

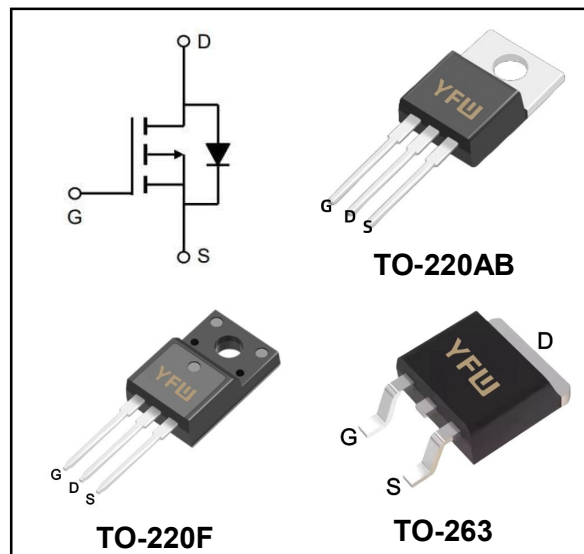
-200V P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	-13A
V_{DSS}	-200V
$R_{DS(on)-typ}(@V_{GS}=-10V)$	< 0.42Ω (Type: 0.34 Ω)

Application

- ◆Power amplifier
- ◆motor drive



Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	-200	V
Gate - Source Voltage	V_{GS}	±20	V
Continuous Drain Current $T_C=25^{\circ}C$	I_D	-13	A
Continuous Drain Current $T_C=100^{\circ}C$		-7.2	A
Pulsed Drain Current ^a	I_{DM}	-52	A
Single Pulse Avalanche Energy ^b	E_{AS}	750	mJ
Repetitive Avalanche Current ^a	I_{AR}	-11	A
Repetitive Avalanche Energy ^a	E_{AR}	13	mJ
Maximum Power Dissipation $T_C=25^{\circ}C$	P_D	125	W
Peak Diode Recovery dV/dt ^c	dV/dt	-5.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Maximum Junction-to-Ambient	R_{thJA}	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

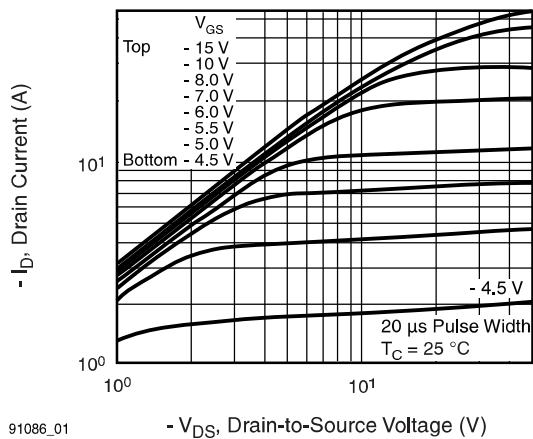
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	V_{DS}	-200	-	-	V
V_{DS} Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	$\Delta V_{DS}/T_J$	-	-0.2	-	V/°C
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu A$	$V_{GS(th)}$	-2.0	-	-4.0	V
Gate-Source Leakage	$V_{GS}=\pm 20V$	I_{GSS}	-	-	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS}=-200V$, $V_{GS}=0V$	I_{DSS}	-	-	-100	μA
	$V_{DS}=-160V$, $V_{GS}=0V$, $T_J=125^\circ C$		-	-	-500	
Drain-Source On-State Resistance	$V_{GS}=-10V$, $I_D=-5.5A$ ^b	$R_{DS(on)}$	-	0.34	0.42	Ω
Forward Transconductance	$V_{DS}=-50V$, $I_D=-6.6A$ ^b	g_{fs}	4.1	-	-	S
Input Capacitance	$V_{GS}=0V$ $V_{DS}=-25V$ $f=1MHz$ MHz, see fig. 5	C_{iss}	-	1200	-	pF
Output Capacitance		C_{oss}	-	370	-	
Reverse Transfer Capacitance		C_{rss}	-	81	-	
Total Gate Charge	$V_{GS}=-10V$ $I_D = -11A$, $V_{DS} = -160V$, see fig. 6 and 13 ^b	Q_g	-	-	44	nC
Gate-Source Charge		Q_{gs}	-	-	7.1	
Gate-Drain Charge		Q_{gd}	-	-	27	
Turn-on delay time	$V_{DD}=-100V$ $I_D=-11A$ $R_G=9.1\Omega$ $R_D=8.6\Omega$ see fig. 10 ^b	$t_{d(on)}$	-	14	-	ns
Rise Time		T_r	-	43	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	39	-	
Fall Time		t_f	-	38	-	
Gate Input Resistance	$f = 1 MHz$, open drain	R_g	0.3	-	1.7	Ω
Continuous Source-Drain Diode Current	Between lead, 6 mm (0.25") from package and center of die contact 	I_S	-	-	-11	A
Pulsed Diode Forward Current ^a		I_{SM}	-	-	-44	A
Body Diode Voltage	$T_J = 25^\circ C$, $I_S = -11A$, $V_{GS} = 0V$ ^b	V_{SD}	-	-	-5	V
Body Diode Reverse Recovery Time	$T_J = 25^\circ C$, $I_F = -11A$, $dI/dt = 100 A/\mu s$ ^b	t_{rr}	-	250	300	ns
Body Diode Reverse Recovery Charge		Q_{rr}	-	2.9	3.6	μC
Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS and LD)	t_{on}	-	-	-	-

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

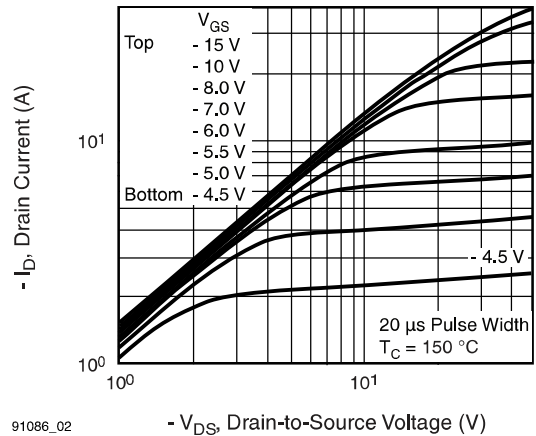
b. Pulse width $\leq 300 \mu s$; duty cycle ≤ 2

Ratings and Characteristic Curves



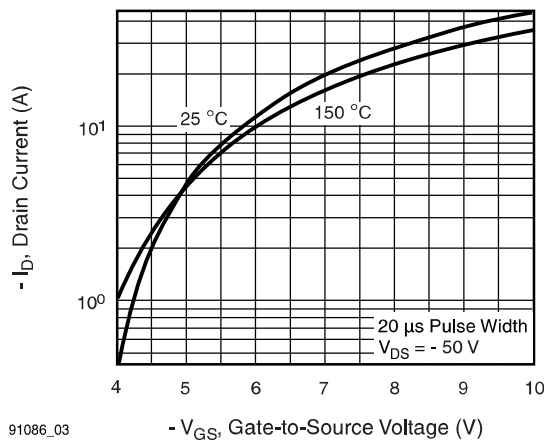
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Fig. 1 - Typical Output Characteristics, $T_C = 25^\circ\text{C}$



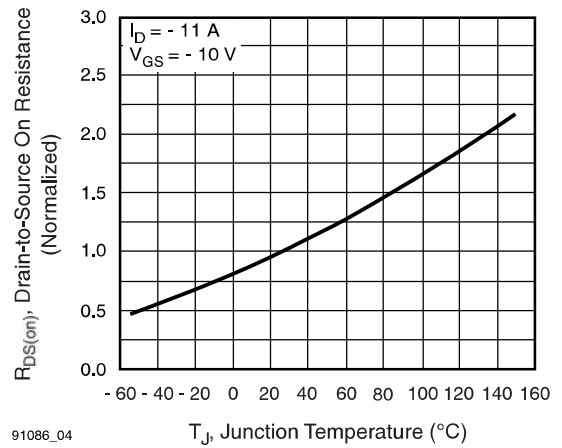
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Fig. 2 - Typical Output Characteristics, $T_C = 150^\circ\text{C}$



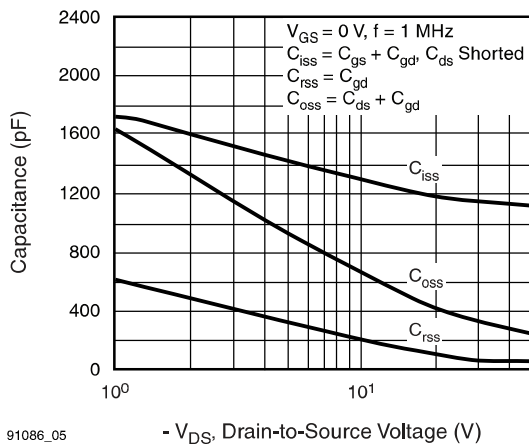
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Fig. 3 - Typical Transfer Characteristics



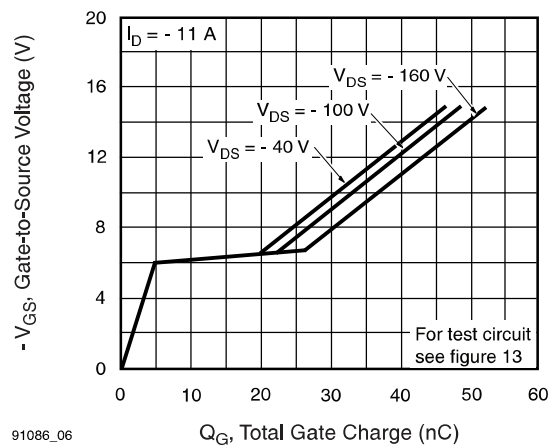
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Fig. 4 - Normalized On-Resistance vs. Temperature



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Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage



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Fig. 6 - Typical Gate Charge vs. Drain-to-Source Voltage

Ratings and Characteristic Curves

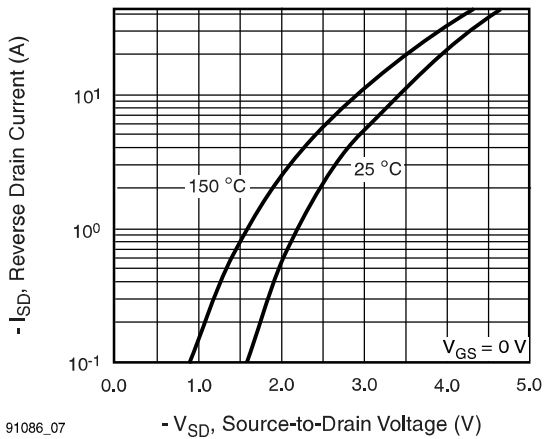


Fig. 7 - Typical Source-Drain Diode Forward Voltage

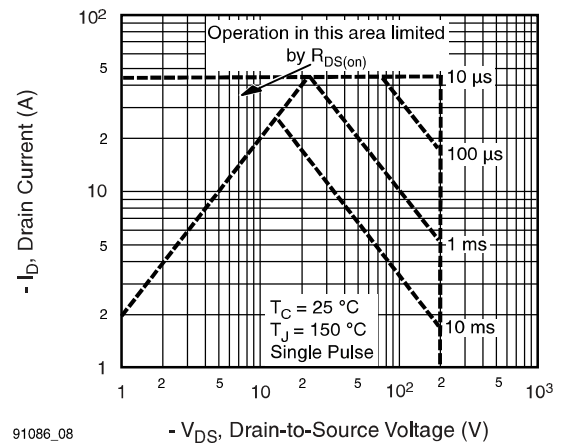


Fig. 8 - Maximum Safe Operating Area

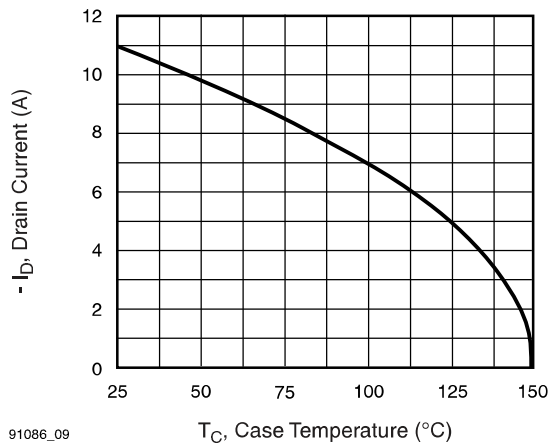


Fig. 9 - Maximum Drain Current vs. Case Temperature

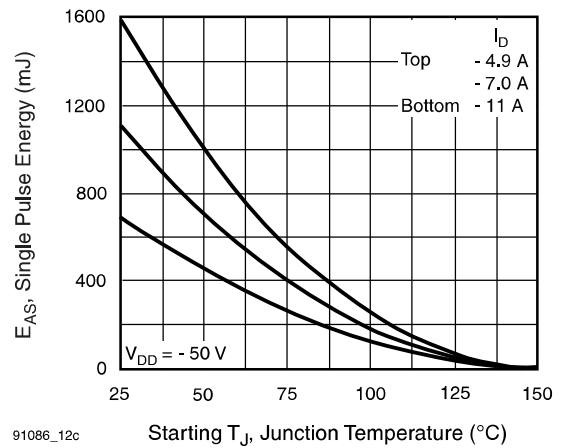


Fig. 10 - Maximum Avalanche Energy vs. Drain Current

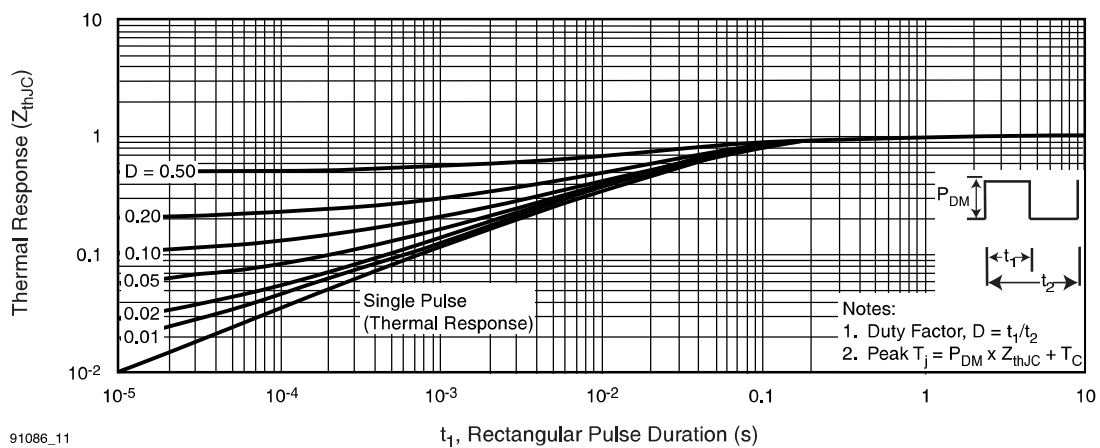
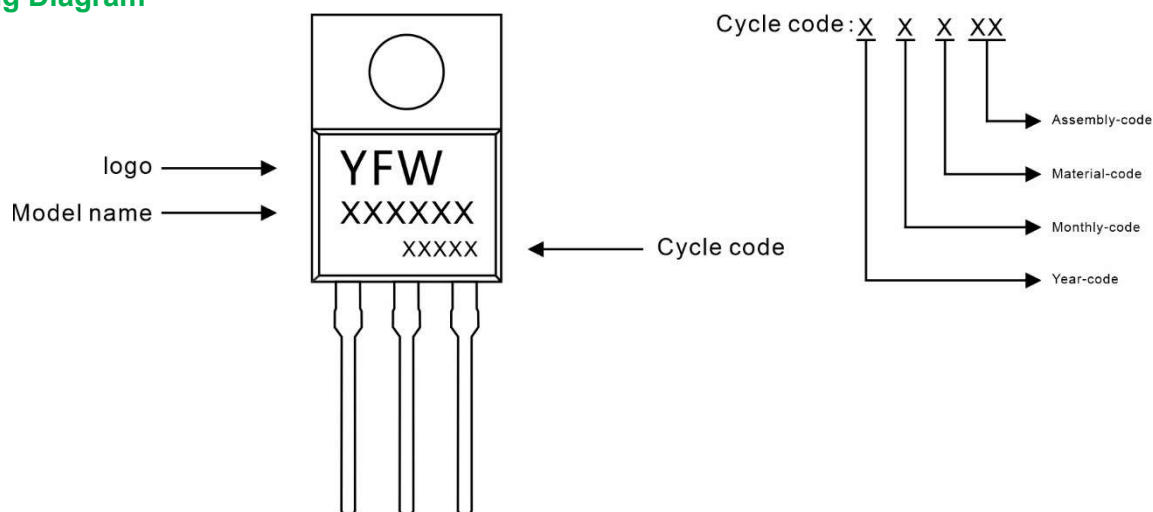


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

Marking Diagram



Ordering information

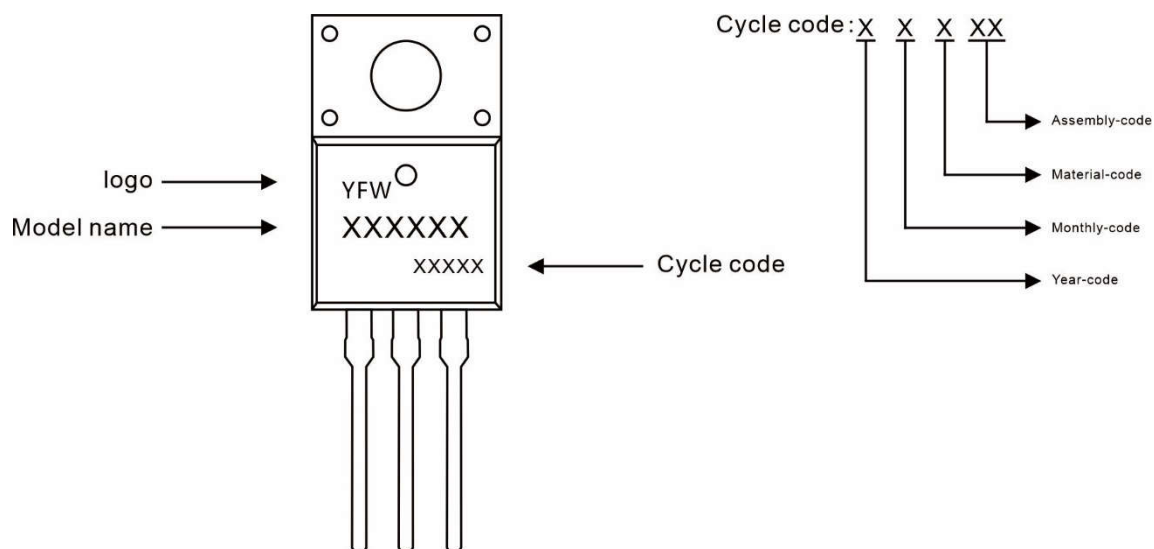
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW13P20AT	TO-220AB	0.07oz(1.96g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220AB

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156

Marking Diagram



Ordering information

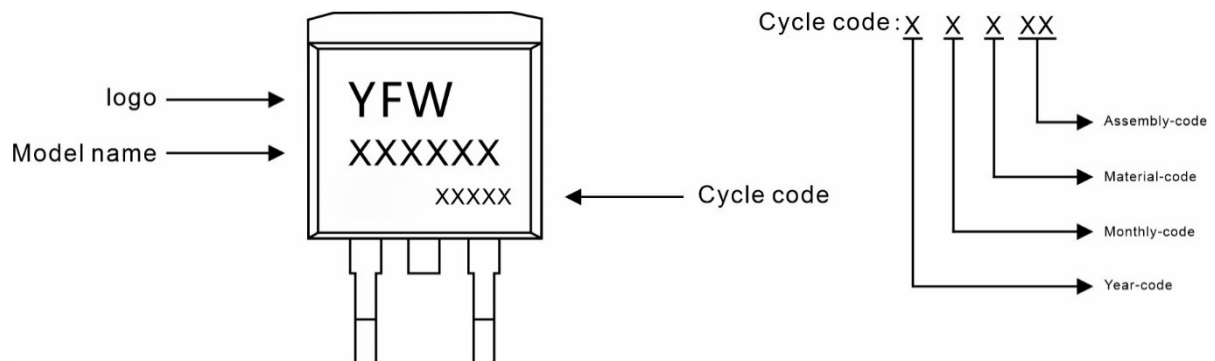
Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW13P20AF	TO-220F	0.06oz(1.74g)	50pcs/tube	1000PCS/Box 5000PCS/Carton

Package Dimensions

TO-220F

Symbol	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.66	2.86	0.105	0.113
b	0.75	0.85	0.030	0.033
b1	1.24	1.44	0.049	0.057
c	0.40	0.60	0.016	0.024
D	10.00	10.32	0.394	0.406
E	15.75	16.05	0.620	0.632
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	3.10	3.5	0.122	0.138
L	13.50	13.90	0.531	0.547
L1	2.90	3.30	0.114	0.130
Φ	3.10	3.30	0.122	0.130

Marking Diagram



Ordering information

Model name	Package	Unit Weight	Base Quantity	Packing Quantity
YFW13P20AS	TO-263	0.04oz(1.16g)	800pcs/reel	1600pcs/box 8000pcs/Cartron

Package Dimensions

TO-263

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	0.00	0.15	0.000	0.006
A2	4.30	4.55	0.169	0.179
B	1.10	1.50	0.043	0.059
b	0.70	0.90	0.028	0.035
b1	1.20	1.50	0.047	0.059
c	0.30	0.60	0.012	0.024
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
L	15.00	15.30	0.591	0.602
L1	5.20	5.40	0.205	0.213
L2	2.40	2.60	0.094	0.102
L3	1.60	1.80	0.063	0.071

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