



## Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low  $R_{DS(on)}$
- Easy to parallel
- Simple to drive
- RoHS Compliant

## Benefits

- Increased Power Density
- Faster Operating Frequency
- Reduction of Heat Sink Requirements
- Higher Efficiency
- Reduced EMI

## Applications

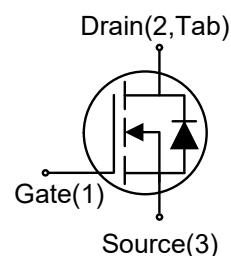
- Power Factor Correction Modules
- Switch Mode Power Supplies
- DC-AC Inverters
- High Voltage DC/DC Converters



Ordering Part Number	Package	Brand
STFU16N65M2	TO-220F	HXY MOSFET



TO-220F



## Maximum Ratings ( $T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
$V_{DS\max}$	Drain - Source Voltage	650	V	$V_{GS} = 0\text{ V}$ , $I_D = 100\text{ }\mu\text{A}$
$V_{GS\max}$	Gate - Source Voltage (dynamic)	-5/+26	V	AC ( $f > 1\text{ Hz}$ )
$V_{GSop}$	Gate - Source Voltage (static)	0/+18	V	Static
$I_D$	Continuous Drain Current	15	A	$T_c = 25^\circ\text{C}$
		12		$T_c = 100^\circ\text{C}$
$I_{DM}$	Pulsed Drain Current	39	A	Pulse width $t_p$ limited by $T_{j\max}$
$P_D$	Power Dissipation	52	W	$T_c = 25^\circ\text{C}$
		25		$T_c = 100^\circ\text{C}$
$T_j$ , $T_{stg}$	Operating Junction and Storage Temperature	-55 to +175	°C	



**Electrical Characteristics** ( $T_c = 25^\circ\text{C}$  unless otherwise specified)

**Static Characteristics**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D=1\text{ mA}$ , $V_{GS}=0\text{V}$	650			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=850\text{V}$ , $V_{GS}=0\text{V}$		1	15	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{DS}=0\text{V}$ , $V_{GS}=18\text{V}$			50	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=1\text{mA}$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$		3.5 2.8	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=18\text{V}$ , $I_D=4.5\text{A}$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$		180 205	220	$\text{m}\Omega$
	Drain-Source On-State Resistance	$V_{GS}=15\text{V}$ , $I_D=4.5\text{A}$ $T_j=25^\circ\text{C}$ $T_j=175^\circ\text{C}$		260 295	300	nA
$C_{iss}$	Input Capacitance	$V_{DS}=400\text{V}$ , $f=1\text{MHz}$ , $V_{GS}=0\text{V}$		180		$\text{pF}$
$C_{oss}$	Output Capacitance			20		$\text{pF}$
$C_{rss}$	Reverse Transfer Capacitance			0.9		$\text{pF}$
$Q_g$	Total Gate Charge	$V_{DS}=400\text{V}$ , $I_D=5\text{A}$ , $R_G = 10\ \Omega$ $V_{GS} = 0/15\text{V}$		11.2		nC
$Q_{gs}$	Gate to Source Charge			2.3		nC
$Q_{gd}$	Gate to Drain Charge			1.1		nC
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=400\text{V}$ , $I_D=5\text{A}$ , $V_{GS}=-5/18\text{V}$ , $R_G=10\Omega$ ,		5		ns
$t_r$	Rise Time			17		ns
$t_{d(off)}$	Turn-Off Delay Time			8		ns
$t_f$	Fall Time			10		ns
$E_{on}$	Turn-On Energy			25		$\mu\text{J}$
$E_{off}$	Turn-Off Energy			10		$\mu\text{J}$



### Reverse Diode Characteristics

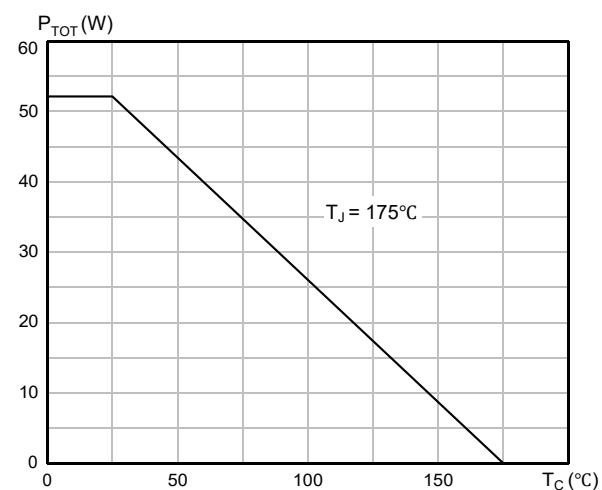
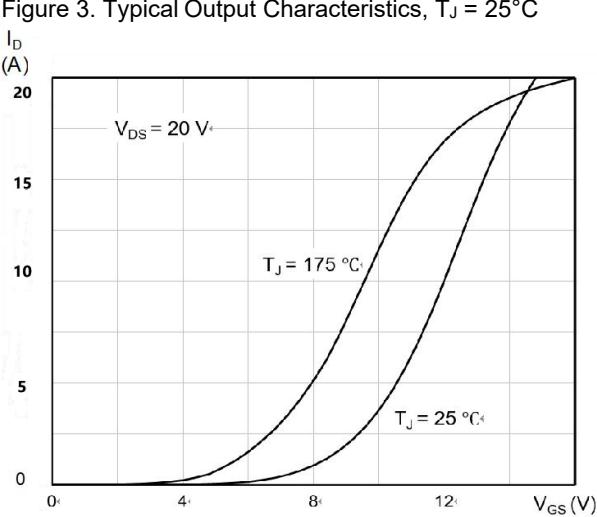
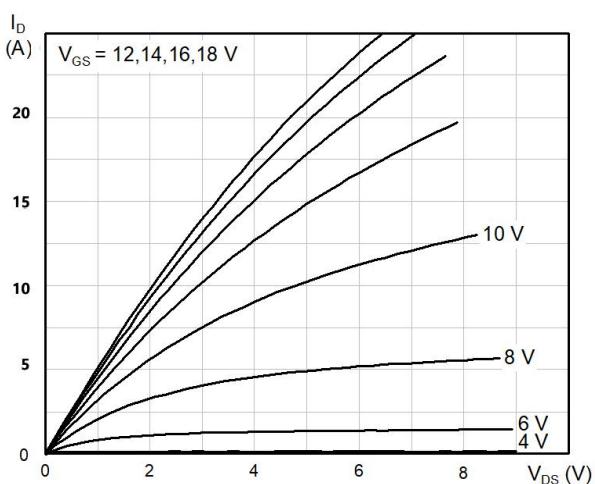
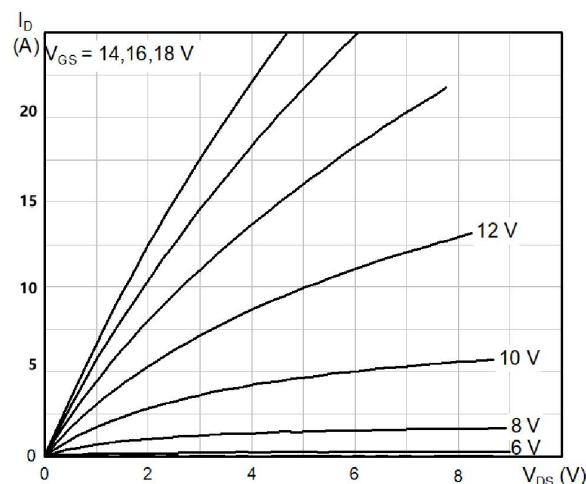
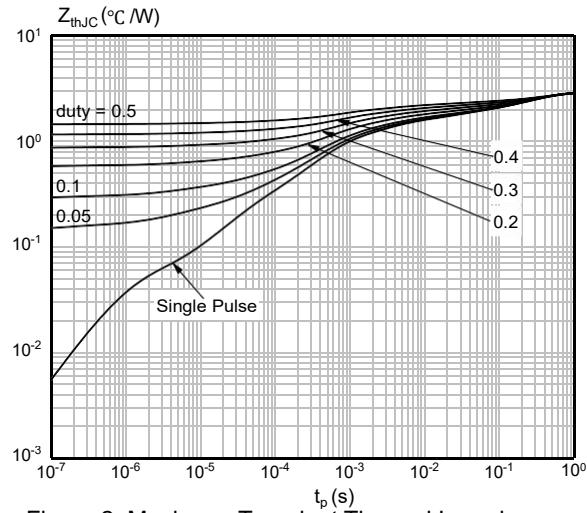
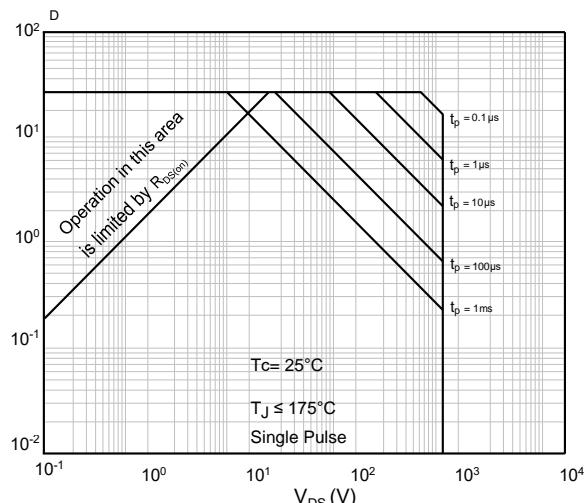
Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{SD}$	Diode Forward Voltage	$V_{GS}=-4V$ , $I_{SD}=2.5A$ $T_j=25^\circ C$ $T_j=175^\circ C$		4.0 3.6		V
$I_s$	Continuous Diode Forward Current	$T_c=25^\circ C$ $T_c=100^\circ C$		15 12		A
$t_{rr}$	Reverse Recovery Time	$I_{SD}=-5A$ $V_{GS}=-5V$ , $I_{SD}=4.5A$ ,		50		ns
$Q_{rr}$	Reverse Recovery Charge	$V_R=400V$ , $di/dt=1000A/\mu s$		38		nC
$I_{rrm}$	Peak Reverse Recovery Current			2.4		A

### Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(j-c)}$	Thermal Resistance from Junction to Case		2.88		°C/W
$R_{th(j-a)}$	Thermal Resistance from Junction to Ambient		40		°C/W



## Typical Performance



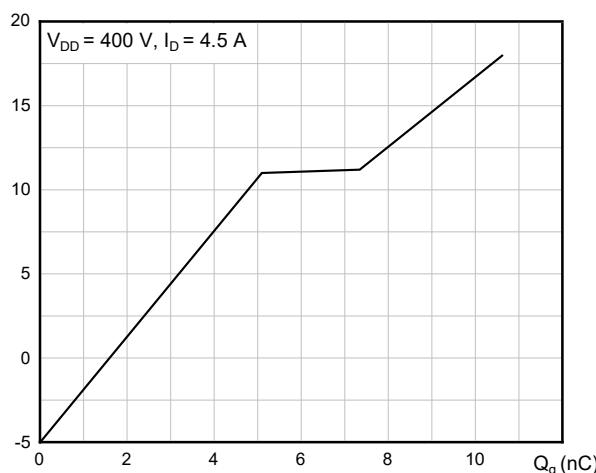


Figure 7. Typical Gate Charge Characteristics

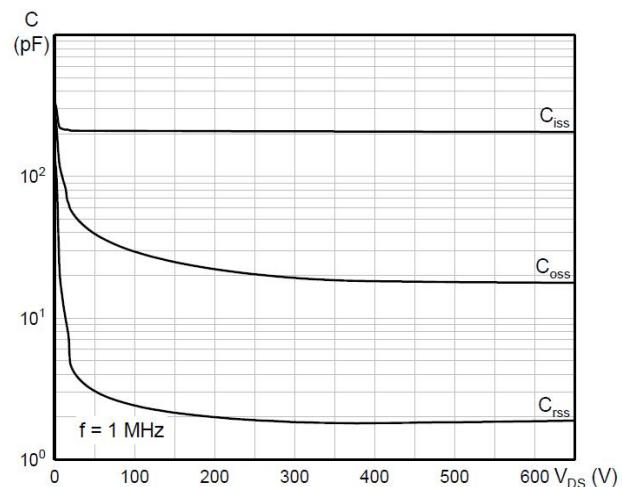


Figure 8. Typical Capacitance Characteristics

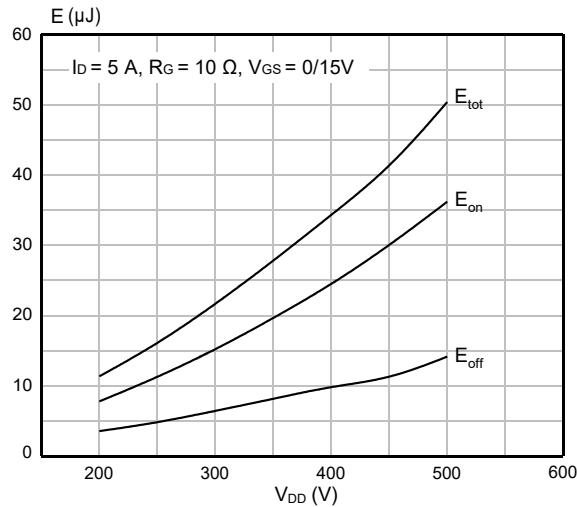


Figure 9. Typical Switching Energy vs. Supply Voltage

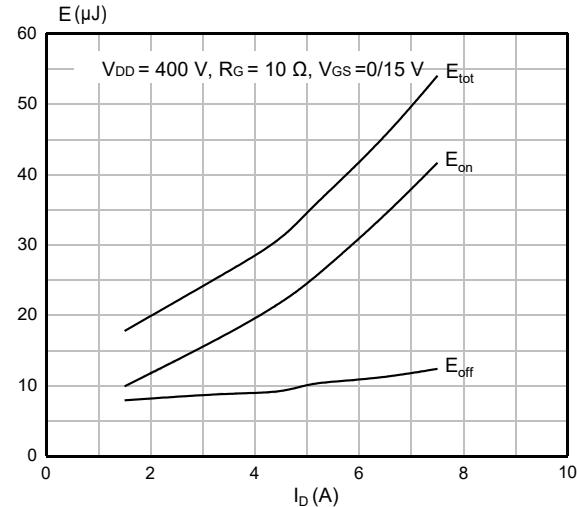


Figure 10. Typical Switching Energy vs. Drain Current

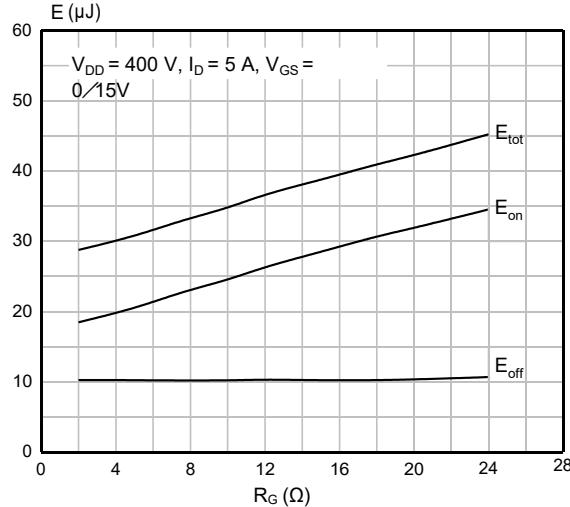


Figure 11. Switching Energy vs. Gate Resistance

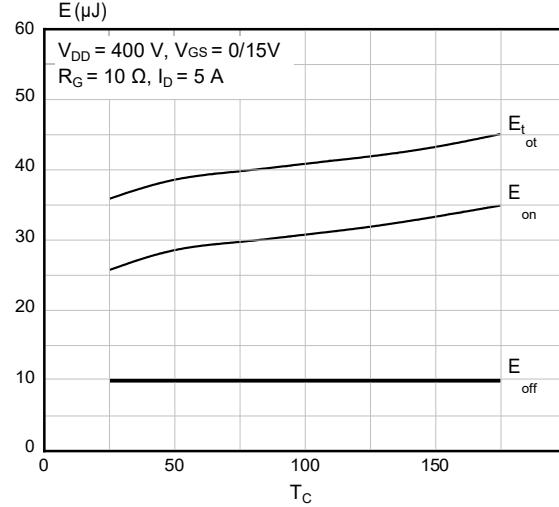
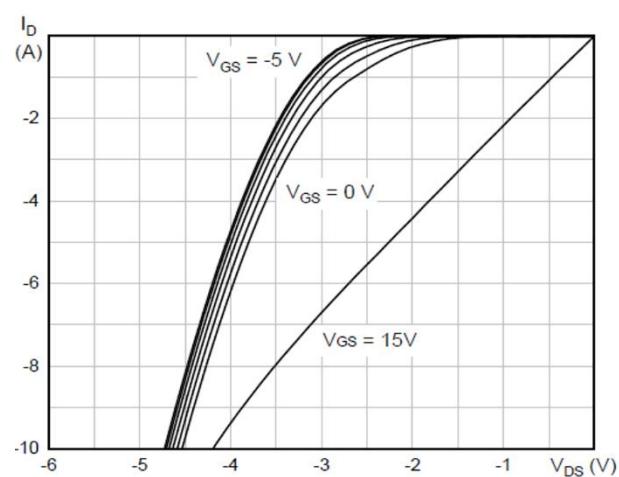
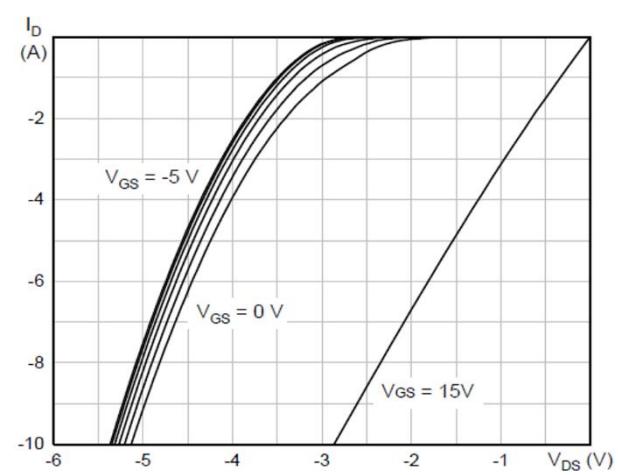
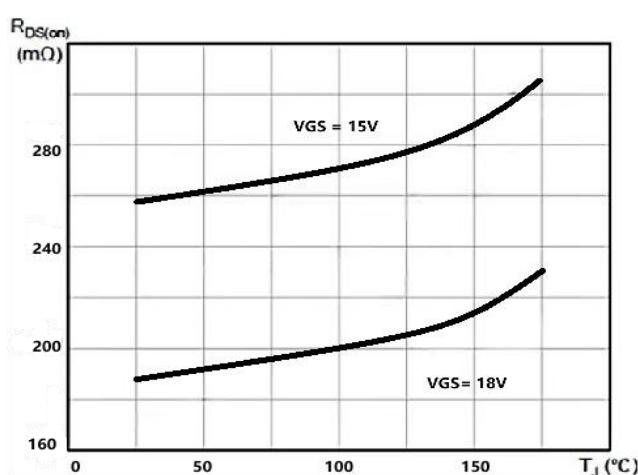
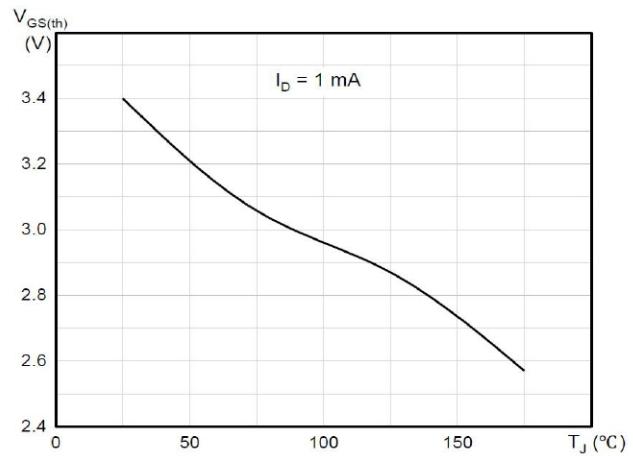
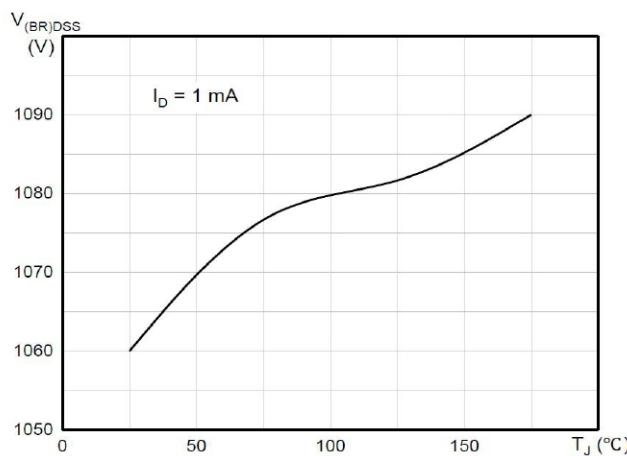


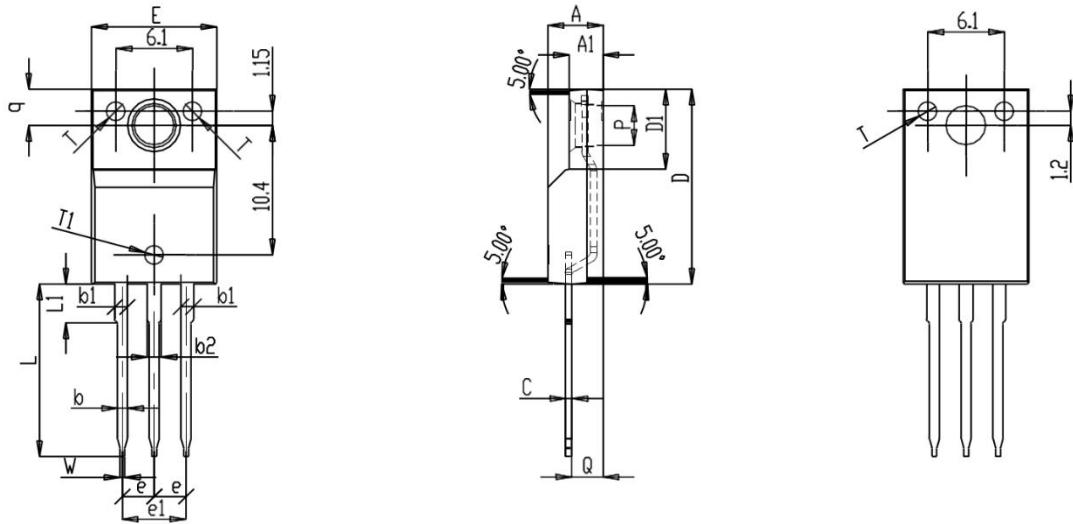
Figure 12. Typical Switching Energy vs. Temperature





## Package Dimensions

Package TO-220F



SYMBOL	MILLIMETERS			NOTES	SYMBOL	MILLIMETERS			NOTES
	Normal	MIN.	MAX.			Normal	MIN.	MAX.	
A	4.4	4.2	4.6		e1	5.08	5	5.12	
A1	2.7	2.5	2.9		L	13.90	13.5	14.4	
b	0.8	0.7	0.9		L1	3.12	2.8	3.3	
b1	1.07	0.9	1.3		P	3.14	3.00	3.20	
b2	1.17	1	1.4		Q	2.44	2.3	2.6	
C	0.5	0.4	0.6		q	2.87	2.6	3	
D	15.63	15.4	15.8		w	0.37	0.3	0.5	
D1	6.22	6	6.4		T	1.52	1.3	1.7	
E	10.06	9.7	10.3		T1	1.20	1.1	1.3	
e	2.54	2.5	2.58						



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