

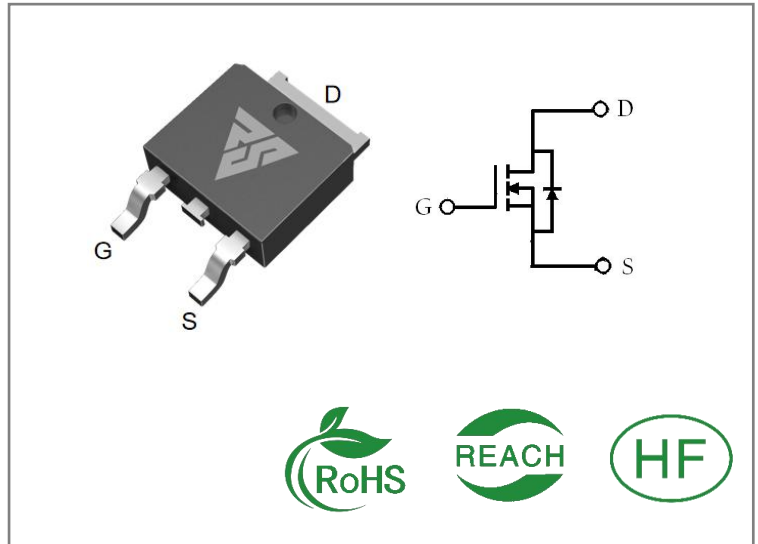
ID	R _{DS(ON)} (Typ)	VDSS
120A	2.6mΩ	40V

Applications:

- Load Switch
- PWM Applications
- Power Managment

Features:

- Super Low Gate Charge
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced Trench technology


Ordering Information

Part Number	Package	Marking	Packing	Qty.
RS40N120D	T0-252	RS40N120D	Tape&reel	2500 PCS

Absolute Maximun Ratings Tc= 2 5℃ unless otherwise specified

Symbol	Parameter	RS40N120D	Units
VDSS	Drain-to-Source Voltage	40	V
ID	Continuous Drain Current TC=25℃ (Note 1)	120	A
ID	Continuous Drain Current TC=100℃ (Note 1)	77	
IDM	Pulsed Drain Current (Note 2)	480	
PD	Power Dissipation TC=25℃ (Note 3)	109	W
VGS	Gate- to- Source Voltage	±20	V
EAS	Single Pulse Avalanche Engergy L = 0.5mH, VDD =24V, VGS=10V,IAS=38A	361	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	℃
	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 150	

* 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	RS40N120D	Units	Test Conditions
R θ JC	Junction-to-Case (Note 1)	1.15	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C

OFF Characteristics T_J= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	40	--	--	V	VGS=0V ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=40V VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=20V VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-20V VDS=0V

ON Characteristics T_J=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance (Note 2)	--	2.6	3.2	mΩ	VGS=10V ID=30A
		--	3.3	4.2	mΩ	VGS=4.5V ID=20A
VGS (TH)	Gate Threshold Voltage	1.0	1.6	2.5	V	VGS=VDS ID=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	15	--	nS	VDS=20V VGS=10V ID=30A RG=2Ω
trise	Rise Time	--	19	--		
td(OFF)	Turn- OFF Delay Time	--	52	--		
tfall	Fall Time	--	24	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	5041	--	pF	VGS=0V VDS=20V f=1.0MHz
Coss	Output Capacitance	--	425	--		
Crss	Reverse Transfer Capacitance	--	356	--		
RG	Gate Resistance	--	1.4	--	Ω	VGS=0V VDS=0V f=1.0MHz
Qg	Total Gate Charge	--	113.6	--	nC	VDS=20V ID=30A VGS=10V
Qgs	Gate- to- Source Charge	--	9.2	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	28	--		

Source- Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	120	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	480	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=30A VGS=0V
trr	Reverse Recovery Time	--	42	--	nS	VGS=0V IS=30A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	46	--	nC	

Notes:

- * 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- * 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%.
- * 3. The power dissipation is limited by 175℃ junction temperature.
- * 4. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

Typical Feature Curve

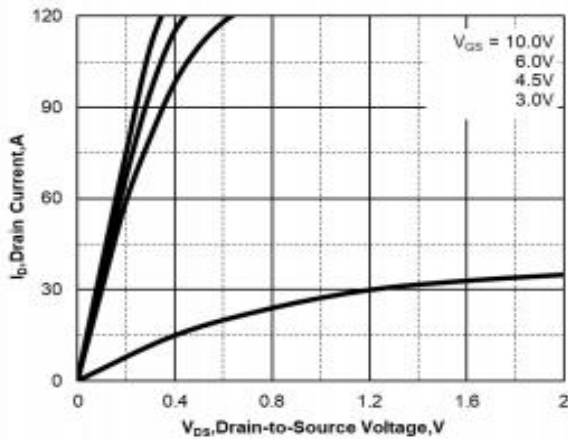


Fig1: Typical Output Characteristics

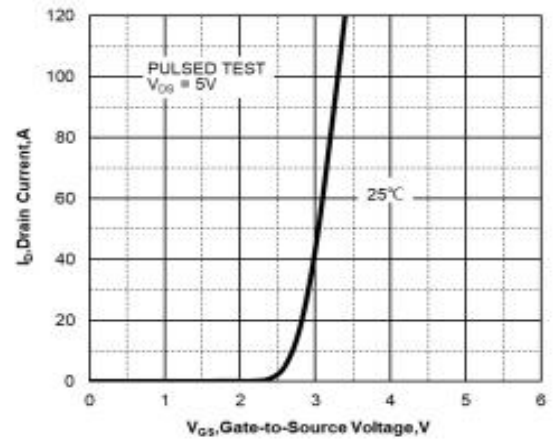


Fig 2: Typical Transfer Characteristics

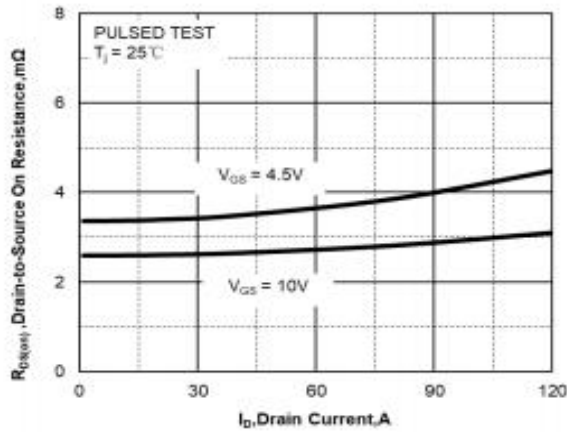


Fig 3: On-Resistance VS. Drain Current

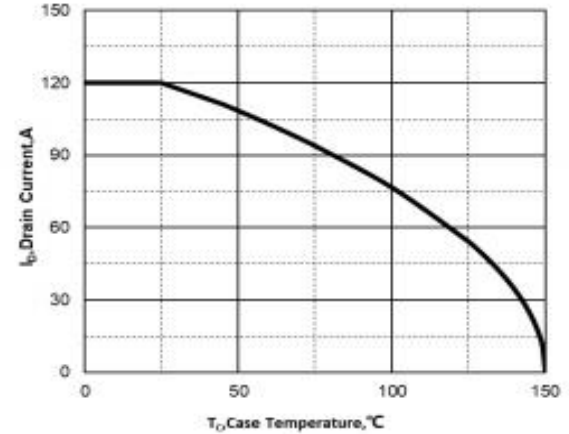


Fig 4: Maximum Continuous Drain Current VS. Case Temperature

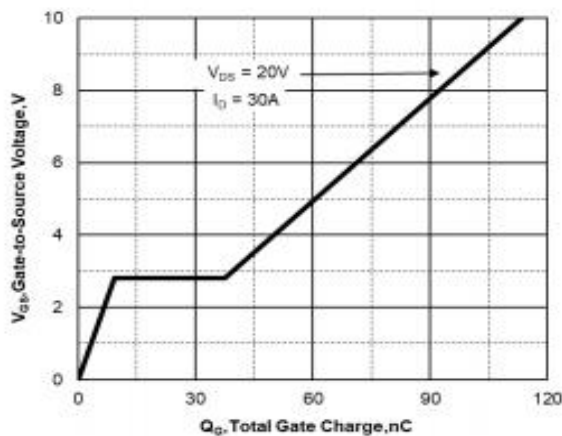


Fig 5: Gate Charge Characteristics

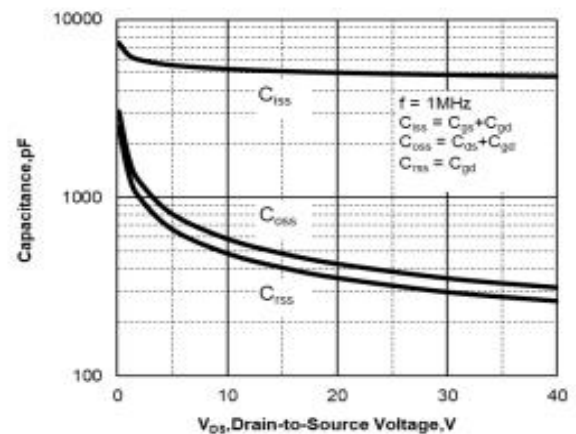


Fig 6: Capacitance Characteristics

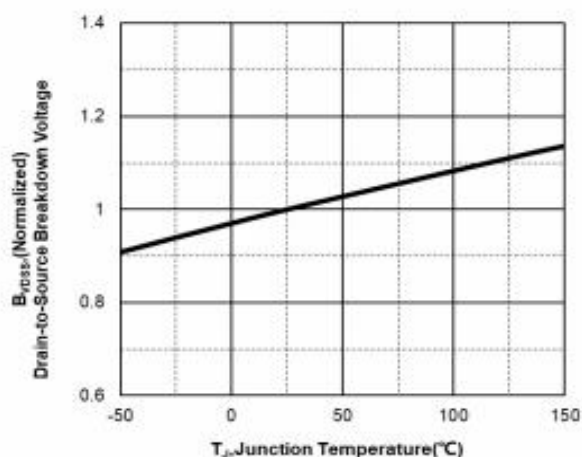


Fig 7: Normalized Breakdown Voltage VS. Junction Temperature

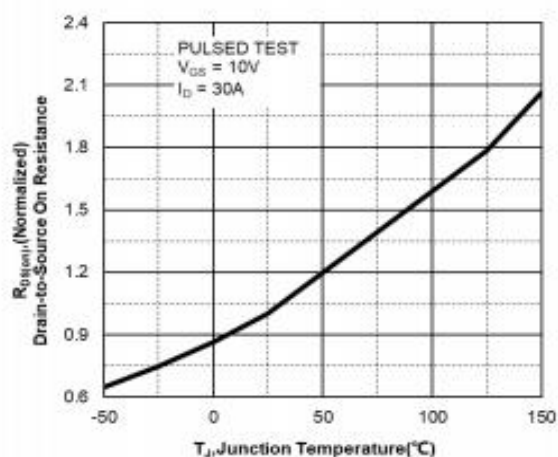


Fig 8: Normalized on Resistance VS. Junction Temperature

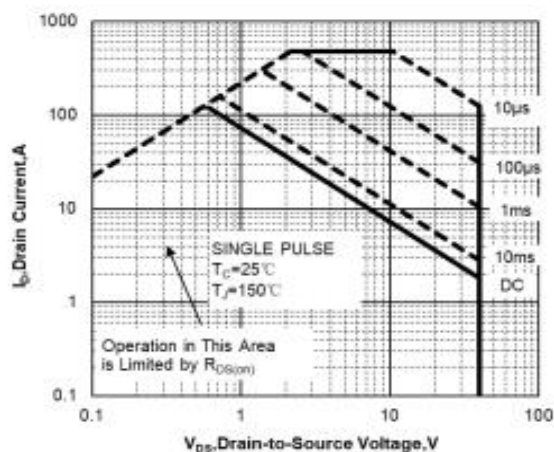


Fig 9: Maximum Safe Operating Area

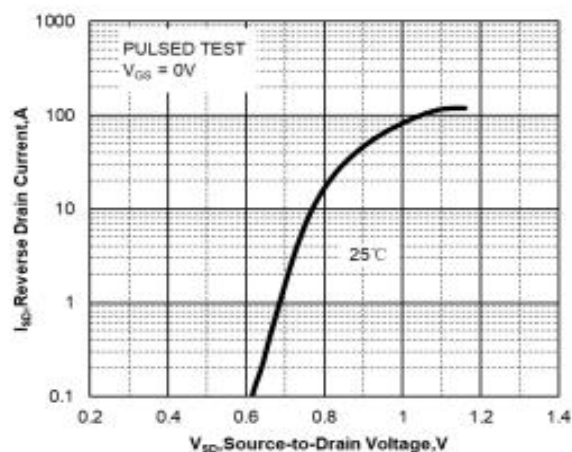


Fig 10: Body Diode Forward Characteristics

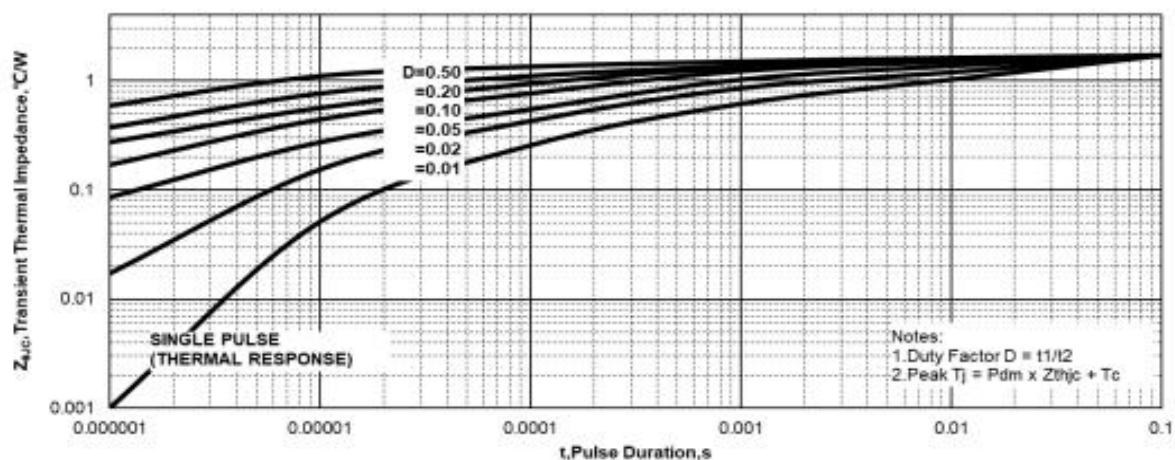


Fig.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Test Circuits and Waveforms

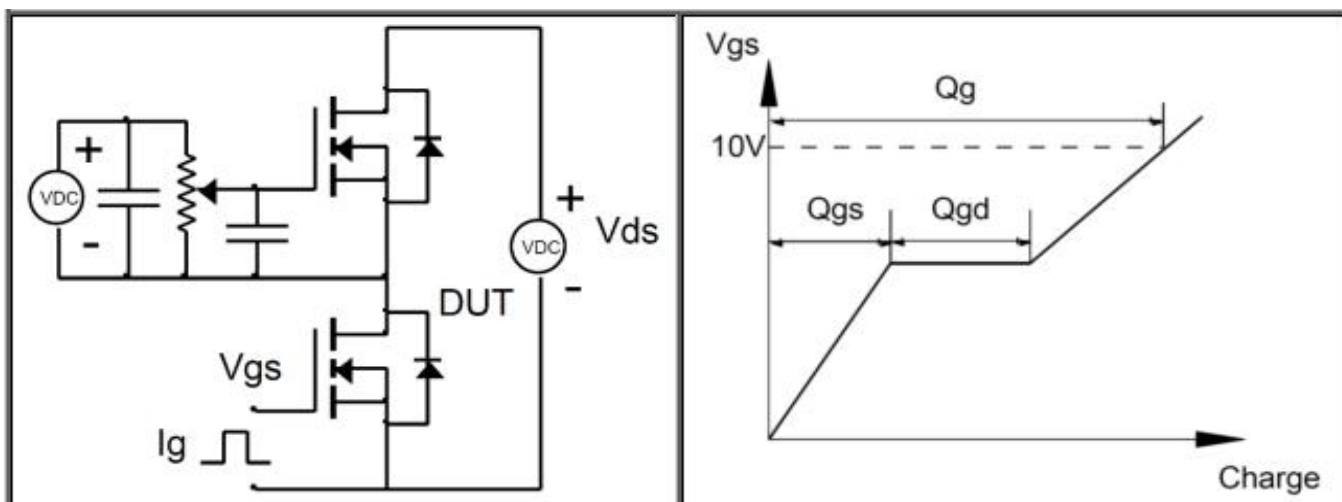


Fig 12: Gate Charge Test Circuit and Waveforms

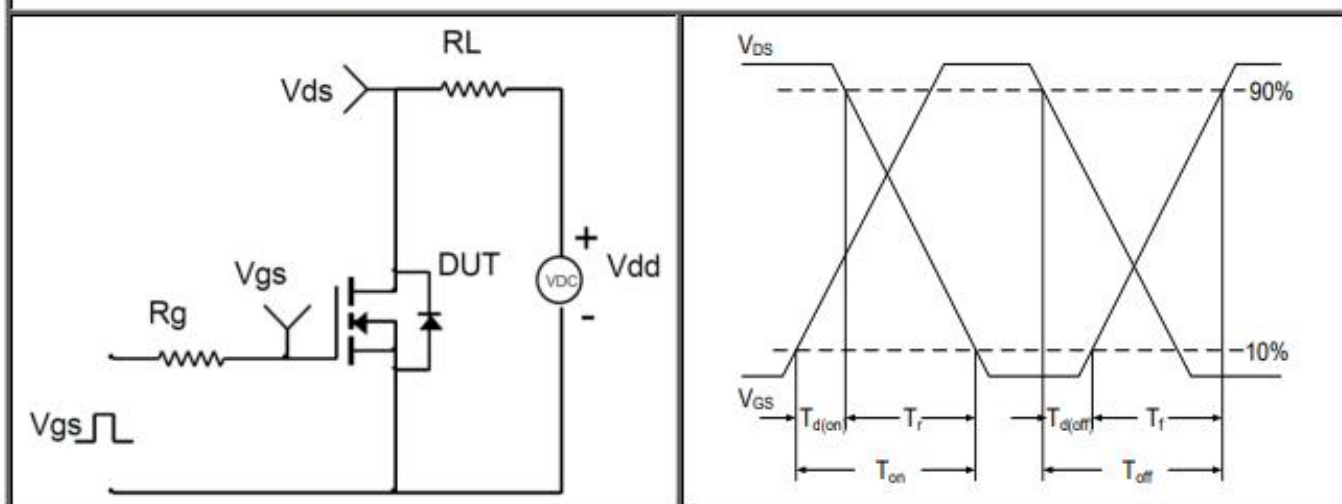


Fig 13: Resistive Switching Test Circuit and Waveforms

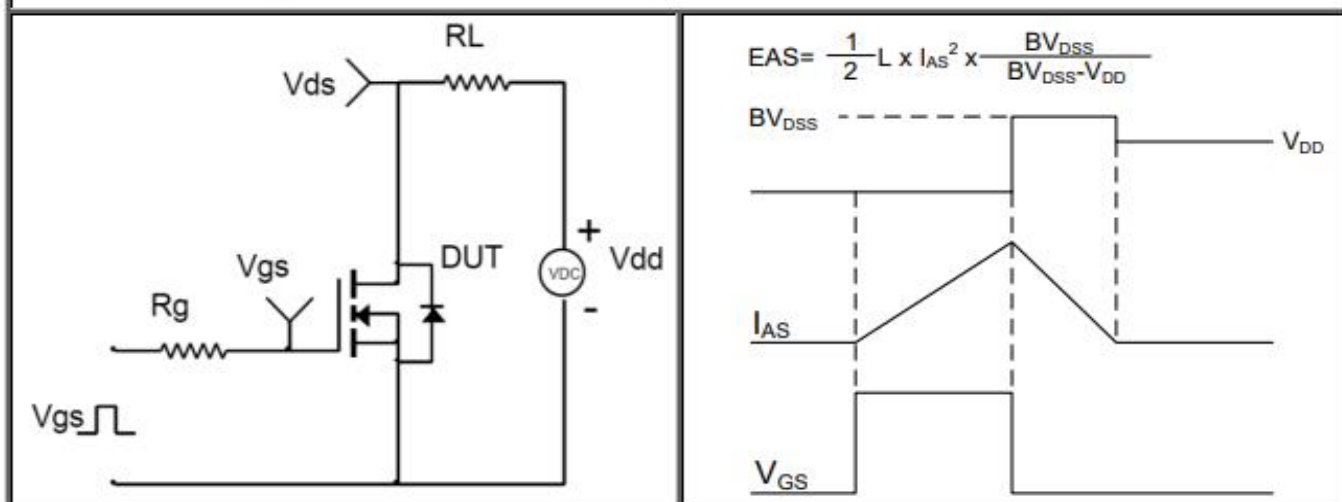
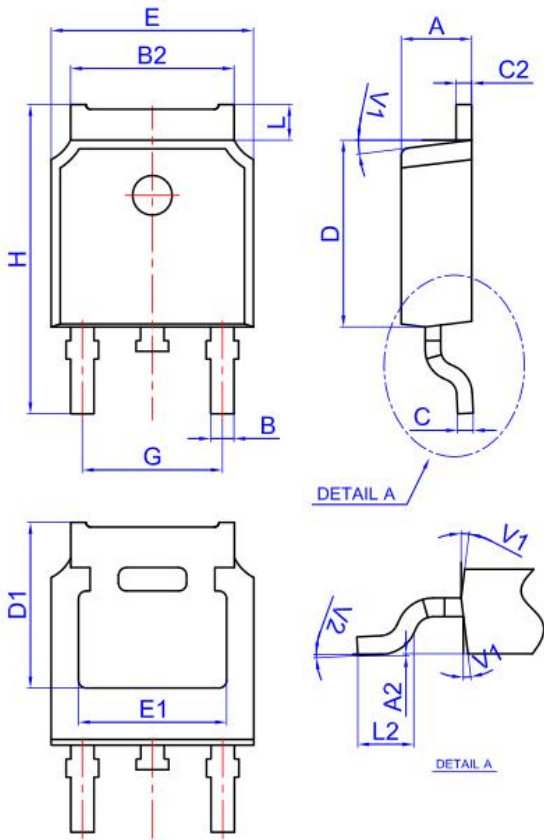


Fig 14: Unclamped Inductive Switching Test Circuit and Waveforms

Package outline drawing(TO-252 Unit: mm)



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

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