

STS2DPFS20V Datasheet

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DiGi Electronics Part Number	STS2DPFS20V-DG
Manufacturer	STMicroelectronics
Manufacturer Product Number	STS2DPFS20V
Description	MOSFET P-CH 20V 2.5A 8SO
Detailed Description	P-Channel 20 V 2.5A (Tc) 2W (Tc) Surface Mount 8-S OIC

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Manufacturer Product Number:

STS2DPF520V

Series:

STripFET™ II

FET Type:

P-Channel

Drain to Source Voltage (Vdss):

20 V

Drive Voltage (Max Rds On, Min Rds On):

2.7V, 4.5V

Vgs(th) (Max) @ Id:

600mV @ 250µA (Min)

Vgs (Max):

±12V

FET Feature:

Schottky Diode (Isolated)

Operating Temperature:

150°C (TJ)

Supplier Device Package:

8-SOIC

Base Product Number:

STS2D

Manufacturer:

STMicroelectronics

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

2.5A (Tc)

Rds On (Max) @ Id, Vgs:

200mOhm @ 1A, 4.5V

Gate Charge (Qg) (Max) @ Vgs:

4.7 nC @ 4.5 V

Input Capacitance (Ciss) (Max) @ Vds:

315 pF @ 15 V

Power Dissipation (Max):

2W (Tc)

Mounting Type:

Surface Mount

Package / Case:

8-SOIC (0.154", 3.90mm Width)

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

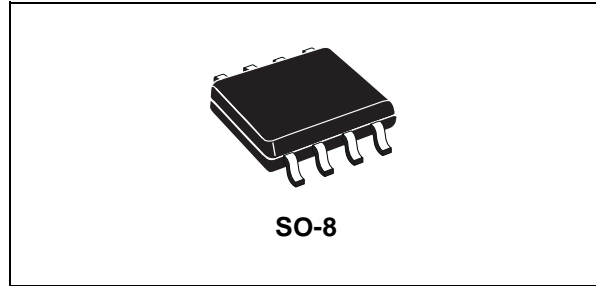


STS2DPFS20V

P-CHANNEL 20V - 0.14 Ω - 2.5A SO-8

2.7V-DRIVE STripFET™ II MOSFET PLUS SCHOTTKY DIODE

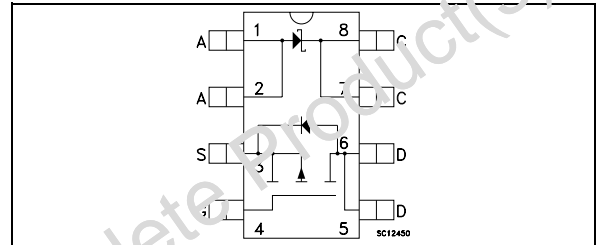
MAIN PRODUCT CHARACTERISTICS			
MOSFET	V _{DSS}	R _{DS(on)}	I _D
	20 V	< 0.20Ω (@4.5V) < 0.25Ω (@2.7V)	2.5 A
SCHOTTKY	I _{F(AV)}	V _{RRM}	V _{F(MAX)}
	3 A	30 V	0.51 V



DESCRIPTION

This product associates the latest low voltage StripFETœ in p-channel version to a low drop Schottky diode. Such configuration is extremely versatile in implementing, a large variety of DC-DC converters for printers, portable equipment, and cellular phones.

INTERNAL SCHEMATIC DIAGRAM



MOSFET ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	20	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kW)	20	V
V _{GS}	Gate- source Voltage	± 12	V
I _D	Drain Current (continuous) at T _C = 25°C	2.5	A
I _D	Drain Current (continuous) at T _C = 100°C	1.58	A
I _{DM} (●)	Drain Current (pulsed)	10	A
P _{tot}	Drain Power Dissipation at T _C = 25°C	2	W

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	30	V
I _{F(RMS)}	RMS Forward Current	20	A
I _{F(AV)}	Average Forward Current	3	A
I _{FSM}	Surge Non Repetitive Forward Current	75	A
I _{RSM}	Non Repetitive Peak Reverse Current	1	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage	10000	V/μs

(●) Pulse width limited by safe operating area

Note: For the P-CHANNEL MOSFET actual polarity of voltages and current has to be reversed

STS2DPFS20V
TERMAL DATA

Rthj-amb	(*)Thermal Resistance Junction-ambient MOSFET	62.5	°C/W
Rthj-amb	(*)Thermal Resistance Junction-ambient SCHOTTKY MAX	100	°C/W
T _{stg}	Storage Temperature Range	-55 to 150	°C
T _j	Maximum Lead Temperature For Soldering Purpose	150	°C

 (*) When Mounted on 1 inch² FR-4 board, 2 oz of Cu and t ≤ 10 sec

ELECTRICAL CHARACTERISTICS (T_{case} = 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	20			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _C = 125°C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 12 V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	0.6			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 4.5 V I _D = 1 A V _{GS} = 2.7 V I _D = 1 A		0.14 0.20	0.20 0.25	Ω Ω

SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _R (*)	Reversed Leakage Current	T _J = 25 °C V _R = 30 V T _J = 125 °C V _R = 30 V		30	0.2 100	mA mA
V _F (*)	Forward Voltage drop	T _J = 25 °C I _F = 3 A T _J = 125 °C I _F = 3 A		0.40	0.51 0.46	mA mA

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} = 15 V I _D = 1 A		4		S
C _{iss}	Input Capacitance	V _{DS} = 15V, f = 1 MHz, V _{GS} = 0		315		pF
C _{oss}	Output Capacitance			87		pF
C _{rss}	Reverse Transfer Capacitance			17		pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	$V_{DD} = 10\text{ V}$ $I_D = 1\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 3)		38 30		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 10\text{ V}$ $I_D = 2\text{ A}$ $V_{GS} = 4.5\text{ V}$		3.5 0.34 0.8	4.7	nC nC nC

SWITCHING OFF

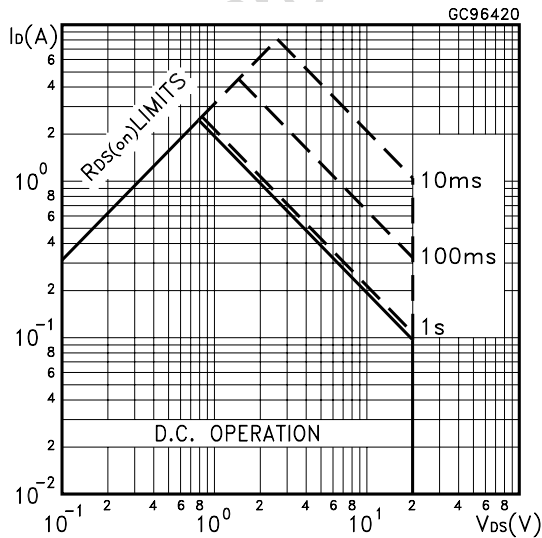
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 10\text{ V}$ $I_D = 1\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 4.5\text{ V}$ (Resistive Load, Figure 3)		45 11		ns ns

SOURCE DRAIN DIODE

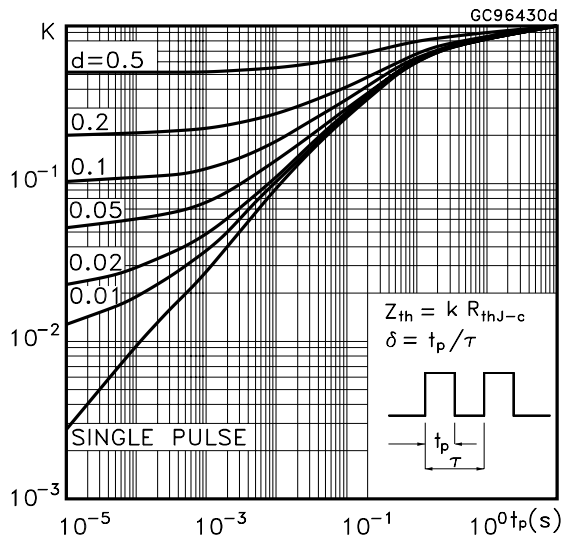
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				2 10	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 2\text{ A}$ $V_{GS} = 0$			1.2	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 2\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 10\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		15 7.5 1		ns nC A

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
 (•) Pulse width limited by safe operating area.

Safe Operating Area

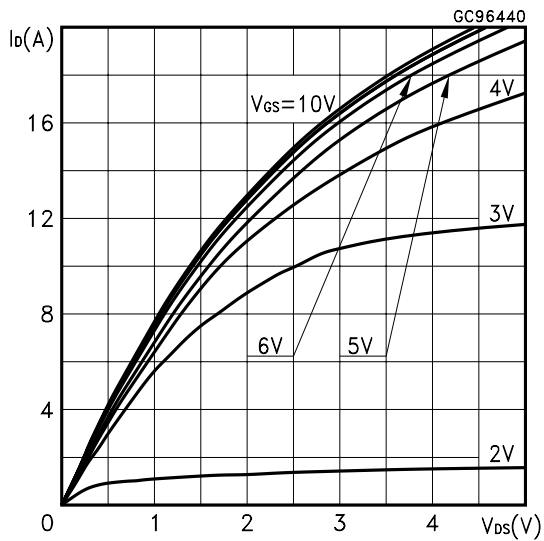


Thermal Impedance

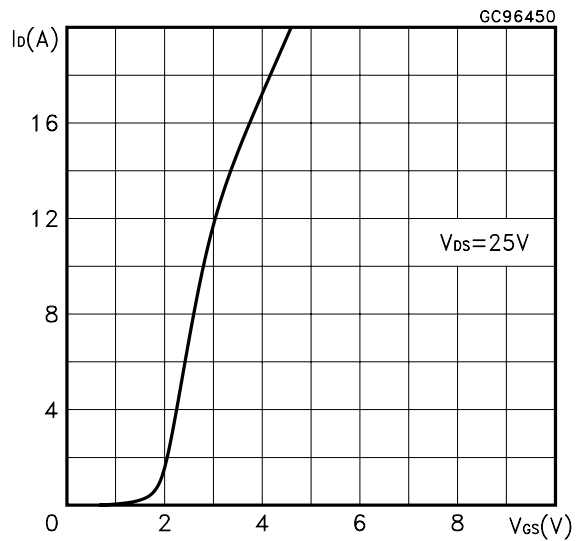


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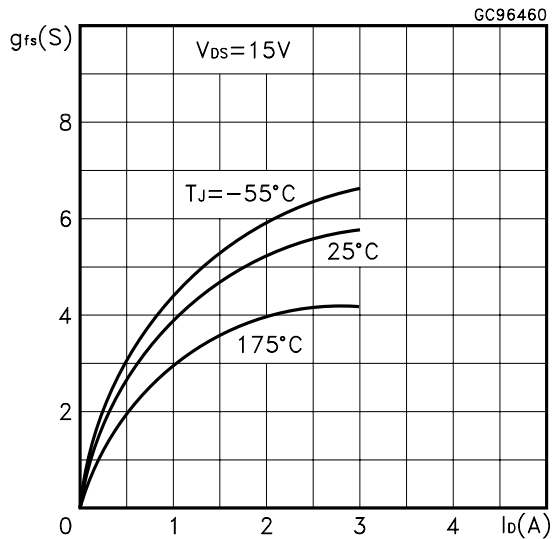
Output Characteristics



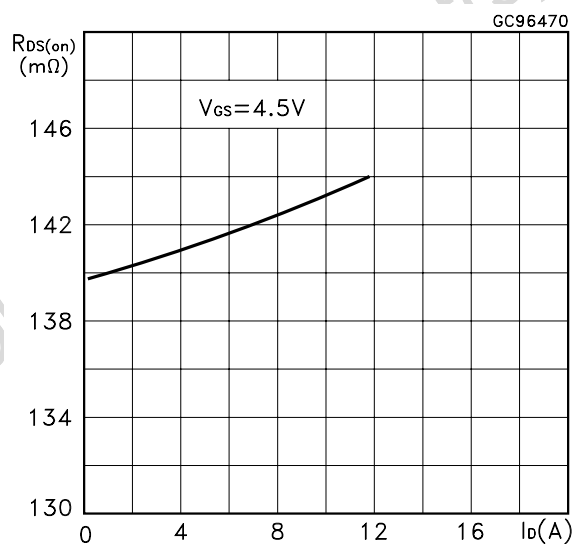
Transfer Characteristics



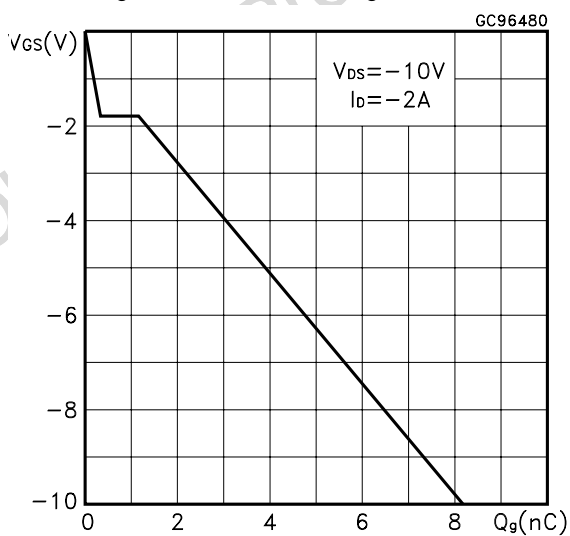
Transconductance



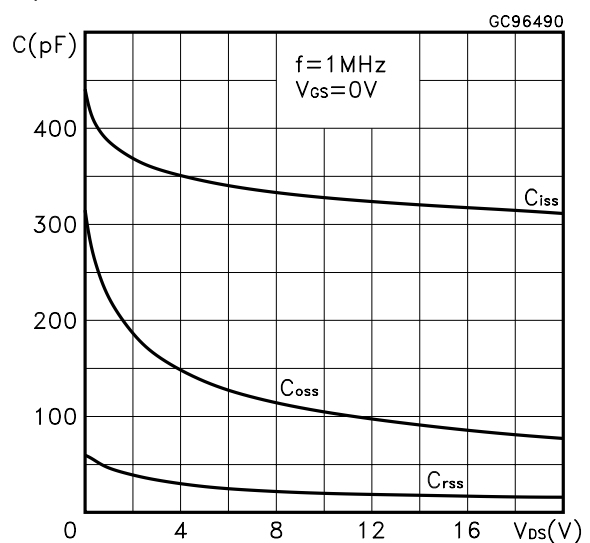
Static Drain-source On Resistance



Gate Charge vs Gate-source Voltage

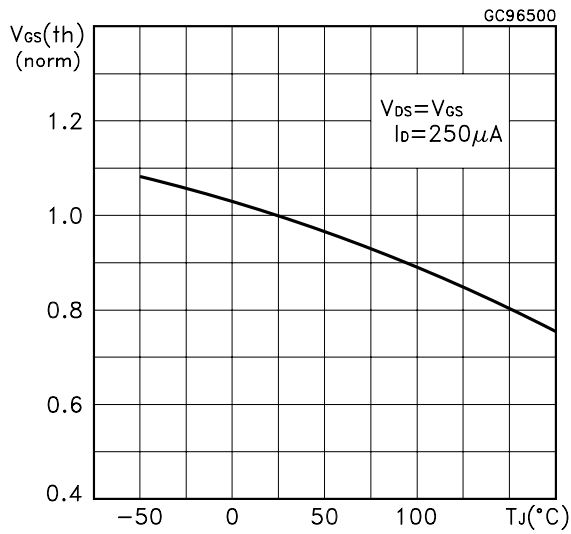


Capacitance Variations

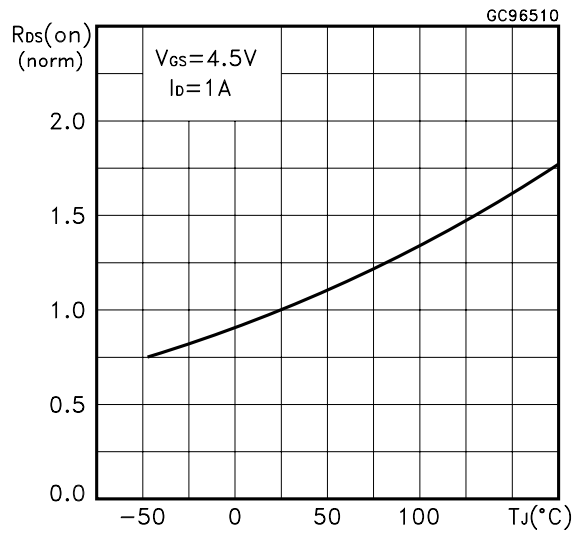


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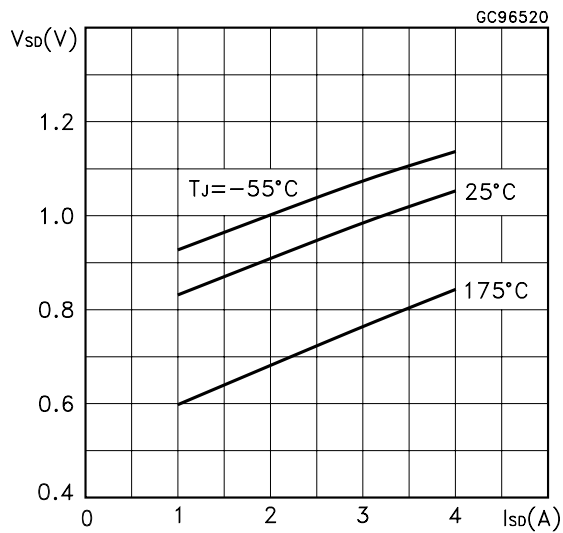
Normalized Gate Threshold Voltage vs Temperature



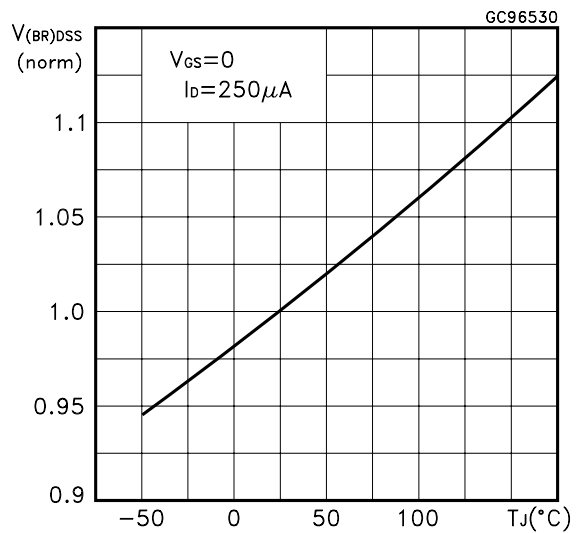
Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics

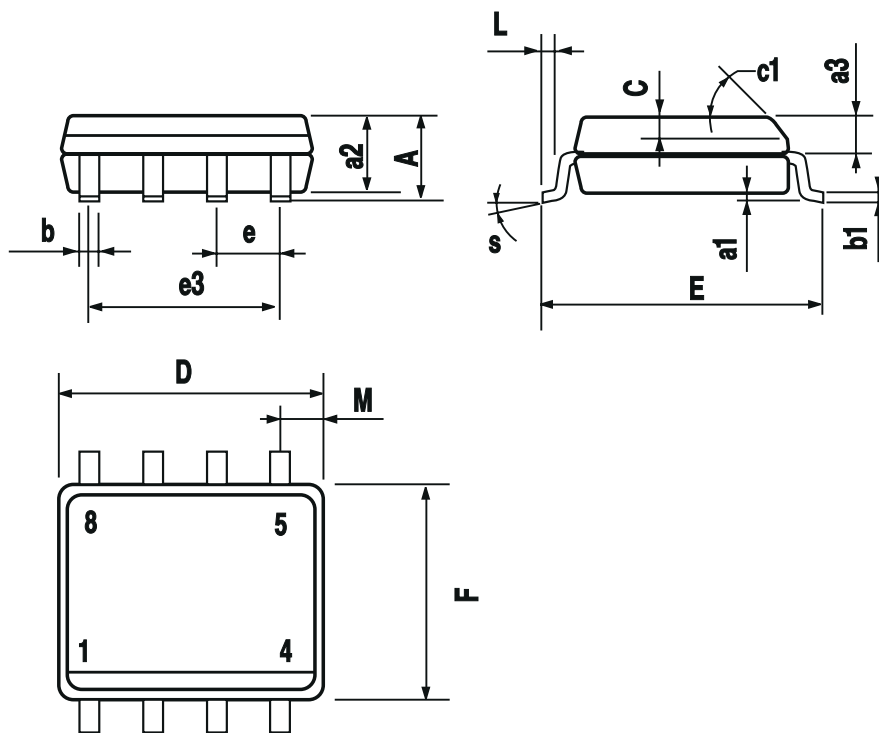


Normalized Breakdown Voltage vs Temperature.



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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