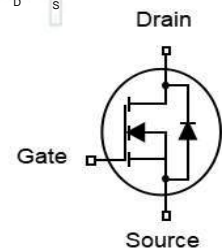


Features

- N-Channel
- Low FOM $R_{DS(on)} \times Q_{gd}$
- Very low on-resistance
- Halogen-free
- RoHS compliant
- 100% EAS Tested

V_{DS}	100	V
$R_{DS(on),TYP@ V_{GS}=10V}$	13	mΩ
$R_{DS(on),TYP@ V_{GS}=4.5V}$	15	mΩ
I_D	55	A

TO-252



Part ID	Package Type	Marking	Packing
ZTG13N10D	TO-252	ZTG13N10D	2500pcs/reel

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage	± 20	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	100	V	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to +175	$^\circ\text{C}$	
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 1, 2)	$T_C = 25^\circ\text{C}$ 220	A	
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	55	A
		$T_C = 100^\circ\text{C}$	35	A
P_D	Maximum Power Dissipation	83	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.5	$^\circ\text{C/W}$	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 4)	62.5	$^\circ\text{C/W}$	
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 3)	8	mJ	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_J=25°C (unless otherwise stated)						
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =80V, V _{GS} =0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.4	2.0	2.5	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =10V, I _D =10A	--	13	16	mΩ
RDS(on)	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =8A	--	15	19	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	--	1398	--	pF
Coss	Output Capacitance		--	386	--	pF
Crss	Reverse Transfer Capacitance		--	14	--	pF
Qg	Total Gate Charge	V _{DS} =50V, I _D =20A, V _{GS} =10V	--	21.8	--	nC
Qgs	Gate-Source Charge		--	4.8	--	nC
Qgd	Gate-Drain Charge		--	3.8	--	nC
Switching Characteristics						
Td(on)	Turn-on Delay Time	V _{DS} =50V, I _D =20A, R _G =10Ω, V _{GS} =10V	--	7.1	--	ns
Tr	Turn-on Rise Time		--	25	--	ns
Td(off)	Turn-Off Delay Time		--	29	--	ns
Tf	Turn-Off Fall Time		--	11.5	--	ns
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
IS	Diode Forward Current		--	--	55	A
VSD	Forward on voltage	I _S =20A, V _{GS} =0V	--	0.9	--	V
Trr	Reverse Recovery Time	T _J =25°C, I _F =50A,	--	38	--	ns
Qrr	Reverse Recovery Charge	di/dt=100A/μs	--	39	--	nC

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 20 V, I_{AS} = 5.5 A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout
5. Pulse Test: Pulse width ≤ 300 us, Duty cycle ≤ 2%
6. Essentially independent of operating temperature

Electrical Characteristics Diagrams

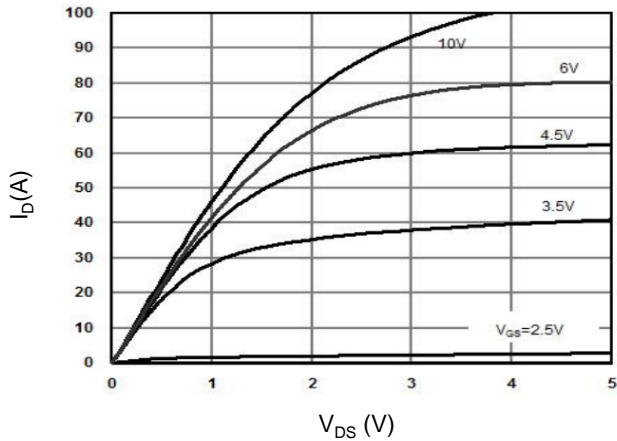


Figure 1: On-Region Characteristics

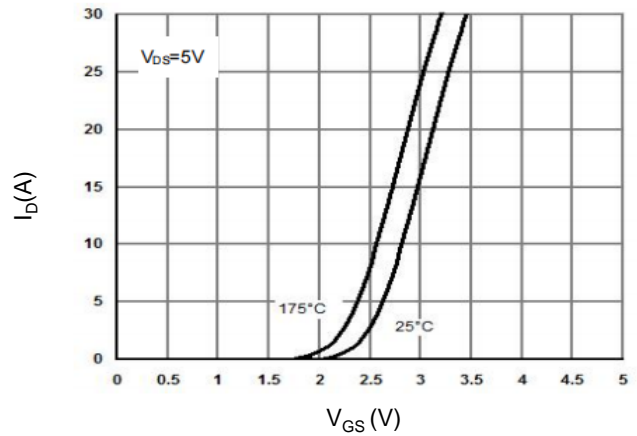


Figure 4: Transfer Characteristics

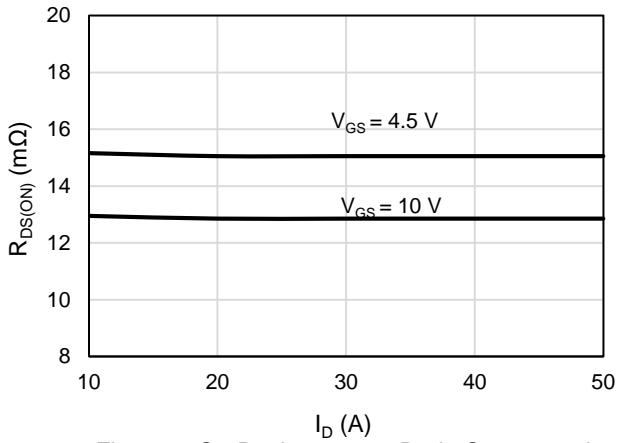


Figure 2: On-Resistance vs. Drain Current and Gate Voltage

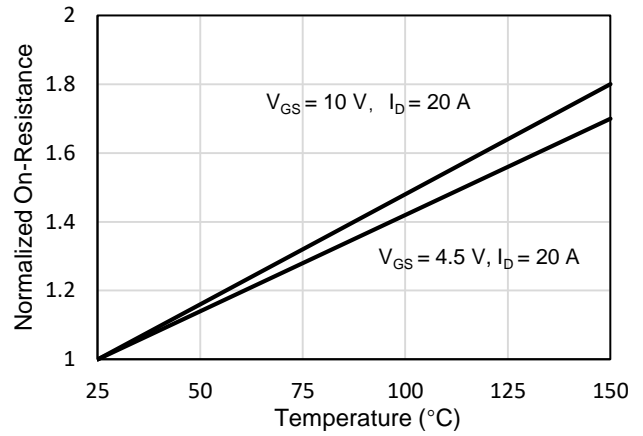


Figure 5: On-Resistance vs. Junction Temperature

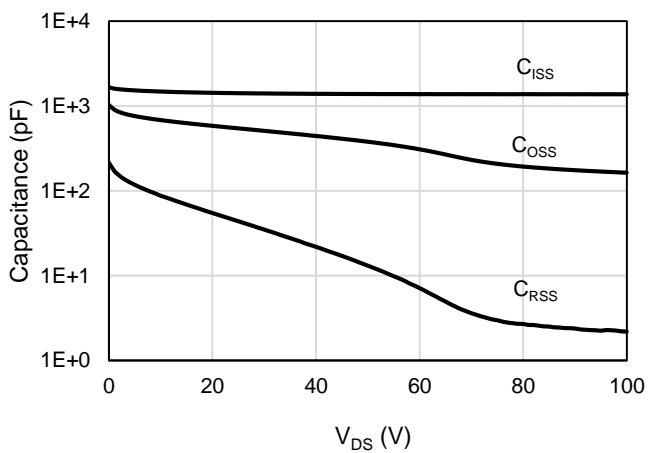


Figure 3: Capacitance Characteristics

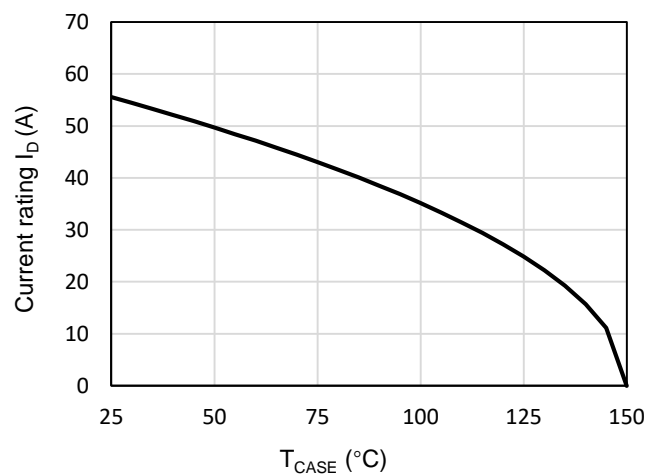


Figure 6: Current De-rating

Electrical Characteristics Diagrams

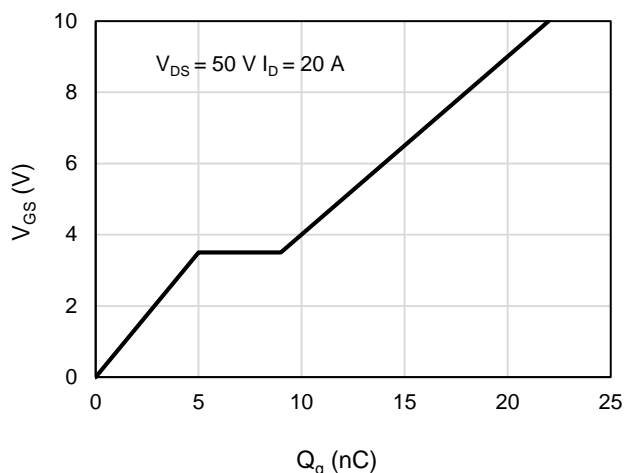


Figure 7: Gate-Charge Characteristics

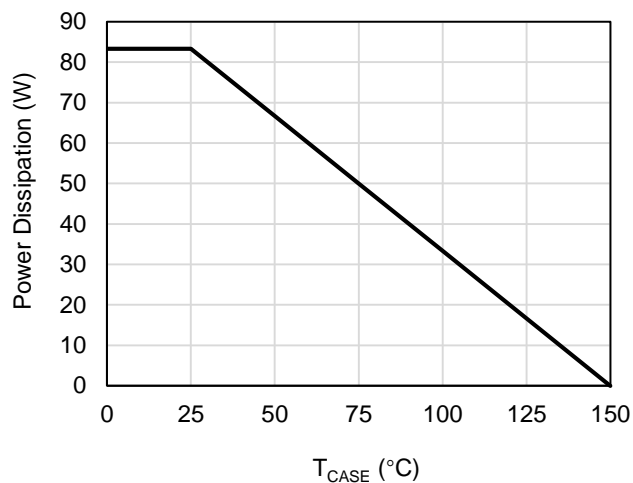


Figure 9: Power De-rating

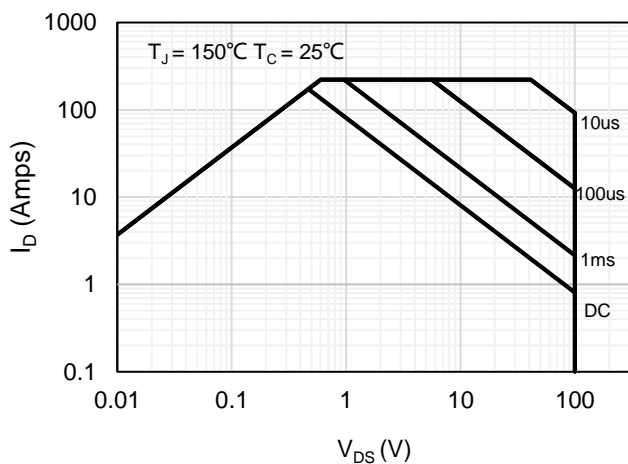


Figure 8: Maximum Forward Biased Safe Operating Area

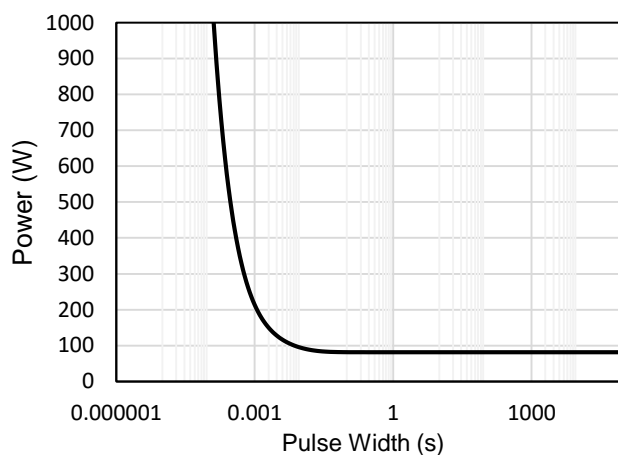


Figure 10: Single Pulse Power Rating Junction-to-Case

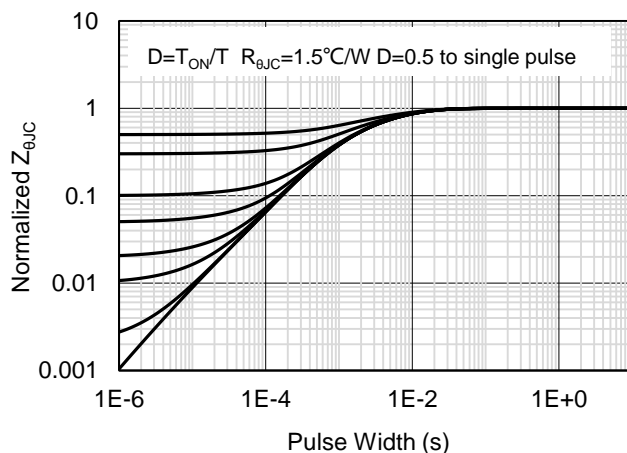
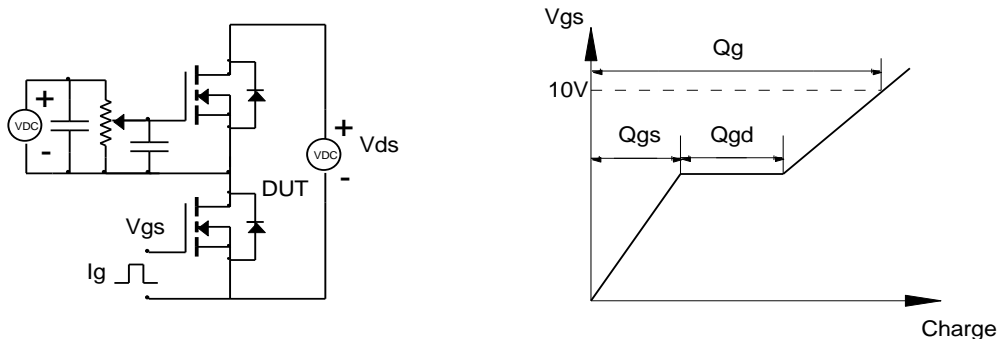


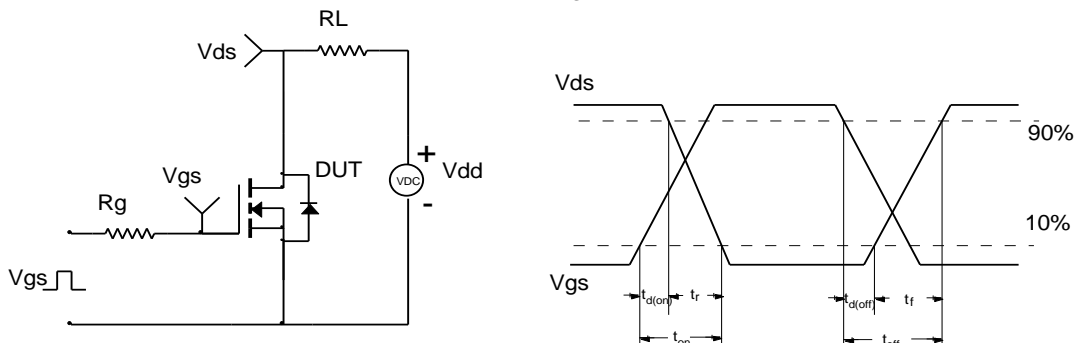
Figure 11: Normalized Maximum Transient Thermal Impedance

Test Circuit and Waveform

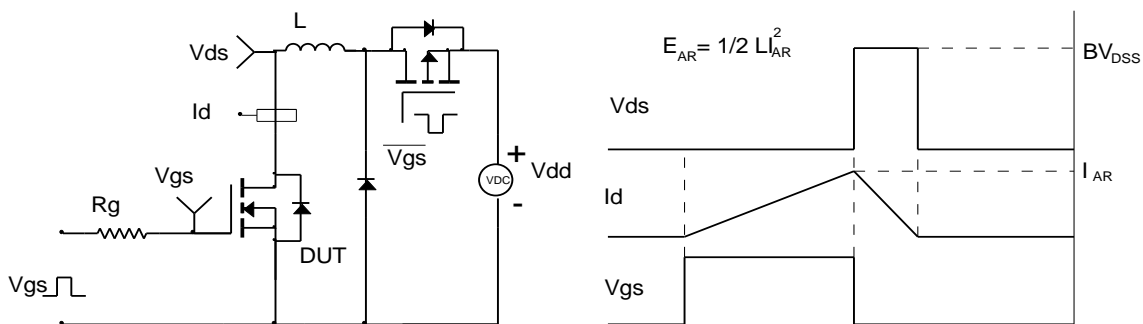
Gate Charge Test Circuit & Waveform



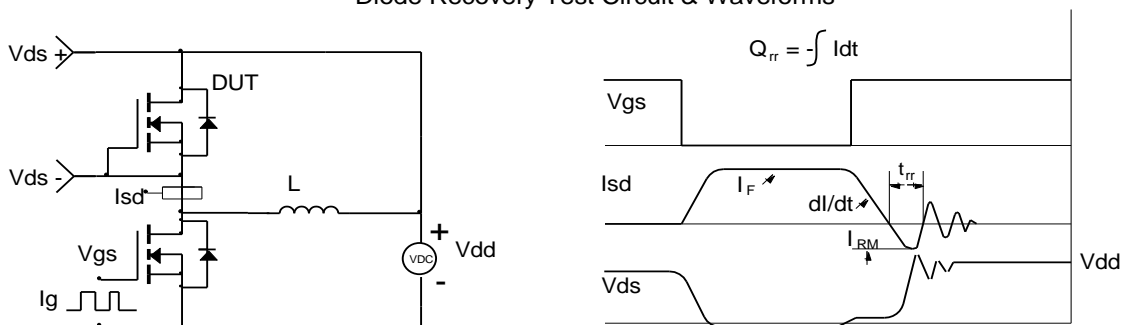
Resistive Switching Test Circuit & Waveforms



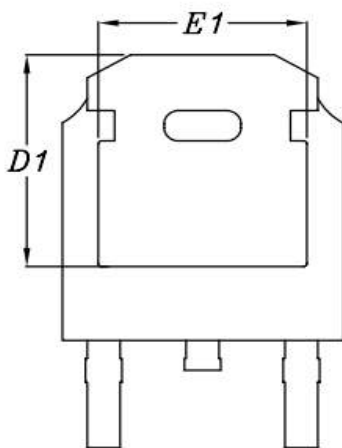
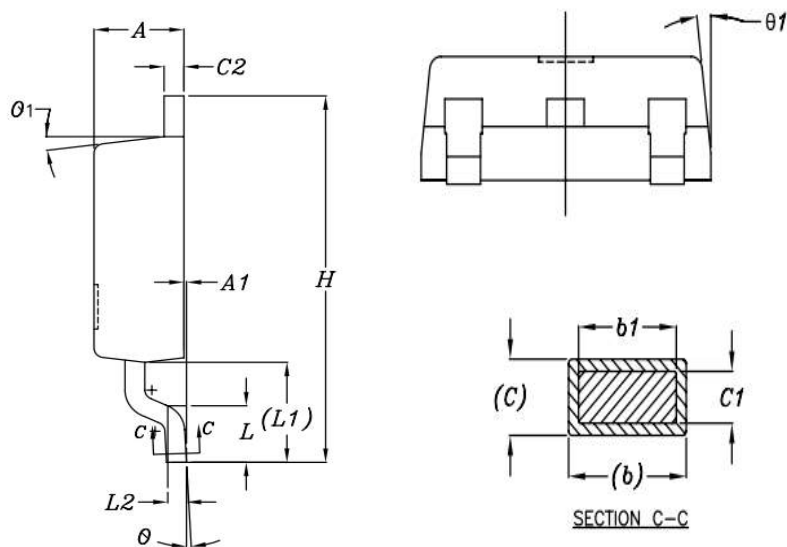
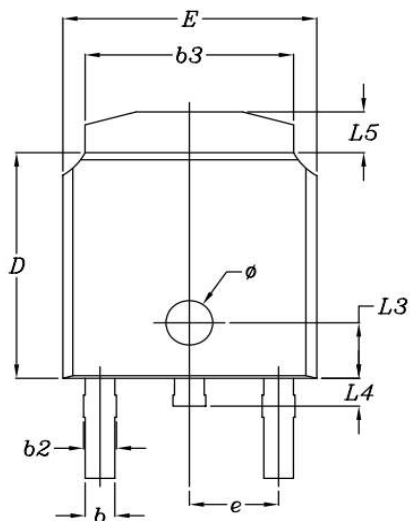
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



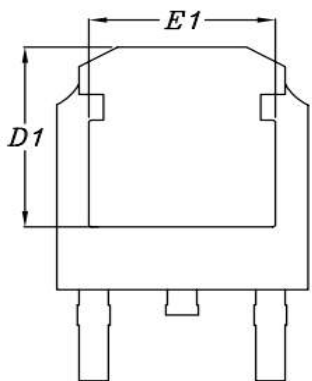
Diode Recovery Test Circuit & Waveforms



TO-252 Package Information



Option(1)
Standard PAD



Option(2)
Large PAD

I T E M	DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.39	0.086	0.094
A1	—	0.13	—	0.005
b	0.70	0.89	0.028	0.035
b1	0.70	0.86	0.028	0.034
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c1	0.41	0.56	0.016	0.022
c2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	—	0.205	—
E	6.35	6.73	0.250	0.265
E1	4.32	—	0.170	—
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	1.40	1.78	0.055	0.070
L1	2.60	2.90	0.102	0.114
L2	0.51 BSC		0.020 BSC	
L3	1.65	1.95	0.065	0.077
L4	0.60	0.90	0.024	0.035
L5	0.89	1.27	0.035	0.050
∅	1*	5*	1*	5*
∅1	7* REF		7* REF	
∅	1.20 REF		1.20 REF	

Customer Service

Sales and Service:

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