

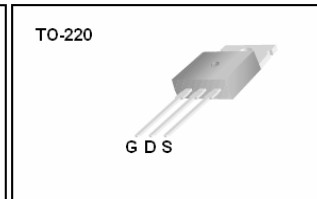
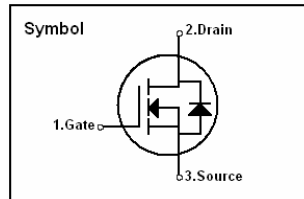


FSP8N60/FS8N60

600V N-Channel MOSFET

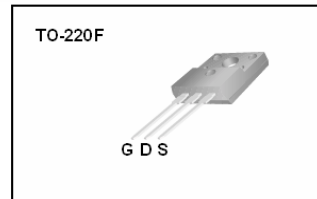
Features

- 7.5A,600v,RDS(on)=1.0Ω@VGS=10V
- Gate charge (Typical 30nC)
- High ruggedness
- Fast switching
- 100% Avalanche Tested
- Improved dv/dt capability



General Description

This Power MOSFET is produced using Truesemi's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supplies, active power factor correction, electronic lamp ballasts based on half bridge topology.



Absolute Maximum Ratings

Symbol	Parameter	FSP8N60	FS8N60	Units
VDSS	Drain to Source Voltage	600		V
ID	Continuous Drain Current(@TC = 25°C)	7.5	7.5	A
	Continuous Drain Current(@TC = 100°C)	4.5	4.5*	A
IDM	Drain Current Pulsed (Note 1)	30	30	A
VGS	Gate to Source Voltage	±30		V
EAS	Single Pulsed Avalanche Energy (Note 2)	285		mJ
EAR	Repetitive Avalanche Energy (Note 1)	15.5		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5		V/ns
PD	Total Power Dissipation(@TC = 25 °C)	155	55	W
	Derating Factor above 25 °C	1.21	0.4	W/ °C
TSTG, TJ	Operating Junction Temperature & Storage Temperature	-55 ~ 150		°C
TL	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300		°C

Thermal Characteristics

Symbol	Parameter	FSP8N60	FS8N60	Units
RθJC	Thermal Resistance, Junction-to-Case	0.85	2.2	°C/W
RθCS	Thermal Resistance, Case-to-Sink Typ	0.5	—	°C/W
RθJA	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

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Electrical Characteristics (TC = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	600	-	-	V
BV _{DSS} T _J	Breakdown Voltage Temperature coefficient	I _D = 250uA, referenced to 25 °C	-	0.57	-	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 600V, V _{GS} = 0V	-	-	10	uA
		V _{DS} = 480V, T _C = 125 °C	-	-	100	uA
I _{GSS}	Gate-Source Leakage, Forward	V _{GS} = 30V, V _{DS} = 0V	-	-	100	nA
	Gate-source Leakage, Reverse	V _{GS} = -30V, V _{DS} = 0V	-	-	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	2.0	-	4.0	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} = 10 V, I _D = 3.75A	-	0.85	1.0	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 25V, f = 1MHz	-	1255	—	pF
C _{oss}	Output Capacitance		-	115	—	
C _{rss}	Reverse Transfer Capacitance		-	14.2	—	
Dynamic Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 300V, I _D = 7.5A, R _G = 25 (Note 4, 5)	-	22	—	ns
t _r	Rise Time		-	90	—	
t _{d(off)}	Turn-off Delay Time		-	76	—	
t _f	Fall Time		-	44	—	
Q _g	Total Gate Charge	V _{DS} = 480V, V _{GS} = 10V, I _D = 7.5A (Note 4, 5)	-	30	—	nC
Q _{gs}	Gate-Source Charge		-	5.2	—	
Q _{gd}	Gate-Drain Charge(Miller Charge)		-	16.3	—	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I _S	Continuous Source Current	Integral Reverse p-n Junction	-	-	7.5	A
I _{SM}	Pulsed Source Current	Diode in the MOSFET	-	-	30	
V _{SD}	Diode Forward Voltage	I _S = 7.5A, V _{GS} = 0V	-	-	1.5	V
t _{rr}	Reverse Recovery Time	I _S = 7.5A, V _{GS} = 0V, di/dt = 100A/us	-	390	-	ns
Q _{rr}	Reverse Recovery Charge	I _S = 7.5A, V _{GS} = 0V, di/dt = 100A/us	-	3.3	-	uC

NOTES

1. Repeatability rating : pulse width limited by junction temperature
2. L = 22.3mH, I_{AS} = 7.5, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} = 7.5A, di/dt = 200A/us, V_{DD} = BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse Width = 300us, Duty Cycle = 2%
5. Essentially independent of operating temperature

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Fig 1. On-State Characteristics

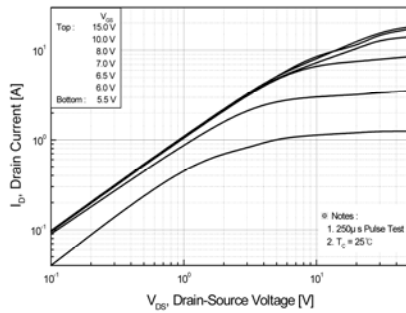


Fig 2. Transfer Characteristics

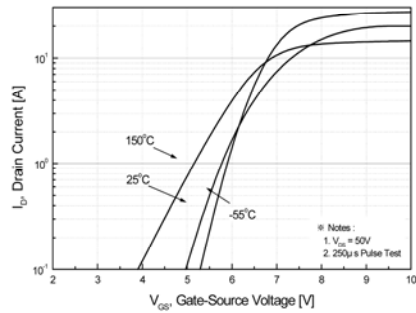


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

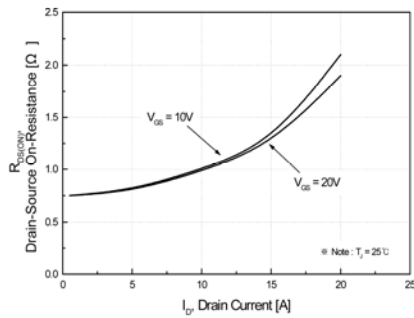


Fig 4. On State Current vs. Allowable Case Temperature

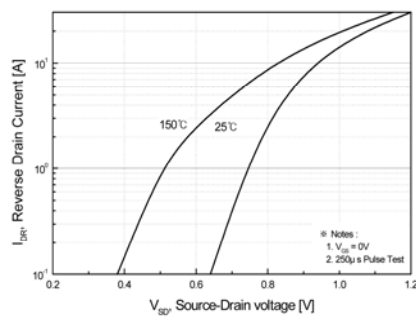


Fig 5. Capacitance Characteristics

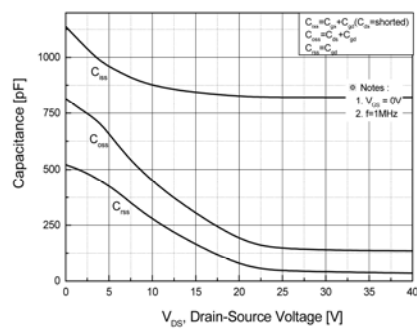
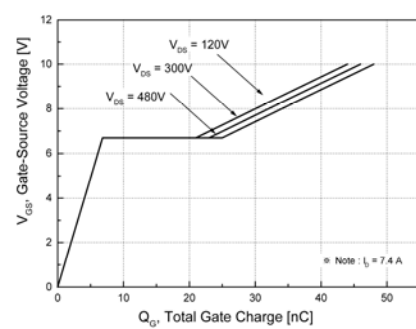


Fig 6. Gate Charge Characteristics



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Fig 7. Breakdown Voltage Variation vs. Junction Temperature

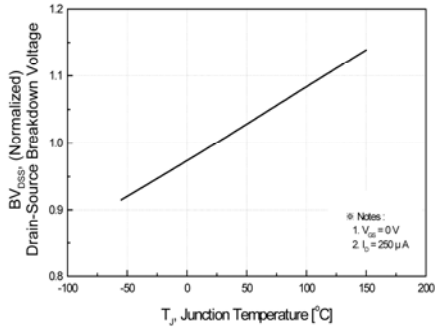


Fig 8. On-Resistance Variation vs. Junction Temperature

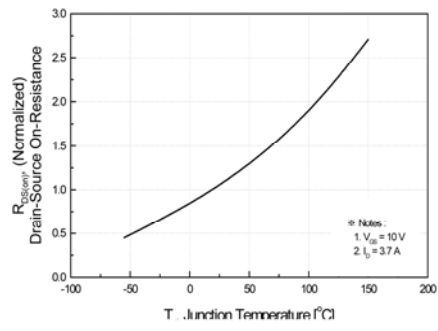


Fig 9 -1 . Maximum Safe Operating Area for FSP8N60

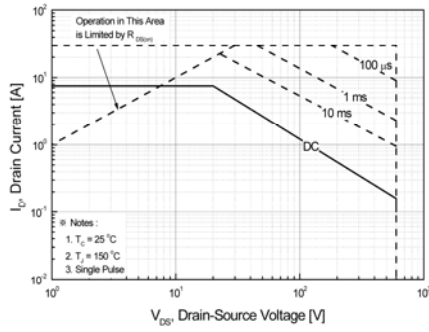


Fig 9 -2 . Maximum Safe Operating Area for FS8N60

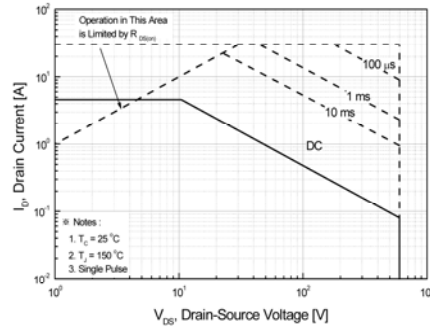


Fig 10. Maximum Drain Current vs. Case Temperature

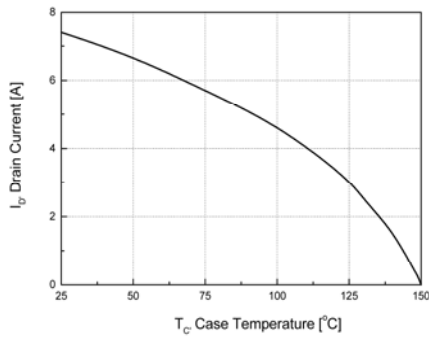


Fig 11-1. Transient Thermal Response Curve for FSP8N60

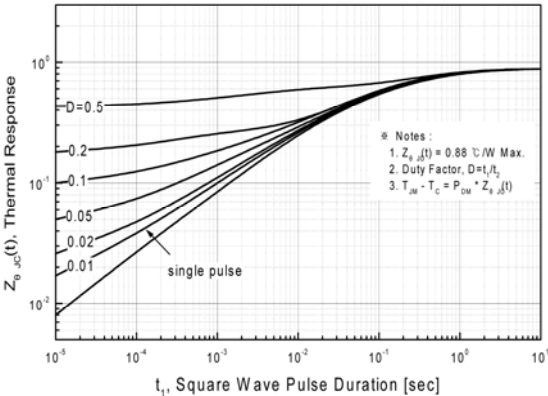
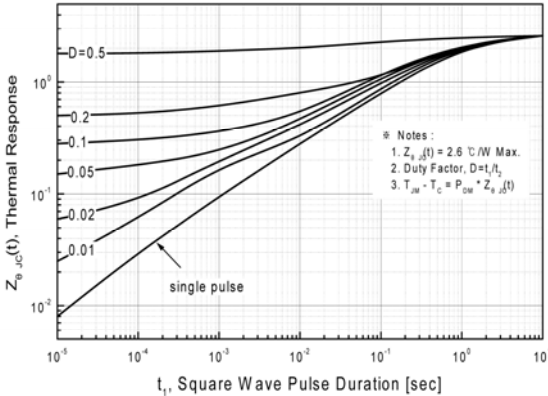


Fig 11-2 . Transient Thermal Response Curve for FS8N60



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Fig. 12. Gate Charge Test Circuit & Waveforms

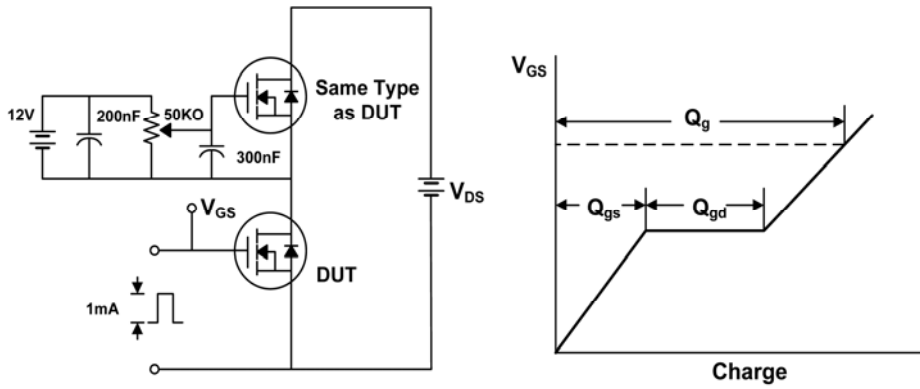


Fig. 13. Switching Time Test Circuit & Waveforms

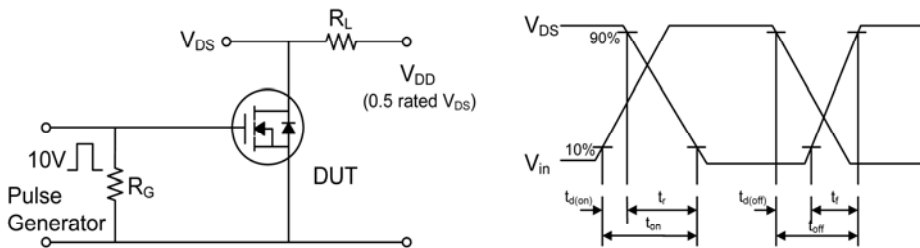


Fig. 14. Unclamped Inductive Switching Test Circuit & Waveforms

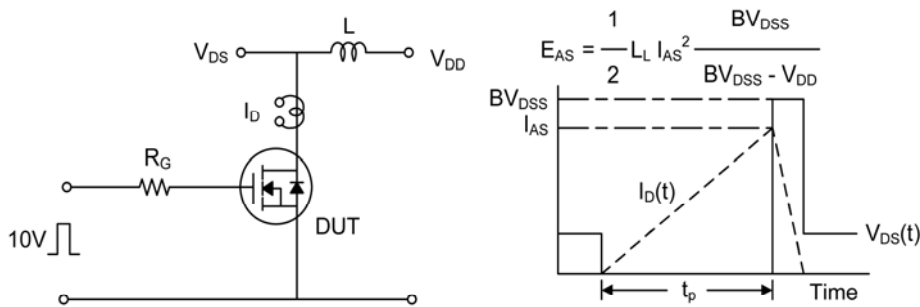
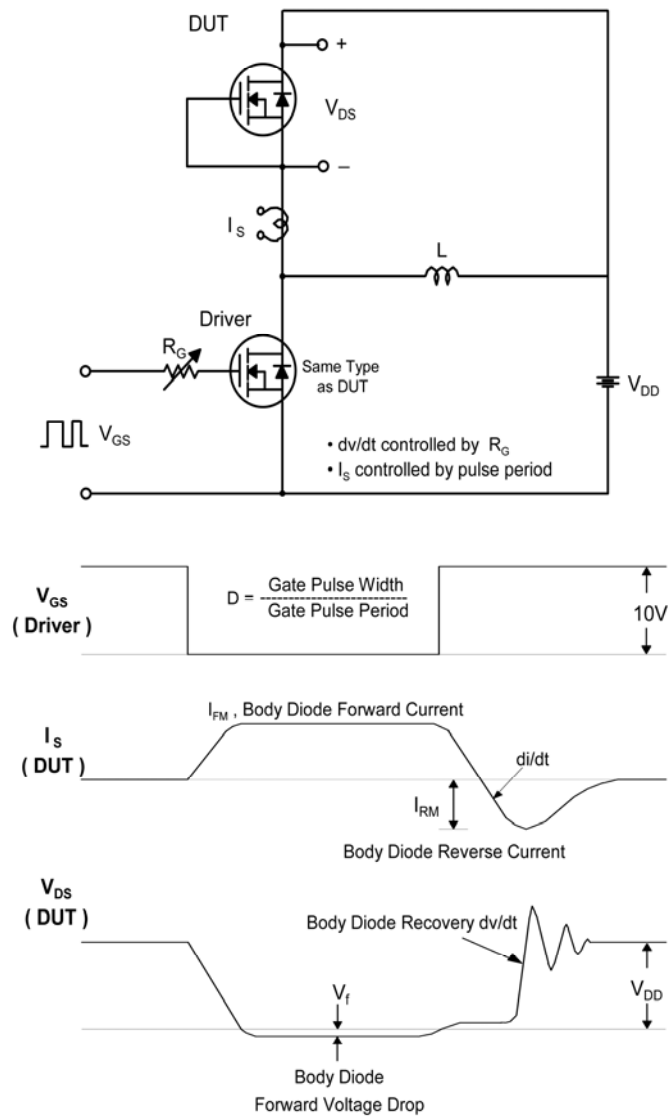


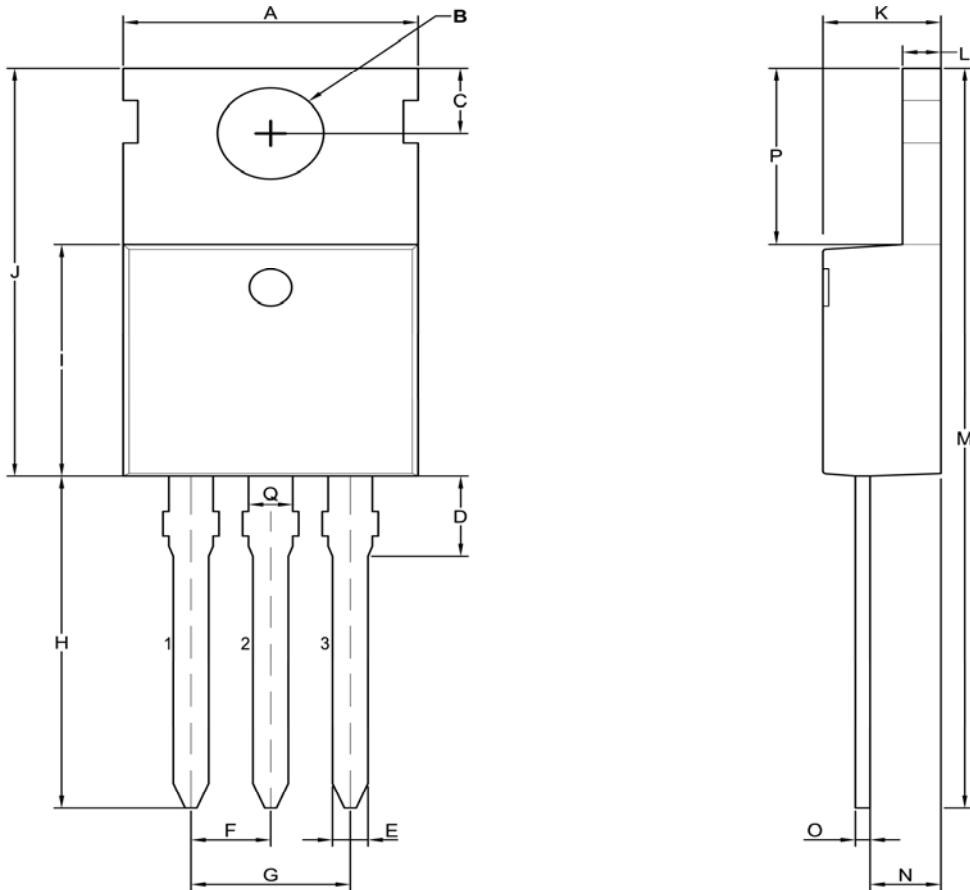
Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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Package Dimensions

TO-220

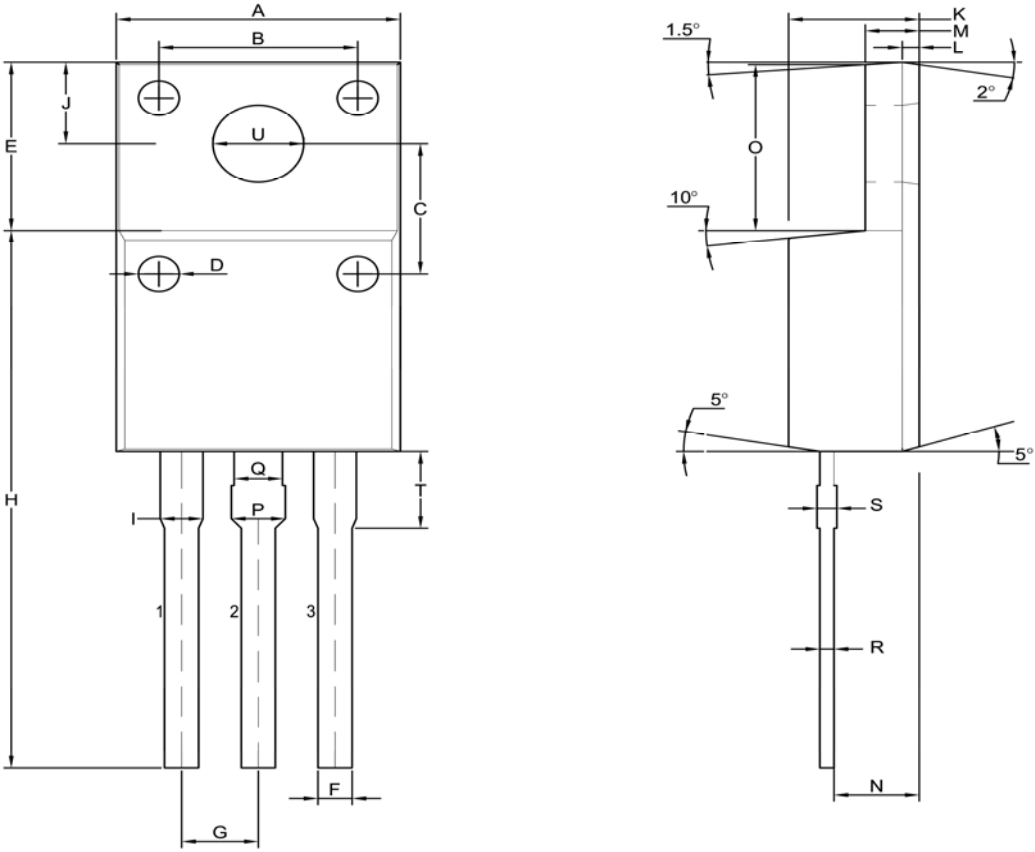


TO-220 DIMENSION			
Symbol	Dimensions in Millimeters		
	Min	Max	Typ
A	10.10	10.35	10.25
B	3.75	3.85	3.80
C	2.50	2.90	2.75
D	3.70	4.50	4.10
E	0.70	0.90	0.80
F	—	—	2.54
G	—	—	5.08
H	13.50	14.20	13.80
I	8.50	9.00	8.80
J	14.80	15.20	15.00
K	4.50	4.58	4.54
L	1.28	1.36	1.32
M	28.60	29.10	28.90
N	2.40	2.90	2.65
O	0.38	0.45	0.40
P	6.20	6.60	6.40
Q	1.30	1.45	1.40

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Package Dimensions

TO-220F



TO-220F DIMENSION			
Symbol	Dimensions In Millimeters		
	Min	Max	Typ
A	9.95	10.10	10.00
B		6.50(typ)	6.5
C		5.95(typ)	5.95
D		φ 1.40(typ)	φ 1.40
E	15.10	15.30	15.20
F	0.55	0.70	0.60
G	2.35	2.73	2.54
H	13.35	13.55	13.40
I	1.11	1.45	1.20
J	2.90	3.10	3.00
K	4.45	4.55	4.50
L		1.15(typ)	1.15
M		3.10(typ)	3.10
N	2.60	2.80	2.70
O	6.80	7.10	6.95
P	1.64	1.70	—
Q	1.48	1.66	1.58
R	0.60	0.68	—
S	0.62	0.78	—
T	3.60	3.90	3.75
U	3.00	3.20	—