40V N-channel Power SGT MOSFET

V_{DSS}	40V
I_D @V_{GS}=10V	125A
$R_{DS(ON)_Typ.}$ @V_{GS}=10V	2.9mΩ

DESCRIPTION：

·Excellent $R_{DS(ON)}$ and Low Gate Charge

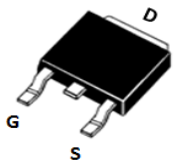
·100% UIS Tested

·100%ΔVds Tested

·Halogen-free

·RoHS-compliant

·AEC-Q101 Qualified



TO-252

TYPICAL APPLICATIONS：

·General Automotive Application

·Load Switch

·PWM Application

MAXIMUM RATINGS (at T_C = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	125 89	A
Pulsed Drain Current (1)		I_{DM}	Refer to Fig.4	A
Single Pulsed Avalanche Energy (2)		E_{AS}	389	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	99 50	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+175	℃

Notes： 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_{GS}=10V, R_G=25ohm, L=3mH, I_{AS}=16.1A, V_{DD}=0V during time in avalanche.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	40 1.5	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	40			V
Zero Gate Voltage Drain Current VDS = 32V, VGS = 0 V	I_{DSS}			1.0	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	1.9	2.7	3.5	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A	$R_{DS(on)}$		2.9	3.8	mΩ
Gate Resistance f=1MHz	R_g		0.8		Ω
Input capacitance f=1MHz, VDS=20V, VGS=0 V	C_{iss}		3633	4905	pF
Output capacitance f=1MHz, VDS=20V, VGS=0 V	C_{oss}		1941	2621	pF
Reverse transfer capacitance f=1MHz, VDS=20V, VGS=0 V	C_{rss}		141	190	pF
Total Gate Charge VDS= 20V, ID= 20A,VGS= 0 to 10V	Q_G		55	74	nC
Gate to Source Charge VDS= 20V, ID= 20A,VGS= 0 to 10V	Q_{GS}		16	22	nC
Gate to Drain Charge VDS= 20V, ID= 20A,VGS= 0 to 10V	Q_{GD}		14	19	nC
Turn-on delay time VDD=20 V, VGS= 10V, ID=20A, R_{GEN}=3Ω	$td_{(ON)}$		16		ns
Rise time VDD=20 V, VGS= 10V, ID=20A, R_{GEN}=3Ω	tr		28		ns
Turn-off delay time VDD=20 V, VGS= 10V, ID=20A, R_{GEN}=3Ω	$td_{(OFF)}$		32		ns
Fall time VDD=20 V, VGS= 10V, ID=20A, R_{GEN}=3Ω	tf		13		ns
Maximum Continuous Body Diode Forward Current	IS			125	A
Maximum Pulsed Body Diode Forward Current	ISM			501	A
Diode Forward Voltage VGS = 0V, I_S =20A	V_{SD}			1.2	V
Revers Recovery Time IF=20A, di/dt = 100A/us	Trr	37	51	69	ns
Revers Recovery Charge IF=20A, di/dt = 100A/us	Qrr		61		nC

Typical Performance Characteristics

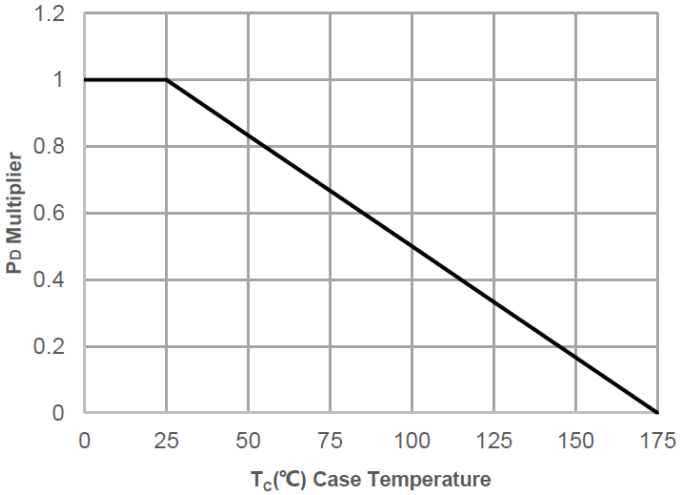


Figure 1. Power De-rating

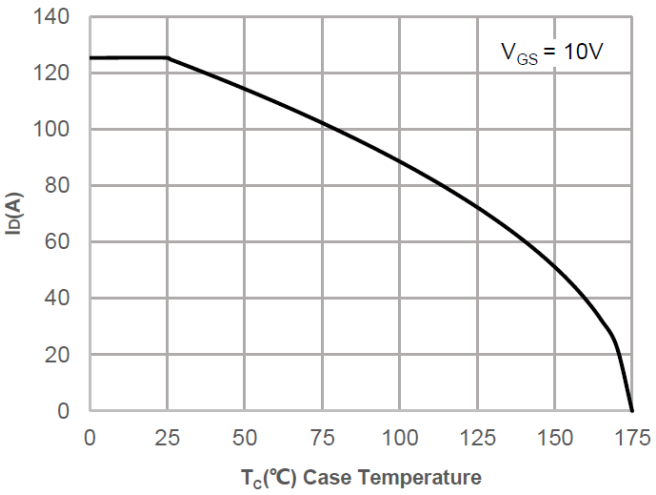


Figure 2. Current De-rating

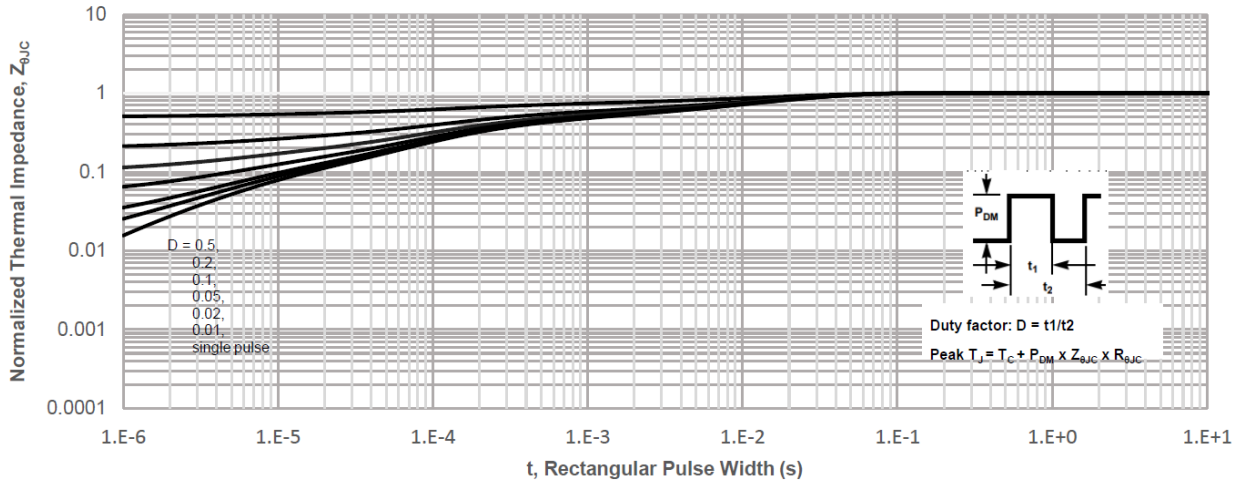


Figure 3. Normalized Maximum Transient Thermal Impedance

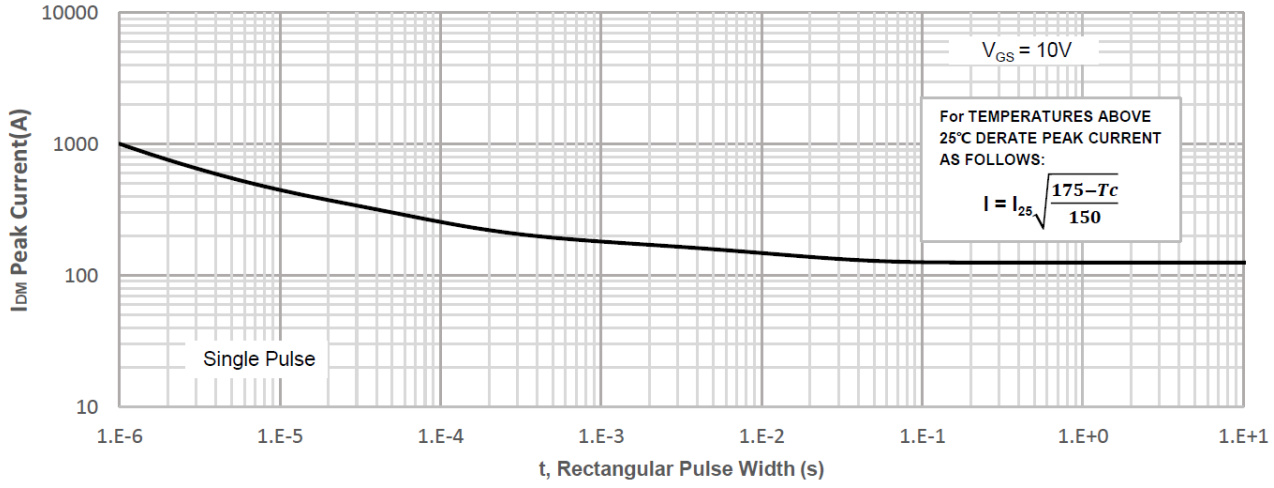


Figure4. Peak Current Capacity

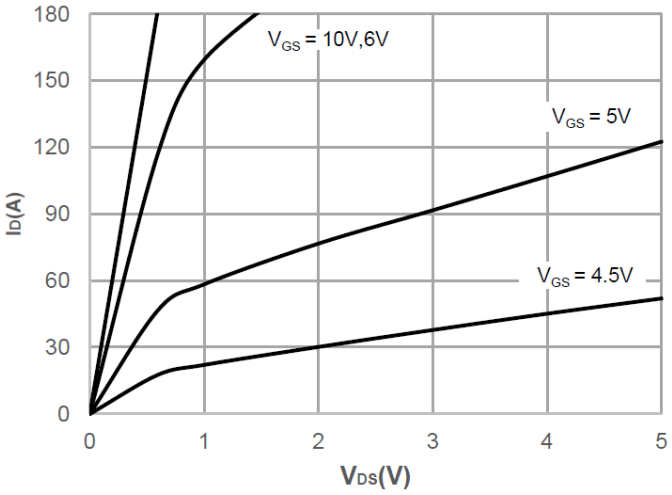


Figure 5. Output Characteristics

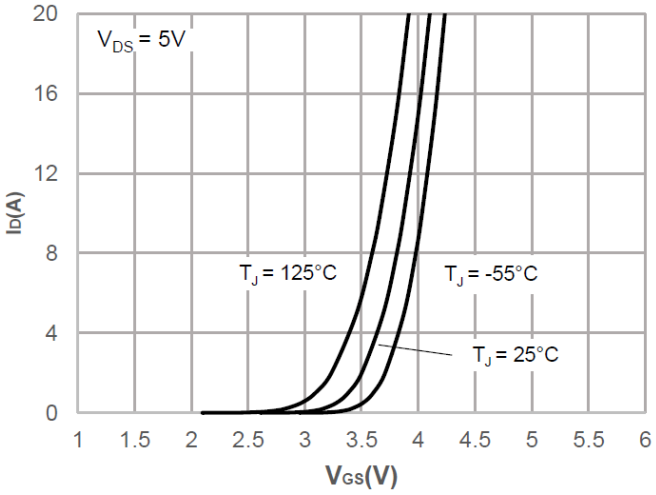


Figure 6. Typical Transfer Characteristics

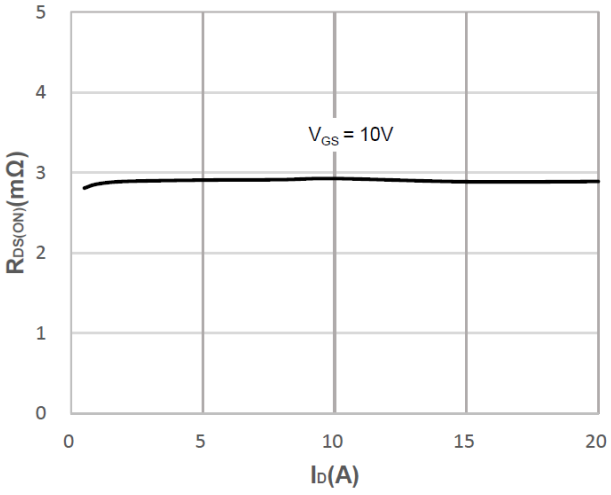


Figure 7. On-resistance vs. Drain Current

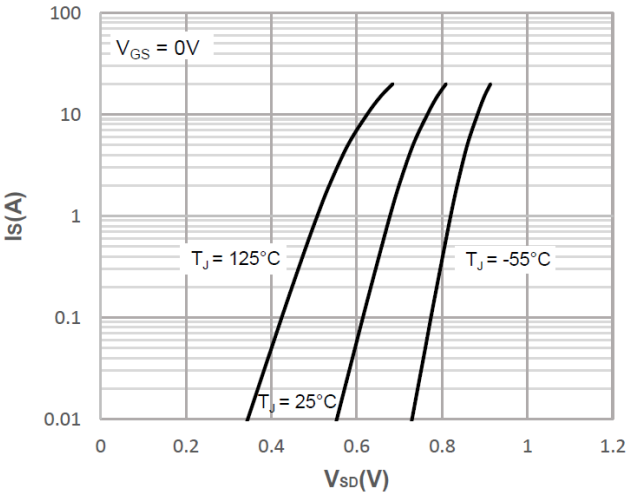


Figure8. Body Diode Characteristics

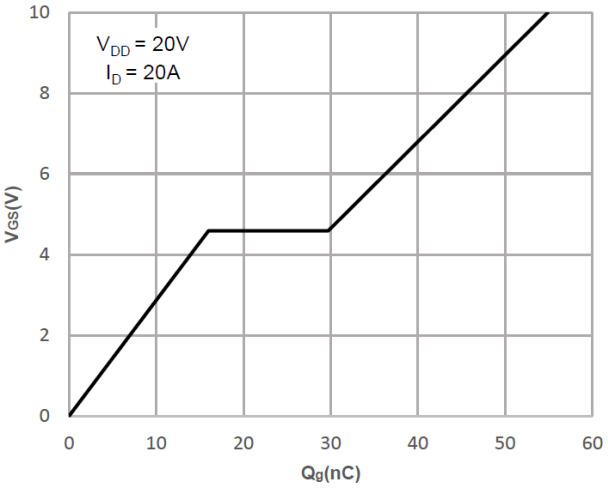


Figure 9. Gate Charge Characteristics

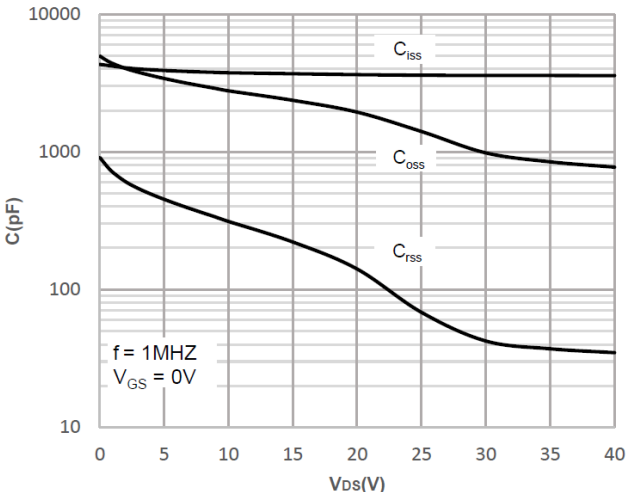


Figure 10. Capacitance Characteristics

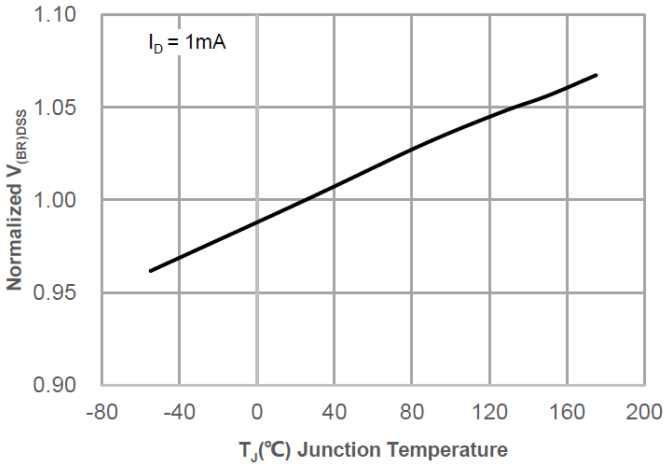


Figure 11. Normalized Breakdown voltage vs. Junction Temperature

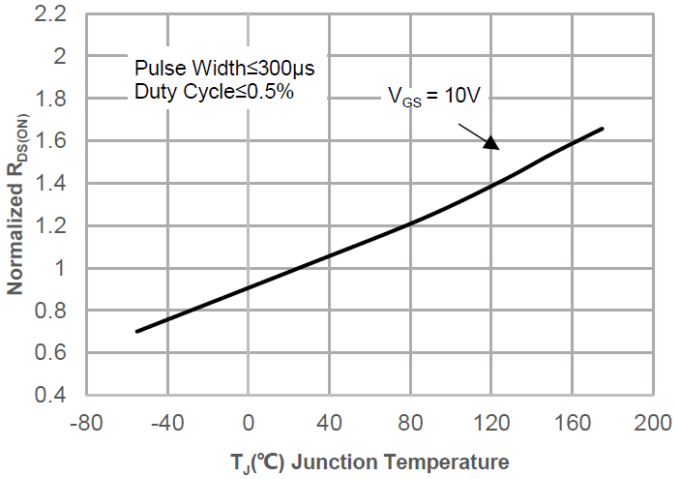


Figure 12. Normalized on Resistance vs. Junction Temperature

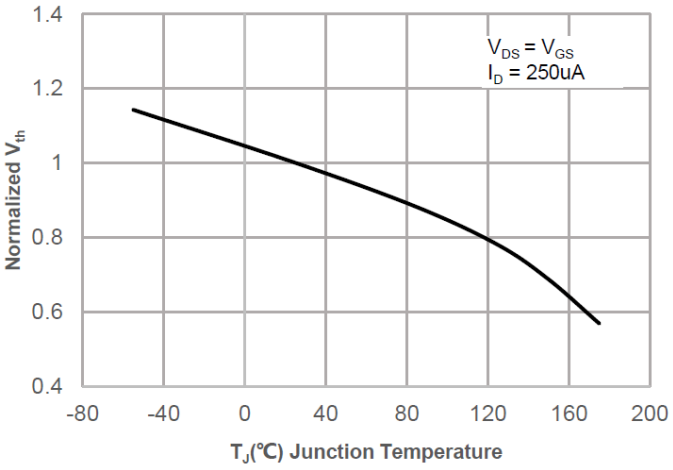


Figure 13. Normalized Threshold Voltage vs. Junction Temperature

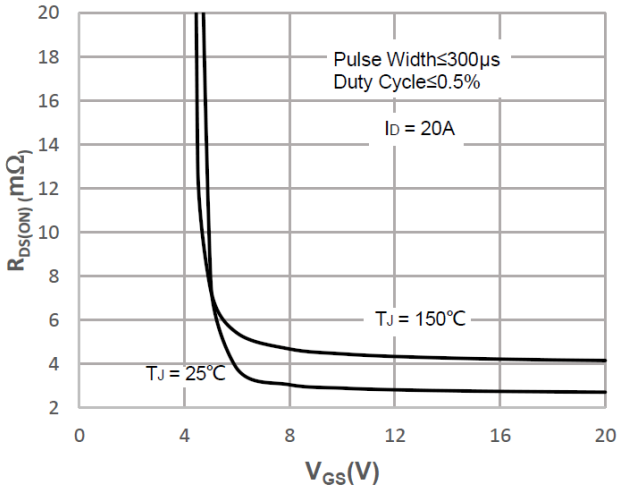


Figure14. $R_{DS(ON)}$ vs. V_{GS}

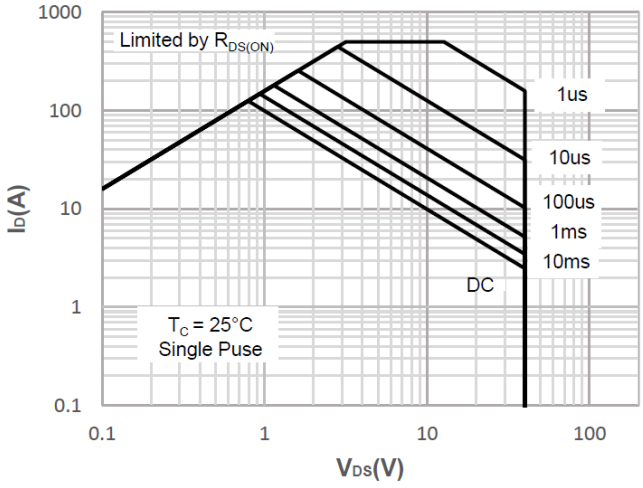
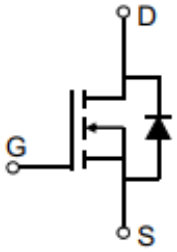
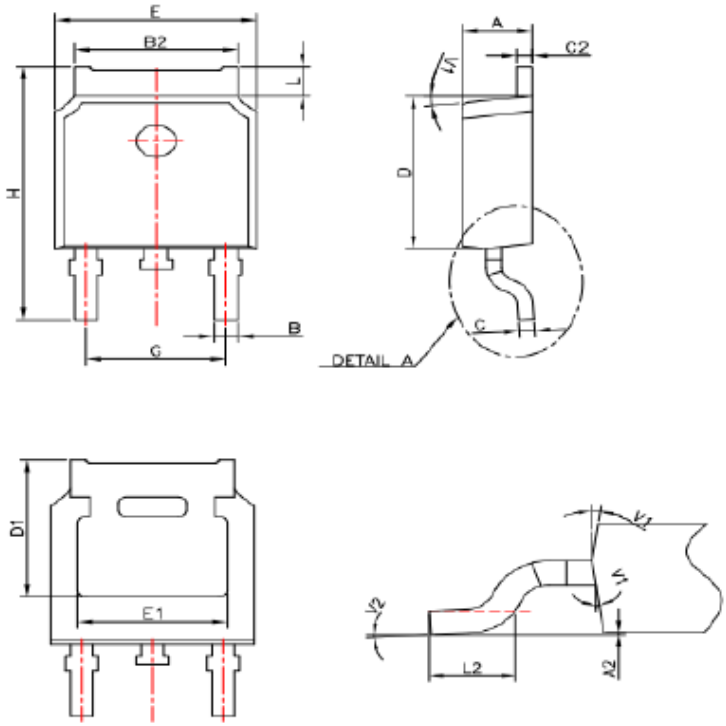


Figure 15. Maximum Safe Operating Area

·Circuit diagram



·Package outlines : Dimensions in (mm)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10	2.30	2.50	0.083	0.091	0.098
A2	0	---	0.15	0	---	0.006
B	0.66	0.76	0.86	0.026	0.030	0.034
B2	5.18	5.33	5.48	0.202	0.210	0.216
C	0.40	0.508	0.60	0.016	0.020	0.024
C2	0.44	0.508	0.58	0.017	0.020	0.023
D	5.90	6.10	6.30	0.232	0.240	0.248
D1	5.30REF			0.209REF		
E	6.40	6.60	6.80	0.252	0.260	0.268
E1	4.826 REF			0.19 REF		
G	4.47	4.57	4.67	0.176	0.180	0.184
H	9.50	10.10	10.70	0.374	0.398	0.421
L	0.95	1.16	1.30	0.037	0.046	0.051
L2	1.35	1.50	1.65	0.053	0.059	0.065
V1	---	7°	---	---	7°	---
V2	0°	---	6°	0°	---	6°

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