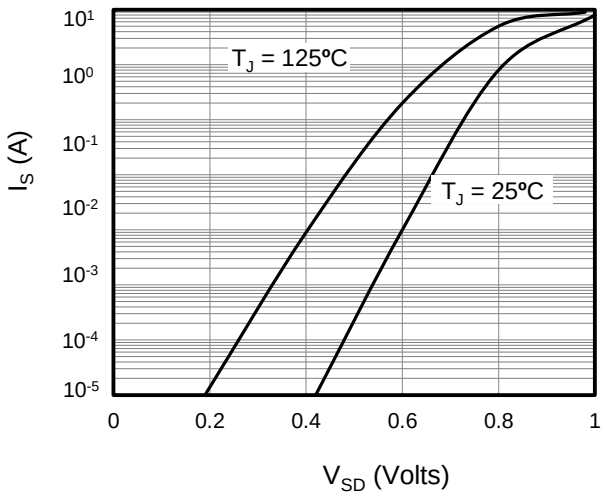


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

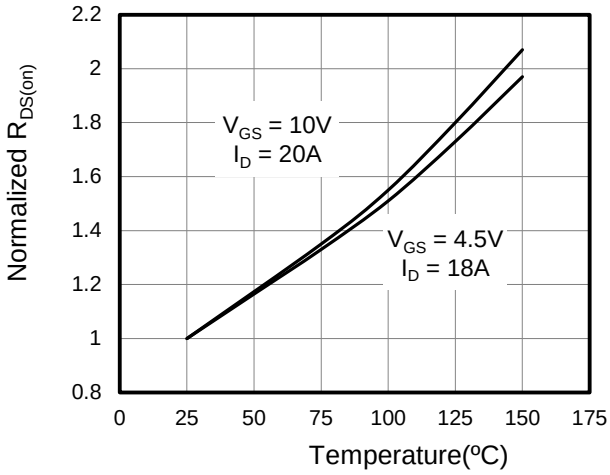


Figure 7: On-Resistance vs. Junction Temperature

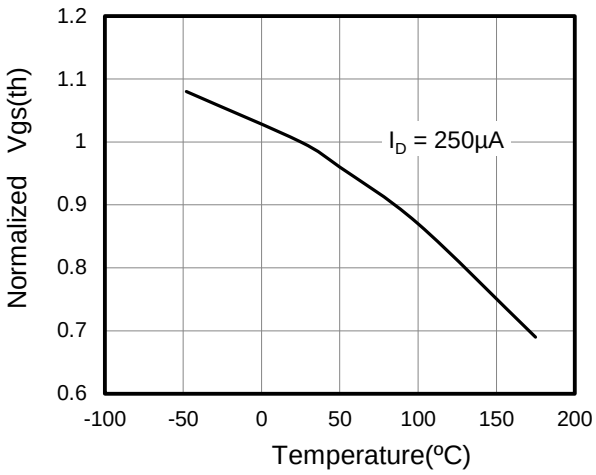


Figure 8: Vgs(th) vs. Junction Temperature

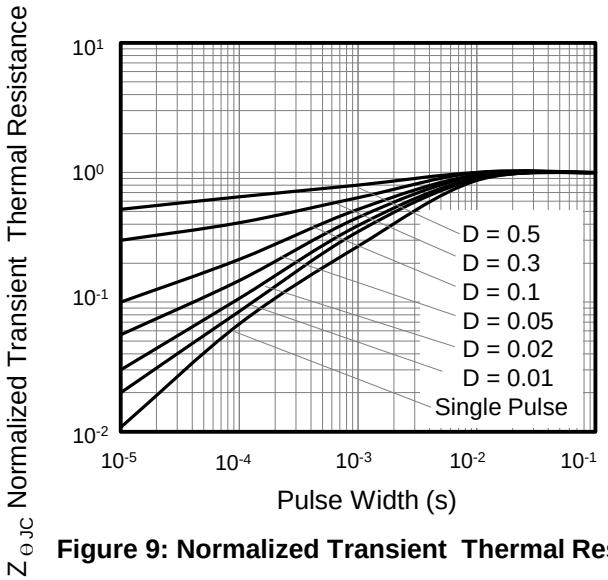


Figure 9: Normalized Transient Thermal Resistance

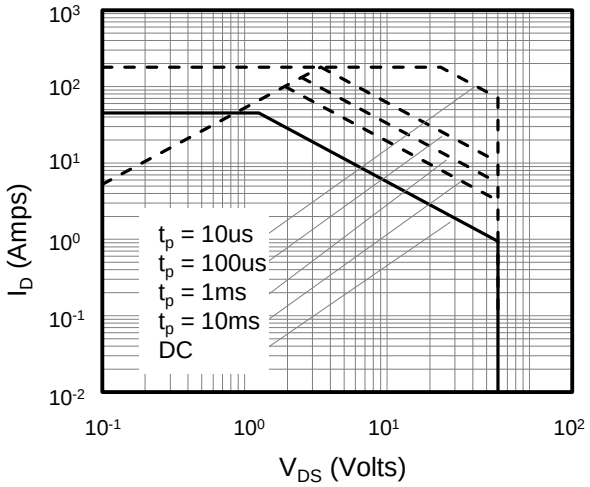


Figure 10: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

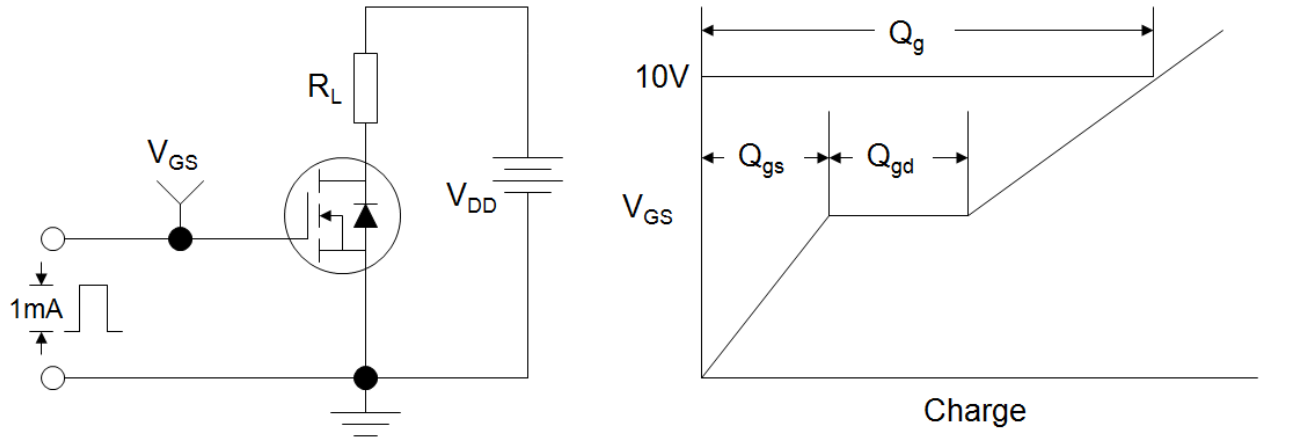


Figure B：Resistive Switching Test Circuit and Waveform

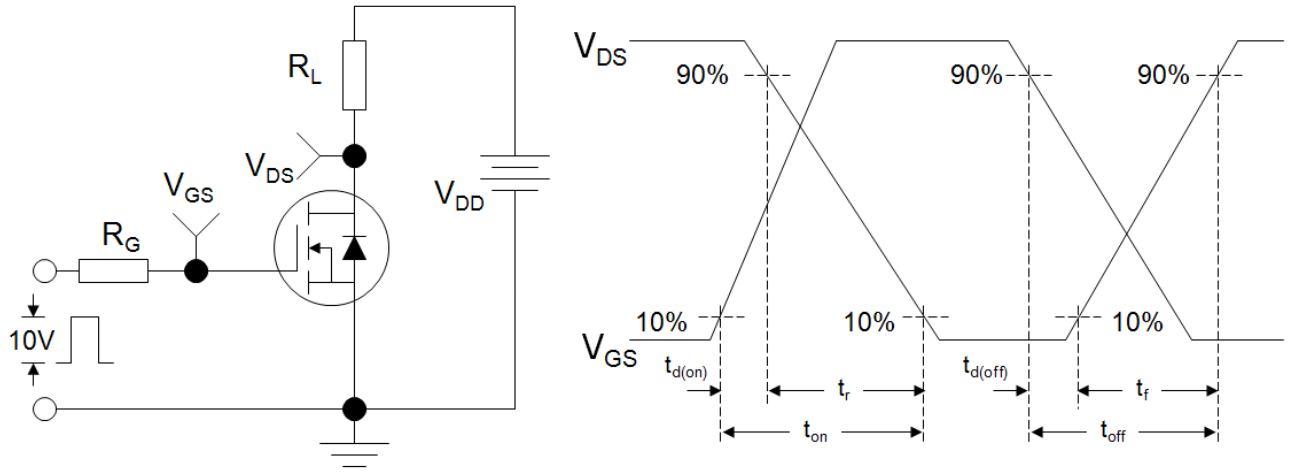
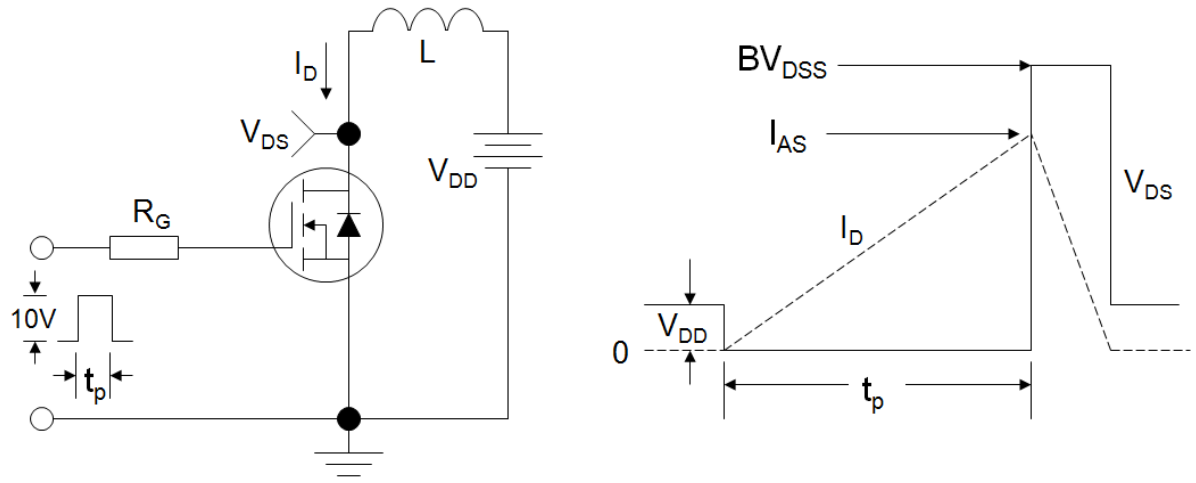


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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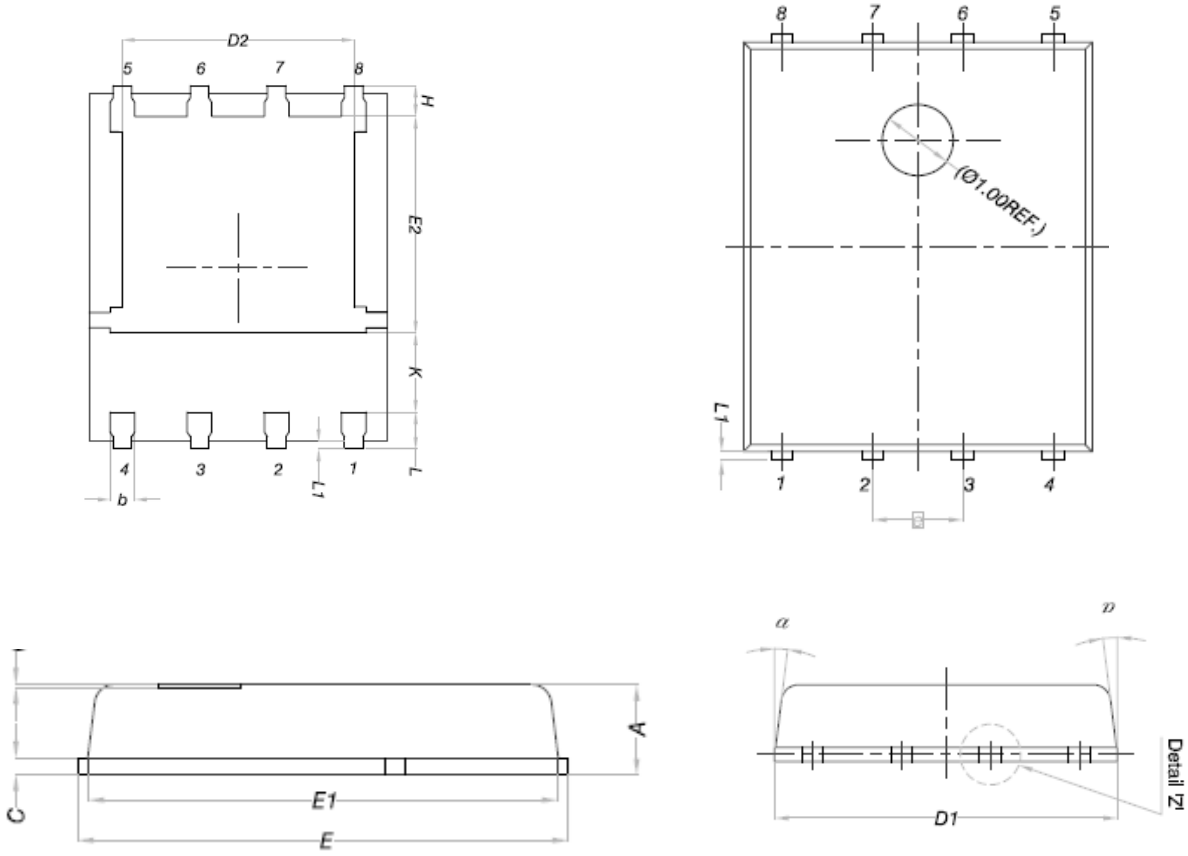

DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96

DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

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