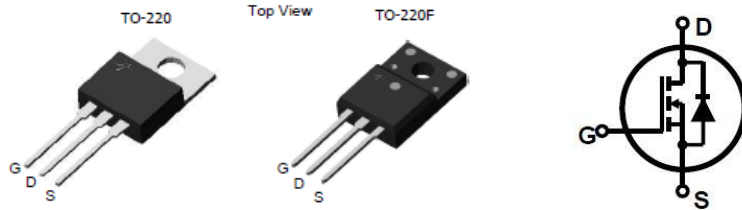


N-channel MOSFET

Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification

BV_{DSS}	I_D	$R_{DS(on)}$
500V	18A	< 0.3 Ω



Device	Package	Marking	Remark
TMP20N50A / TMPF20N50A	TO-220 / TO-220F	TMP20N50A / TMPF20N50A	RoHS
TMP20N50AG / TMPF20N50AG	TO-220 / TO-220F	TMP20N50AG / TMPF20N50AG	Halogen Free

Absolute Maximum Ratings

Parameter	Symbol	TMP20N50A(G)	TMPF20N50A(G)	Unit	
Drain-Source Voltage	V_{DSS}	500		V	
Gate-Source Voltage	V_{GS}	± 30		V	
Continuous Drain Current	I_D	$T_C = 25\text{ }^\circ\text{C}$	18	18 *	A
		$T_C = 100\text{ }^\circ\text{C}$	12.4	12.4 *	A
Pulsed Drain Current (Note 1)	I_{DM}	72	72 *	A	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	705		mJ	
Repetitive Avalanche Current (Note 1)	I_{AR}	18		A	
Repetitive Avalanche Energy (Note 1)	E_{AR}	29		mJ	
Power Dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	290	48	W
		Derate above 25 $^\circ\text{C}$	2.32	0.38	W/ $^\circ\text{C}$
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5		V/ns	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ\text{C}$	
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300		$^\circ\text{C}$	

* Limited only by maximum junction temperature

Thermal Characteristics

Parameter	Symbol	TMP20N50A(G)	TMPF20N50A(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.43	2.6	$^\circ\text{C}/\text{W}$
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics : $T_C=25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 400\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
Forward Gate-Source Leakage Current	I_{GSSF}	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

ON

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3	--	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 9\text{ A}$	--	0.25	0.30	Ω
Forward Transconductance ^(Note 4)	g_{FS}	$V_{DS} = 30\text{ V}, I_D = 9\text{ A}$	--	14	--	S

DYNAMIC

Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	2880	--	pF
Output Capacitance	C_{oss}		--	283	--	pF
Reverse Transfer Capacitance	C_{rss}		--	10	--	pF

SWITCHING

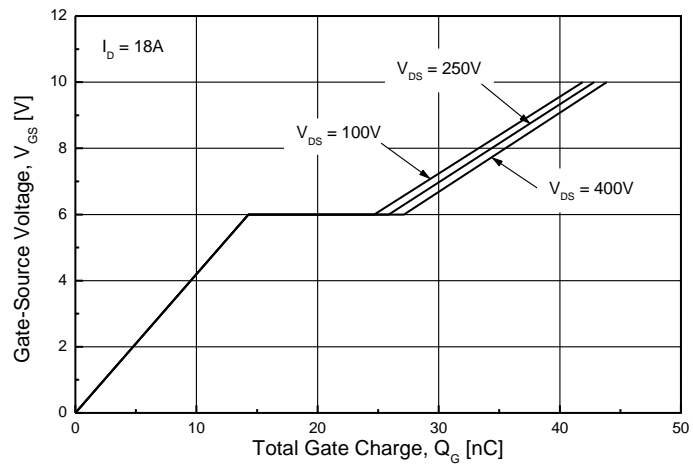
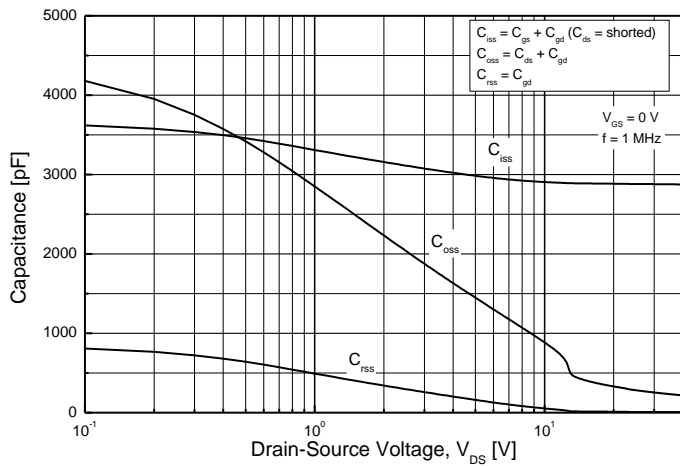
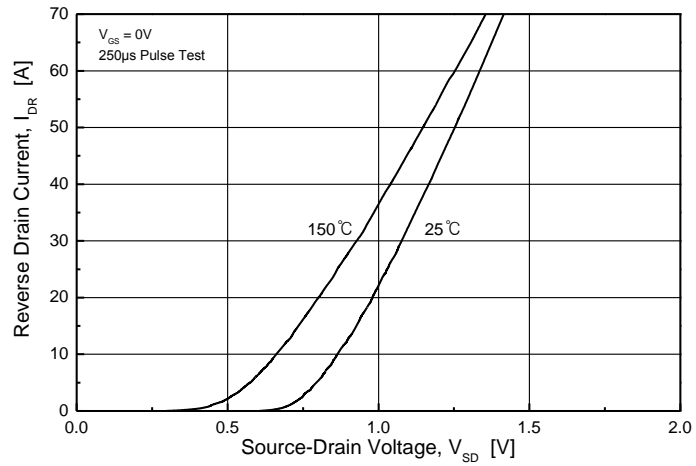
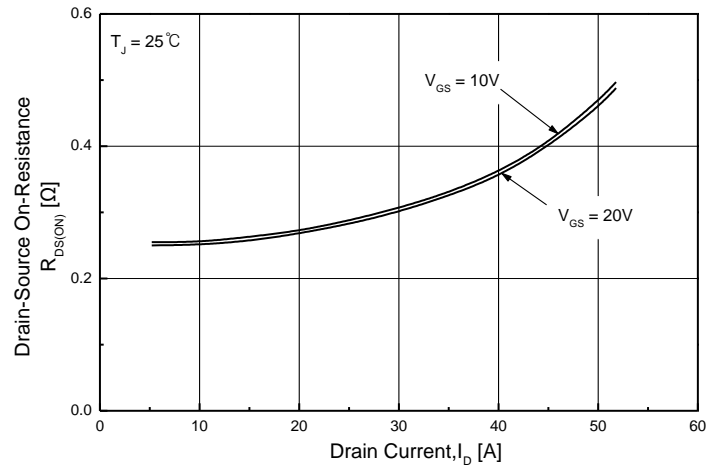
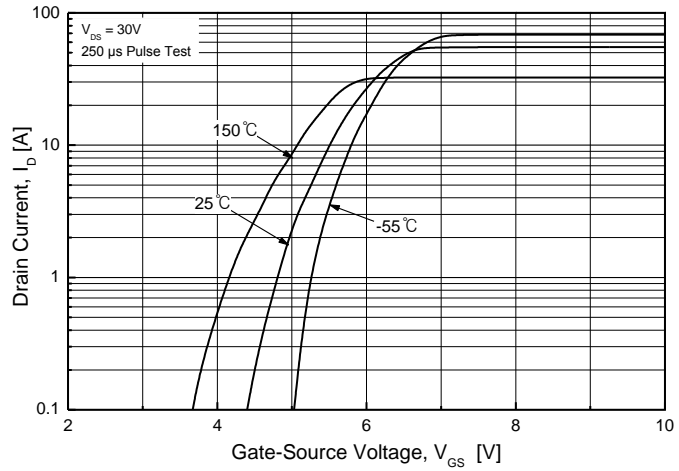
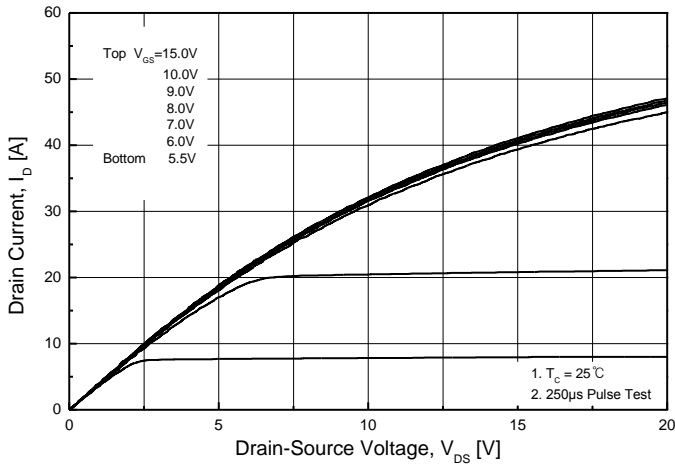
Turn-On Delay Time ^(Note 4,5)	$t_{d(on)}$	$V_{DD} = 250\text{ V}, I_D = 18\text{ A},$ $R_G = 25\ \Omega$	--	64	--	ns
Turn-On Rise Time ^(Note 4,5)	t_r		--	61	--	ns
Turn-Off Delay Time ^(Note 4,5)	$t_{d(off)}$		--	123	--	ns
Turn-Off Fall Time ^(Note 4,5)	t_f		--	38	--	ns
Total Gate Charge ^(Note 4,5)	Q_g	$V_{DS} = 400\text{ V}, I_D = 18\text{ A},$ $V_{GS} = 10\text{ V}$	--	44	--	nC
Gate-Source Charge ^(Note 4,5)	Q_{gs}		--	14	--	nC
Gate-Drain Charge ^(Note 4,5)	Q_{gd}		--	13	--	nC

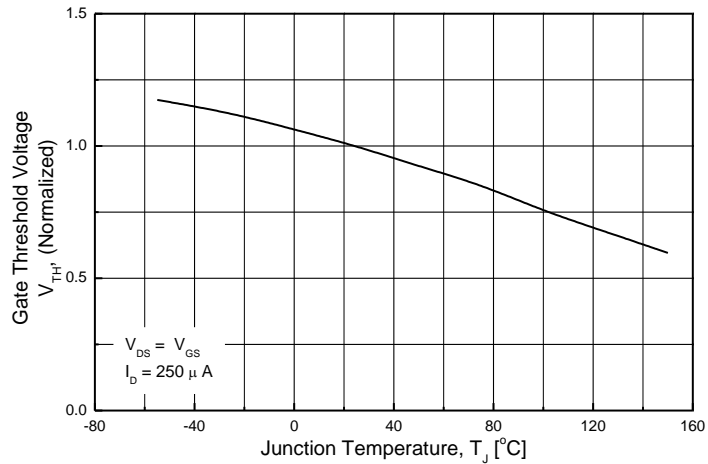
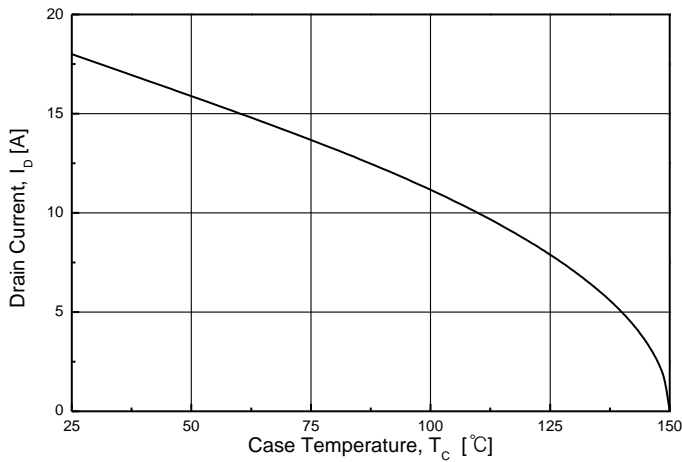
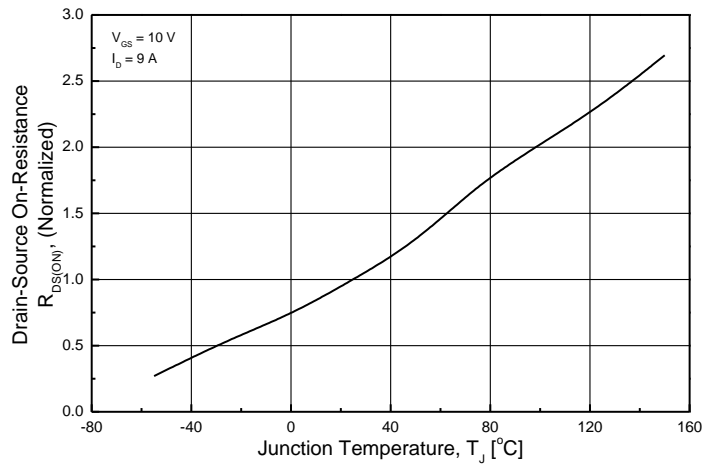
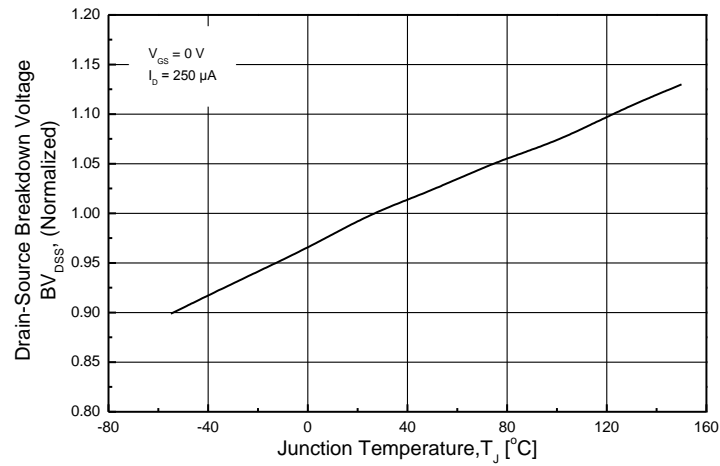
SOURCE DRAIN DIODE

Maximum Continuous Drain-Source Diode Forward Current	I_S	---	--	--	18	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	--	--	72	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 18\text{ A}$	--	--	1.5	V
Reverse Recovery Time ^(Note 4)	t_{rr}	$V_{GS} = 0\text{ V}, I_S = 18\text{ A}$ $di_F / dt = 100\text{ A}/\mu\text{s}$	--	421	--	ns
Reverse Recovery Charge ^(Note 4)	Q_{rr}		--	5.9	--	μC

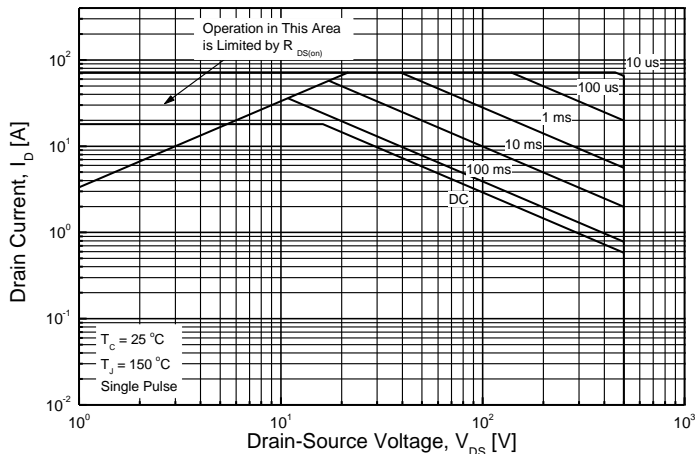
Note :

1. Repeated rating : Pulse width limited by safe operating area
2. $L=4.6\text{mH}, I_{AS} = 18\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega,$ Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 18\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DS},$ Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s},$ Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics

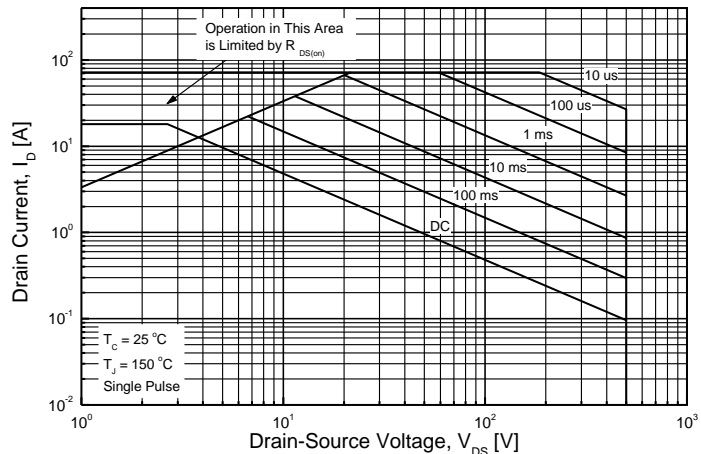


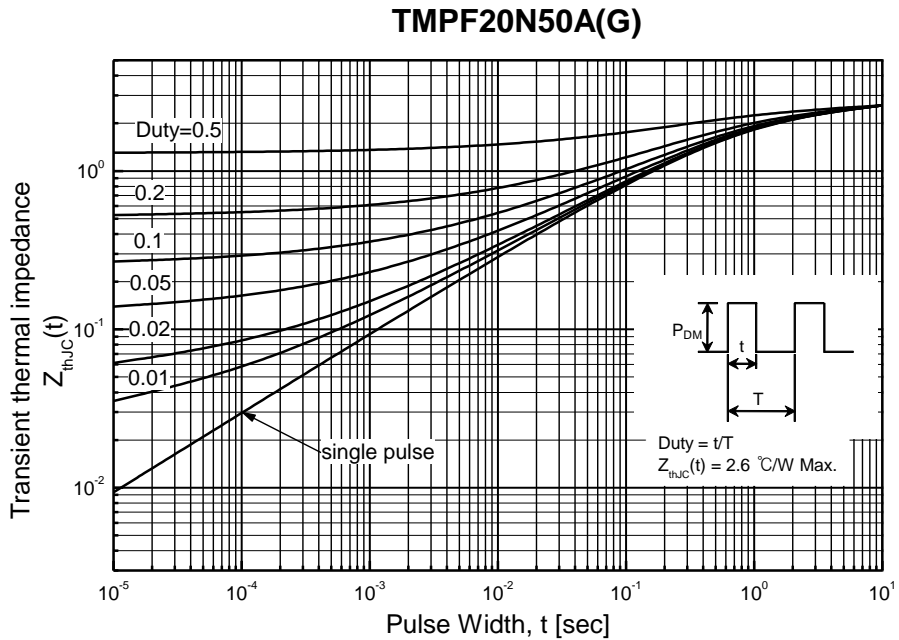
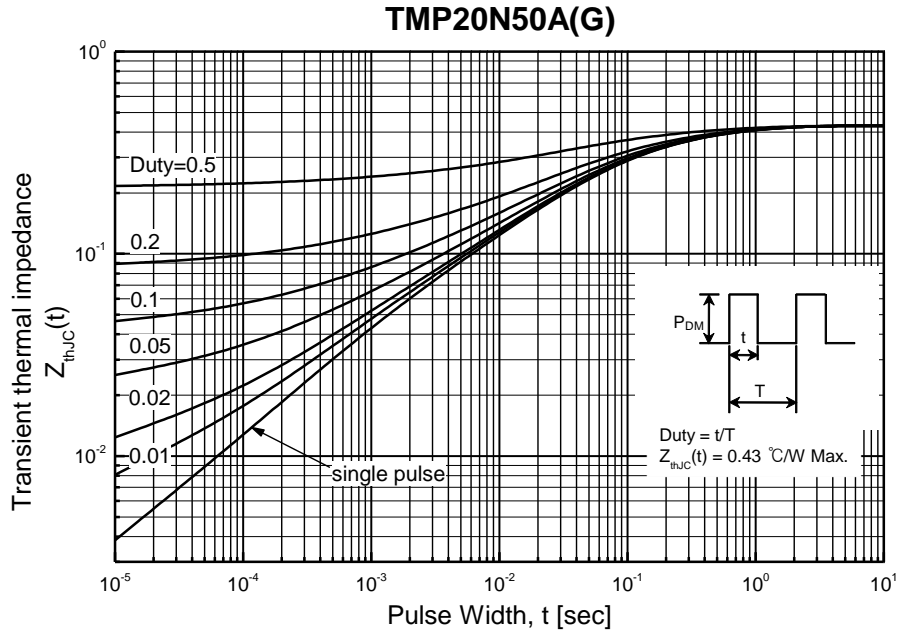


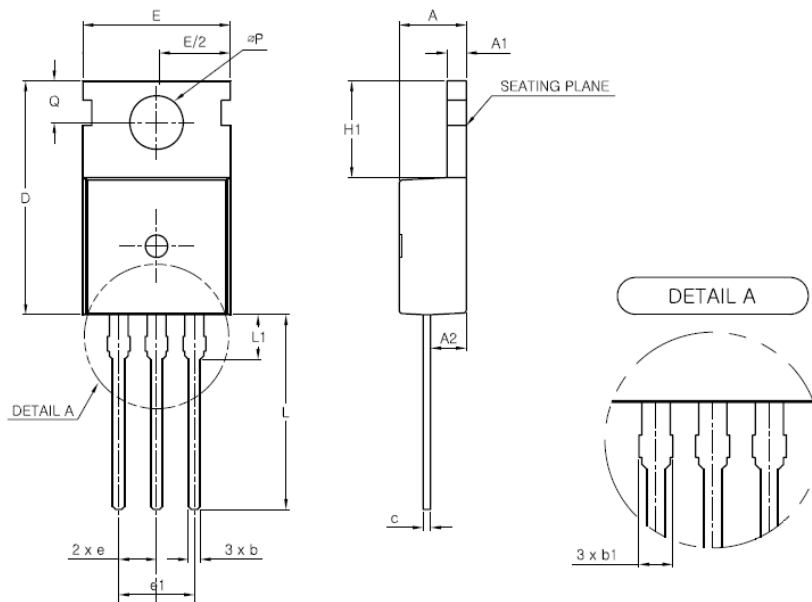
TMP20N50A(G)



TMPF20N50A(G)

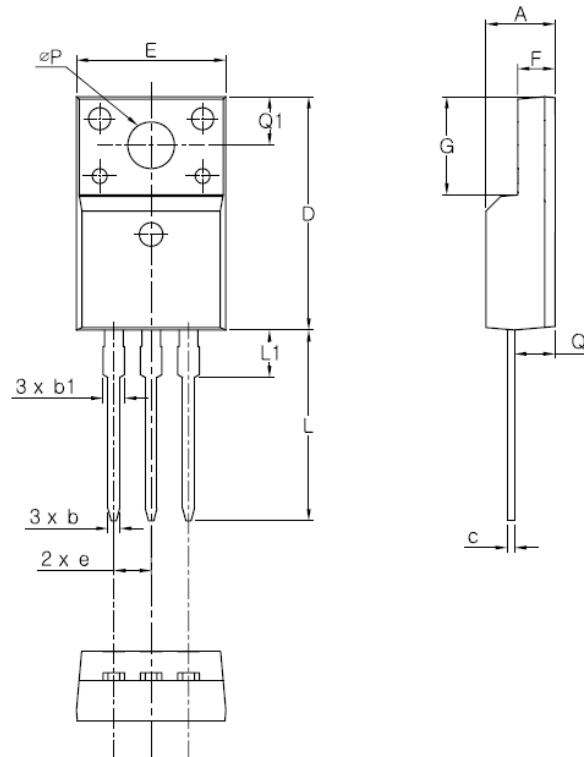




TO-220AB-3L MECHANICAL DATA


SYMBOL	MIN	MAX
A	4.30	4.70
A1	1.22	1.40
A2	2.20	2.79
b	0.70	0.91
b1	1.15	1.62
c	0.36	0.60
D	14.99	15.90
E	9.70	10.41
e	2.54 TYP	
e1	5.08 BSC	
H1	5.97	6.70
L	12.88	13.97
L1	3.31	3.81
ØP	3.40	3.88
Q	2.60	2.90

TO-220F-3L MECHANICAL DATA



SYMBOL	MIN	MAX
A	4.50	4.93
b	0.70	0.91
b1	1.15	1.47
c	0.36	0.60
D	15.67	16.07
E	6.96	10.36
e	2.54 BSC	
F	2.34	2.74
G	6.48	6.90
L	12.37	13.18
L1	2.23	3.43
Q	2.56	2.96
Q1	3.10	3.50
ØP	2.98	3.38

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