

General Description

These N-channel MOSFET are produced using advanced MagnaChip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

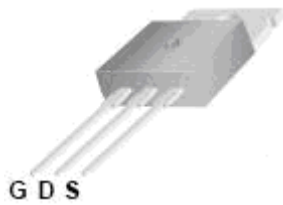
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

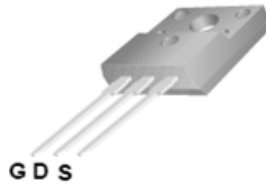
- $V_{DS} = 500V$
- $V_{DS} = 550V$ @ T_{jmax}
- $I_D = 16A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.35\Omega$ @ $V_{GS} = 10V$

Applications

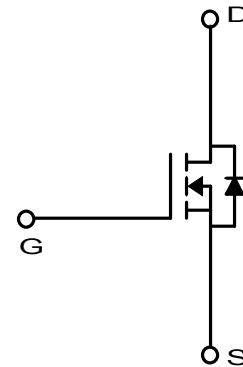
- Power Supply
- HID
- Lighting



TO-220
MDP Series



TO-220F
MDF Series



Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics		Symbol	MDP16N50G	MDF16N50G	Unit
Drain-Source Voltage		V_{DSS}	500		V
Drain-Source Voltage @ T_{jmax}		$V_{DSS} @ T_{jmax}$	550		V
Gate-Source Voltage		V_{GSS}	± 30		V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	16	16*	A
	$T_C = 100^\circ C$		10.1	10.1*	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	64	64*	A
Power Dissipation	$T_C = 25^\circ C$	P_D	204.9	49.4	W
	Derate above 25 $^\circ C$		1.64	0.39	W/ $^\circ C$
Repetitive Avalanche Energy ⁽¹⁾		E_{AR}	20.5		mJ
Peak Diode Recovery dv/dt ⁽³⁾		dv/dt	4.5		V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	780		mJ
Junction and Storage Temperature Range		T_J, T_{stg}	$-55 \sim 150$		$^\circ C$

* I_D limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	MDP16N50G	MDF16N50G	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	62.5	$^\circ C/W$
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	0.61	2.53	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDP16N50GTH	-55~150°C	TO-220	Tube	Halogen Free
MDF16N50GTH	-55~150°C	TO-220F	Tube	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	500	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3.0	-	5.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 500V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 8A		0.30	0.35	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 8A	-	14.8	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 16A, V _{GS} = 10V ⁽³⁾	-	34.9		nC
Gate-Source Charge	Q _{gs}		-	12.4		
Gate-Drain Charge	Q _{gd}		-	14.2		
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	1724		pF
Reverse Transfer Capacitance	C _{rss}		-	8.3		
Output Capacitance	C _{oss}		-	226		
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 250V, I _D = 16A, R _G = 25Ω ⁽³⁾	-	46		ns
Rise Time	t _r		-	88.5		
Turn-Off Delay Time	t _{d(off)}		-	96.5		
Fall Time	t _f		-	41		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	I _S = 16A, V _{GS} = 0V	-	16	-	A
Source-Drain Diode Forward Voltage	V _{SD}		-		1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 16A, dl/dt = 100A/μs ⁽³⁾	-	325		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	3.34		μC

Notes :

1. Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_J(MAX) = 150^\circ C$.
3. $I_{SD} \leq 16.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$
4. $L = 5.48mH$, $I_{AS} = 16.0A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

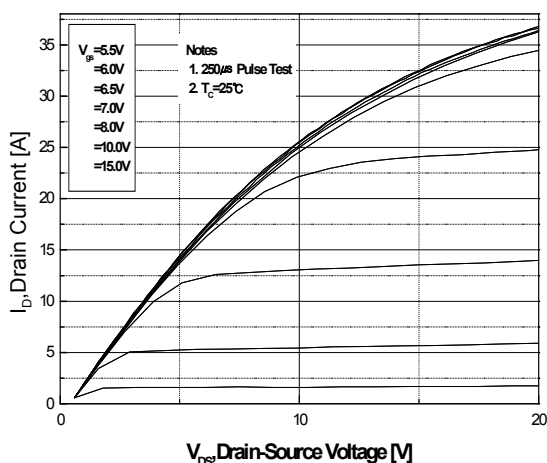


Fig.1 On-Region Characteristics

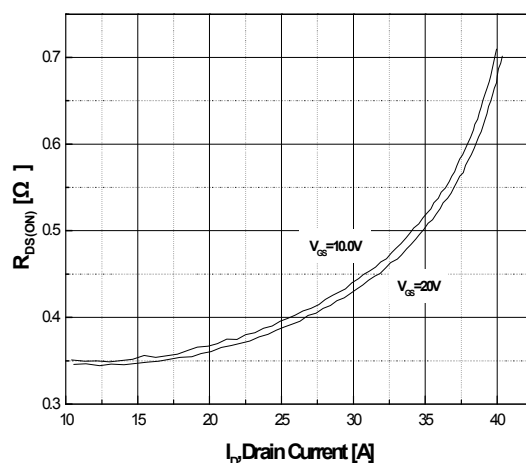


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

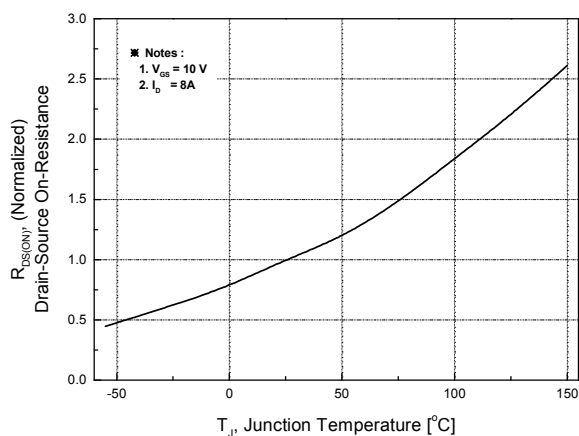


Fig.3 On-Resistance Variation with Temperature

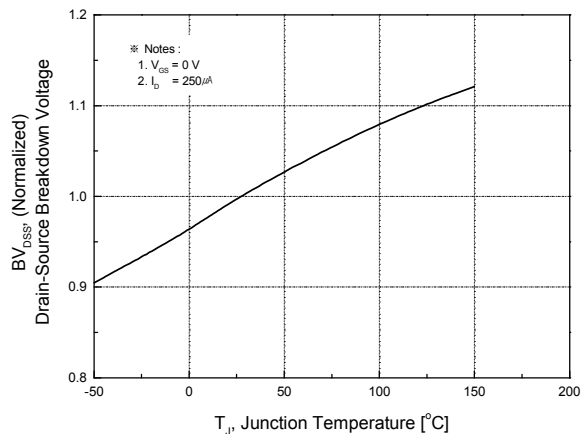


Fig.4 Breakdown Voltage Variation vs. Temperature

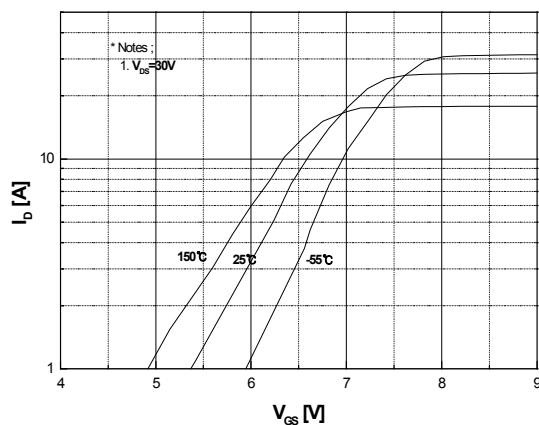


Fig.5 Transfer Characteristics

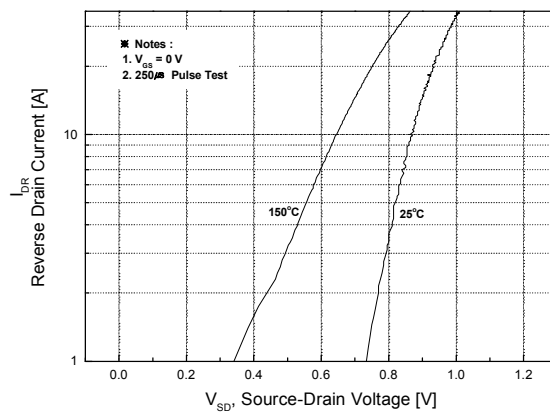


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

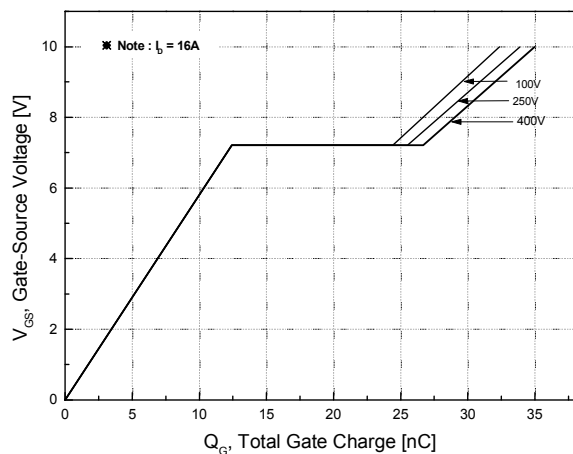


Fig.7 Gate Charge Characteristics

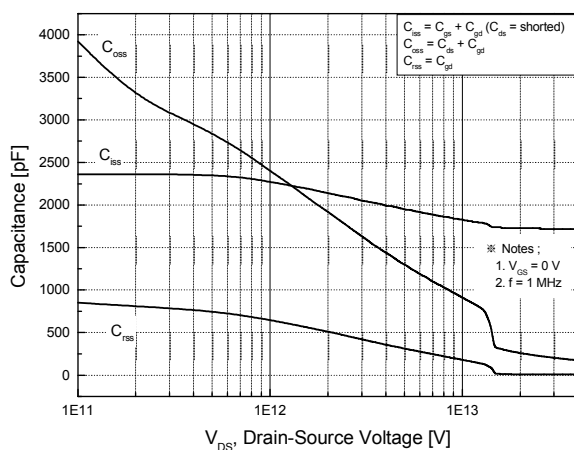


Fig.8 Capacitance Characteristics

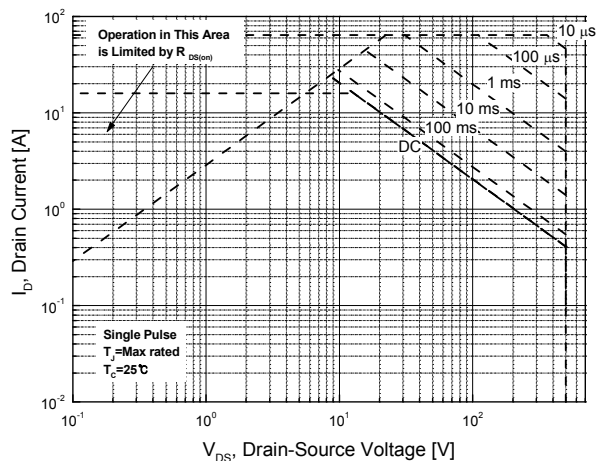
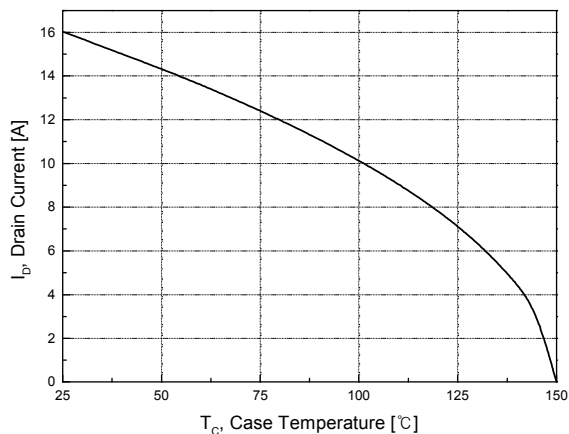
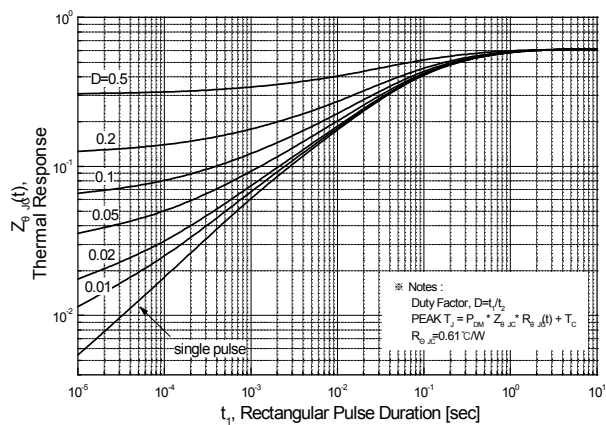
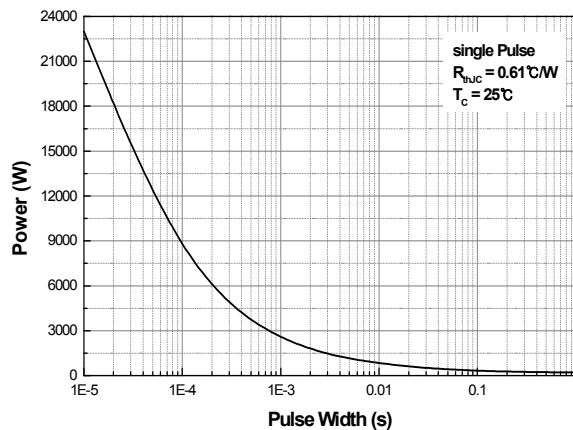
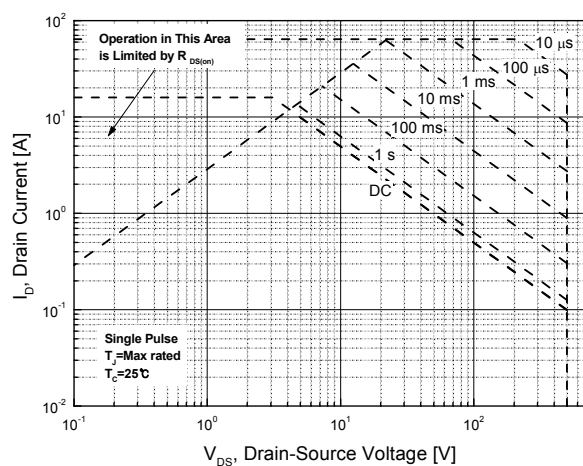
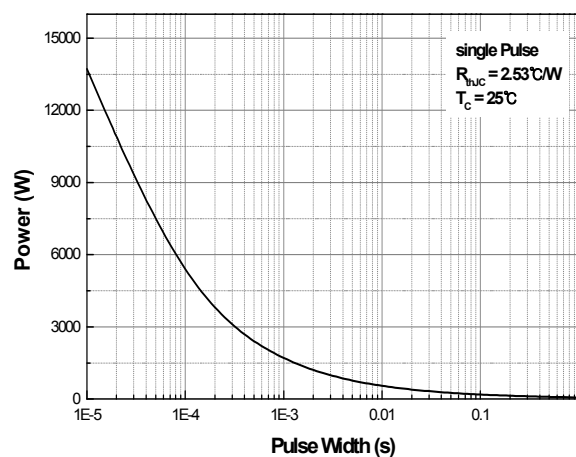
Fig.9 Maximum Safe Operating Area
MDP16N50G (TO-220)

Fig.10 Maximum Drain Current vs. Case Temperature

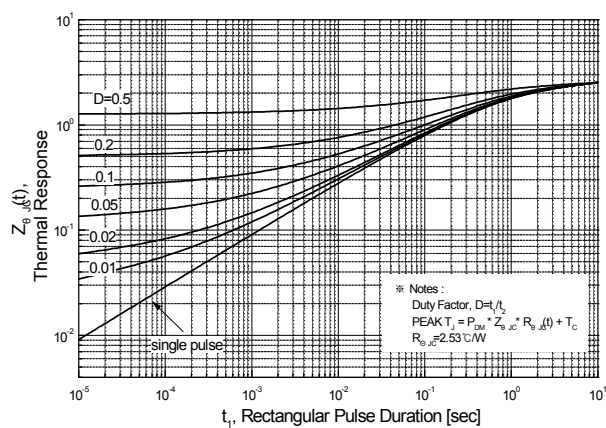
Fig.11 Transient Thermal Response Curve
MDP16N50G (TO-220)Fig.12 Single Pulse Maximum Power
Dissipation MDP16N50G (TO-220)



**Fig.13 Maximum Safe Operating Area
MDF16N50G (TO-220F)**



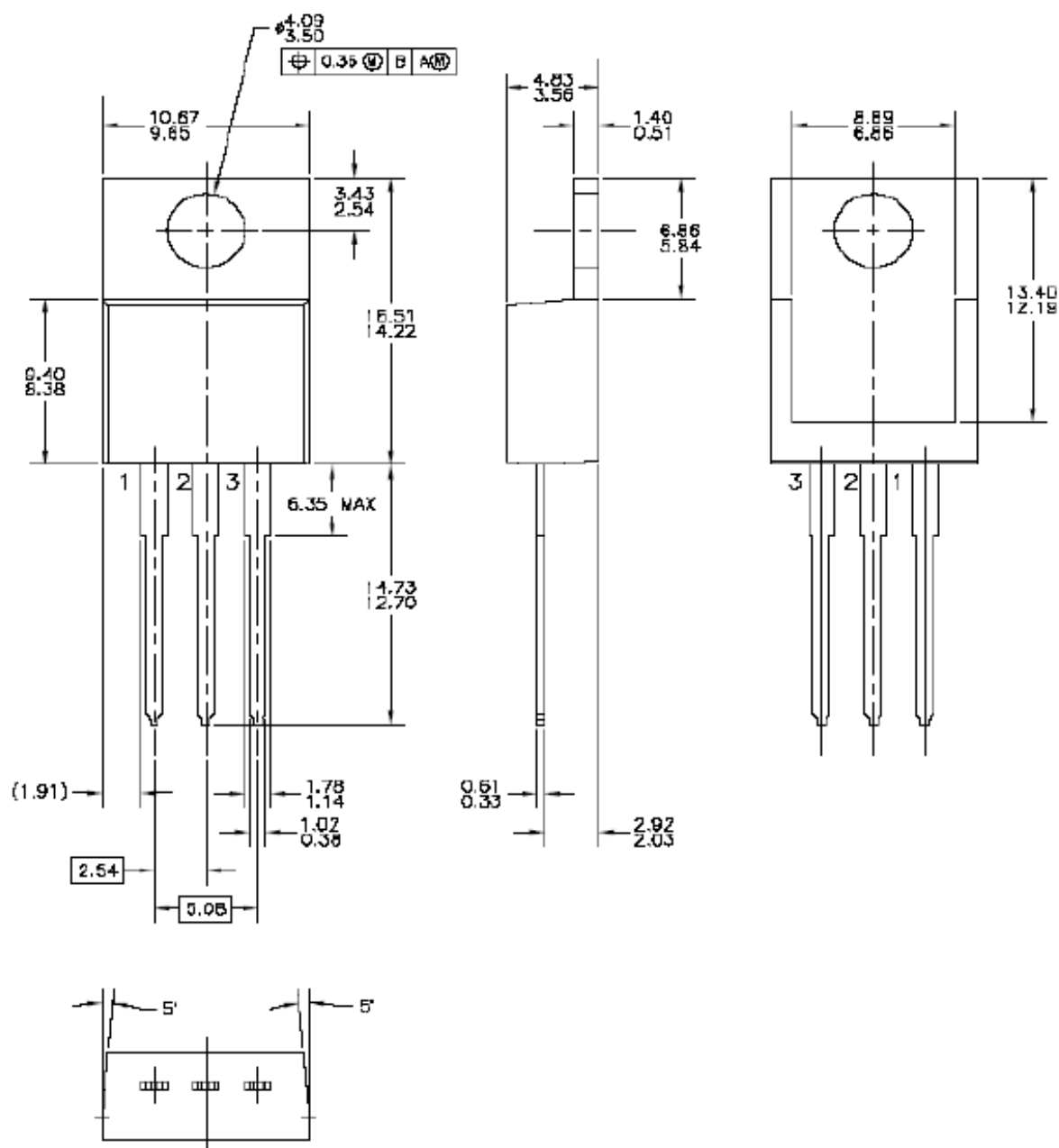
**Fig.12 Single Pulse Maximum Power
Dissipation MDF16N50G (TO-220F)**



**Fig.11 Transient Thermal Response Curve
MDF16N50G (TO-220F)**

Physical Dimensions

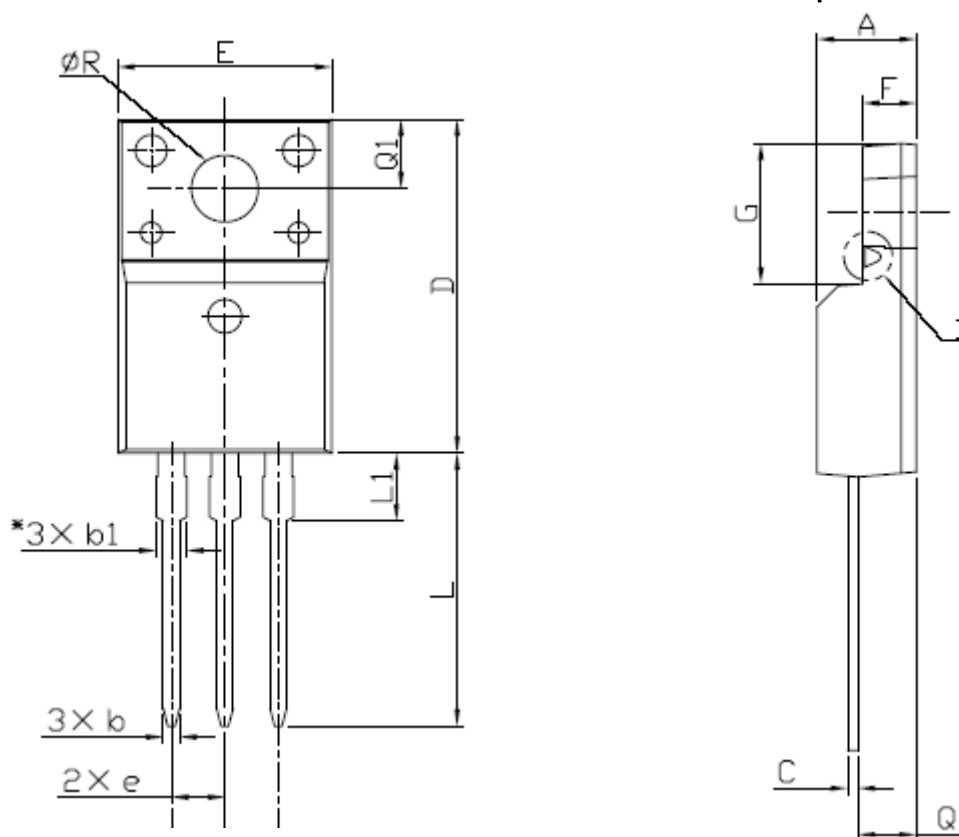
TO-220



Physical Dimensions

3 Leads, TO-220F

Dimensions are in millimeters unless otherwise specified



Symbol	Min	Nom	Max
A	4.50		4.93
b	0.63		0.91
b1	1.15		1.47
C	0.33		0.63
D	15.47		16.13
E	9.60		10.71
e		2.54	
F	2.34		2.84
G	6.48		6.90
L	12.24		13.72
L1	2.79		3.67
Q	2.52		2.96
Q1	3.10		3.50
Ø R	3.00		3.55

DISCLAIMER:

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