

## Features

- Fast switching
- Low Gate Charge
- Improved dv/dt capability
- 100% avalanche tested
- Green Device Available

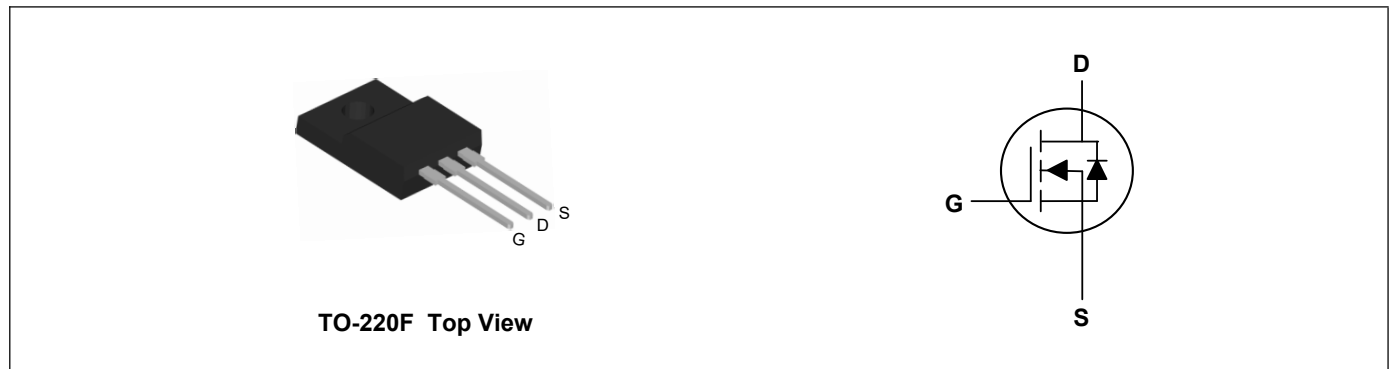
## Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC to DC Converters

## Product Summary



$V_{DS}$	700	V
$I_D$	10	A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	0.88	$\Omega$



## Absolute Maximum Ratings( $T_C=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	700	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current <sup>1</sup>	$I_D$	10	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	40	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	500	mJ
Total Power Dissipation <sup>4</sup>	$P_D$	40	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$

## Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	---	62.5	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	---	3.13	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	700	---	---	V
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	---	0.78	0.88	Ω
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	2.0	---	4.0	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =700V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =560V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	100	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	---	---	±100	nA
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =5A	---	9.5	---	S
Total Gate Charge	Q <sub>g</sub>	V <sub>DD</sub> =325V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	33	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	9	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	12	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =325V, R <sub>G</sub> =10Ω, I <sub>D</sub> =10A	---	28	---	ns
Rise Time	T <sub>r</sub>		---	23	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	54	---	
Fall Time	T <sub>f</sub>		---	25	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	1642	---	pF
Output Capacitance	C <sub>oss</sub>		---	128	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	7	---	

**Drain-Source Diode Characteristics**

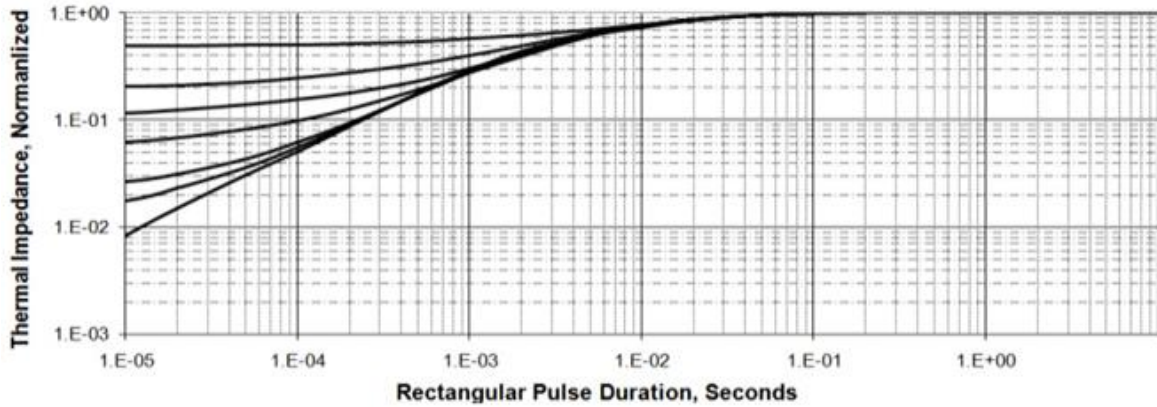
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current <sup>1</sup>	I <sub>S</sub>	T <sub>C</sub> =25°C	---	---	10	A
Pulsed Source Current	I <sub>SM</sub>		---	---	40	A
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A, T <sub>J</sub> =25°C	---	---	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =10A, V <sub>GS</sub> =0V di/dt=100A/μs, T <sub>J</sub> =25°C	---	540	---	nS
Reverse Recovery Charge	Q <sub>rr</sub>		---	3.31	---	nC

**Note:**

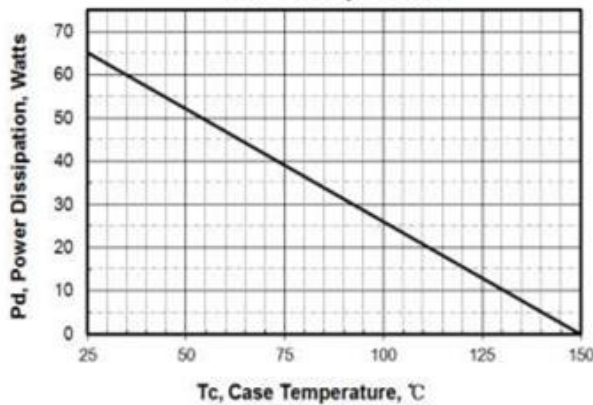
1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 380us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=15mH
4. The power dissipation is limited by 150°C junction temperature

**Typical Characteristics**

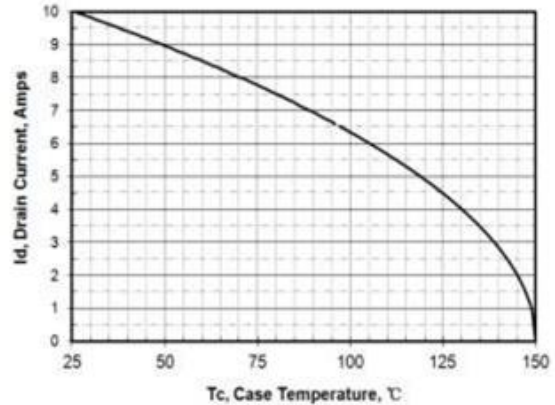
**Figure 1. Maximum Transient Thermal Impedance**



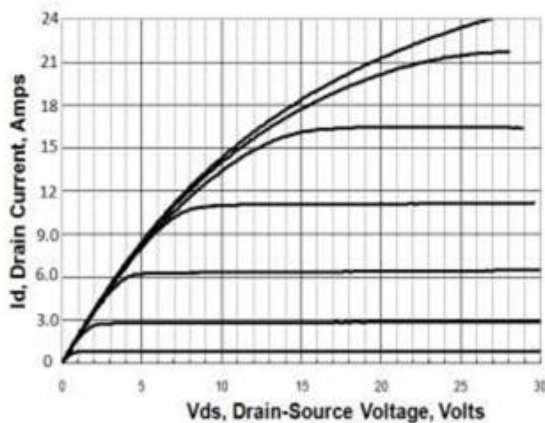
**Figure 2 . Max. Power Dissipation vs Case Temperature**



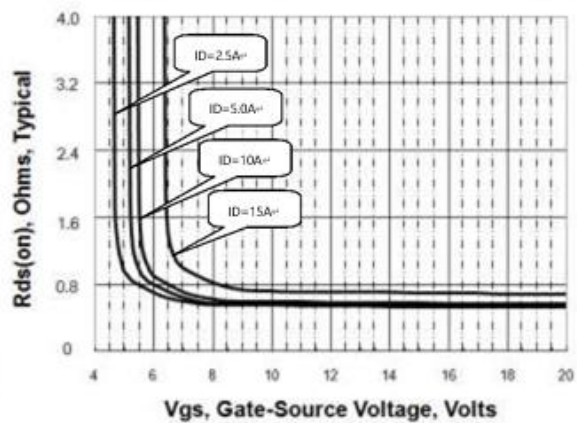
**Figure 3 .Maximum Continuous Drain Current vs Tc**



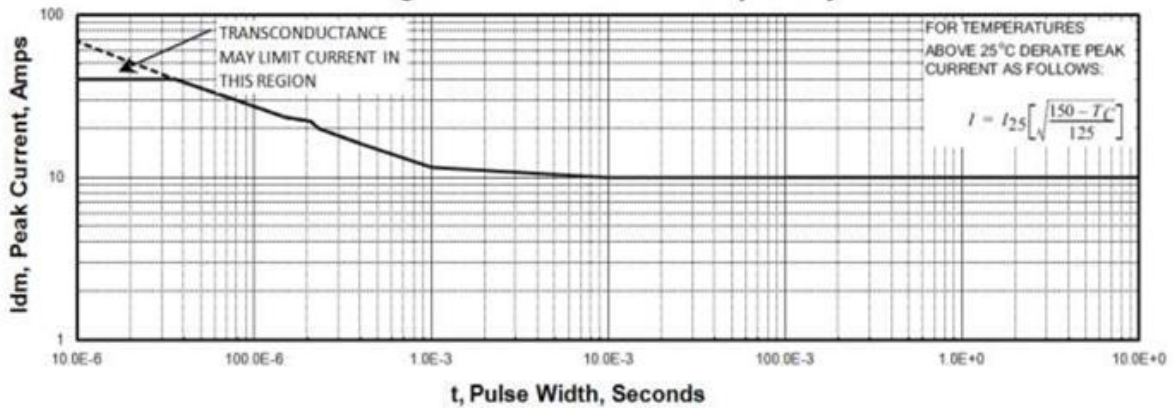
**Figure 4. Output Characteristics**



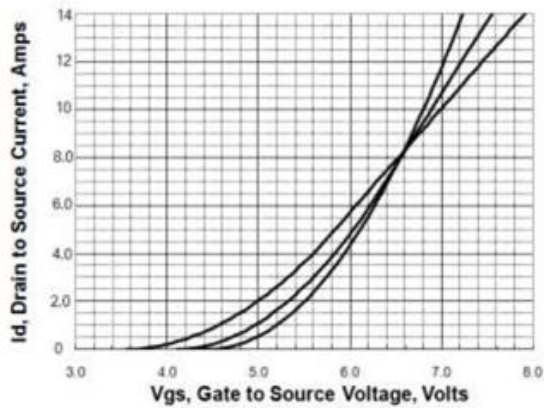
**Figure 5. Rds(on) vs Gate Voltage**



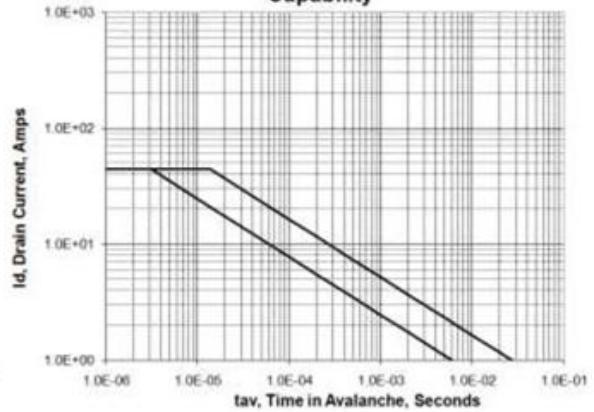
**Figure 6. Peak Current Capability**



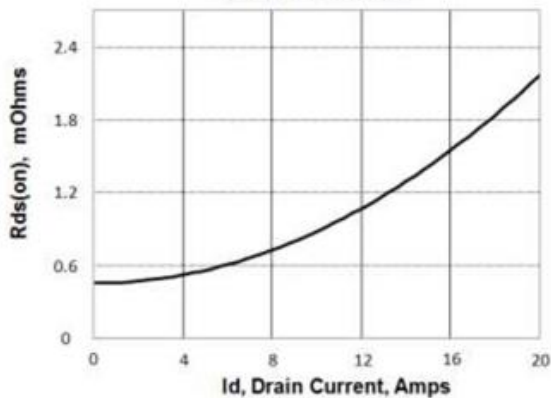
**Figure 7. Transfer Characteristics**



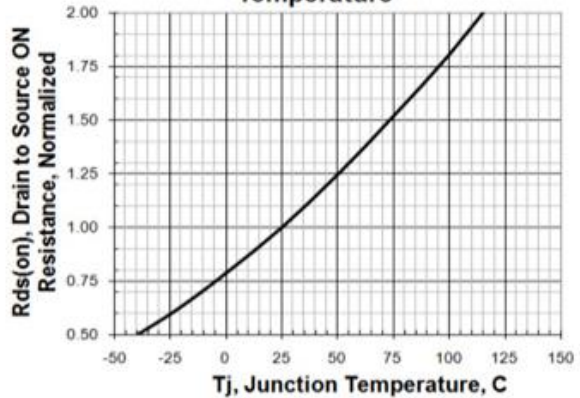
**Figure 8. Unclamped Inductive Switching Capability**



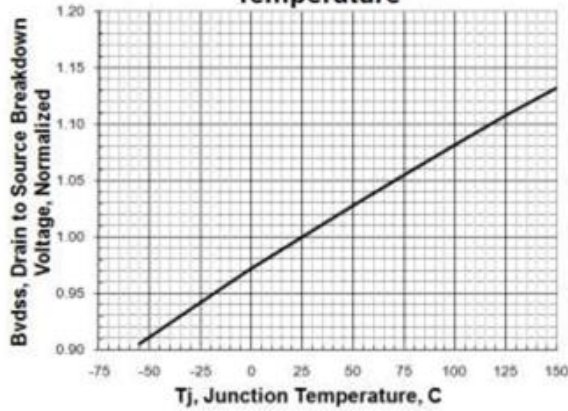
**Figure 9. Drain to Source ON Resistance vs Drain Current**



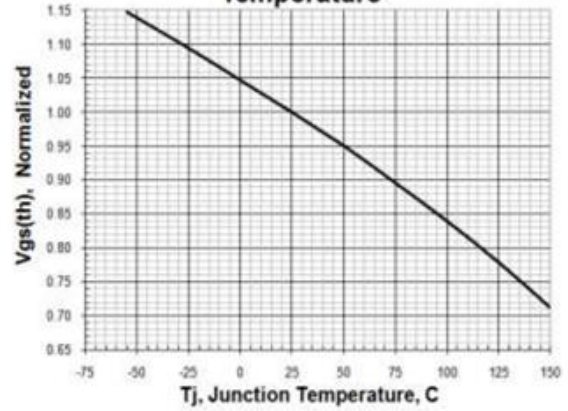
**Figure 10. Rds(on) vs Junction Temperature**



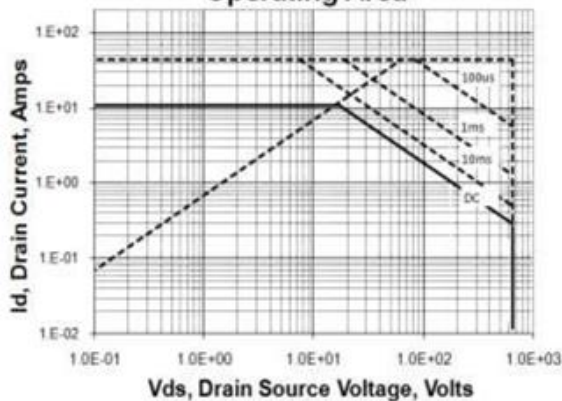
**Figure 11. Breakdown Voltage vs Temperature**



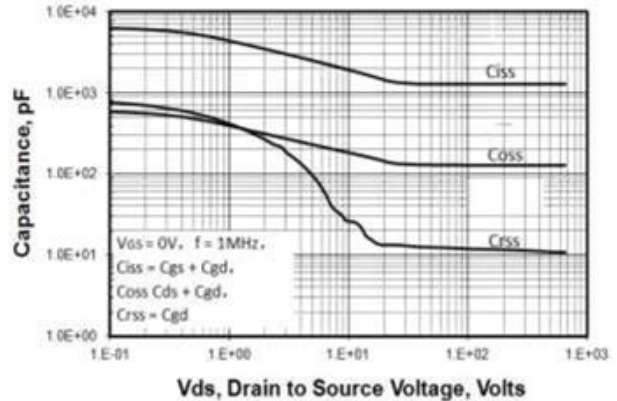
**Figure 12. Threshold Voltage vs Temperature**



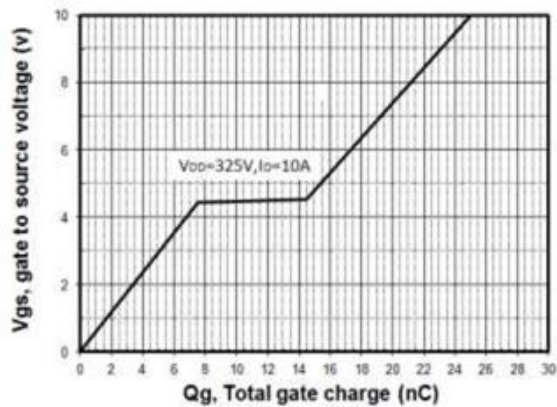
**Figure 13 . Maximum Safe Operating Area**



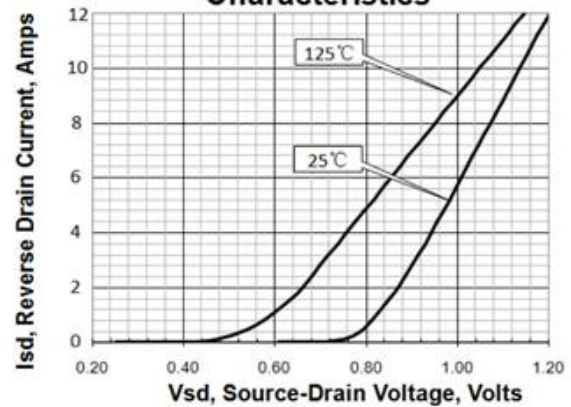
**Figure 14. Capacitance vs Vds**



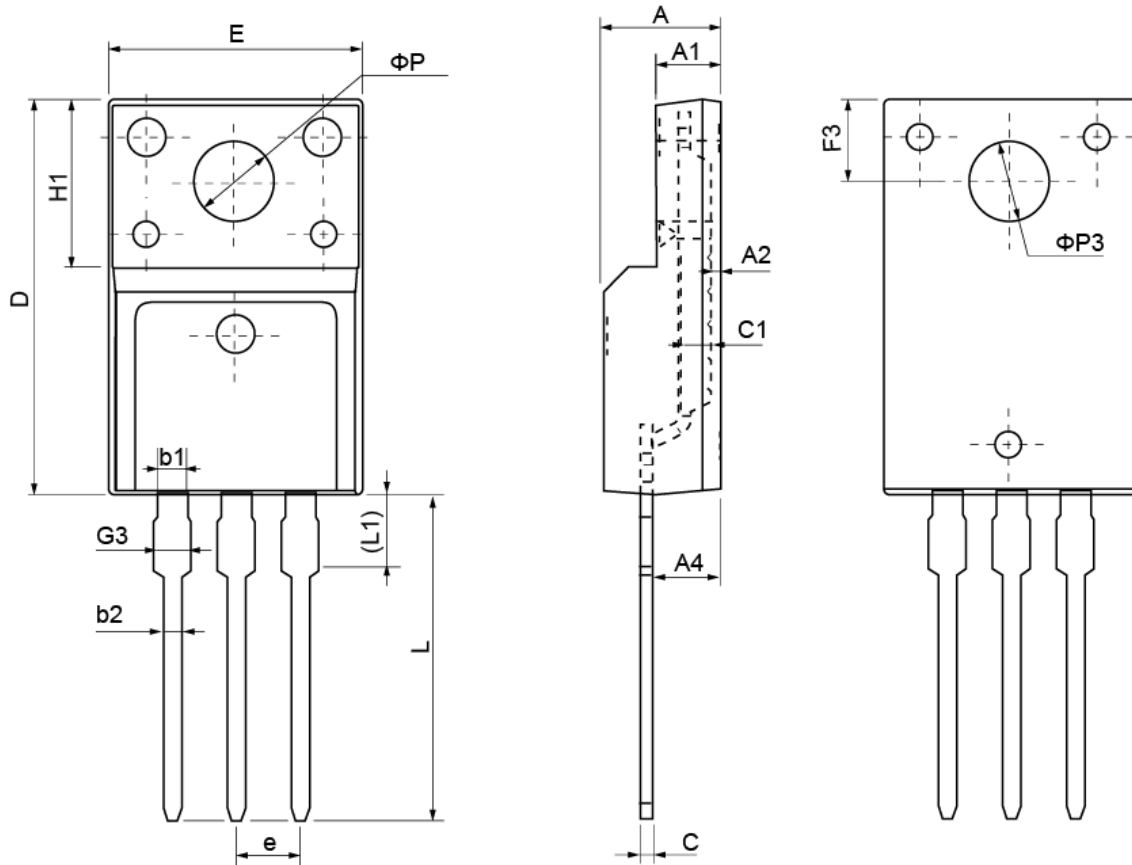
**Figure 15 . Typical Gate Charge**



**Figure 16. Body Diode Transfer Characteristics**



**TO-220F Package Outline Dimensions**



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	4.40	4.70	5.00	<b>H1</b>	6.70 REF		
<b>A1</b>	2.30	2.55	2.80	<b>L</b>	12.30	12.98	13.30
<b>A2</b>	0.30	0.50	0.70	<b>L1</b>	2.95	3.10	3.50
<b>A4</b>	2.45	2.80	3.05	<b>φ P</b>	3.03	3.20	3.50
<b>c</b>	0.30	0.50	0.70	<b>φ P3</b>	3.15	3.45	3.65
<b>c1</b>	1.20	1.30	1.40	<b>b1</b>	1.10	1.30	1.45
<b>D</b>	15.40	15.90	16.40	<b>b2</b>	0.60	0.80	1.00
<b>E</b>	9.86	10.16	10.46	<b>F3</b>	3.05	3.30	3.55
<b>e</b>	2.54 BSC			<b>G3</b>	1.15	1.35	1.55