

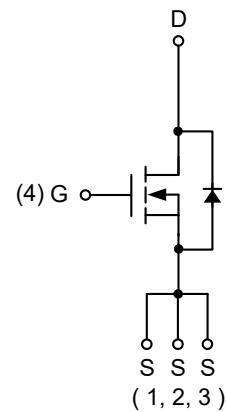
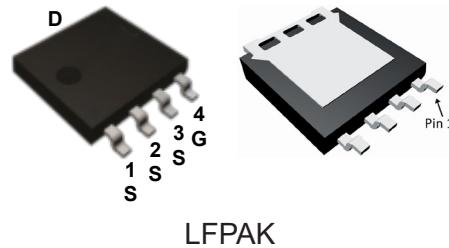
Features

- 40V/180A
 $R_{DS(ON)} = 1.8m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 2.3m\Omega (typ.) @ V_{GS} = 4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)
- Moisture Sensitivity Level MSL1
(per JEDEC J-STD-020D)

Applications

- Power Management in Desktop Computer or DC/DC Converters.

Pin Description



Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	
I _S	Diode Continuous Forward Current	T _C =25°C	180	A
I _D	Continuous Drain Current	T _C =25°C	180	A
		T _C =100°C	135	
I _{DM} ^a	Pulsed Drain Current	T _C =25°C	540	
P _D	Maximum Power Dissipation	T _C =25°C	250	W
		T _C =100°C	125	
R _{θJC}	Thermal Resistance-Junction to Case	Steady state	0.6	°C/W
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤10s	18	°C/W
		Steady state	55	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	65	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	211	mJ

Note * : Maximum continuous current is limited by bonding wire.

Note a : Pulse width limited by maximum junction temperature.

Note b : Surface mounted on 1in^2 pad area, steady state $t = 999\text{s}$.

Note c : UIS tested and pulse width limited by maximum junction temperature (initial temperature $T_J=25^{\circ}\text{C}$).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

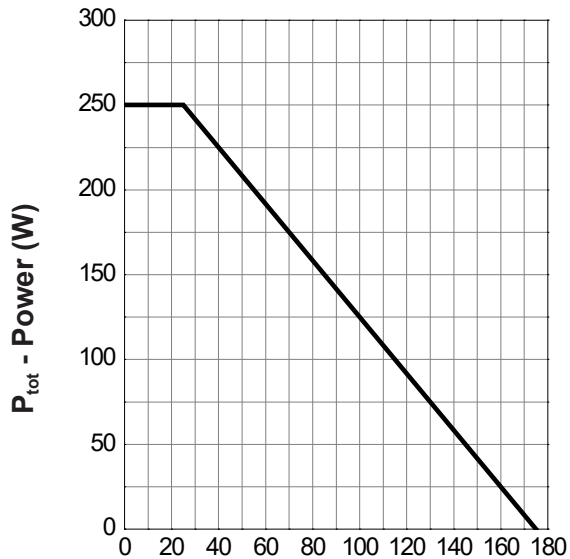
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.3	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A V _{GS} =4.5V, I _{DS} =15A	- -	1.8 2.3	2.1 2.7	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =20A	-	82	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =20A, dI _{SD} /dt=100A/μs	-	57	-	ns
t _a	Charge Time		-	30	-	
t _b	Discharge Time		-	27	-	
Q _{rr}	Reverse Recovery Charge		-	57	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	5300	6890	pF
C _{oss}	Output Capacitance		-	1150	-	
C _{rss}	Reverse Transfer Capacitance		-	175	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	21	38	ns
t _r	Turn-on Rise Time		-	11	20	
t _{d(OFF)}	Turn-off Delay Time		-	85	153	
t _f	Turn-off Fall Time		-	84	152	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =20A	-	74	104	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =20A	-	35	-	
Q _{gth}	Threshold Gate Charge		-	10	-	
Q _{gs}	Gate-Source Charge		-	13	-	
Q _{gd}	Gate-Drain Charge		-	8.5	-	

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note e : Guaranteed by design, not subject to production testing.

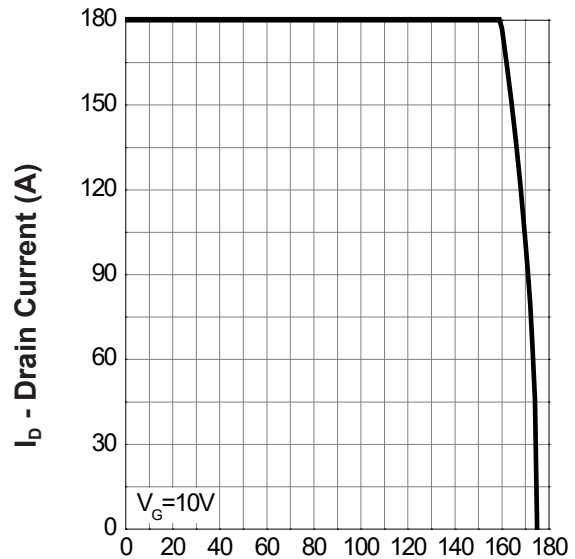
Typical Operating Characteristics

Power Dissipation



T_c - Case Temperature (°C)

Drain Current

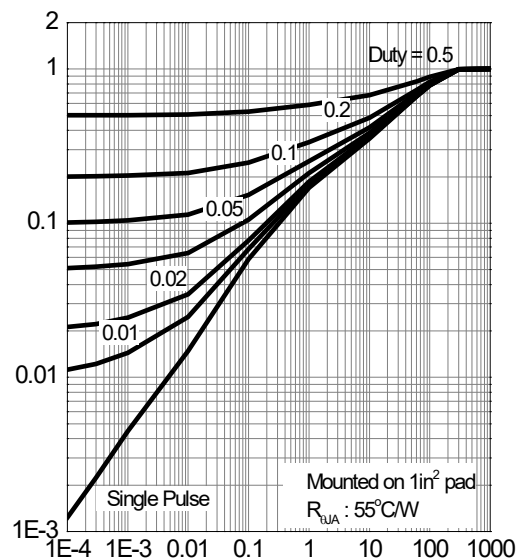


T_c - Case Temperature (°C)

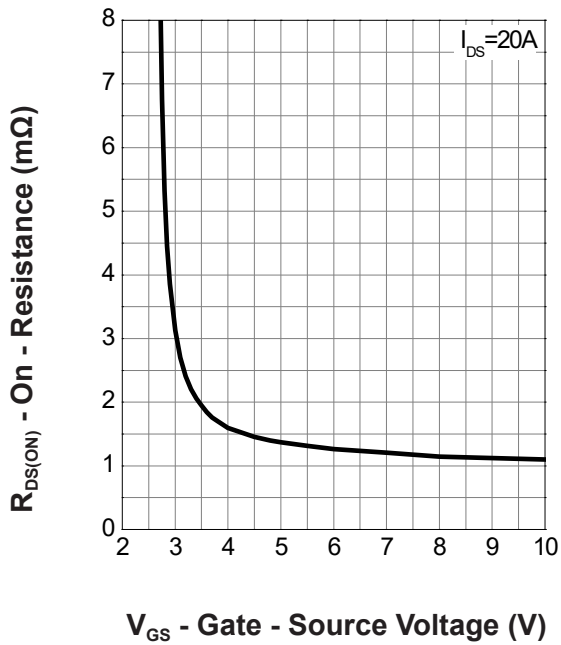
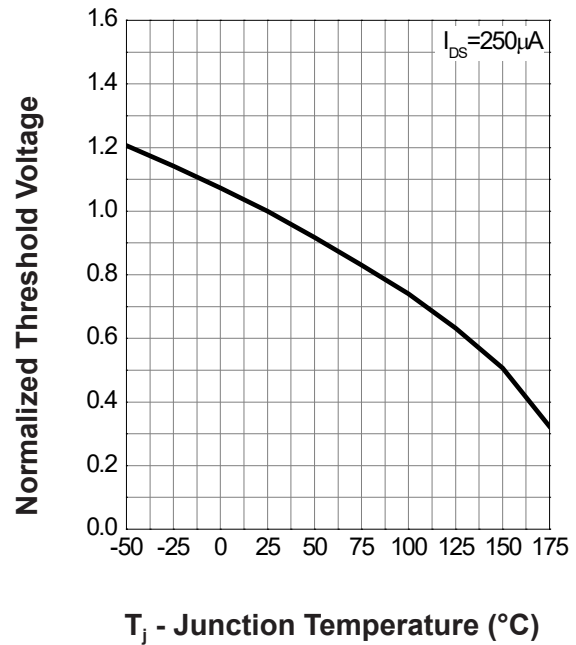
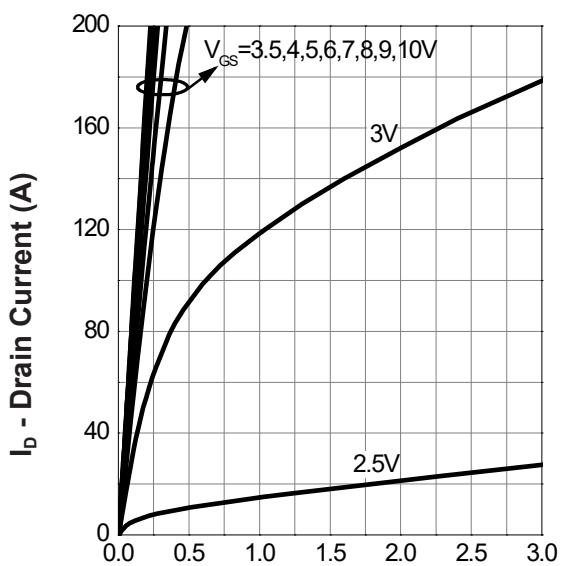
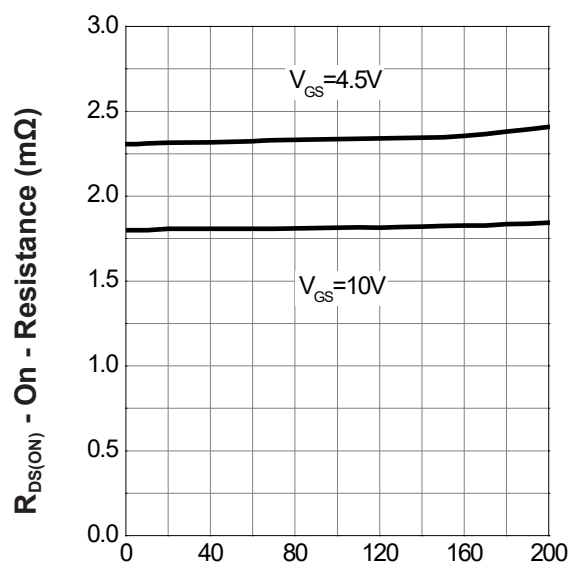
Safe Operation Area

I_D - Drain Current (A)

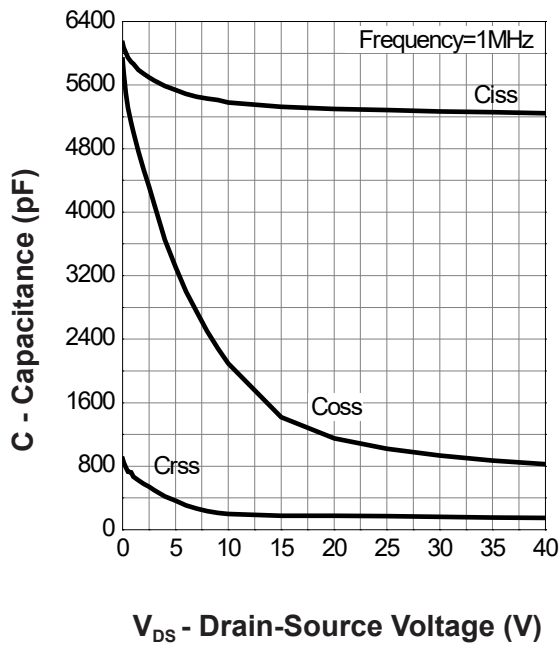
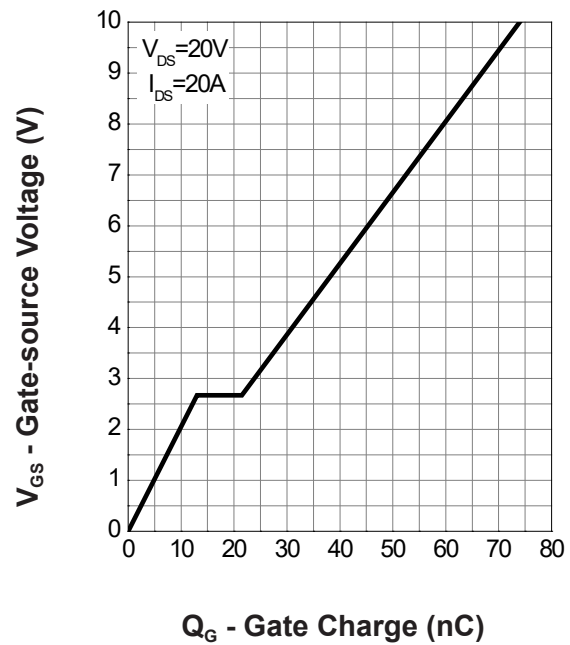
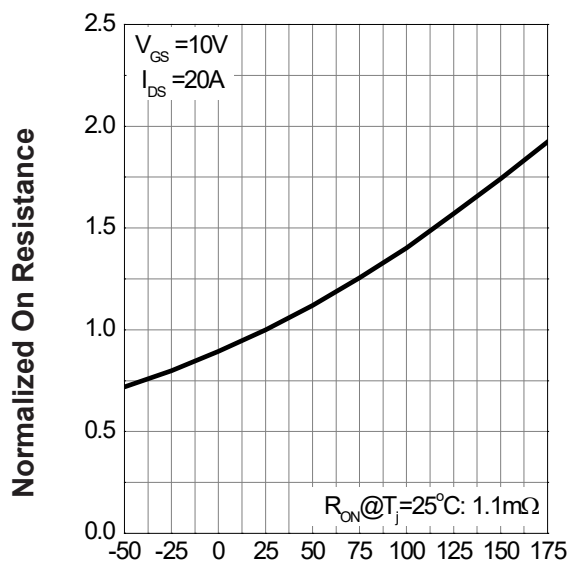
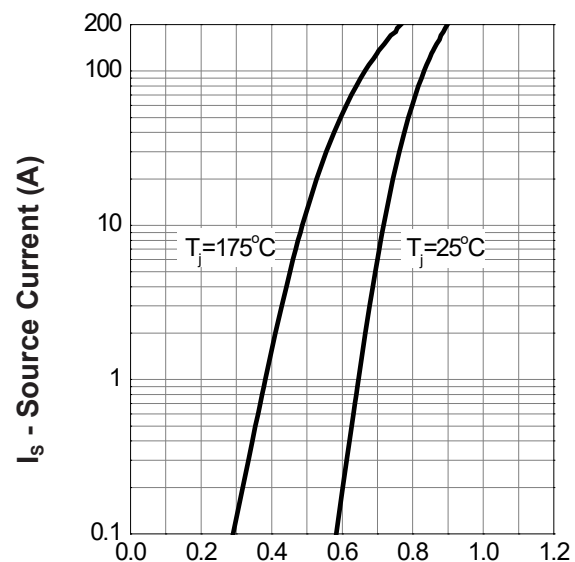
Thermal Transient Impedance



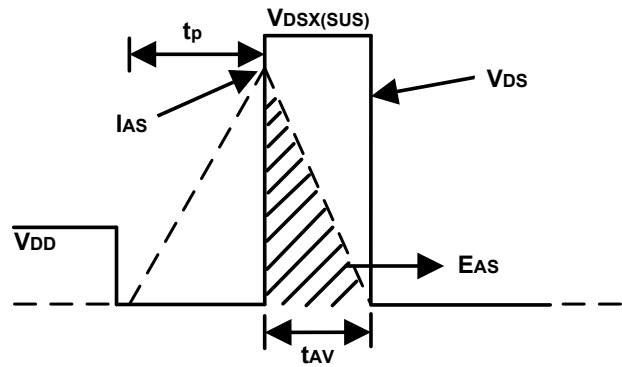
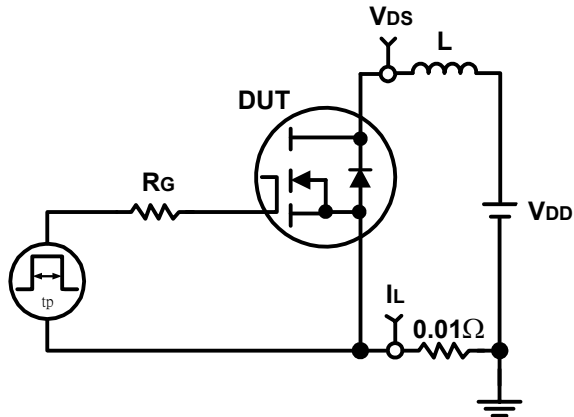
Typical Operating Characteristics(Cont.)

Gate-Source On Resistance

Gate Threshold Voltage

Output Characteristics

Drain-Source On Resistance


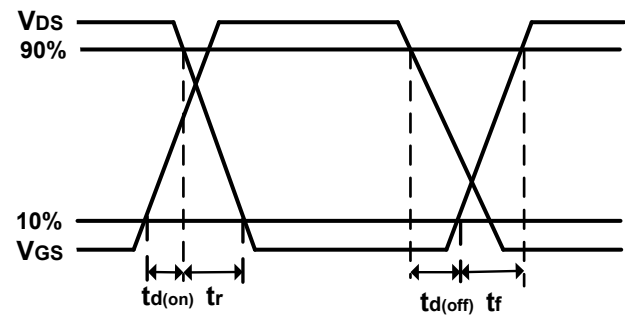
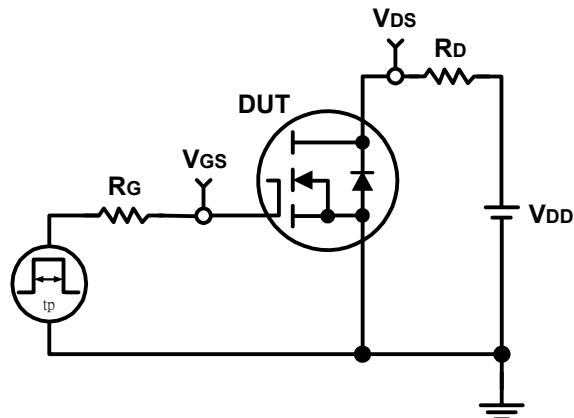
Typical Operating Characteristics(Cont.)

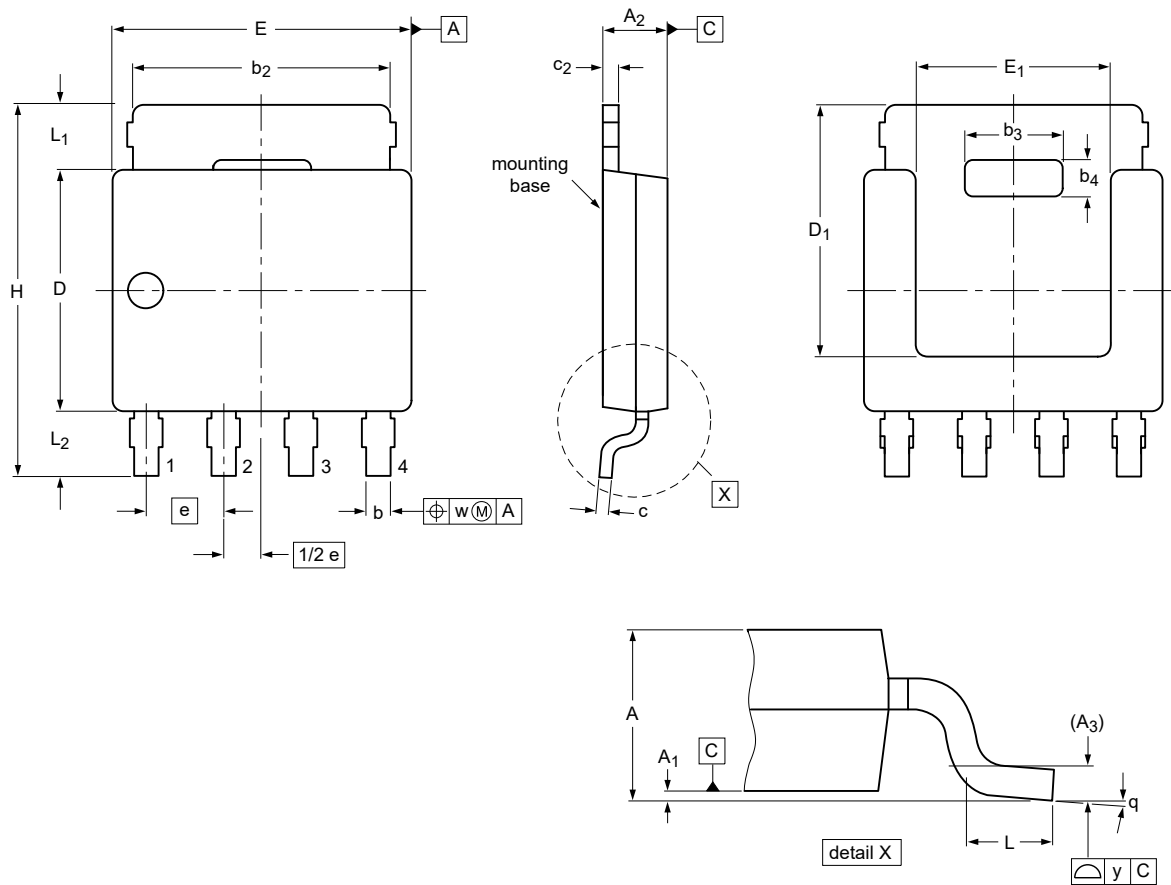
Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms





0 5 mm
scale

θ
8°
0°

Dimensions (mm are the original dimensions)

Unit ⁽¹⁾	A	A ₁	A ₂	A ₃	b	b ₂	b ₃	b ₄	c	c ₂	D ⁽¹⁾	D ₁ ⁽¹⁾	E ⁽¹⁾	E ₁ ⁽¹⁾	e	H	L	L ₁	L ₂	w	y
max	1.20	0.15	1.10		0.50	4.41	2.2	0.9	0.25	0.30	4.10	4.20	5.0	3.3		6.2	0.85	1.3	1.3		
nom				0.25											1.27					0.25	0.1
min	1.01	0.00	0.95		0.35	3.62	2.0	0.7	0.19	0.24	3.80		4.8	3.1		5.8	0.40	0.8	0.8		