

Description

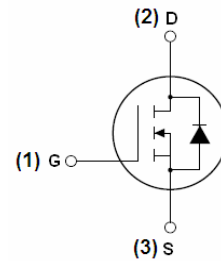
The HM25N06D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

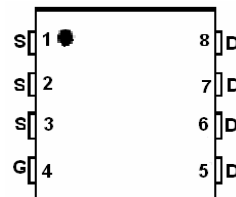
- $V_{DS} > 60V, I_D = 25A$
 $R_{DS(ON)} < 17m\Omega @ V_{GS}=10V$ (Typ:12.6m Ω)
- High density cell design for ultra low $R_{ds(on)}$
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM25N06D	HM25N06D	DFN5X6-8L	--	--	--

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	25	A
Drain Current-Continuous($T_C=100^{\circ}C$)	$I_D(100^{\circ}C)$	17	A
Pulsed Drain Current	I_{DM}	85	A
Maximum Power Dissipation	P_D	40	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	3.75	$^{\circ}C/W$
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Electrical Characteristics ($T_A=25^{\circ}C$ unless otherwise noted)

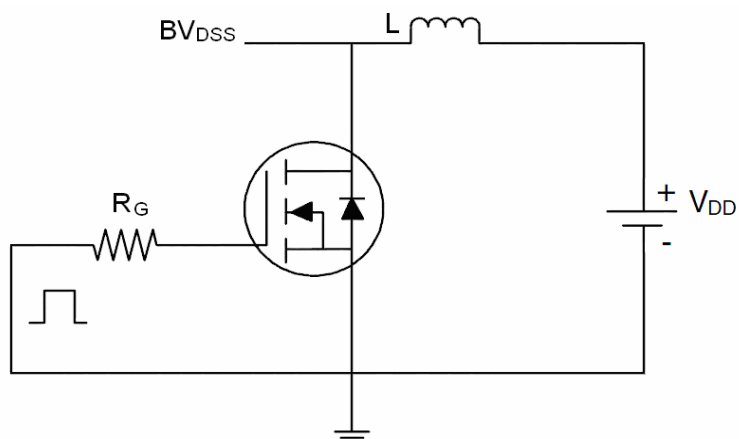
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V ID=250μA	60	69	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=60V, VGS=0V	-	-	1	μA
Gate-Body Leakage Current	IGSS	VGS=±20V, VDS=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250μA	1.0	1.5	2.2	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=5A		12.6	17	V
Forward Transconductance	gFS	VDS=5V, ID=5A	11	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	Ciss	VDS=30V, VGS=0V, F=1.0MHz		1000		PF
Output Capacitance	Coss			100		PF
Reverse Transfer Capacitance	Crss			67		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	td(on)	VDS=30V, ID=5A VGS=10V, RGEN=3Ω	-	4.7	-	nS
Turn-on Rise Time	tr		-	2.3	-	nS
Turn-Off Delay Time	td(off)		-	15.7	-	nS
Turn-Off Fall Time	tf		-	1.9	-	nS
Total Gate Charge	Qg	VDS=30V, ID=5A, VGS=10V	-	30	-	nC
Gate-Source Charge	Qgs		-	10	-	nC
Gate-Drain Charge	Qgd		-	5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	VSD	VGS=0V, IS=6A	-	-	1.2	V
Diode Forward Current (Note 2)	IS		-	-	6	A
Reverse Recovery Time	trr	TJ = 25°C, IF =5A di/dt = 100A/μs (Note3)	-	25	-	nS
Reverse Recovery Charge	Qrr		-	35	-	nC
Forward Turn-On Time	ton	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

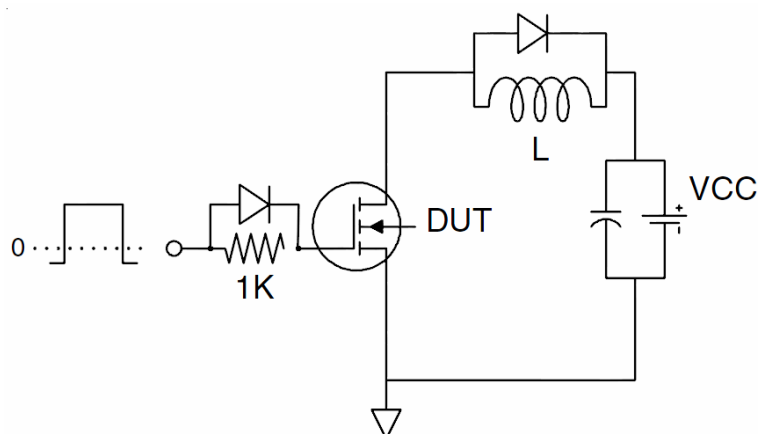
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test Circuit

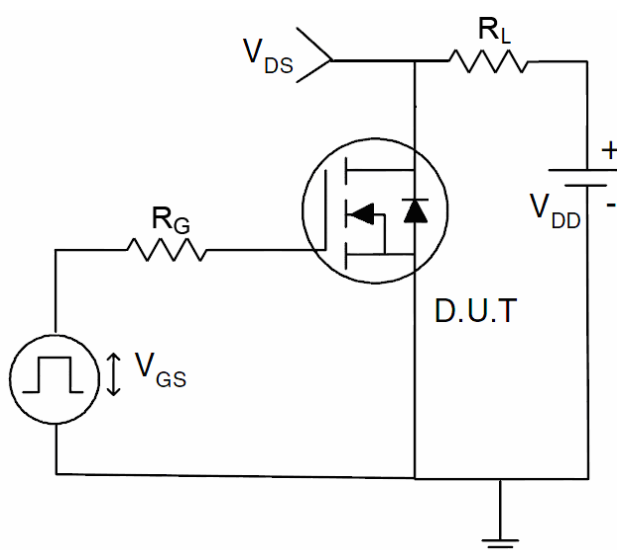
1) E_{AS} test Circuits



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

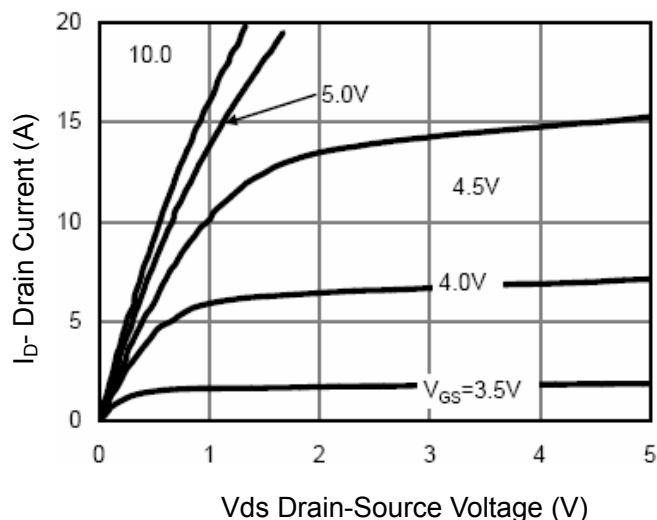


Figure 1 Output Characteristics

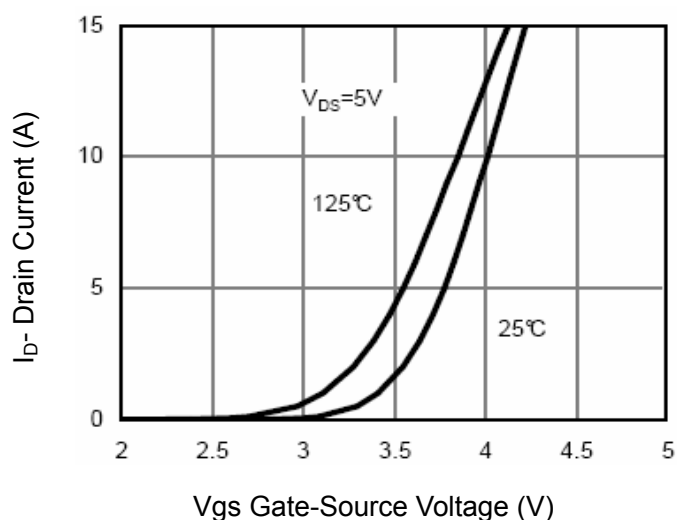


Figure 2 Transfer Characteristics

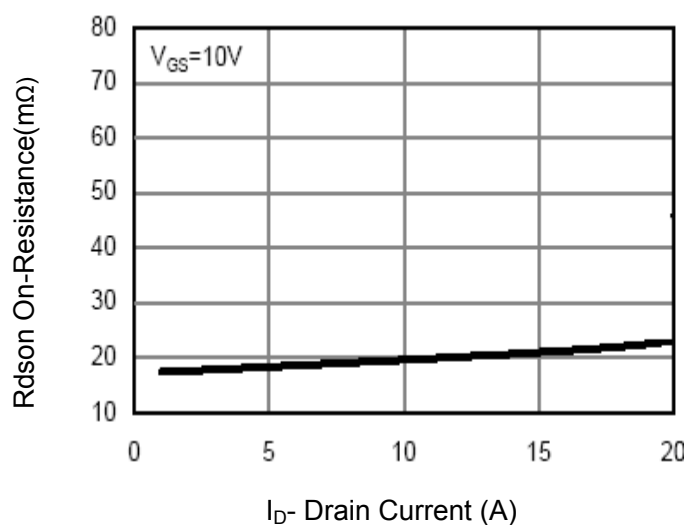


Figure 3 $R_{DS(on)}$ - Drain Current

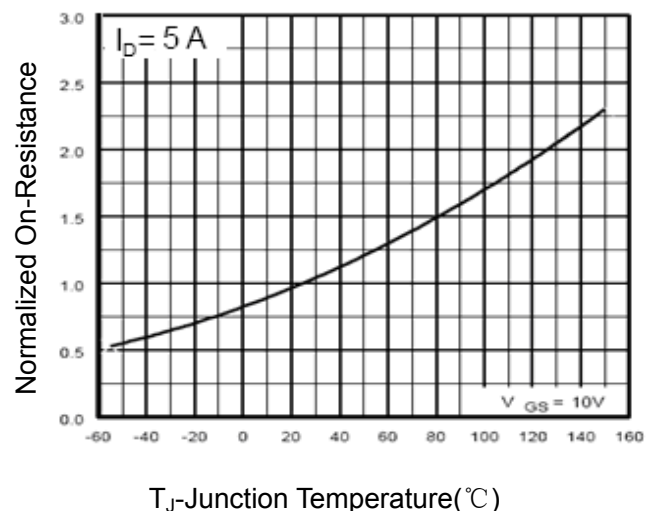


Figure 4 $R_{DS(on)}$ -Junction Temperature

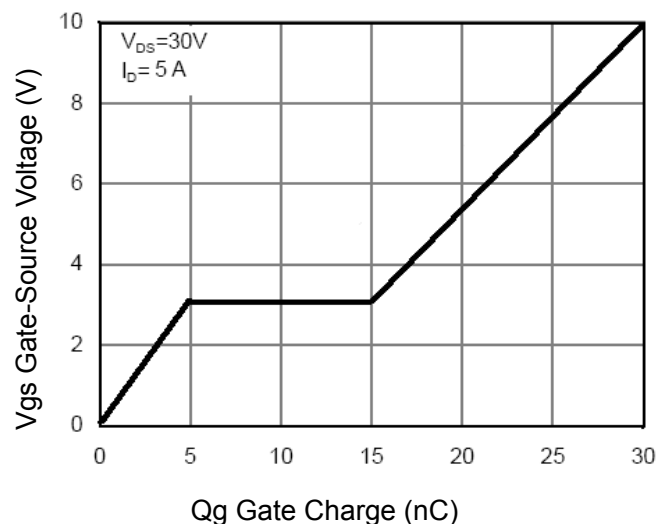


Figure 5 Gate Charge

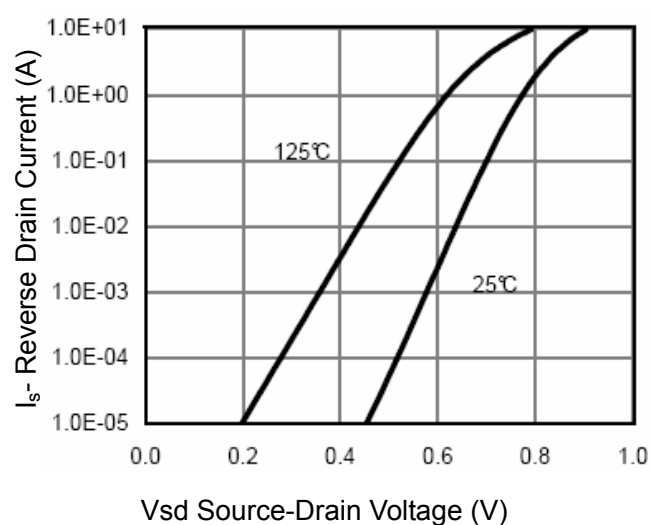


Figure 6 Source- Drain Diode Forward

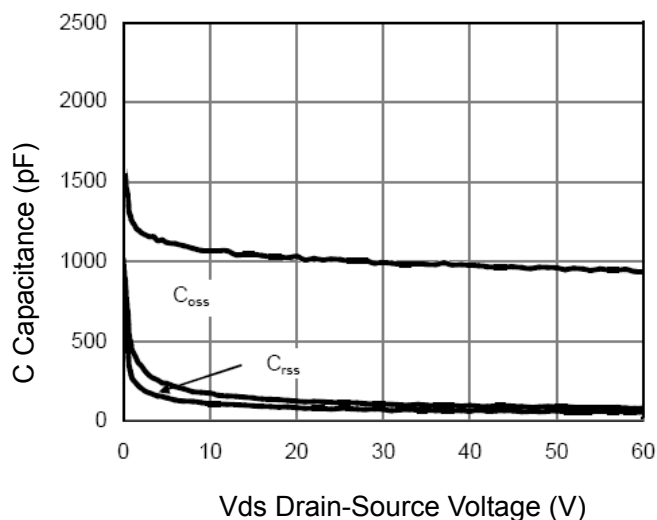


Figure 7 Capacitance vs Vds

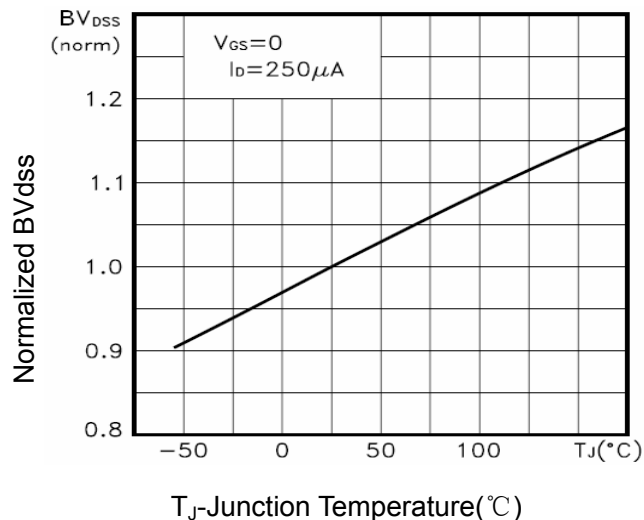


Figure 9 BV_{dss} vs Junction Temperature

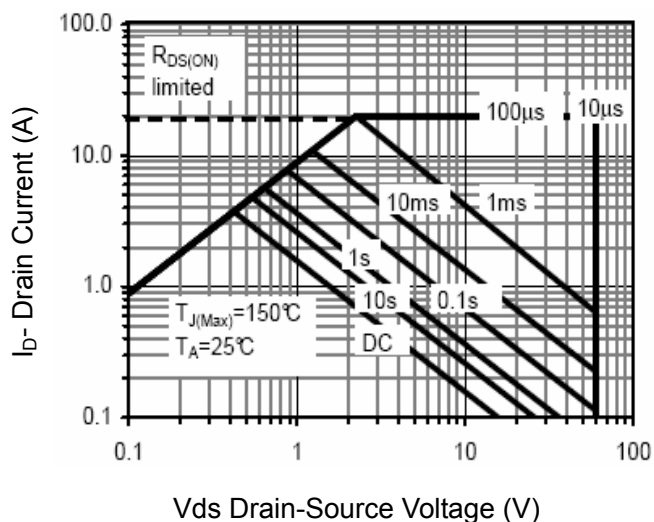


Figure 8 Safe Operation Area

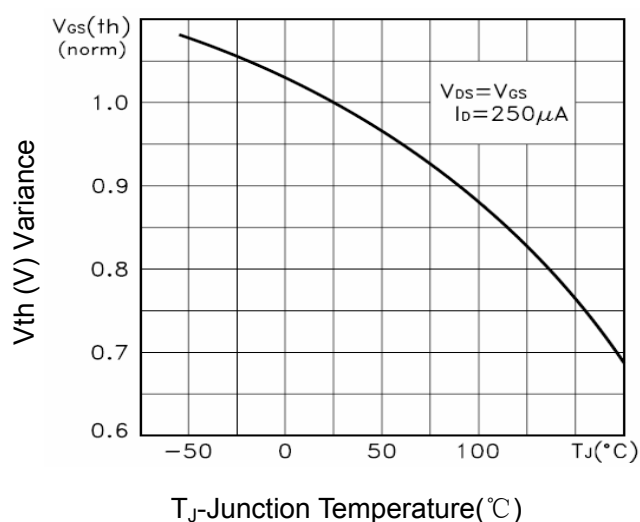


Figure 10 $V_{GS(th)}$ vs Junction Temperature

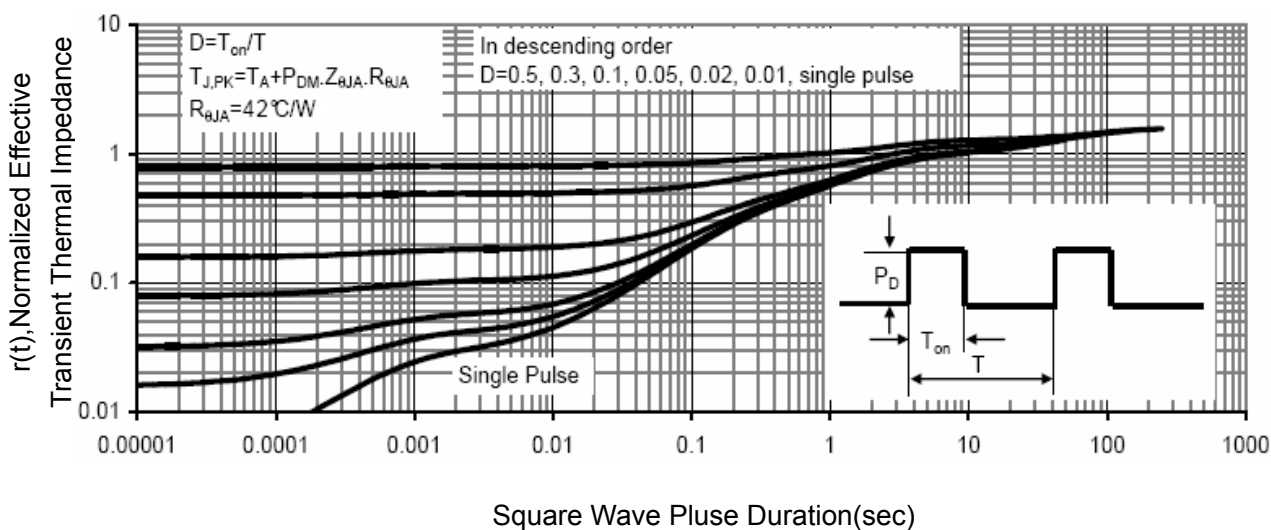
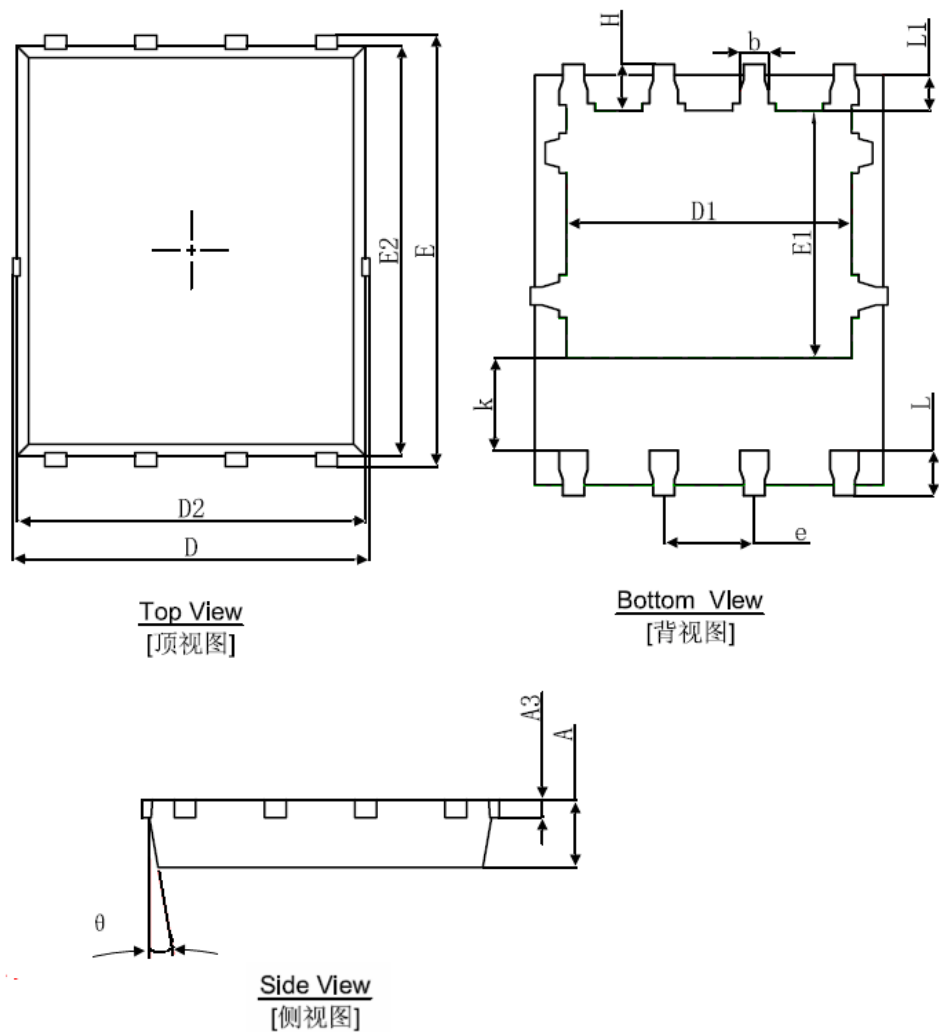


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°