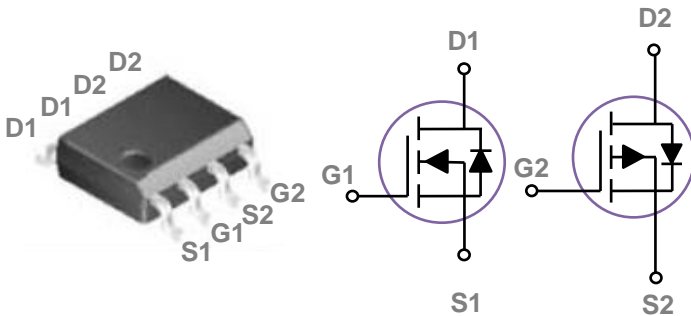


### General Description

These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

### SOP8 Pin Configuration



BVDSS	RDSON	ID
30V	20mΩ	8A
-30V	50mΩ	-5.5A

### Features

- Fast switching
- Green Device Available
- Suit for 4.5V Gate Drive Applications

### Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

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

Symbol	Parameter	Rating		Units
$V_{DS}$	Drain-Source Voltage	30	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	8	-5.5	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	5	-3.5	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	32	-22	A
EAS	Single Pulse Avalanche Energy <sup>2,6</sup>	14	5	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	17	10	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	2.5		W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.02		W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	50	$^\circ\text{C}/\text{W}$

**N-CH Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=8A$	---	15	20	$m\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	21	30	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.5	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$mV/^\circ\text{C}$
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	3	---	S

**Dynamic and switching Characteristics**

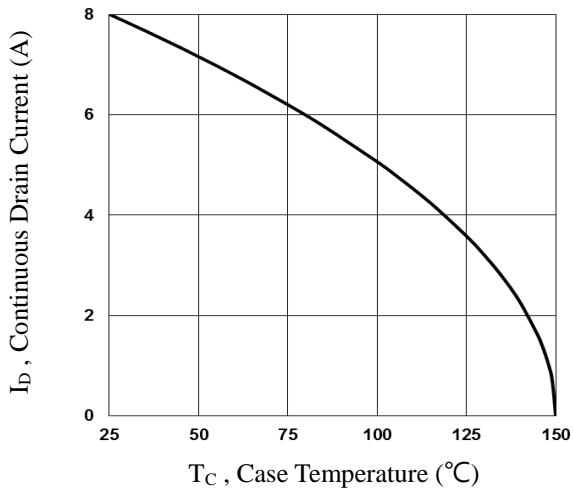
$Q_g$	Total Gate Charge <sup>3, 4</sup>	$V_{DS}=15V, V_{GS}=4.5V, I_D=8A$	---	4.1	6	nC
$Q_{gs}$	Gate-Source Charge <sup>3, 4</sup>		---	1	1.4	
$Q_{gd}$	Gate-Drain Charge <sup>3, 4</sup>		---	2.1	4	
$T_{d(on)}$	Turn-On Delay Time <sup>3, 4</sup>	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	2.8	5	ns
$T_r$	Rise Time <sup>3, 4</sup>		---	7.2	14	
$T_{d(off)}$	Turn-Off Delay Time <sup>3, 4</sup>		---	15.8	30	
$T_f$	Fall Time <sup>3, 4</sup>		---	4.6	9	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	345	500	pF
$C_{oss}$	Output Capacitance		---	55	80	
$C_{rss}$	Reverse Transfer Capacitance		---	32	55	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	3.2	6.4	$\Omega$

**Drain-Source Diode Characteristics and Maximum Ratings**

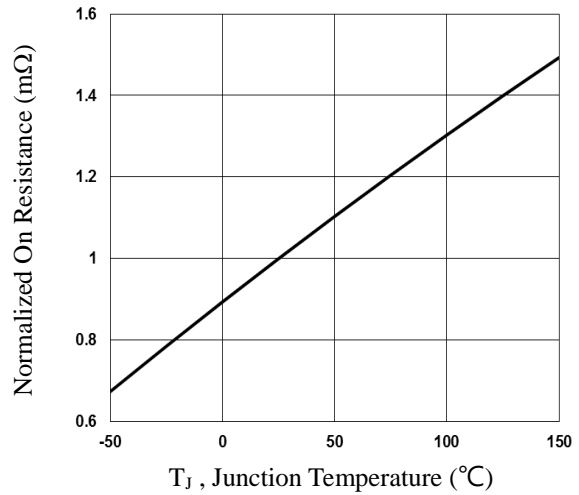
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	8	A
$I_{SM}$	Pulsed Source Current		---	---	16	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

Note :

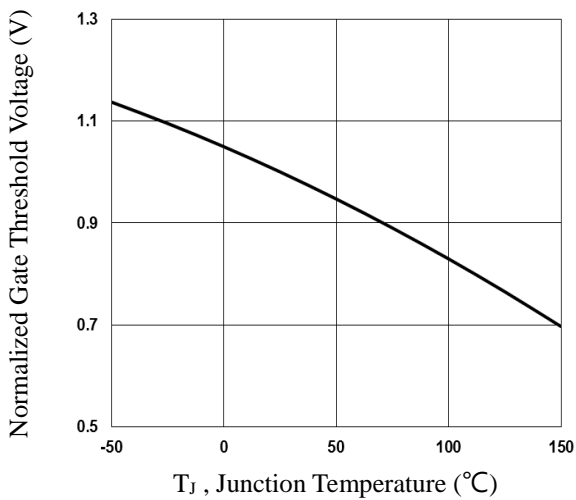
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=17A, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.



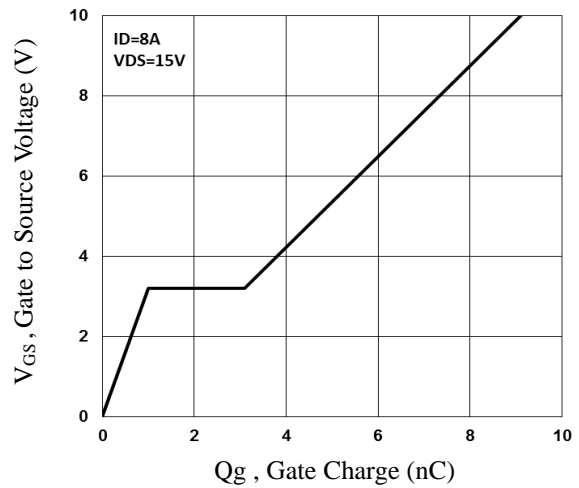
**Fig.1 Continuous Drain Current vs.  $T_c$**



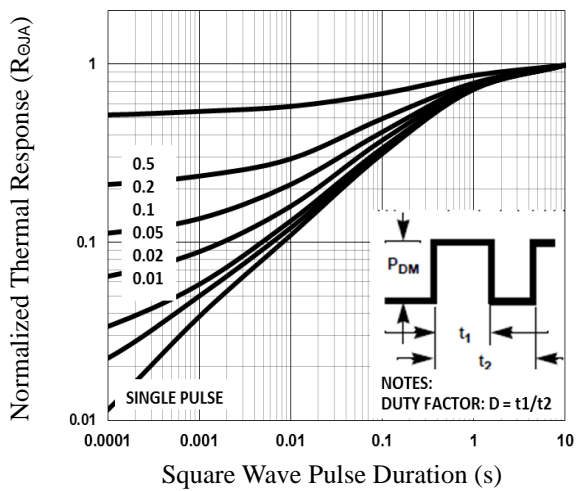
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



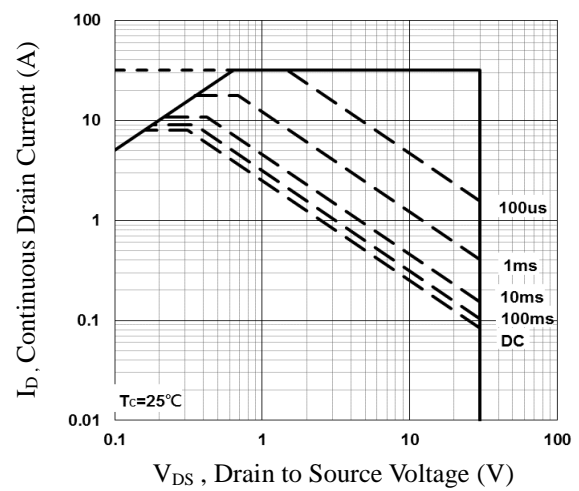
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**



**Fig.5 Normalized Transient Response**



**Fig.6 Maximum Safe Operation Area**

**P-CH Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	---	-0.03	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	-10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A	---	40	50	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	---	65	90	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.2	-1.6	-2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	4	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A	---	3.5	---	S

**Dynamic and switching Characteristics**

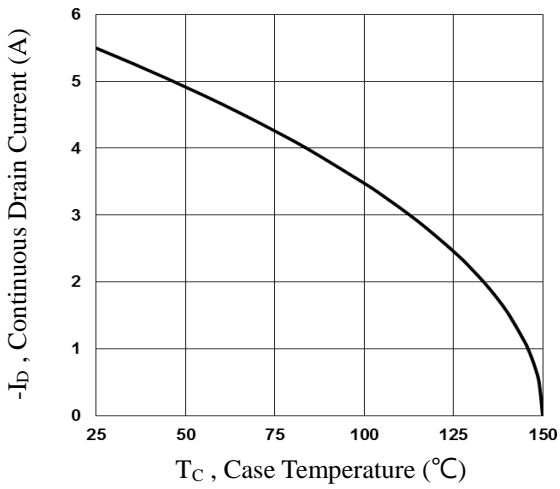
Q <sub>g</sub>	Total Gate Charge <sup>7,8</sup>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	---	5.1	7	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>7,8</sup>		---	2	3	
Q <sub>gd</sub>	Gate-Drain Charge <sup>7,8</sup>		---	2.2	4	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>7,8</sup>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω I <sub>D</sub> =-1A	---	3.4	6	ns
T <sub>r</sub>	Rise Time <sup>7,8</sup>		---	10.8	21	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>7,8</sup>		---	26.9	51	
T <sub>f</sub>	Fall Time <sup>7,8</sup>		---	6.9	13	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHz	---	560	810	pF
C <sub>oss</sub>	Output Capacitance		---	55	80	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	40	60	

**Drain-Source Diode Characteristics and Maximum Ratings**

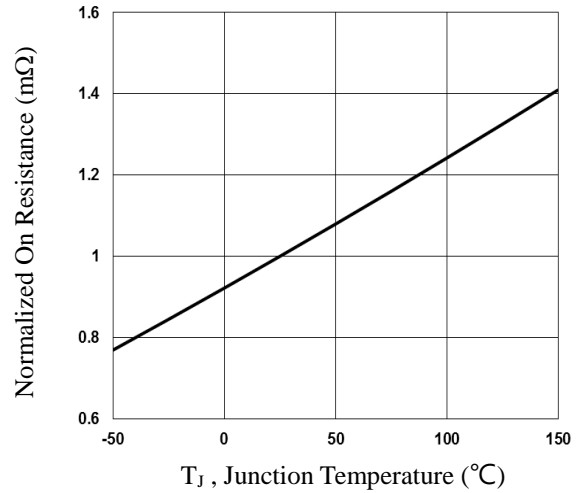
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-5.5	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-11	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V

Note :

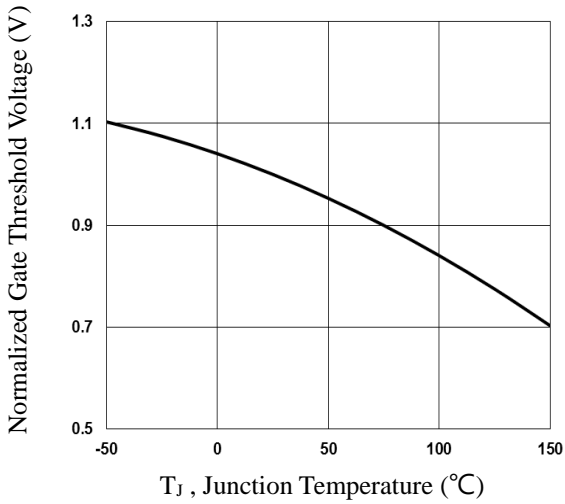
5. Repetitive Rating : Pulsed width limited by maximum junction temperature.
6. V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-10A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
7. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
8. Essentially independent of operating temperature.



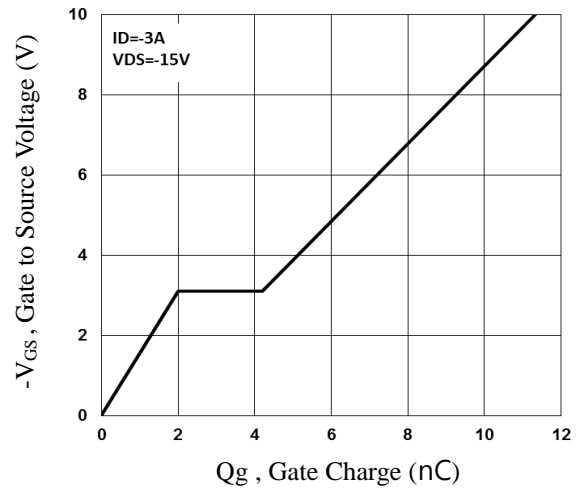
**Fig.1 Continuous Drain Current vs.  $T_c$**



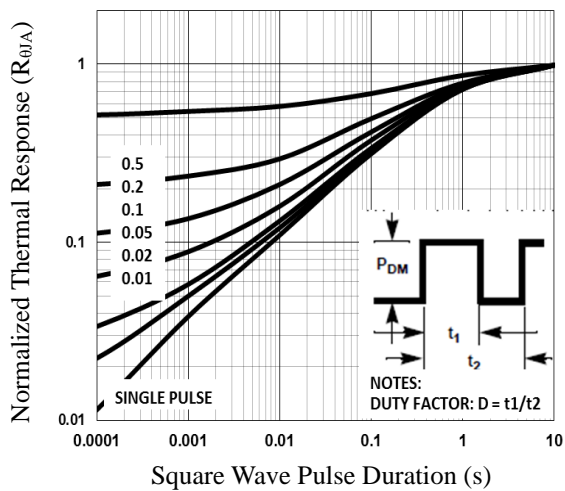
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$**



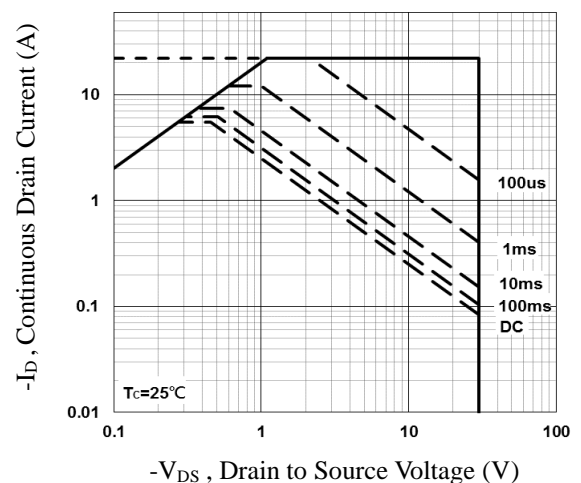
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

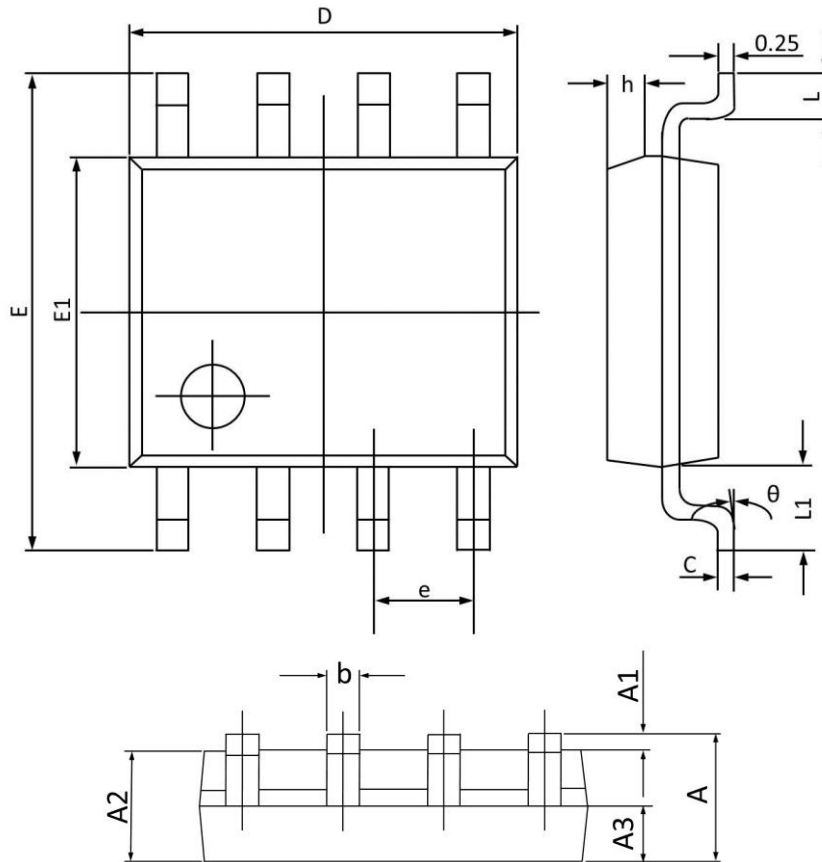


**Fig.5 Normalized Transient Impedance**



**Fig.6 Maximum Safe Operation Area**

## SOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.380	0.510	0.015	0.020
c	0.170	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.020
L	0.400	0.800	0.016	0.031
L1	1.050(BSC)		0.041(BSC)	
$\theta$	0°	8°	0°	8°

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