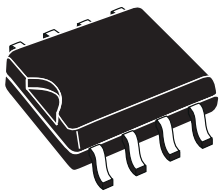
STS2DNE60

DUAL N-CHANNEL 60V - 0.180Ω - 2A SO-8
STripFET™ POWER MOSFET

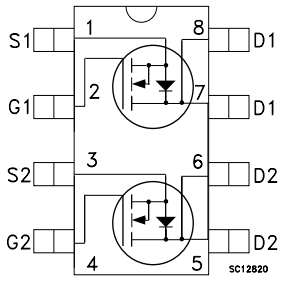
TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STS2DNE60	60 V	< 0.23 Ω	2 A

- TYPICAL $R_{DS}(on)$ = 0.180Ω
- LOW THRESHOLD GATE DRIVE
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY



SO-8

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- DC MOTOR DRIVE
- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/ DESKTOP PC_S

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	60	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	60	V
V_{GS}	Gate- source Voltage	± 20	V
I_D	Drain Current (continuos) at T_C = 25°C Single Operation Drain Current (continuos) at T_C = 100°C Single Operation	2 1.3	A A
I_{DM} (●)	Drain Current (pulsed)	8	A
P_{TOT}	Total Dissipation at T_C = 25°C Dual Operation Total Dissipation at T_C = 25°C Single Operation	2 1.6	W W

(●) Pulse width limited by safe operating area

THERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-amb Max Single Operation (*)Thermal Resistance Junction-amb Max Dual Operation	78 62.5	°C/W °C/W
T_j	Max. Operating Junction Temperature	150	°C
T_{stg}	Storage Temperature	–65 to 150	°C

ELECTRICAL CHARACTERISTICS (TCASE = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	60			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V, I_D = 1 A		0.180	0.23	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} = 15V , I_D = 1 A		1.8		S
C_{iss}	Input Capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		310		pF
C_{oss}	Output Capacitance			45		pF
C_{rss}	Reverse Transfer Capacitance			12		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 15 V, I_D = 1 A		12.6		ns
t_r	Rise Time	R_G = 4.7Ω V_{GS} = 10 V (see test circuit, Figure 3)		14		ns
Q_g	Total Gate Charge	V_{DD} = 24 V, I_D = 2 A,		12	20	
Q_{gs}	Gate-Source Charge	V_{GS} = 10 V		5.1		nC
Q_{gd}	Gate-Drain Charge			2.7		

SWITCHING OFF

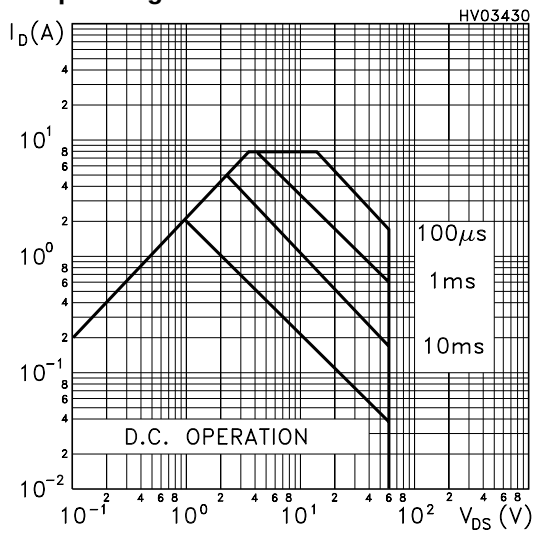
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(off)}$	Off-voltage Rise Time	V_{DD} = 48 V, I_D = 2 A		4.5		ns
t_f	Fall Time	R_G = 4.7Ω, V_{GS} = 10 V		5		ns
t_c	Cross-over Time	(see test circuit, Figure 5)		12		ns

SOURCE DRAIN DIODE

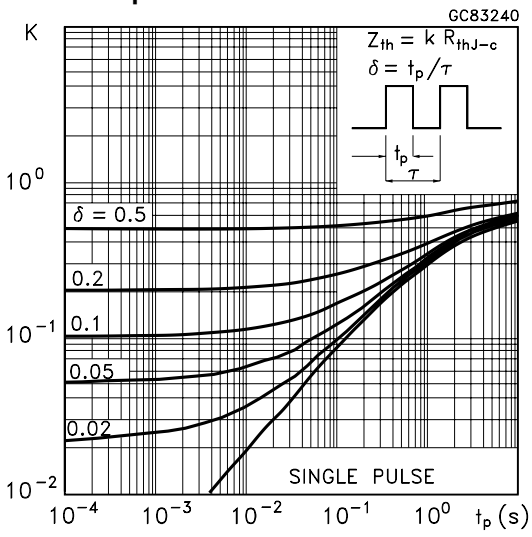
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				2	A
I_{SDM} (1)	Source-drain Current (pulsed)				8	A
V_{SD} (2)	Forward On Voltage	I_{SD} = 2 A, V_{GS} = 0			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 2 A, di/dt = 100A/µs,		40		ns
Q_{rr}	Reverse Recovery Charge	V_{DD} = 20 V, T_j = 150°C		50		nC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		2.5		A

Note: 1. Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

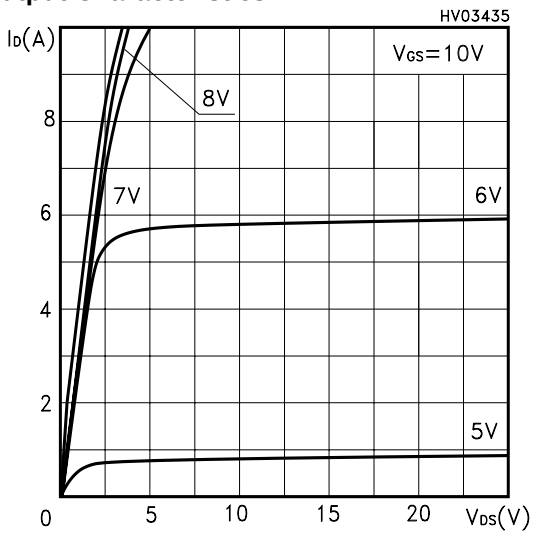
Safe Operating Area



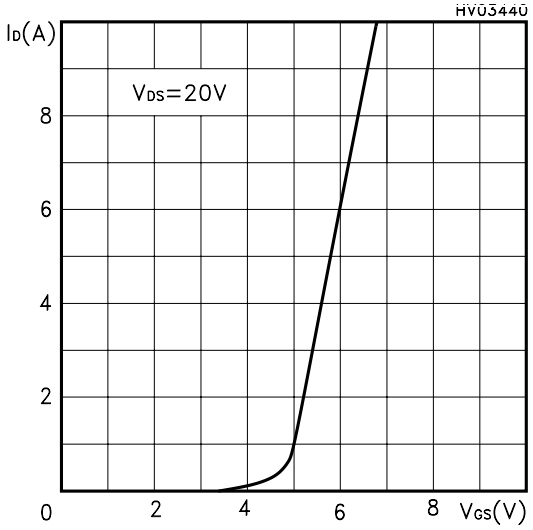
Thermal Impedance



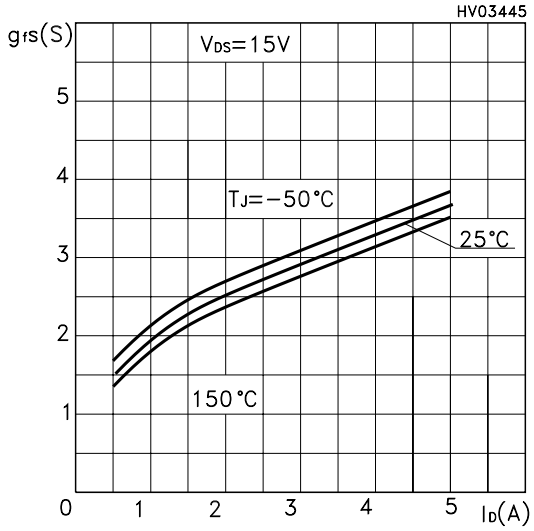
Output Characteristics



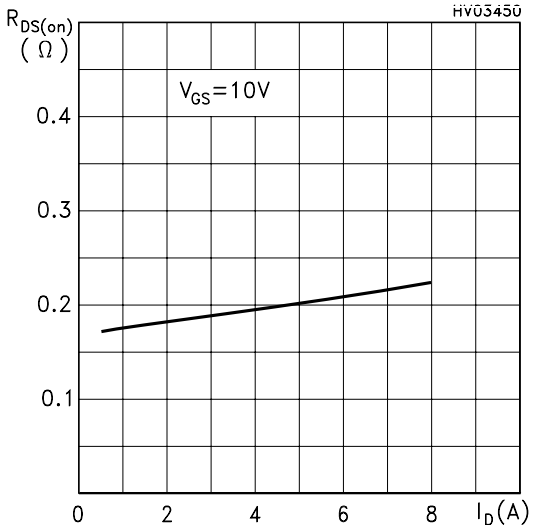
Transfer Characteristics



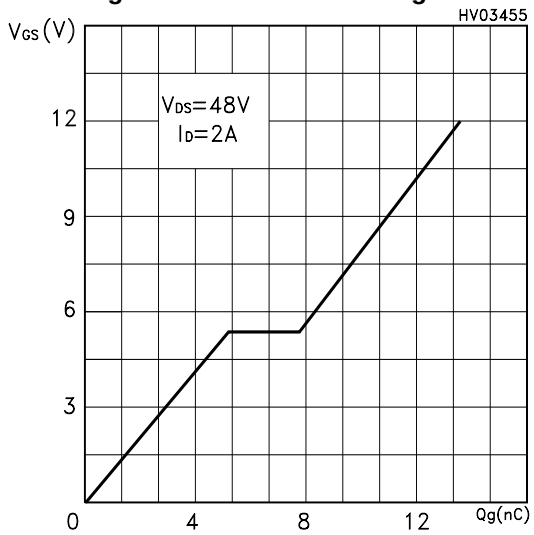
Tranconductance



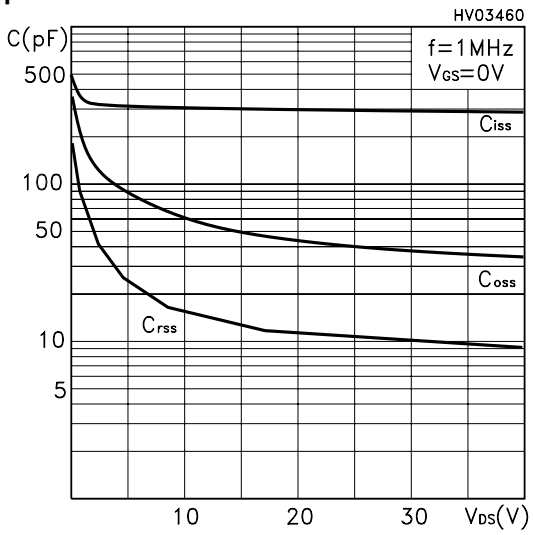
Static Drain-Source On Resistance



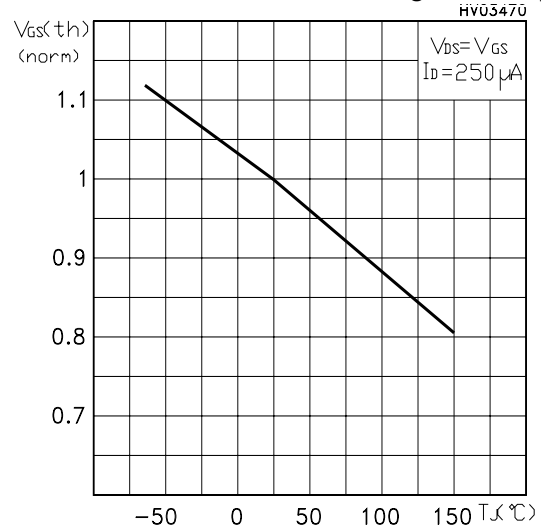
Gate Charge vs Gate-source Voltage



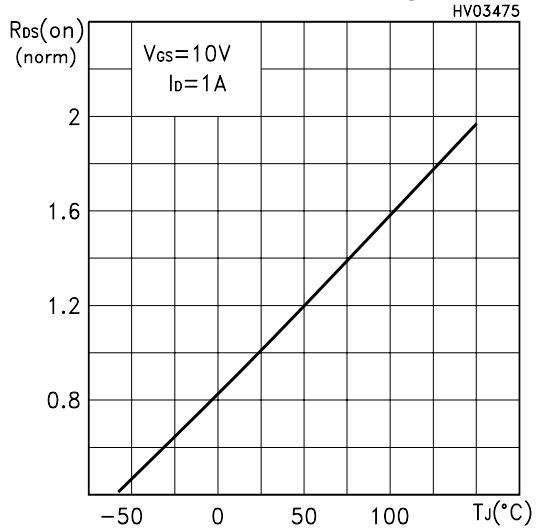
Capacitance Variations



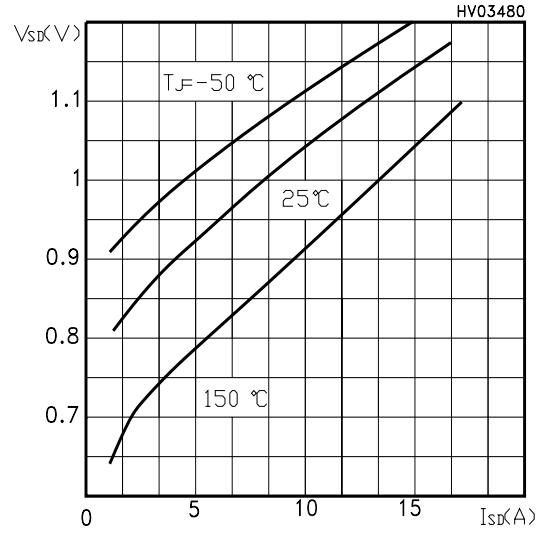
Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Drain-Source Breakdown vs Temperature

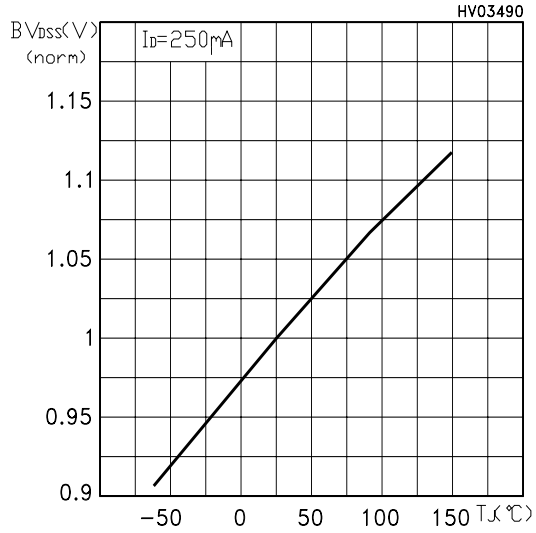


Fig. 1: Unclamped Inductive Load Test Circuit

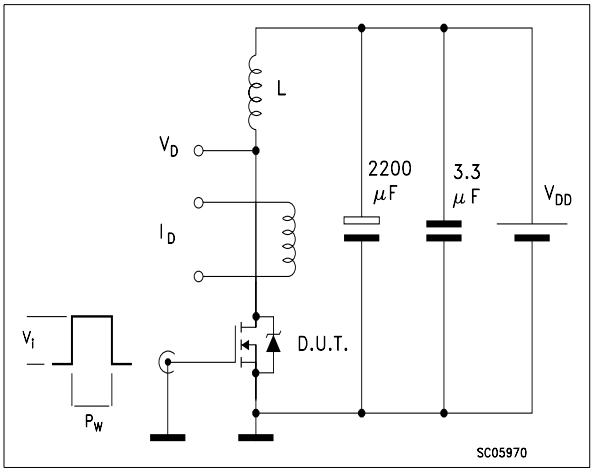


Fig. 2: Unclamped Inductive Waveform

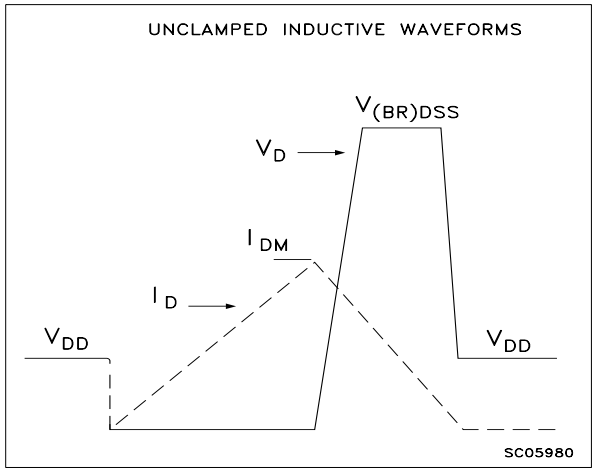


Fig. 3: Switching Times Test Circuit For Resistive Load

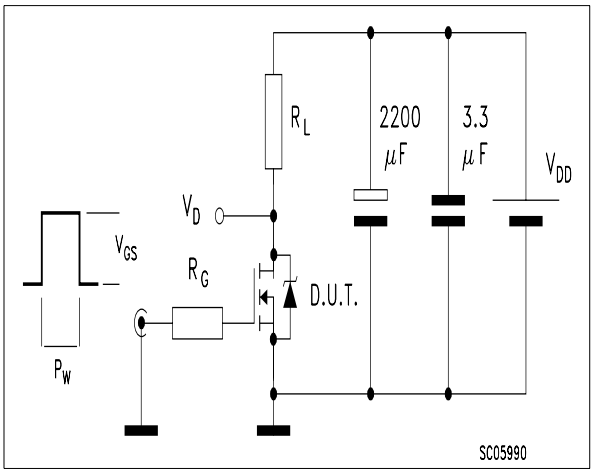


Fig. 4: Gate Charge test Circuit

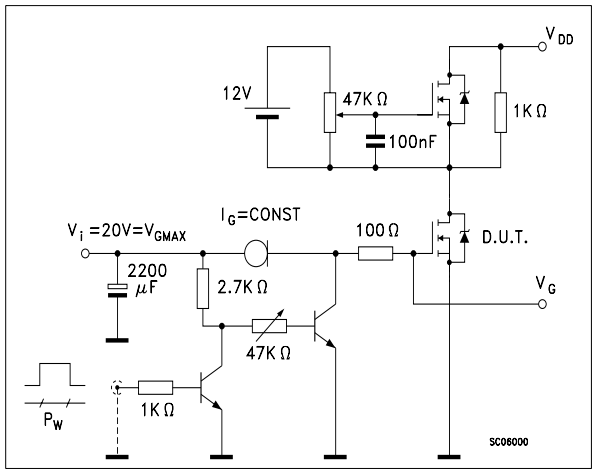
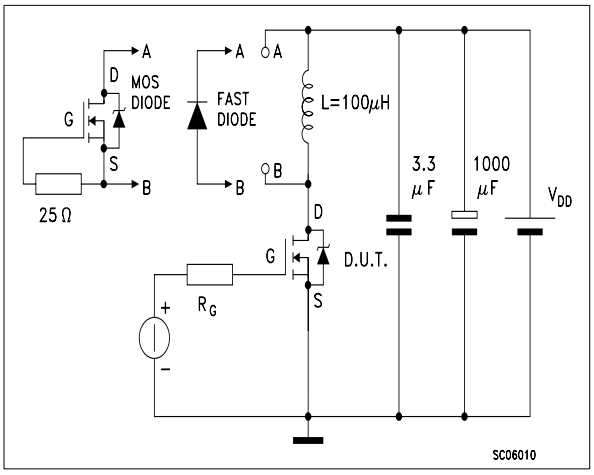
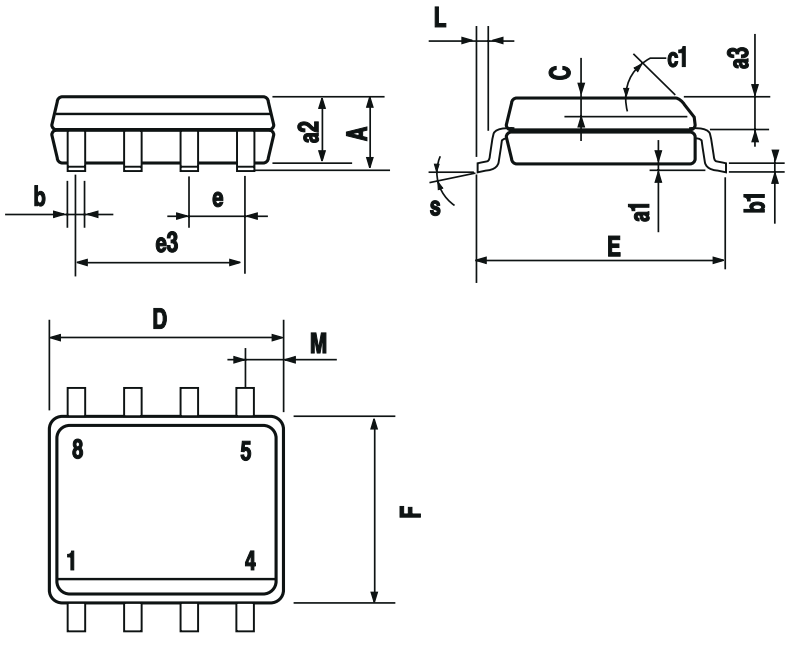


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



SO-8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45 (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8 (max.)					



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