

## NCE N-Channel Enhancement Mode Power MOSFET

### DESCRIPTION

The NCE7080 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

### GENERAL FEATURES

- $V_{DS} = 70V, I_D = 80A$   
 $R_{DS(ON)} < 8m\Omega @ V_{GS} = 10V$  (Typ: 6.3m $\Omega$ )
- High density cell design for ultra low  $R_{dson}$
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

### Application

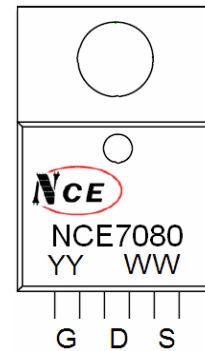
- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

**100% UIS TESTED!**

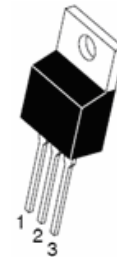
**100%  $\Delta V_{ds}$  TESTED!**



Schematic diagram



Marking and pin Assignment



TO-220 top view

### Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE7080	NCE7080	TO-220	-	-	-

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	70	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous	I <sub>D</sub>	80	A
Drain Current-Continuous(TC=100°C)	I <sub>D</sub> (100°C)	56	A
Pulsed Drain Current	I <sub>DM</sub>	310	A
Maximum Power Dissipation	PD	150	W
Derating factor		1	W/°C
Single pulse avalanche energy (Note 5)	E <sub>AS</sub>	450	mJ
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 To 175	°C

**Thermal Characteristic**

Thermal Resistance, Junction-to-Case(Note 2)	R $\theta$ JC	1	°C/W
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**Electrical Characteristics (TA=25°C unless otherwise noted)**

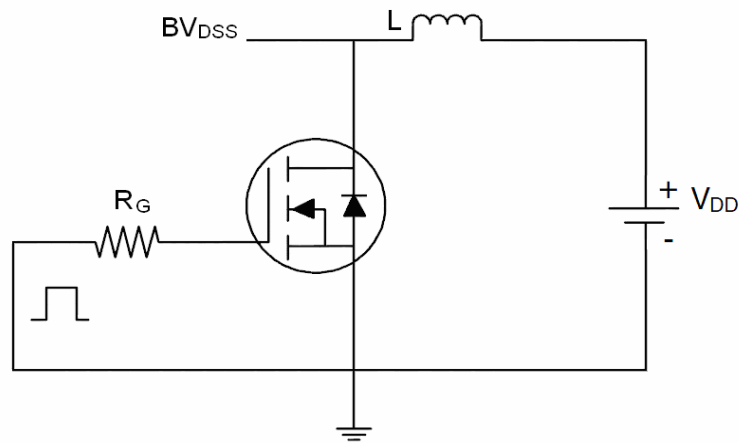
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V ID=250μA	70	74	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=70V, VGS=0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250μA	2	3	4	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=30A	-	6.3	8	mΩ
Forward Transconductance	gFS	VDS=25V, ID=30A	50	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	Ciss	VDS=25V, VGS=0V, F=1.0MHz	-	3400	-	PF
Output Capacitance	Coss		-	310	-	PF
Reverse Transfer Capacitance	Crss		-	221	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	td(on)	VDD=30V, ID=2A, RL=15Ω VGS=10V, RG=2.5Ω	-	15	-	nS
Turn-on Rise Time	tr		-	11	-	nS
Turn-Off Delay Time	td(off)		-	52	-	nS
Turn-Off Fall Time	tf		-	13	-	nS
Total Gate Charge	Qg	VDS=30V, ID=30A, VGS=10V	-	94	-	nC
Gate-Source Charge	Qgs		-	16	-	nC
Gate-Drain Charge	Qgd		-	24	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	VSD	VGS=0V, IS=30A	-	-	1.2	V
Diode Forward Current (Note 2)	IS		-	-	78	A
Reverse Recovery Time	trr	TJ = 25°C, IF =75A di/dt = 100A/μs(Note3)	-	33		nS
Reverse Recovery Charge	Qrr		-	54		nC
Forward Turn-On Time	ton	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

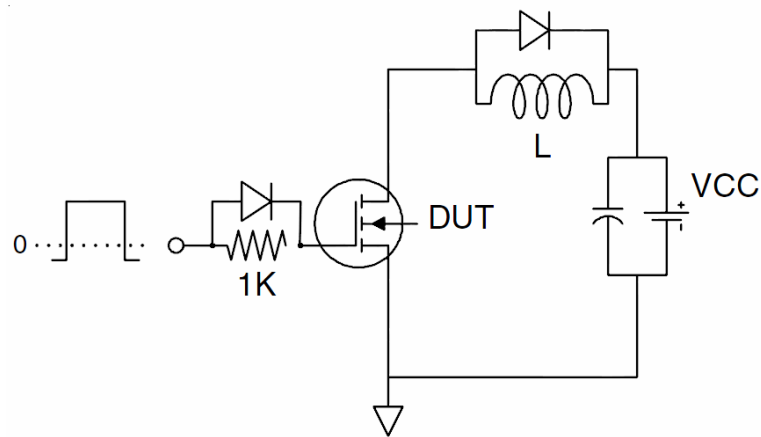
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: Tj=25°C, VDD=35V, VG=10V, L=0.5mH, Rg=25Ω

## Test circuit

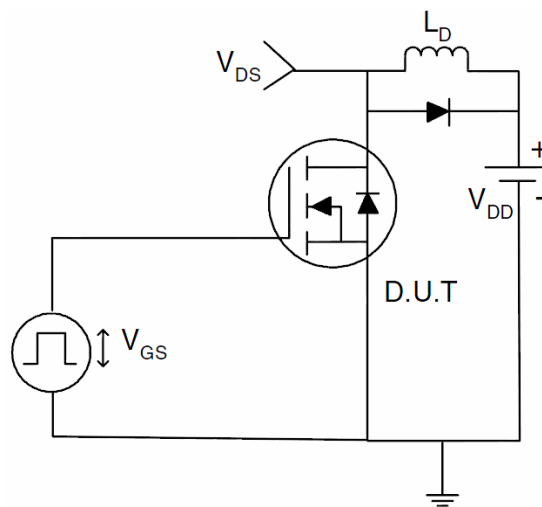
### 1) EAS test Circuits



### 2) Gate charge test Circuit:



### 3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

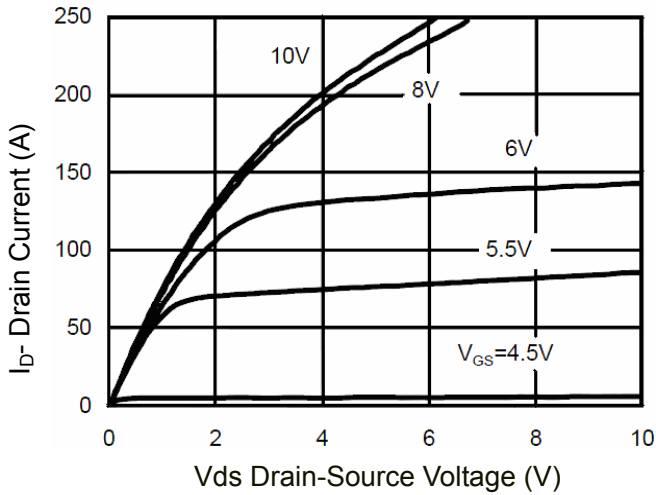


Figure 1 Output Characteristics

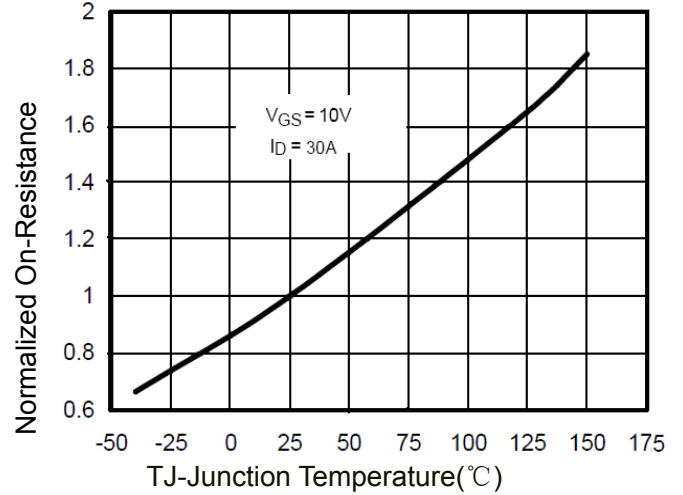


Figure 4 Rdson-Junction Temperature

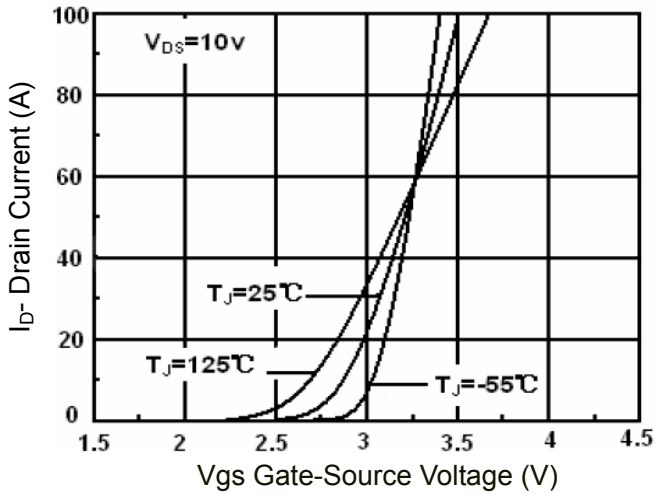


Figure 2 Transfer Characteristics

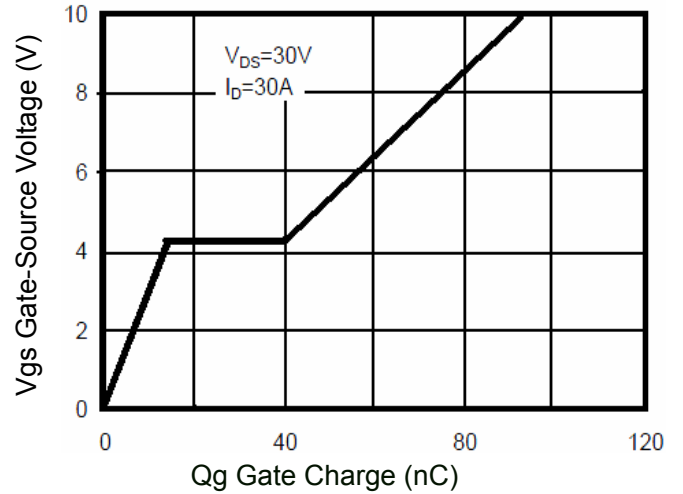


Figure 5 Gate Charge

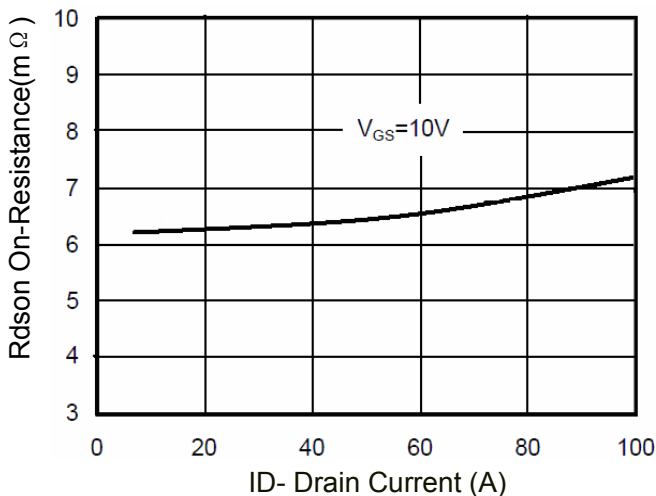


Figure 3 Rdson- Drain Current

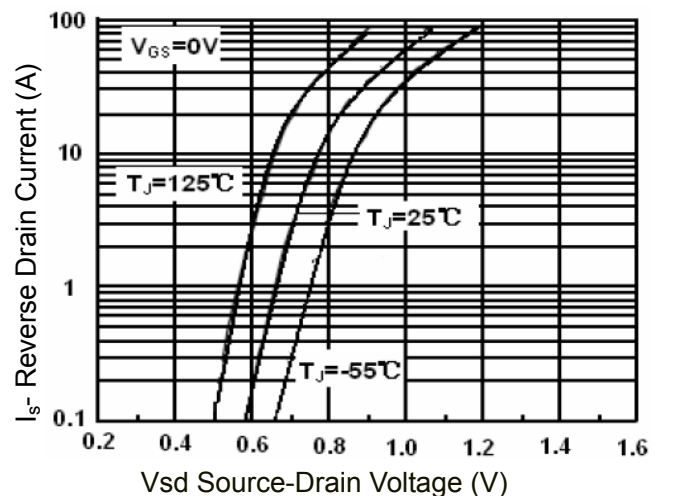


Figure 6 Source- Drain Diode Forward

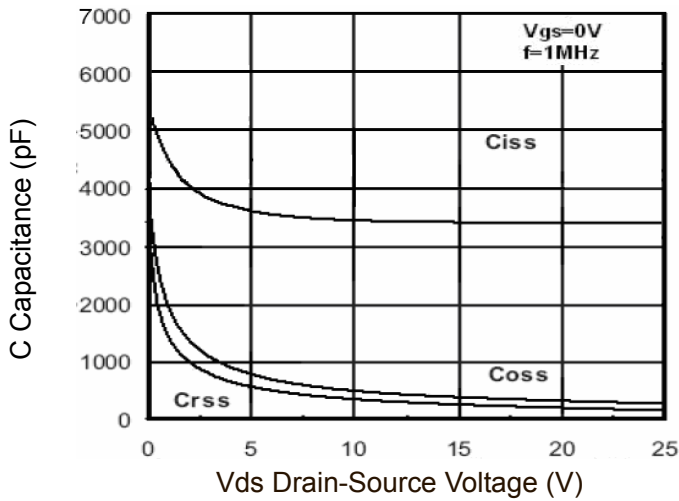


Figure 7 Capacitance vs Vds

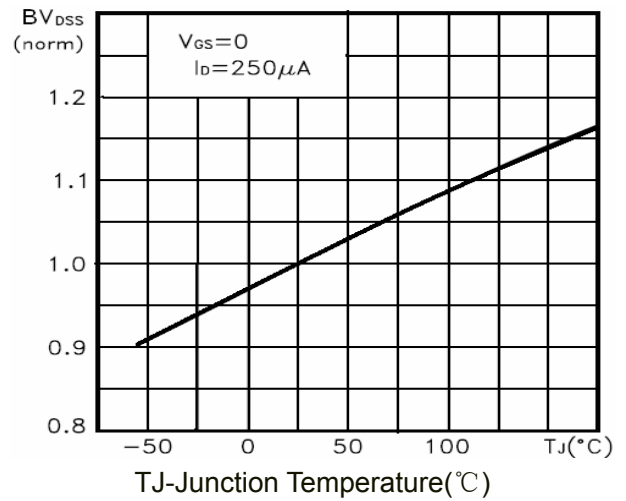


Figure 9  $BV_{DSS}$  vs Junction Temperature

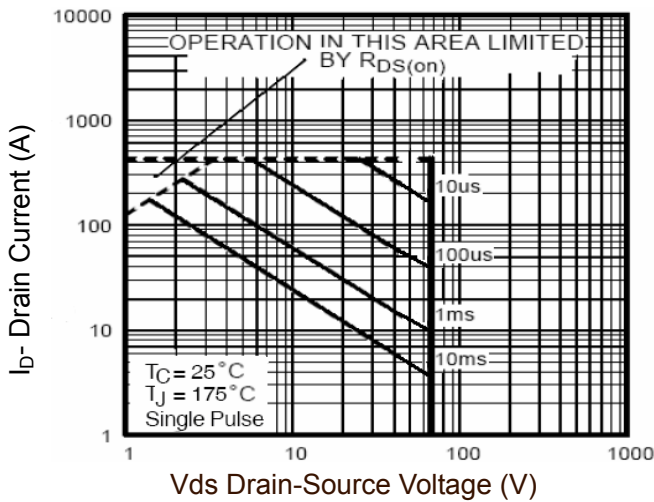


Figure 8 Safe Operation Area

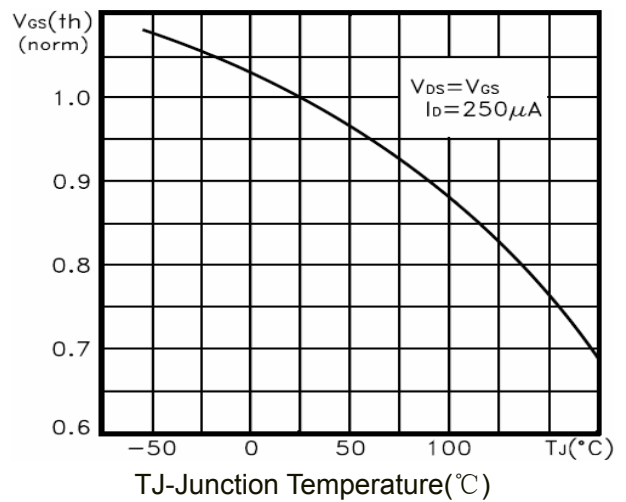


Figure 10  $V_{GS(th)}$  vs Junction Temperature

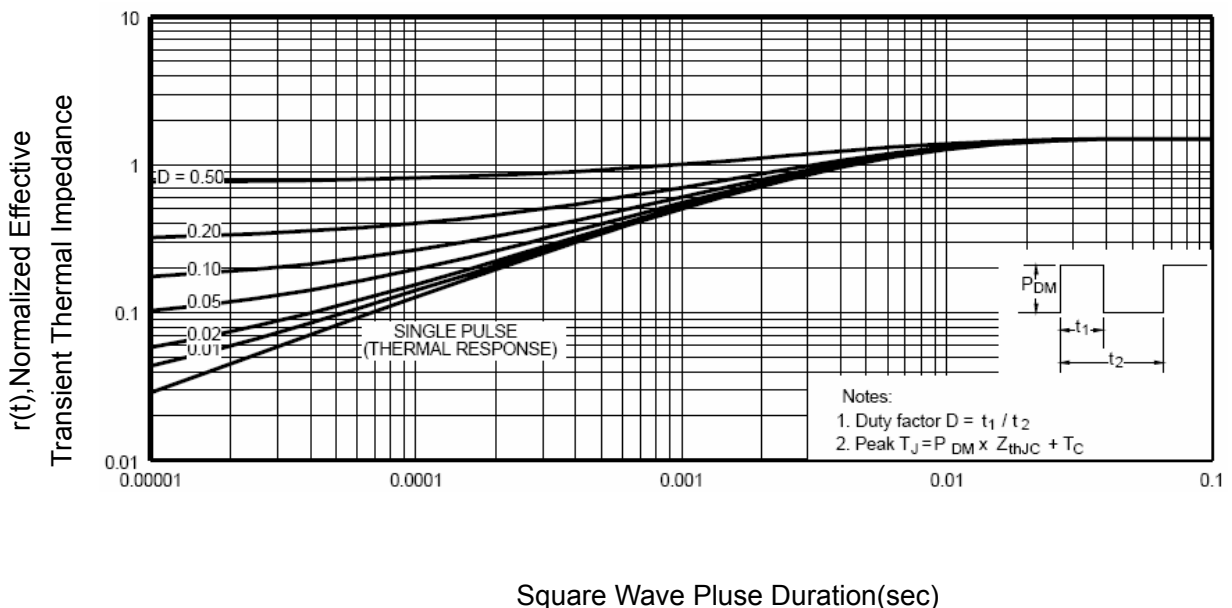


Figure 11 Normalized Maximum Transient Thermal Impedance



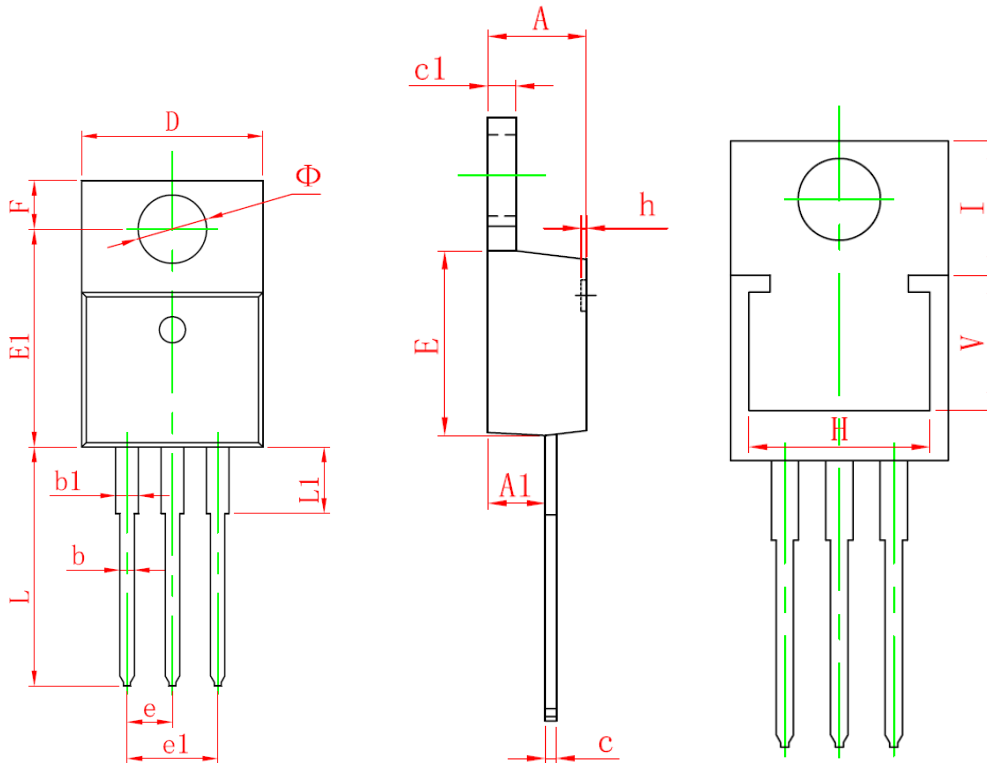
<http://www.ncepower.com>

Pb Free Product

NCE7080

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## TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	10.010	10.350	0.394	0.407
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 (TYP.)		0.100 (TYP.)	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
H	8.440 REF.		0.332 REF.	
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
V	6.360 REF.		0.250 REF.	
I	6.300 REF.		0.248 REF.	
Φ	3.735	3.935	0.147	0.155

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