60V 20A N-Channel Enhancement Mode Power MOSFET

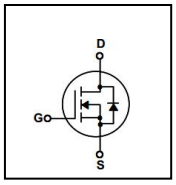
Features

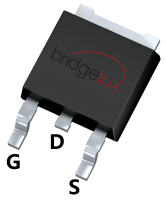
- RDSON≤33mΩ @Vgs=10V, Id=10A
- Advanced trench technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

- Load Switch
- PWM Application
- Power management

SYMBOL





TO-252

ASSEMBLY MESSAGE

Product Name	Package	Packaging
BXT330N06D	TO-252	Reel

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Parameter		Symbol	Rating	Unit
			TO-252	
Drain-Source Voltage		V_{DSS}	60	V
Drain Current	Continuous (T_C = 25°C)	I_D	20	A
	Continuous (T_C = 100°C)		14	A
Drain Current	Pulsed (Note1)	I_{DM}	80	A
Single Pulsed Avalanche Energy		EAS	18	mJ
Gate-Source Voltage		V_{GSS}	±20	V
Power Dissipation	T_C =25°C	P_D	27.8	W
Maximum Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

Note： 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		TO-252	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	5.4	°C / W

ELECTRICAL CHARACTERISTICS（T_J=25℃,unless otherwise Noted）

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V, ID=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=60V, VGS=0V			1	uA
Gate-Body Leakage Current, Forward	I_{GSS}	VGS=20V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-20V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	VDS=VGS, ID=250μA	1.0	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	VGS=10V, ID=10A		26	33	mΩ
		VGS=4.5V, ID=5A		33	45	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	VDS=25V, VGS=0V, f=1.0MHz		975		pF
Output Capacitance	C_{OSS}			61		pF
Reverse Transfer Capacitance	C_{RSS}			56		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	VDD=30V, ID=20A, VGS = 10V, RG=1.8Ω		7.2		ns
Turn-ON Rise Time	t_R			20		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			15		ns
Turn-OFF Fall-Time	t_F			24		ns
Total Gate Charge(Note2)	Q_G	VDS =30V, VGS =10V, ID =10A		24.5		nC
Gate Source Charge	Q_{GS}			4.3		nC
Gate Drain Charge	Q_{GD}			6.4		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	Is=20A, VGS=0V			1.2	V
Diode Continuous Forward Current	I_S				20	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				80	A
Body Diode Reverse Recovery Time	trr	IF=20A, dI/dt=100A/μs		29		ns
Body Diode Reverse Recovery Charge	Qrr			50		nC

Note： 2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

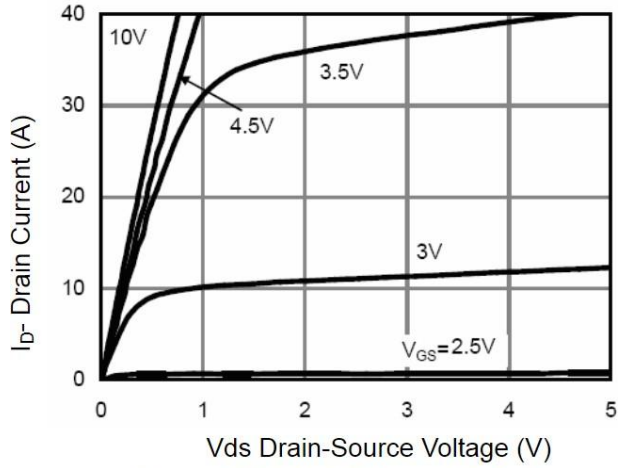


Figure 1 Output Characteristics

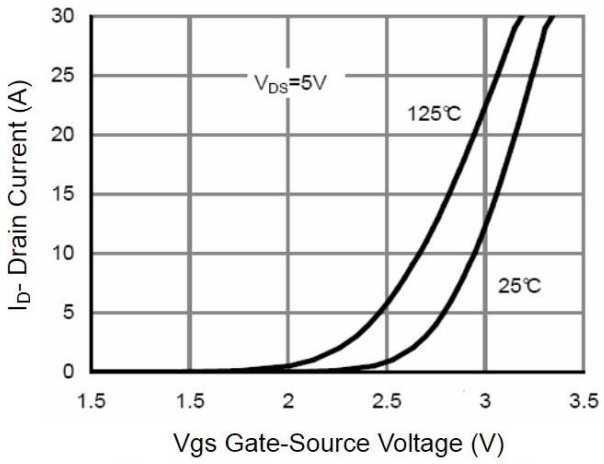


Figure 2 Transfer Characteristics

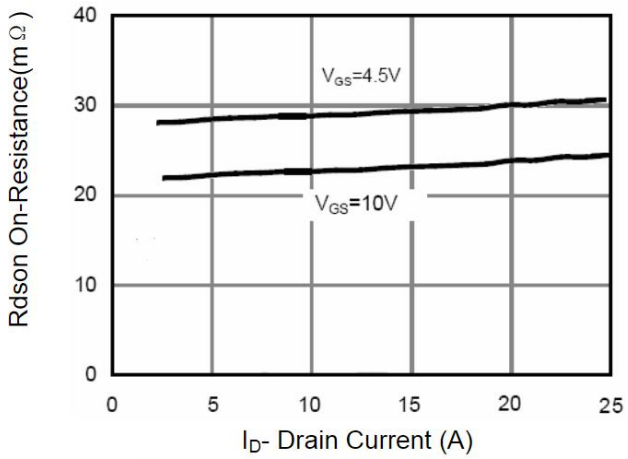


Figure 3 Rdson- Drain Current

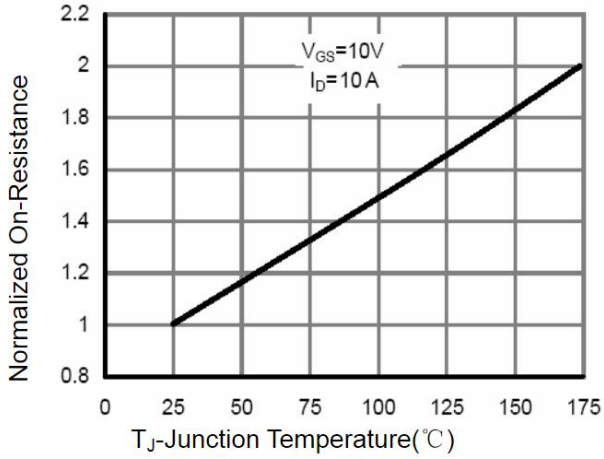


Figure 4 Rdson-Junction Temperature

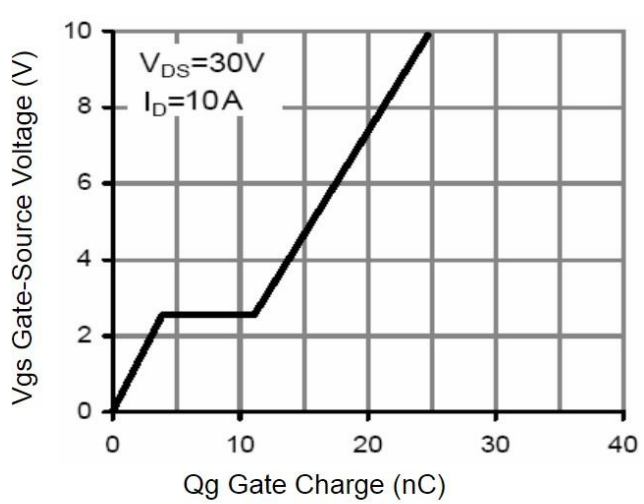


Figure 5 Gate Charge

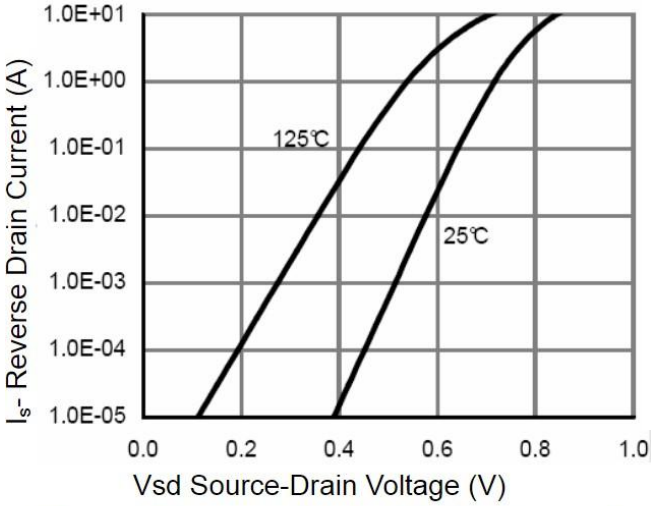


Figure 6 Source- Drain Diode Forward

TYPICAL CHARACTERISTICS(Cont.)

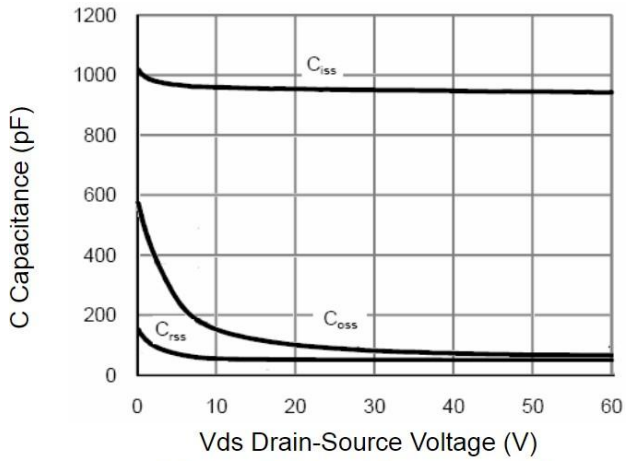


Figure 7 Capacitance vs Vds

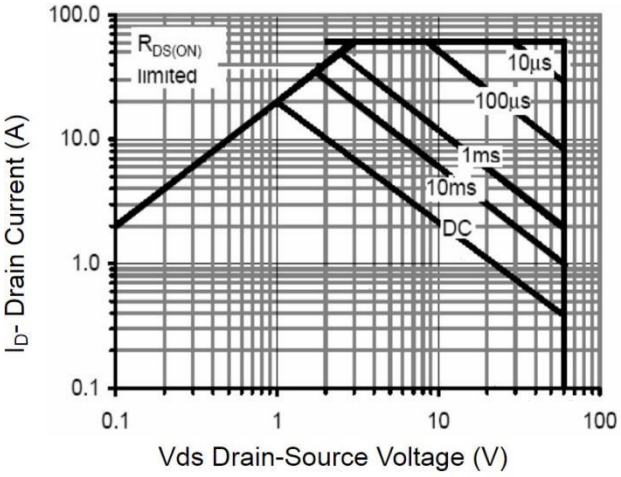


Figure 8 Safe Operation Area

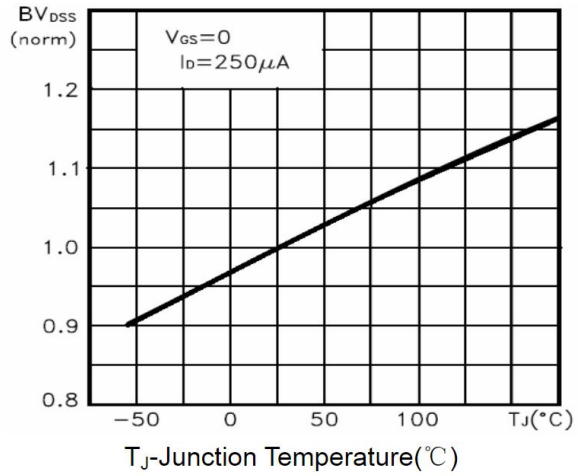


Figure 9 BV_{DSS} vs Junction Temperature

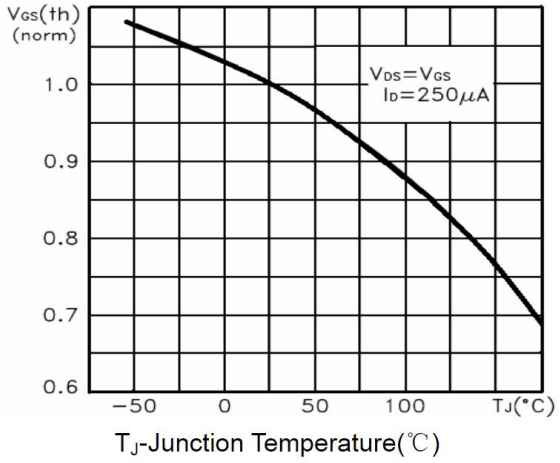


Figure 10 $V_{GS(th)}$ vs Junction Temperature

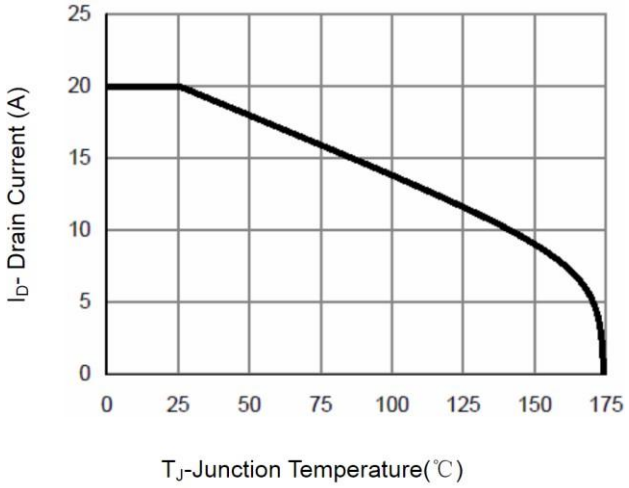
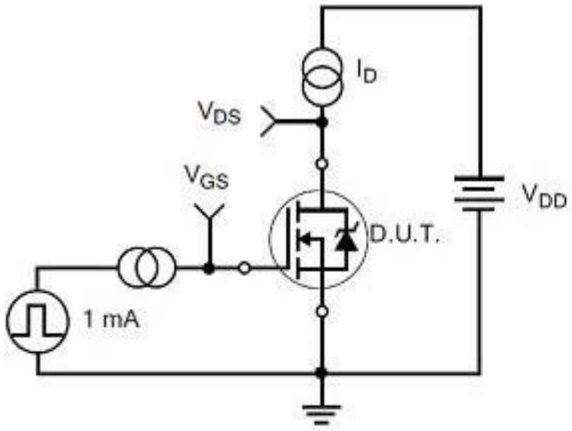
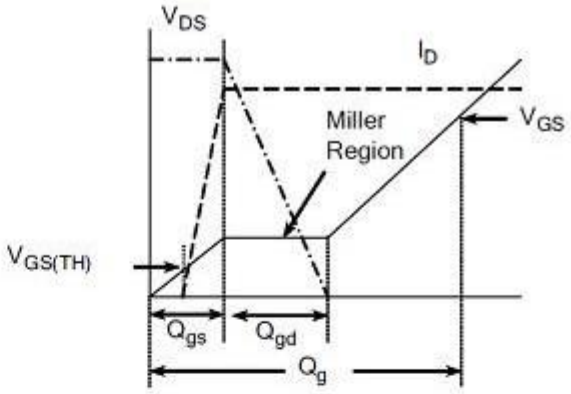


Figure 11 Current De-rating

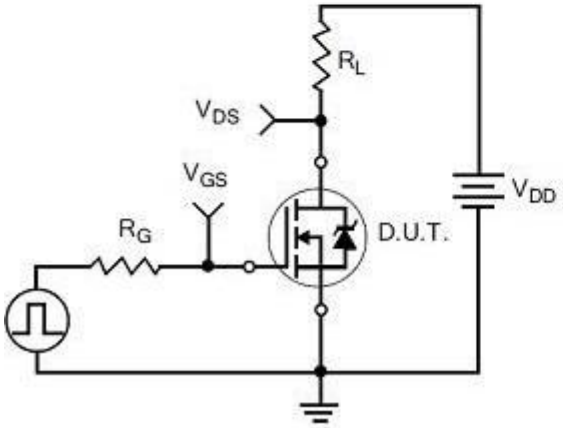
TEST CIRCUITS AND WAVEFORMS



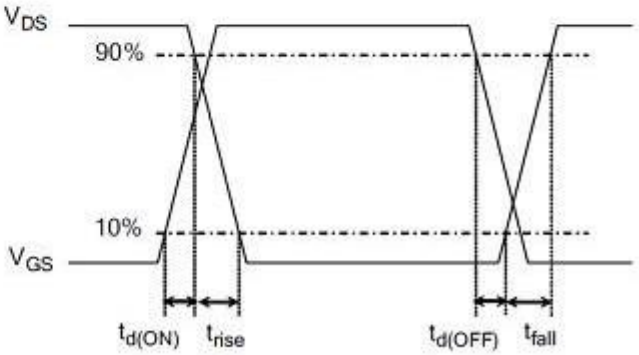
Gate Charge Test Circuit



Gate Charge Waveform

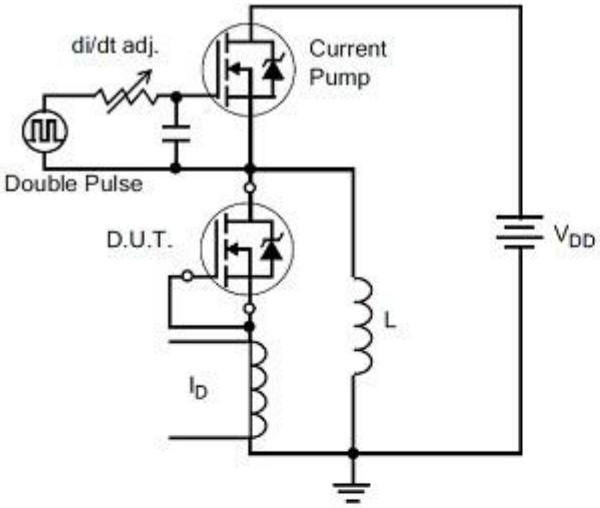


Resistive Switching Test Circuit

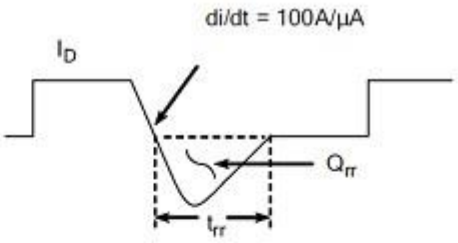


Resistive Switching Waveforms

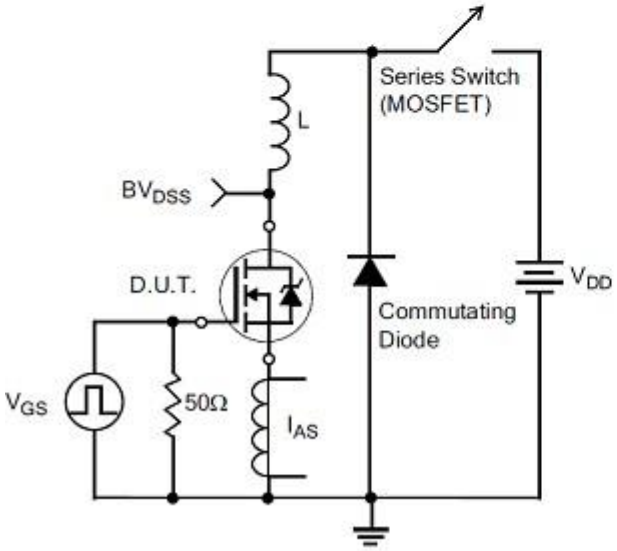
TEST CIRCUITS AND WAVEFORMS(Cont.)



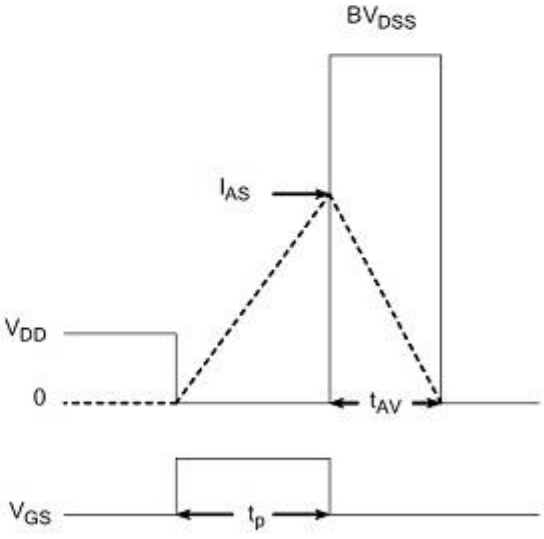
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



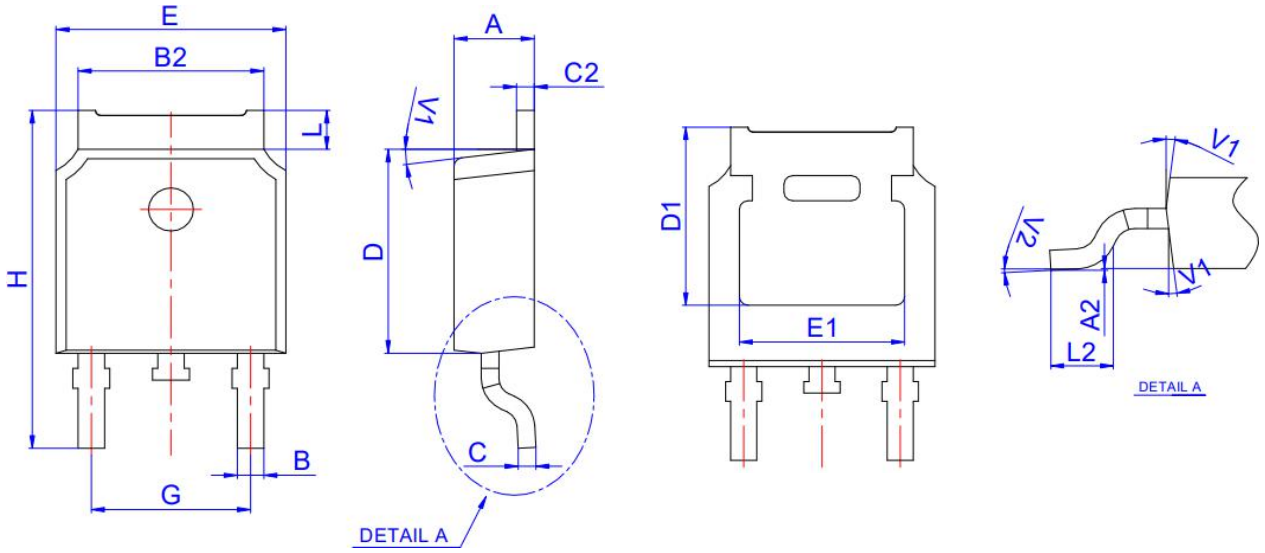
Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

TO-252 Package



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Revision history

Document revision history

Date	Revision	Changes
25-Jan-2021	1.0	First release

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