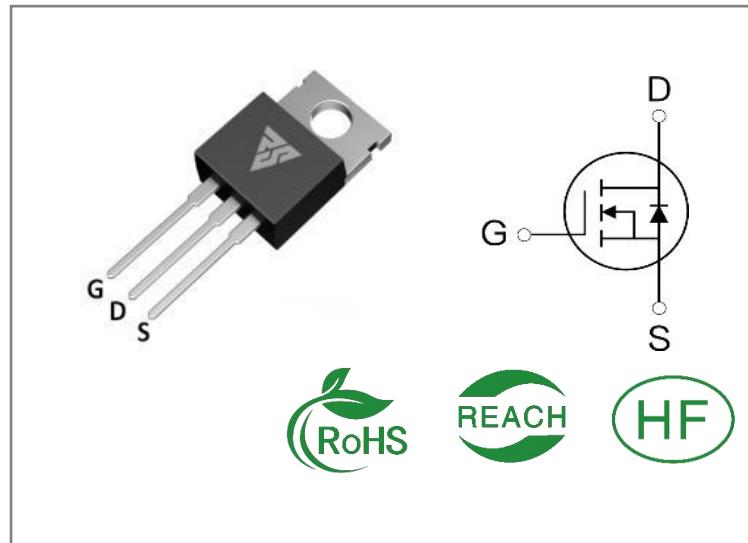


ID	$R_{DS(ON)}(Typ)$	VDSS
50A	15mΩ	60V


**Applications:**

- Load Switch
- PWM Applications
- Power Management

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS60N50T	TO-220	RS60N50T	Tube	50 PCS

**Absolute Maximum Ratings  $T_c = 25^\circ\text{C}$  unless otherwise specified**

Symbol	Parameter	RS60N50T	Units
VDSS	Drain-to-Source Voltage	60	V
ID	Continuous Drain Current $T_c=25^\circ\text{C}$	50	A
ID	Continuous Drain Current $T_c=100^\circ\text{C}$	33	
IDM	Pulsed Drain Current (Note*1)	200	
PD	Power Dissipation	75	W
VGS	Gate- to- Source Voltage	$\pm 20$	V
EAS	Single Pulse Avalanche Energy	81	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds		
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 175	

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" Table may cause permanent damage to the device.

**Thermal Resistance**

Symbol	Parameter	RS60N50T	Units	Test Conditions
R <sub>θJC</sub>	Junction-to-Case	2	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C

**OFF Characteristics** TJ= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	60	--	--	V	V <sub>GS</sub> =0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V
	Gate- to- Source Reverse Leakage	--	--	-100		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V

**ON Characteristics** TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance (Note*2)	--	15	18	mΩ	V <sub>GS</sub> =10V, ID=30A
		--	19	24	mΩ	V <sub>GS</sub> =4.5V, ID=20A
VGS(TH)	Gate Threshold Voltage	1.0	1.6	2.5	V	V <sub>GS</sub> =V <sub>DS</sub> , ID=250μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	11	--	nS	V <sub>DS</sub> =30V ID=30A RG=1.8Ω
trise	Rise Time	--	79	--		
td(OFF)	Turn- OFF Delay Time	--	33	--		
tfall	Fall Time	--	107	--		

**Dynamic Characteristics** Essentially independent of operating temperature

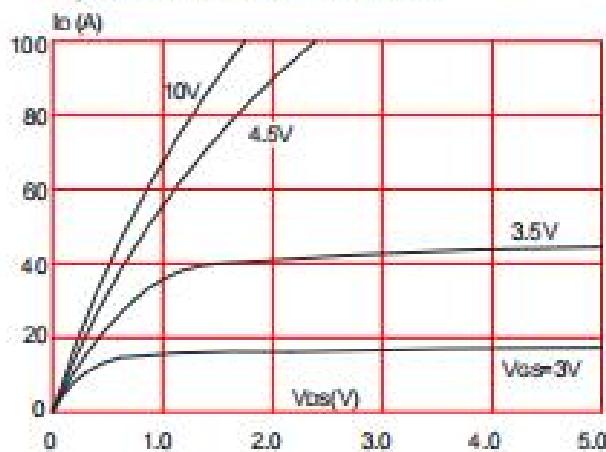
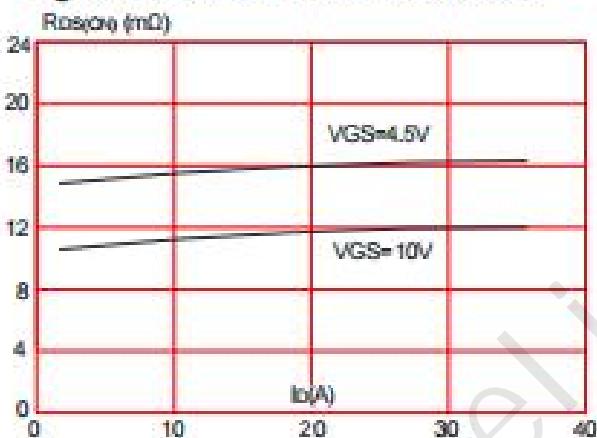
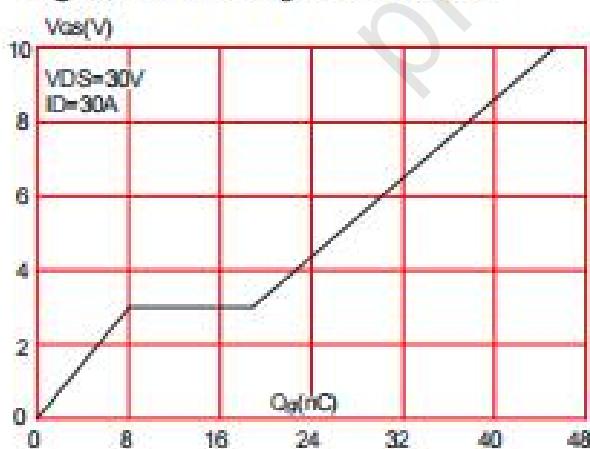
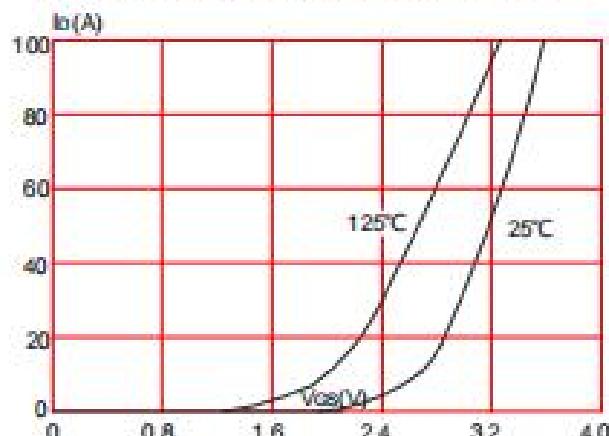
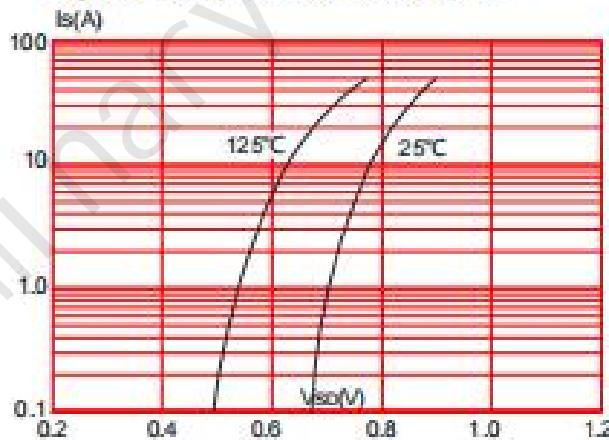
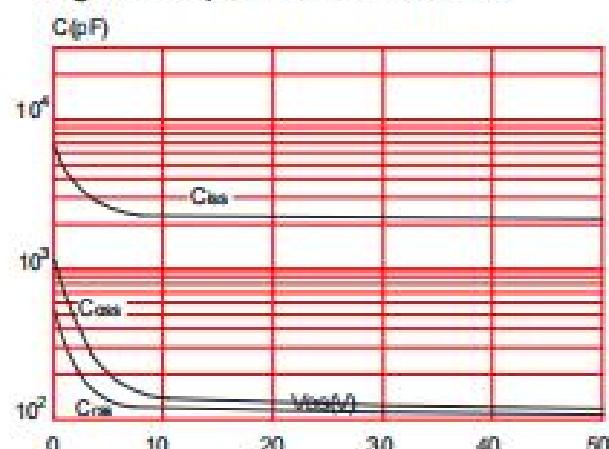
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C <sub>iss</sub>	Input Capacitance	--	2030	--	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
C <sub>oss</sub>	Output Capacitance	--	130	--		
C <sub>rss</sub>	Reverse Transfer Capacitance	--	115	--		
Q <sub>g</sub>	Total Gate Charge	--	45	--	nC	V <sub>DS</sub> =30V I <sub>D</sub> =30A V <sub>GS</sub> =10V
Q <sub>gs</sub>	Gate- to- Source Charge	--	8	--		
Q <sub>gd</sub>	Gate-to-Drain(" Miller") Charge	--	11	--		

**Source- Drain Diode Characteristics**

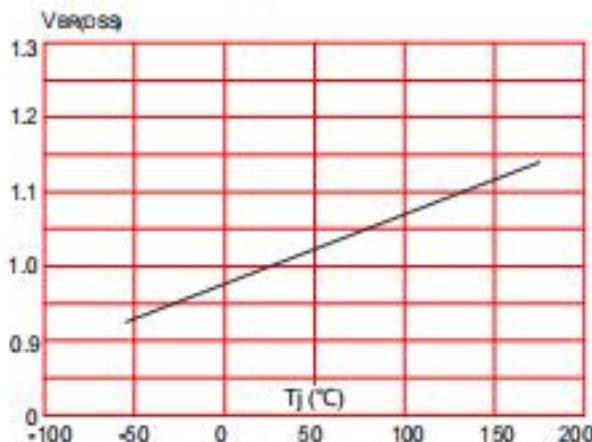
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I <sub>S</sub>	Continuous Source Current	--	--	50	A	Integral pn- diode in MOSFET
I <sub>SM</sub>	Maximum Pulsed Current	--	--	200	A	
V <sub>SD</sub>	Diode Forward Voltage	--	--	1.2	V	I <sub>S</sub> =30A, V <sub>GS</sub> =0V
t <sub>rr</sub>	Reverse Recovery Time	--	14	--	nS	V <sub>GS</sub> =0V I <sub>S</sub> =30A di/dt=100A/μs
Q <sub>rr</sub>	Reverse Recovery Charge	--	10	--	nC	

**Notes:**

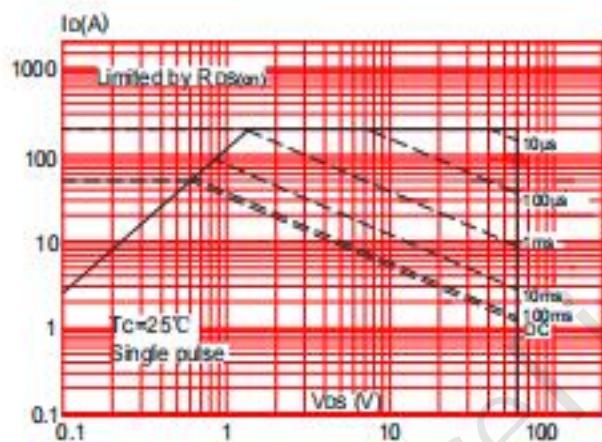
- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 0.5%

**Typical Feature Curve**
**Figure 1: Output Characteristics**

**Figure 3: On-resistance vs. Drain Current**

**Figure 5: Gate Charge Characteristics**

**Figure 2: Typical Transfer Characteristics**

**Figure 4: Body Diode Characteristics**

**Figure 6: Capacitance Characteristics**


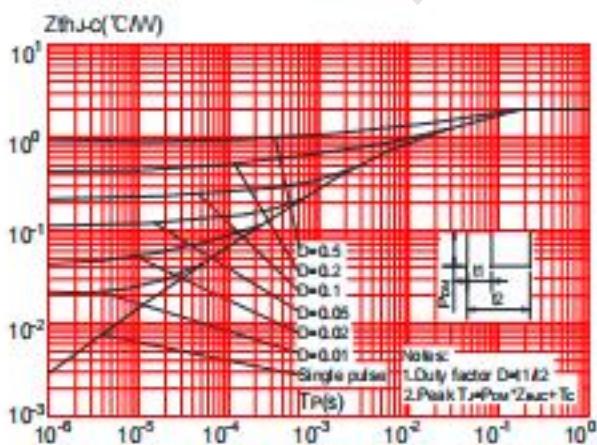
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



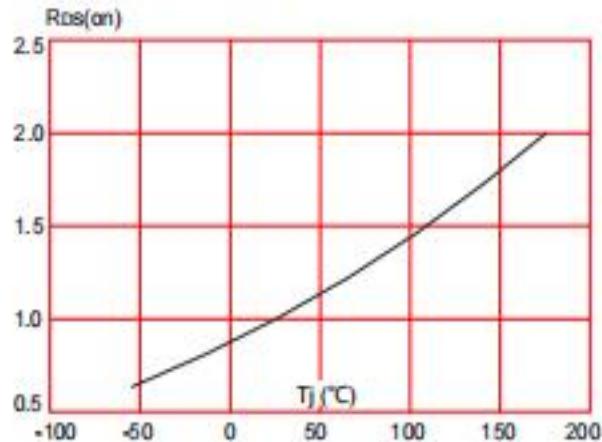
**Figure 9: Maximum Safe Operating Area**



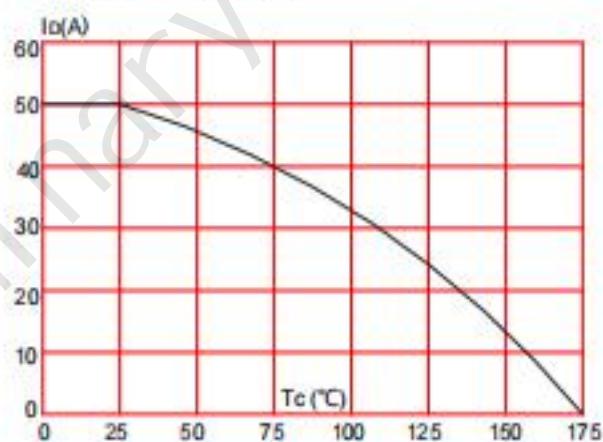
**Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**



**Figure 8: Normalized on Resistance vs. Junction Temperature**



**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



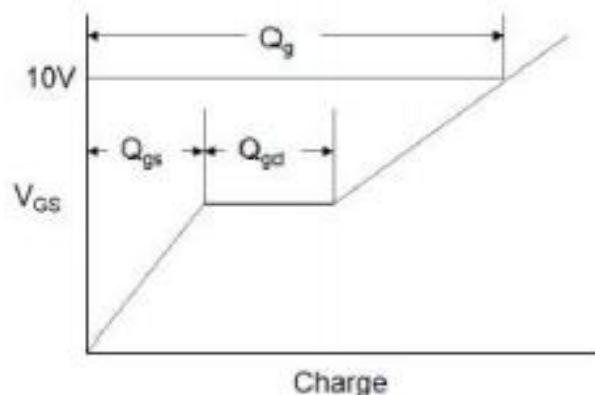
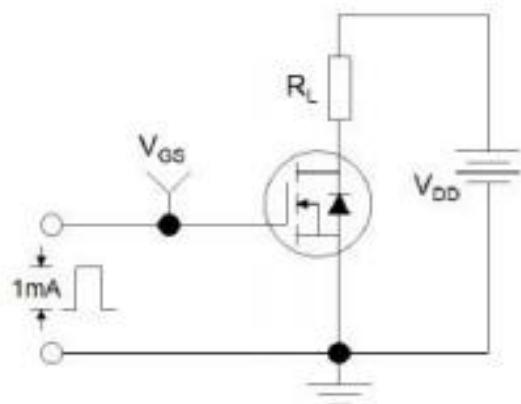
**Test Circuits and Waveforms**


Figure 1: Gate Charge Test Circuit & Waveform

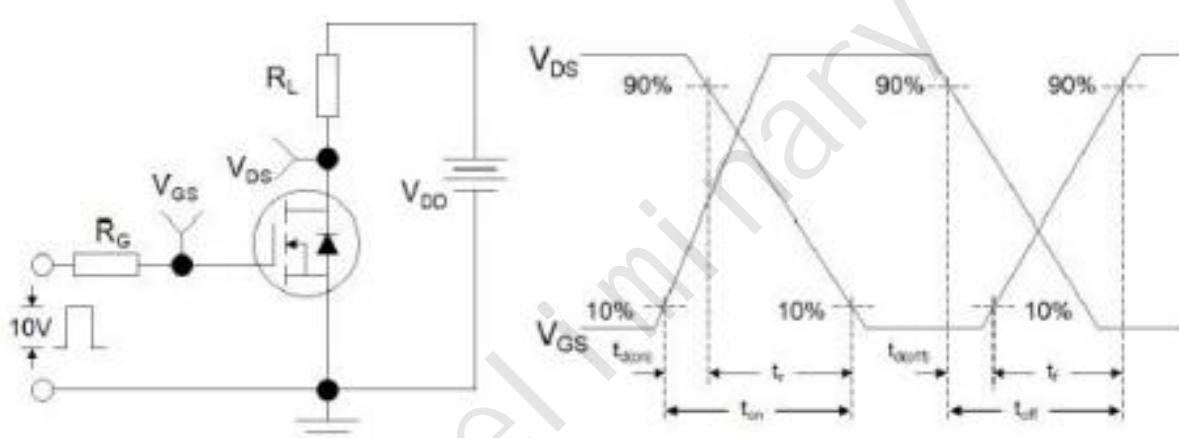


Figure 2: Resistive Switching Test Circuit & Waveforms

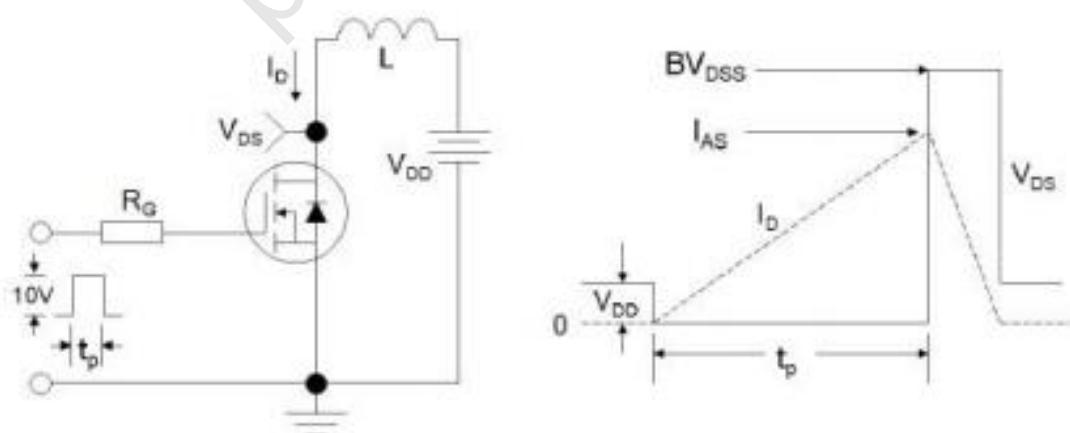
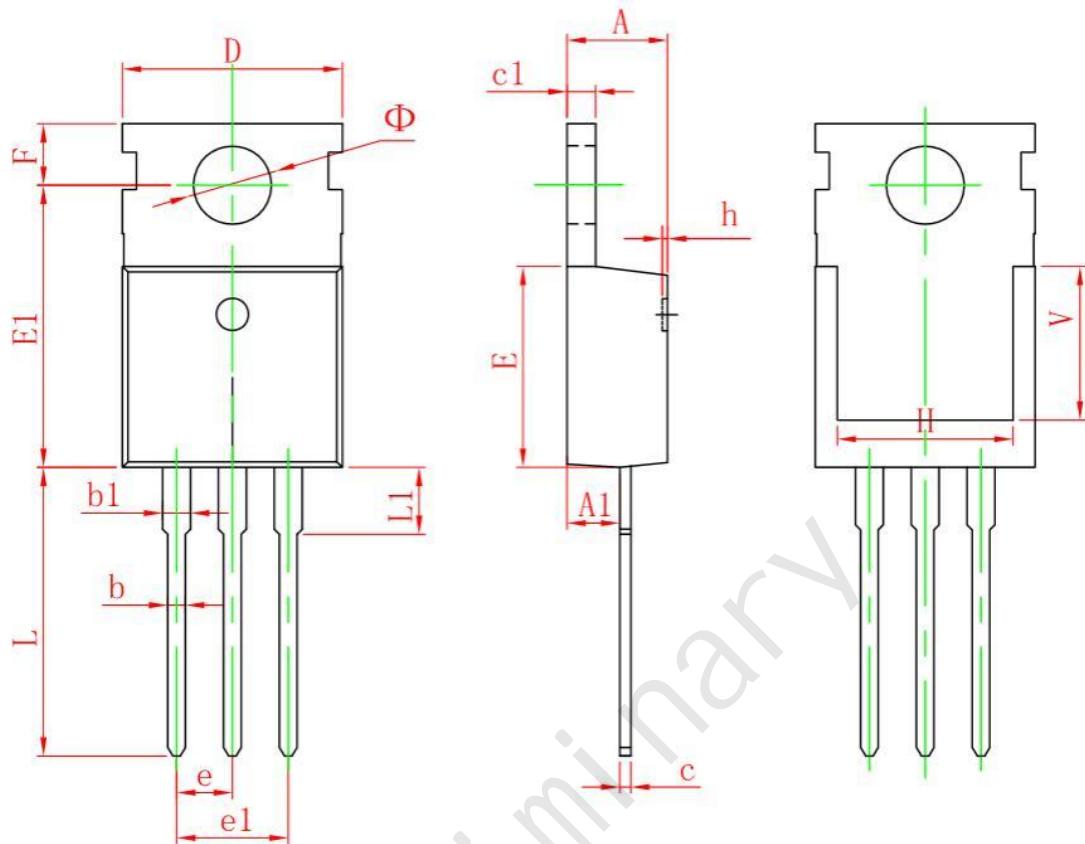


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

**Package outline drawing(TO-220 Unit: mm )**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
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	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

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