

FSM75N75
FEATURES

Part No	V _{DSS} (at T _J (max))	R _{DS(on)}	I _D
FSM75N75	75V	<0.011Ω	80A

- Exceptional dv/dt capability
- 100% avalanche tested
- Low intrinsic capacitances

ADVANTAGES

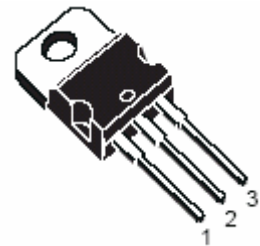
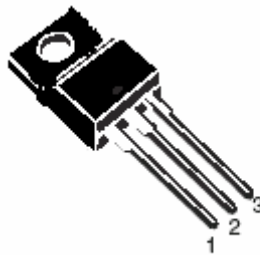
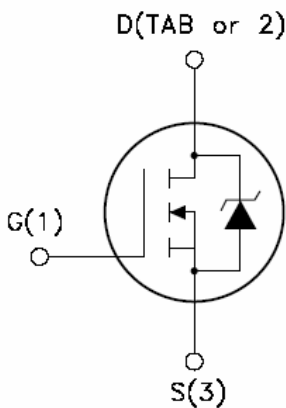
- Easy to mount
- Space savings
- High power density

GENERAL DESCRIPTION

This Power MOSFET series has specifically been designed to minimize input capacitance and gate charge. It is therefore suitable as primary switch in advanced high-efficiency, high-frequency isolated DC-DC converters for Telecom and Computer applications. It is also intended for any applications with low gate drive requirements.

APPLICATIONS

- DC motor control
- Solenoid and relay drivers
- DC-DC Converters
- Automotive environment

INTERNAL SCHEMATIC DIAGRAM AND EXTERIOR

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V _{DSS}	T _J = 25°C to 150°C	75	V
V _{GS}	Continuous	± 20	V
I _D	Drain current (continuous) at T _C = 25°C	80	A
	Drain current (continuous) at T _C = 100°C	65	
I _{DM}	Drain current (pulsed with limited by T _{JM}) at T _C = 25°C	320	A
P _D	T _J = 25°C	200	W
	Derating Factor	1.5	W/°C
dv/dt	Peak diode recovery voltage slope (I _{SD} ≤ 80A, di/dt ≤ 300A/μs, V _{DD} ≤ V _{(BR)DSS} , T _J ≤ T _{JMAX})	15	V/ns
E _{AS}	T _J = 25°C, I _D = 40A, V _{DD} = 38V	700	mJ
T _J	Max operating junction temperature	160	°C
T _{stg}	Storage temperature	-55 to 160	°C

■ THERMAL DATA

Symbol	Parameter	Rating	Unit
R_{thJC}	Thermal resistance junction-case	1	°C/W
R_{thJA}	Thermal resistance junction-ambient	62.5	°C/W
T_I	Maximum lead temperature for soldering purpose ⁽¹⁾	300	°C

Note: (1) 1.6mm from case for 10sec.

■ ELECTRICAL CHARACTERISTICS($T_{CASE}=25^{\circ}C$, UNLESS OTHERWISE NOTED)

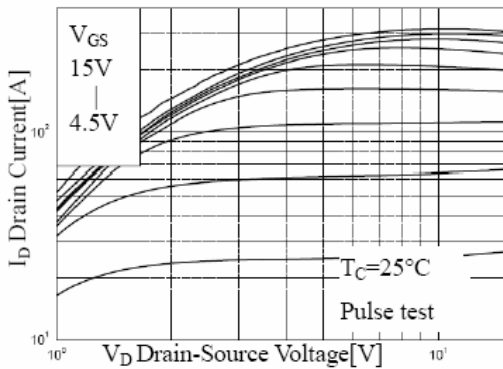
Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics					
V_{DSS}	$I_D = 250\mu A, V_{GS} = 0$	75			V
I_{DSS}	$V_{DS} = 75V, V_{GS} = 0, T_J = 25^{\circ}C$ $V_{DS} = 75V, V_{GS} = 0, T_J = 100^{\circ}C$			1 10	μA μA
I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0$			± 100	nA
On Characteristics					
$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	2.8	4	V
$R_{DS(on)}$	$V_{GS} = 10V, I_D = 40A$ Pulse test, $t \leq 300$ ms, duty cycle $d \leq 2\%$		0.0097	0.011	Ω
Dynamic Characteristics					
g_{fs}	$V_{DS} = 15V, I_D = 40A$, Pulse test		80		S
C_{iss}	$V_{DS} = 25V, f = 1MHz, V_{GS} = 0V$		3000		pF
C_{oss}			800		
C_{rss}			50		
Switching Characteristics					
$t_{d(on)}$	$V_{DD} = 38V, I_D = 45A, V_{GS} = 10V$		20		ns
t_r			15		
$t_{d(off)}$			60		
t_f			10		
Q_g	$V_{GS} = 60V, I_D = 80A, V_{GS} = 10V$		100		nC
Q_{gs}			20		
Q_{gd}			40		

ELECTRICAL CHARACTERISTICS(T_{CASE}=25°C, UNLESS OTHERWISE NOTED)

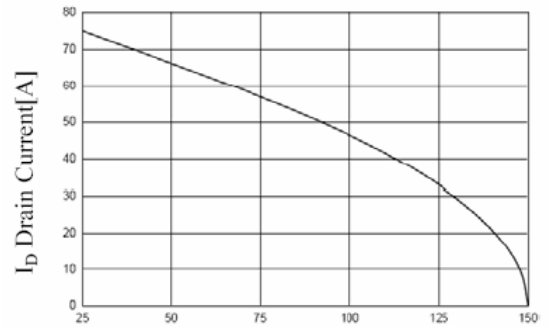
Source-Drain Diode Ratings and Characteristics

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
I _S	V _{GS} = 0V, Source-drain Current			80	A
I _{SM}	Repetitive; pulse width limited by T _{JM}			320	A
V _{SD}	I _F = 80A, V _{GS} = 0 V		0.98	1.4	V
t _{rr}	V _{GS} = 0 V, I _s = 80A		70		ns
Q _{rr}	dI _F =100A/us, Pulse test, t ≤ 300 μs, duty cycle d ≤ 1.5%		200		nC

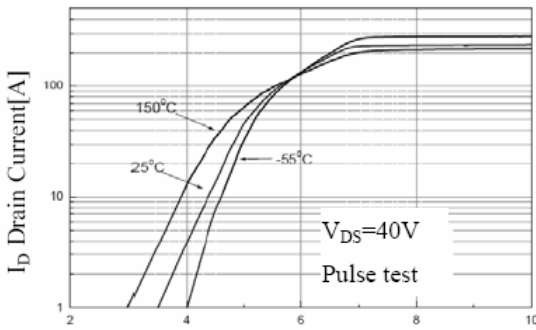
TYPICAL CHARACTERISTICS



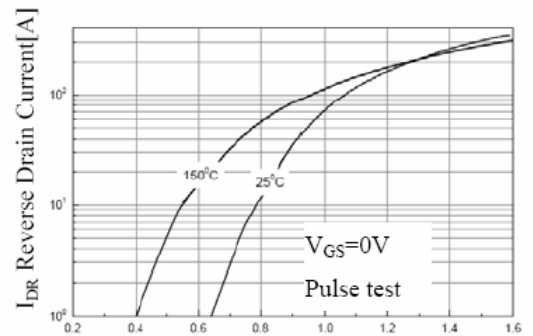
On-region Characteristics



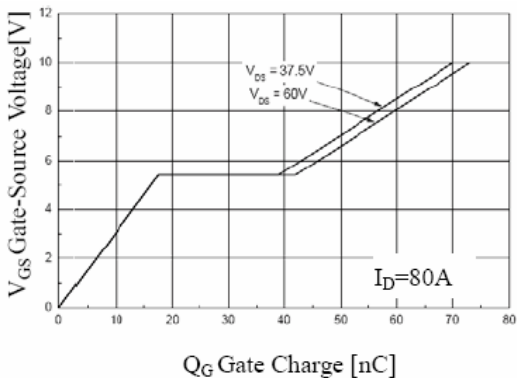
Maximum Drain Current



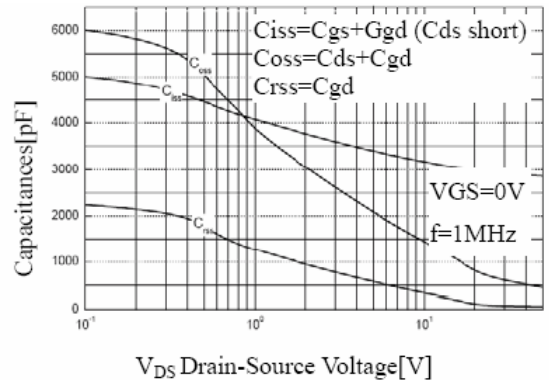
Transfer Characteristics



Body Diode Characteristics

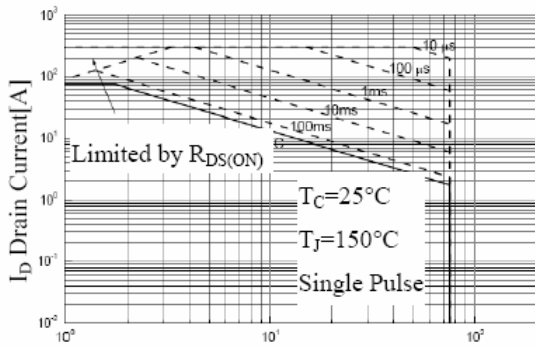


Gate Charge Characteristics

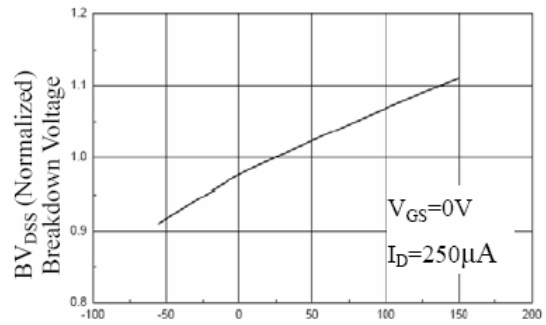


Capacitance Characteristics

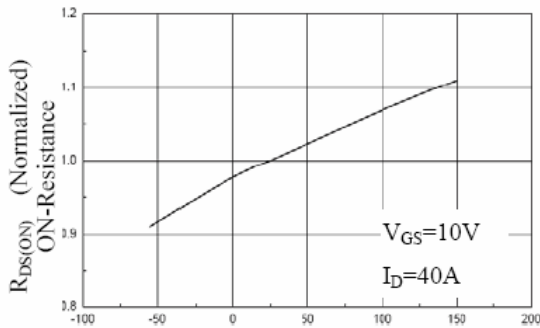
■ TYPICAL CHARACTERISTICS (CONTINUED)



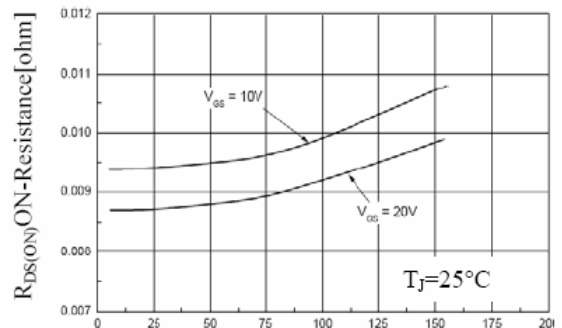
V_{DS} Drain-Source Voltage [V]
Safe Operating Area



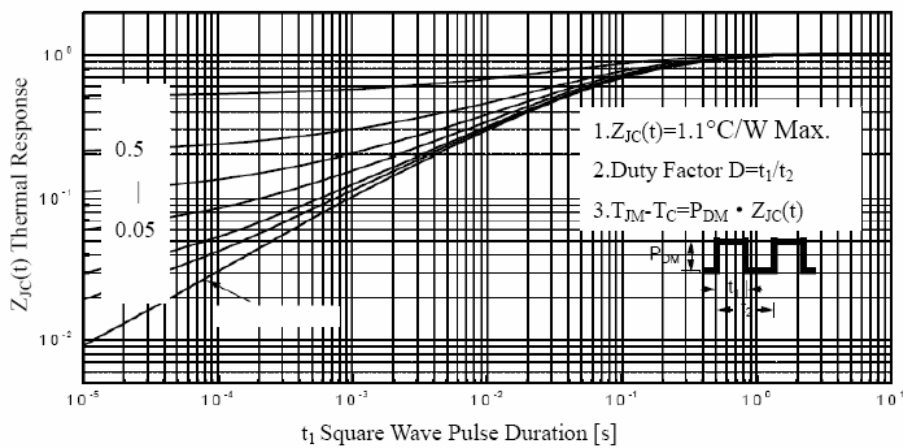
T_J Junction Temperature [°C]
Breakdown Voltage Variation



T_J Junction Temperature [°C]
On-Resistance Variation

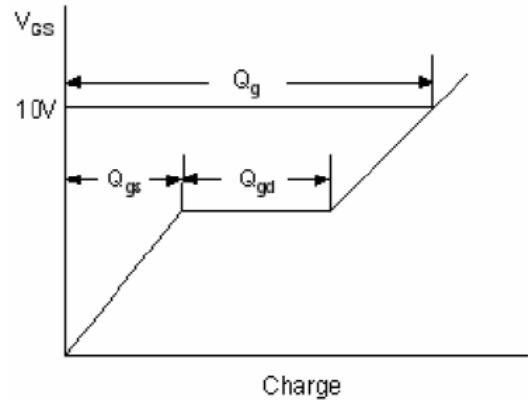
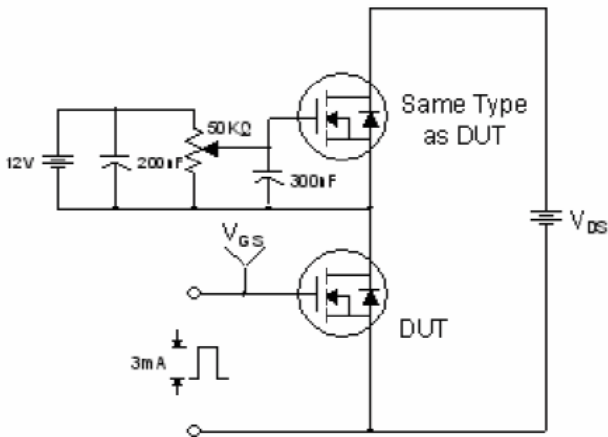


I_D Drain Current [A]
ON-Resistance Variation

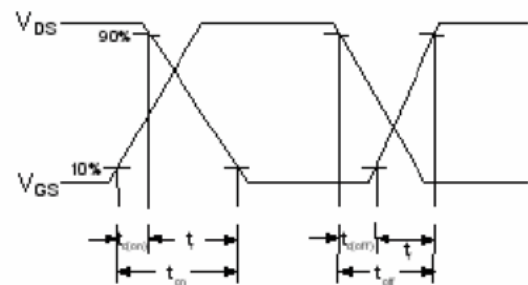
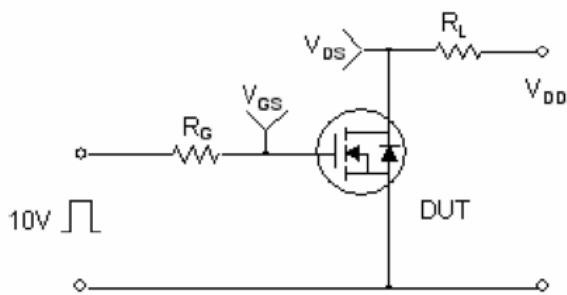


t₁ Square Wave Pulse Duration [s]
Body Diode Characteristics

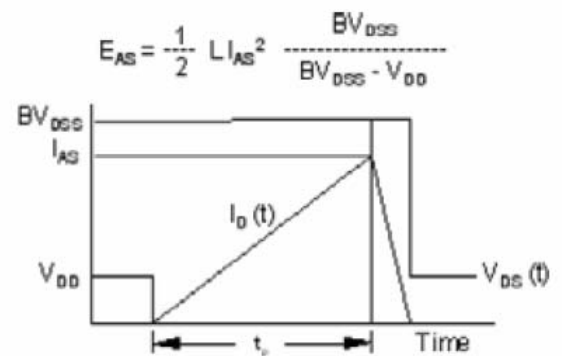
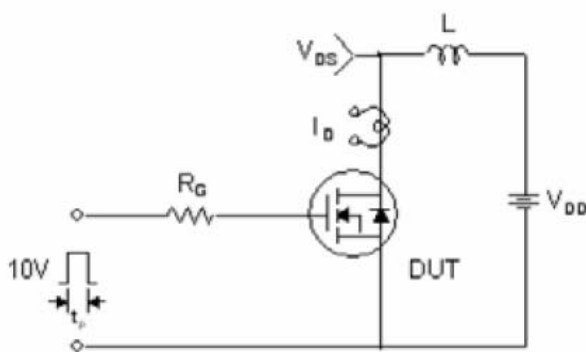
■ TEST CIRCUITS



Gate Charge Test Circuit and Waveform

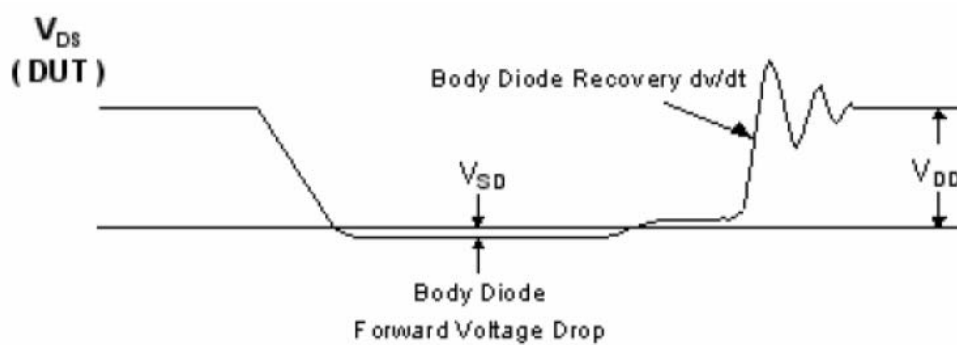
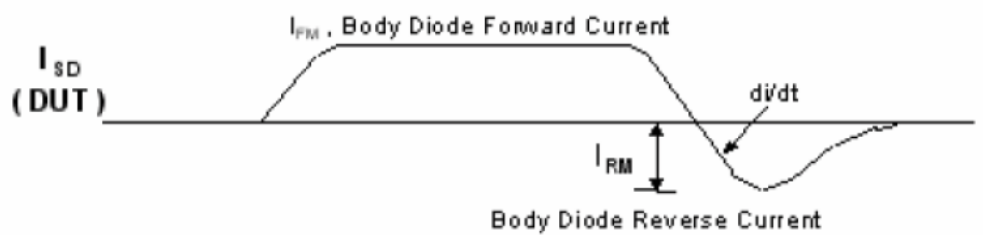
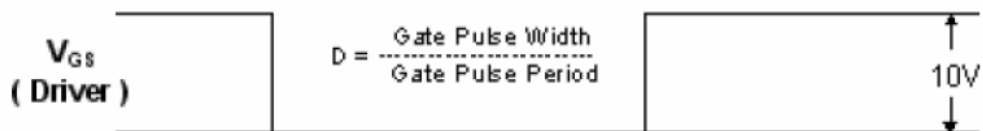
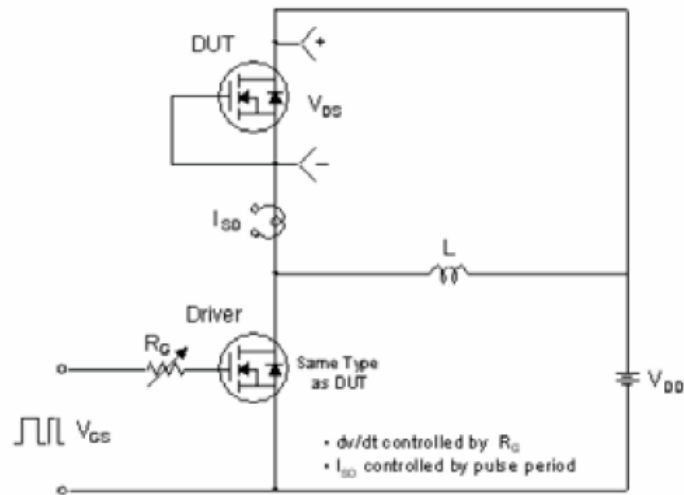


Resistive switch Test Circuit and Waveform



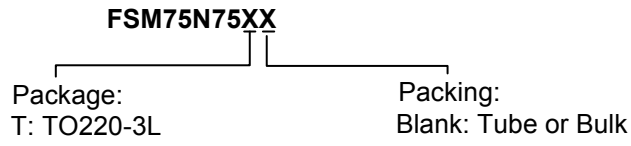
UIS Test Circuit and Waveform

■ TEST CIRCUITS (CONTINUED)

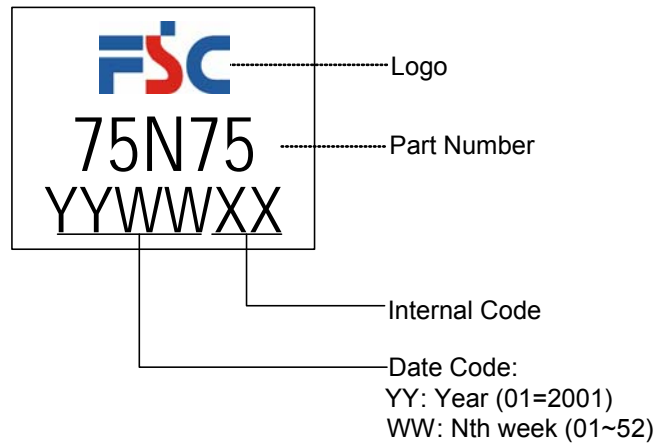


Peak Diode Recovery dv/dt Test Circuit and Waveform

■ ORDERING INFORMATION

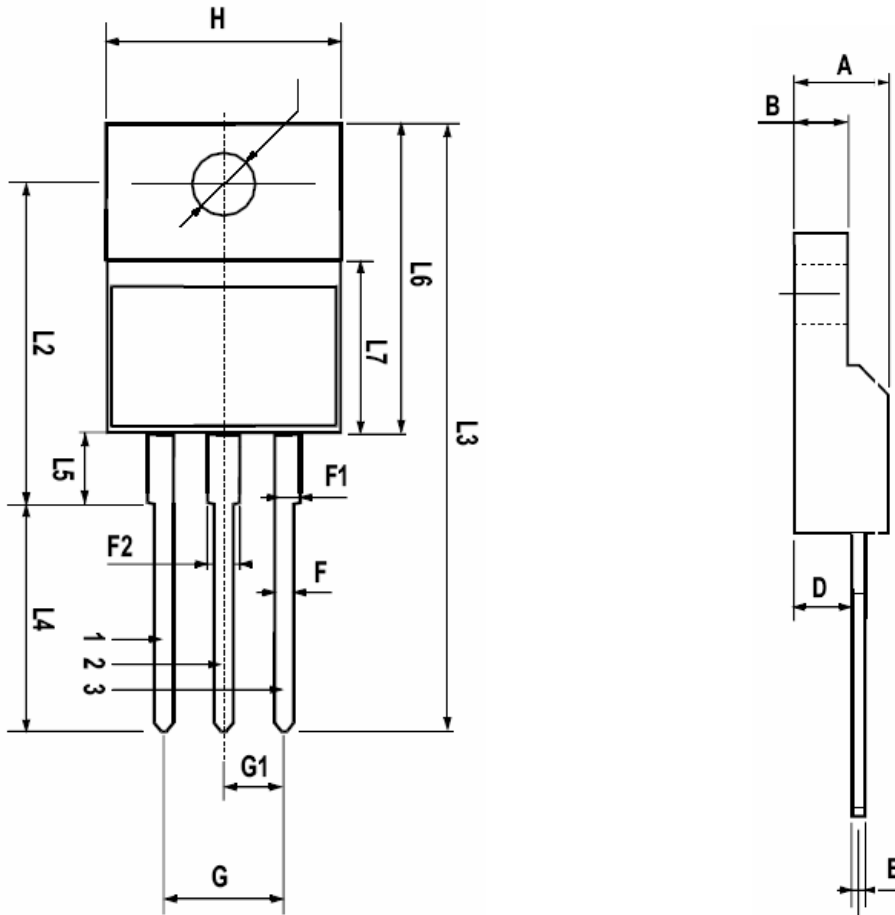


■ MARKING INFORMATION



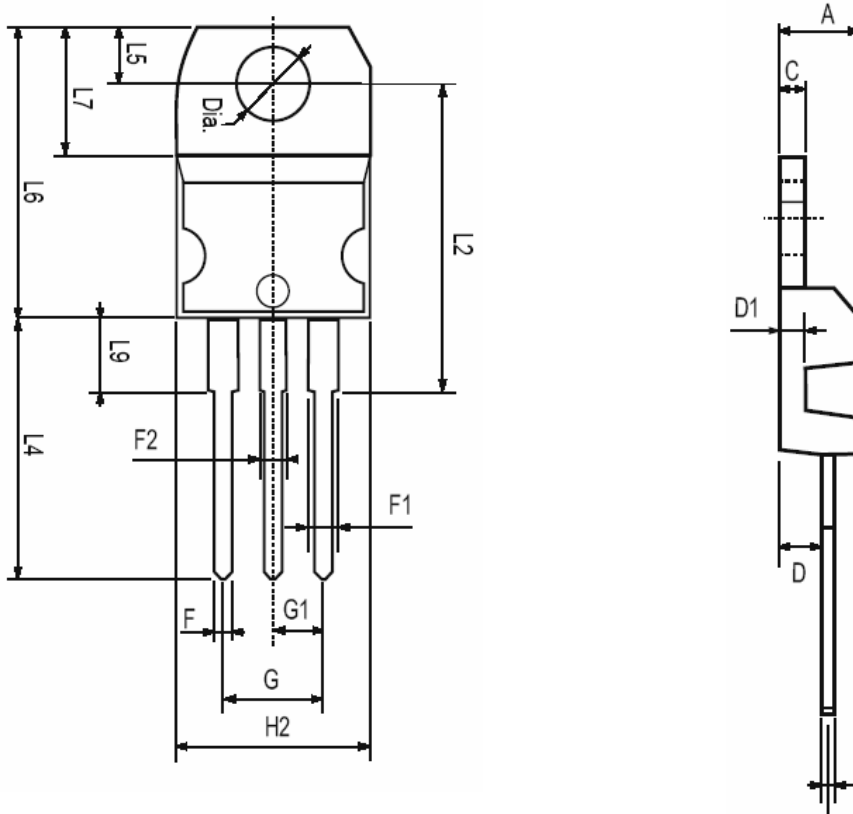
■ PACKAGE INFORMATION

(I) TO220



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L5	2.9		3.6	0.114		0.141
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Φ	3		3.2	0.118		0.126

(2) TO220



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.4	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA	3.75		3.85	0.147		0.151