



JMP(C.F.K.I)6N70C

Description

JMP N-channel MOSFET

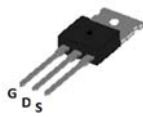
Features

- 700V, 6A
- $R_{DS(ON)} = 1.4\Omega$ (Typ.) @ $V_{GS} = 10V, I_D = 3A$
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

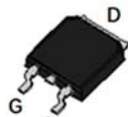
Package



TO-220C
JMPC6N70C



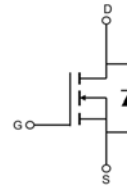
TO-220F
JMPC6N70C



TO-252
JMPK6N70C



TO-251S
JMPC6N70C



Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Max.		Units	
		TO-220F	TO-220C/252/251S		
V_{DSS}	Drain-Source Voltage	700		V	
V_{GSS}	Gate-Source Voltage	± 30		V	
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	6	A	
		$T_C = 100^\circ\text{C}$	4	A	
I_{DM}	Pulsed Drain Current ^{note1}	24		A	
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	115		mJ	
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	63	97	W
			1.98	1.29	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	60	$^\circ\text{C}/\text{W}$	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		$^\circ\text{C}$	



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Electrical Characteristics (T_C=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	700	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 700V, V _{GS} = 0V, T _J = 25°C	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±30V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	-	4.0	V
R _{DSON}	Static Drain-Source On-Resistance <small>note3</small>	V _{GS} = 10V, I _D = 3A	-	1.4	1.6	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	891	-	pF
C _{oss}	Output Capacitance		-	110	-	pF
C _{rss}	Reverse Transfer Capacitance		-	14	-	pF
Q _g	Total Gate Charge	V _{DD} = 560V, I _D = 6A, V _{GS} = 10V	-	22	-	nC
Q _{gs}	Gate-Source Charge		-	4.3	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	13	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 350V, I _D = 6A, R _G = 25Ω	-	15	-	ns
t _r	Turn-On Rise Time		-	18	-	ns
t _{d(off)}	Turn-Off Delay Time		-	80	-	ns
t _f	Turn-Off Fall Time		-	35	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	6	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	24	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _{SD} = 6A, T _J = 25°C	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _S = 6A, di/dt = 100A/μs	-	300	-	ns
Q _{rr}	Reverse Recovery Charge		-	4.1	-	μC

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. I_{AS} = 4.5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%



Typical Performance Characteristics

Figure 1: Output Characteristics

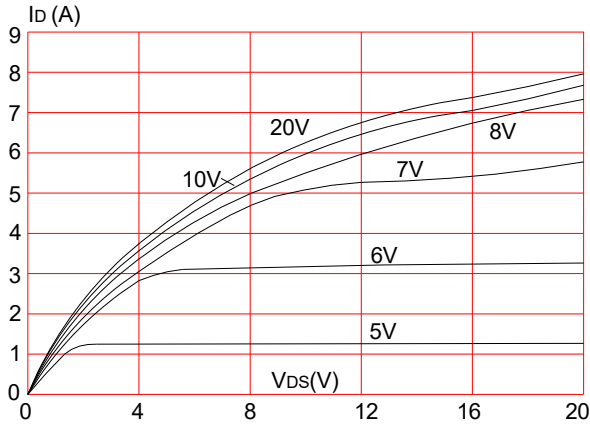


Figure 2: Typical Transfer Characteristics

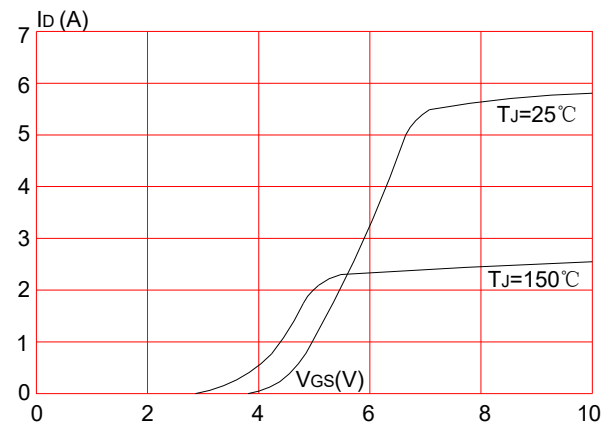


Figure 3: On-resistance vs. Drain Current

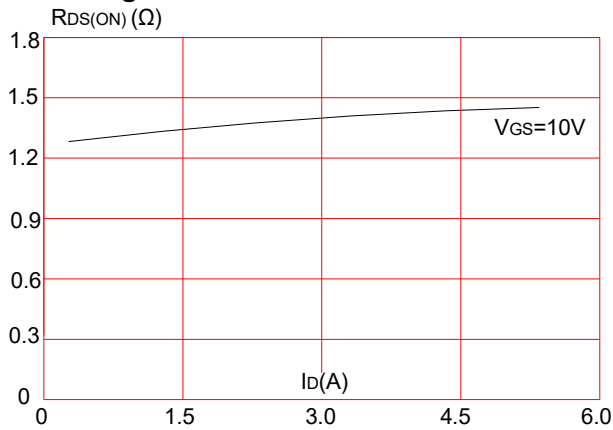


Figure 4: Body Diode Characteristics

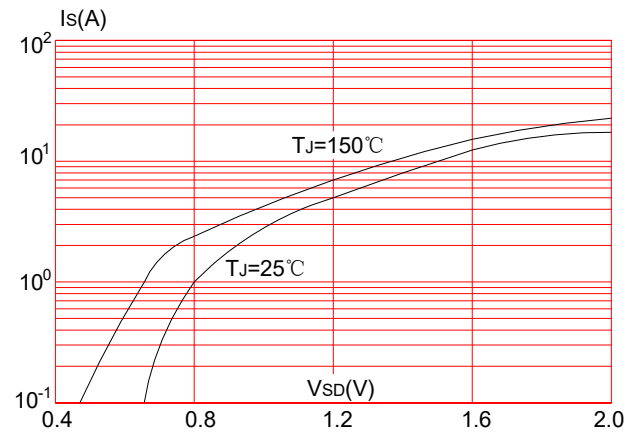


Figure 5: Gate Charge Characteristics

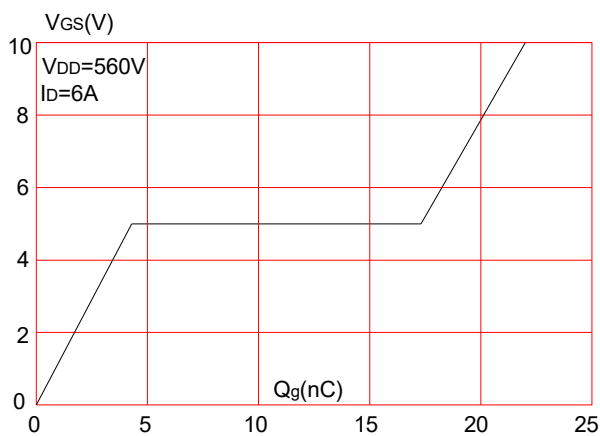
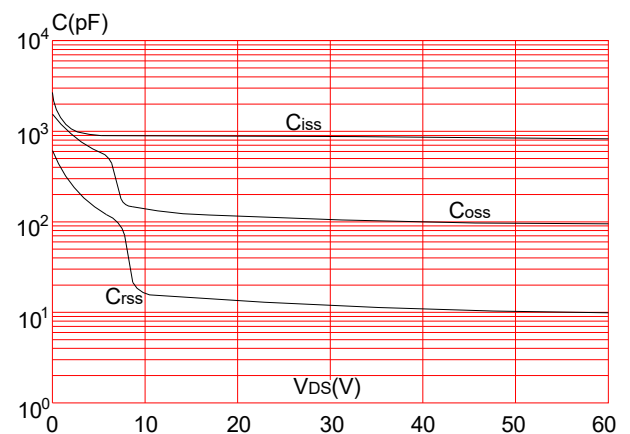


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

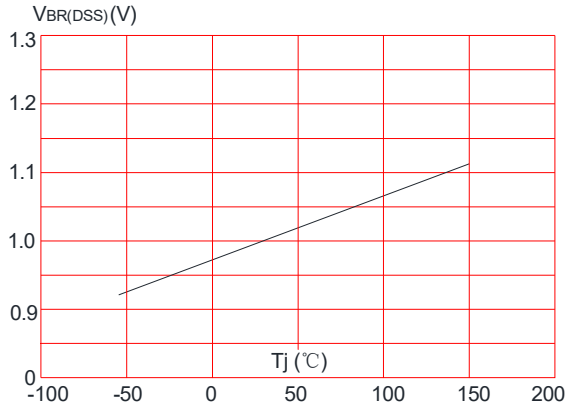


Figure 8: Normalized on Resistance vs. Junction Temperature

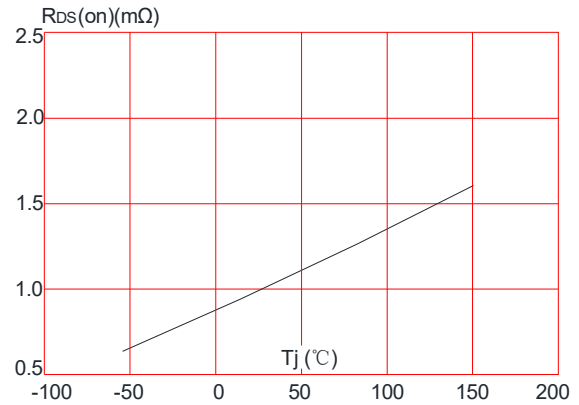


Figure 9: Maximum Safe Operating Area

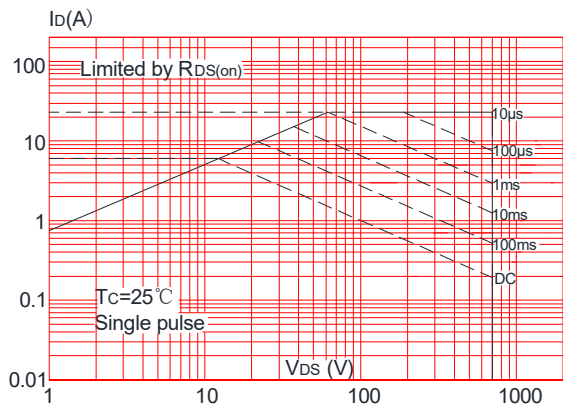


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

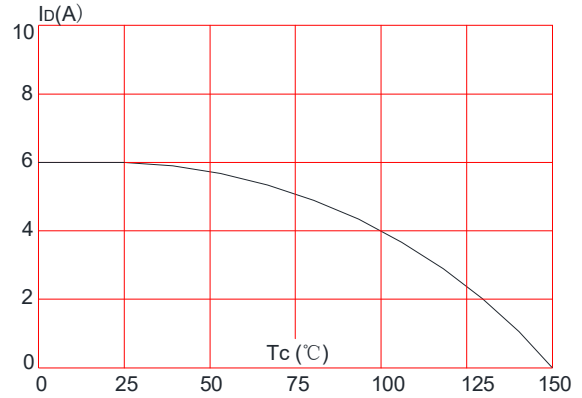


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220F)

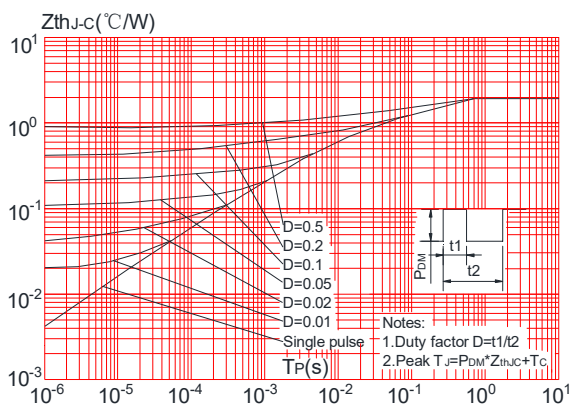
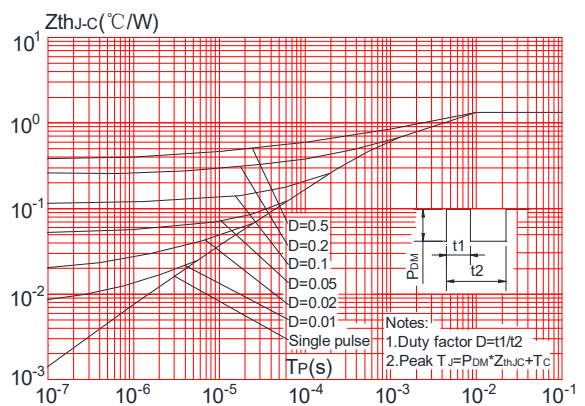


Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Ambie (TO-220C, TO-252, TO-251S)



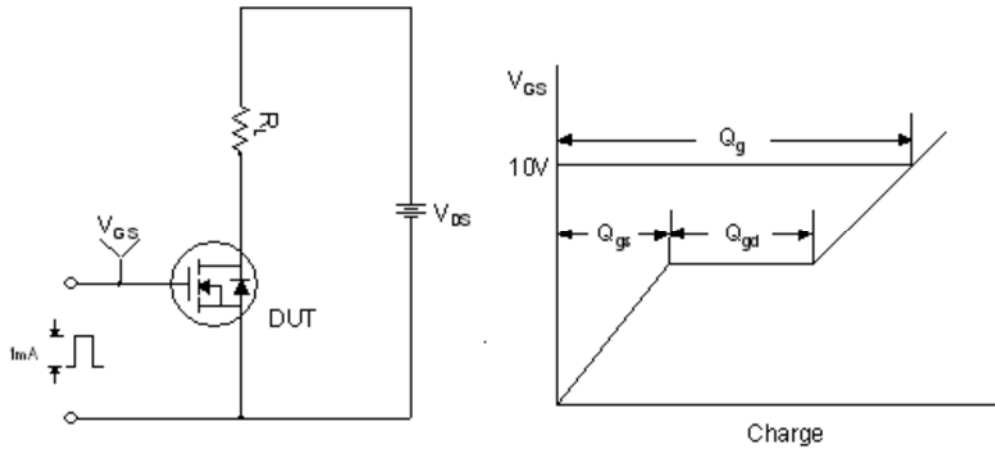


Figure 1. Gate Charge Test Circuit & Waveform

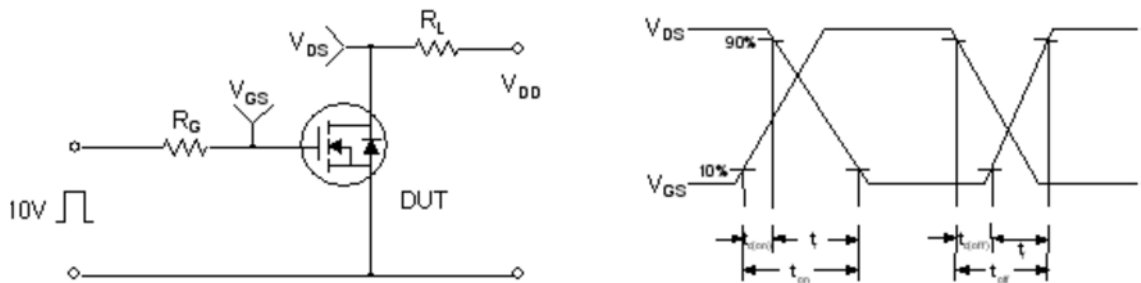


Figure 2. Resistive Switching Test Circuit & Waveforms

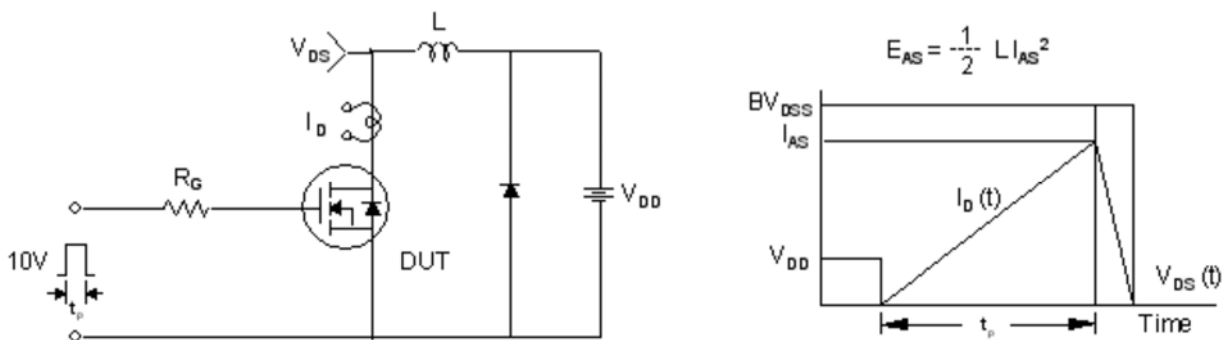


Figure 3. Unclamped Inductive Switching Test Circuit & Waveforms

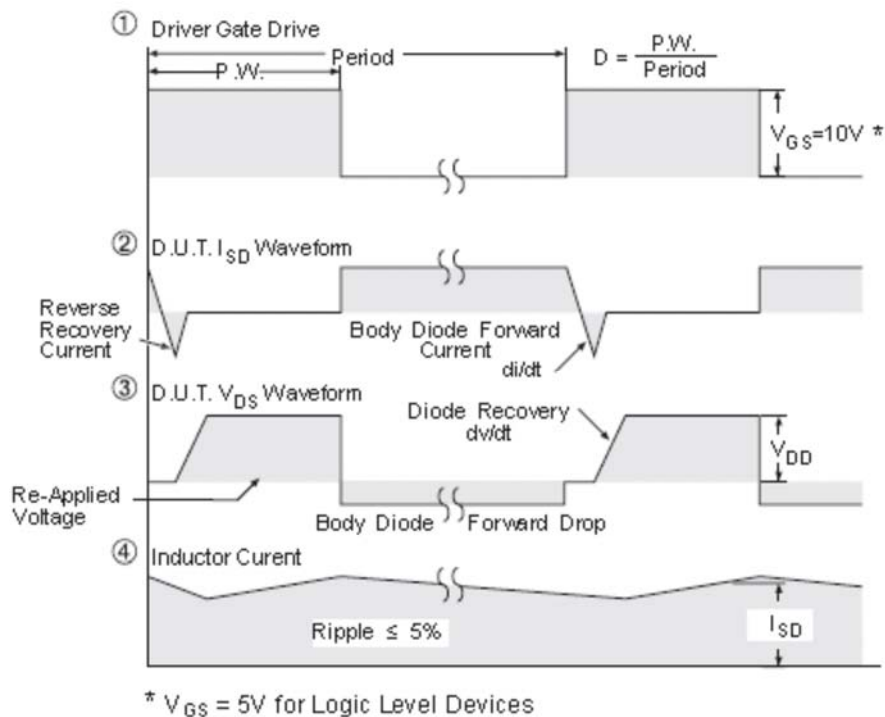
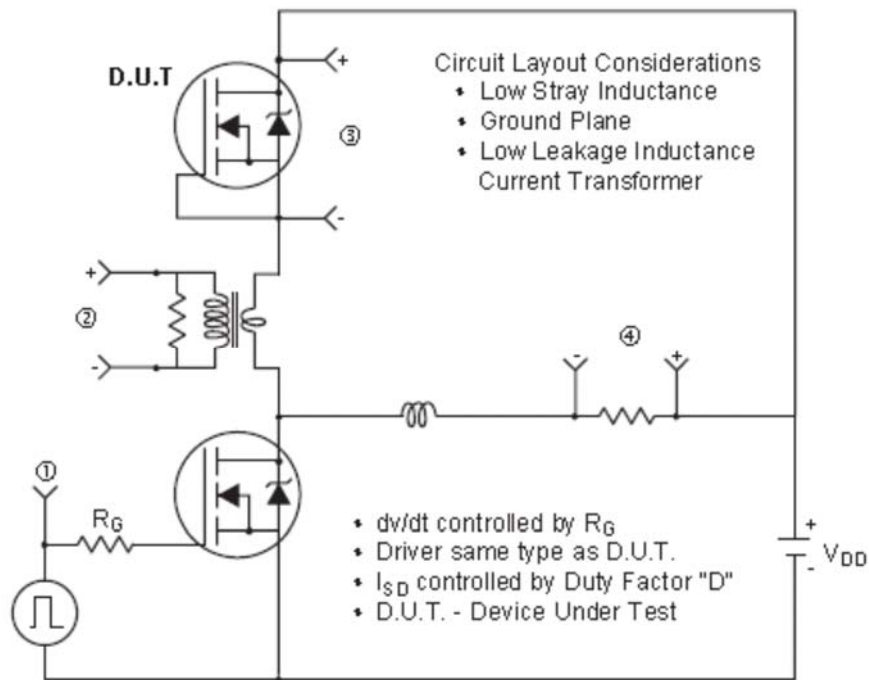
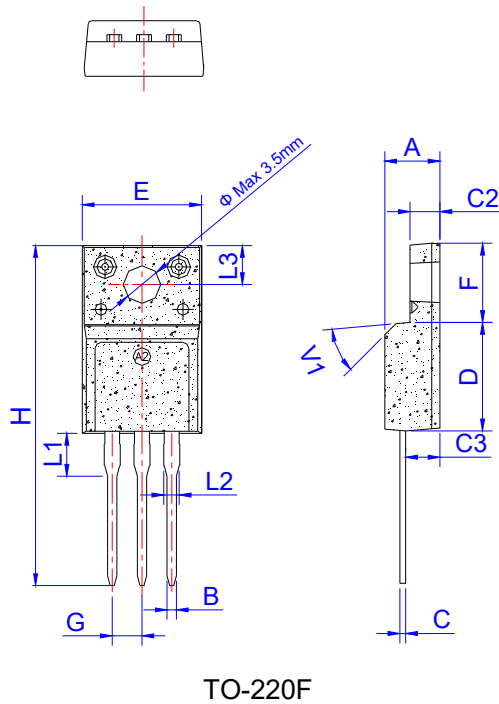


Figure 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)



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Package Mechanical Data



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

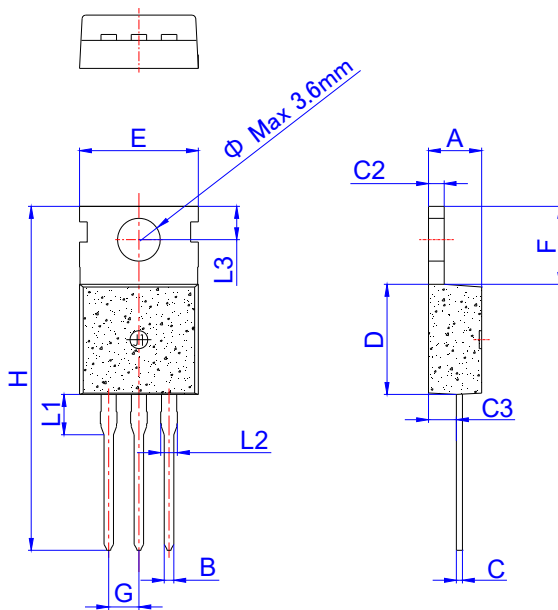
Package Information -TO-220F

OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON (PCS)
TUBE	50	1,000	8,000



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Package Mechanical Data



TO-220C

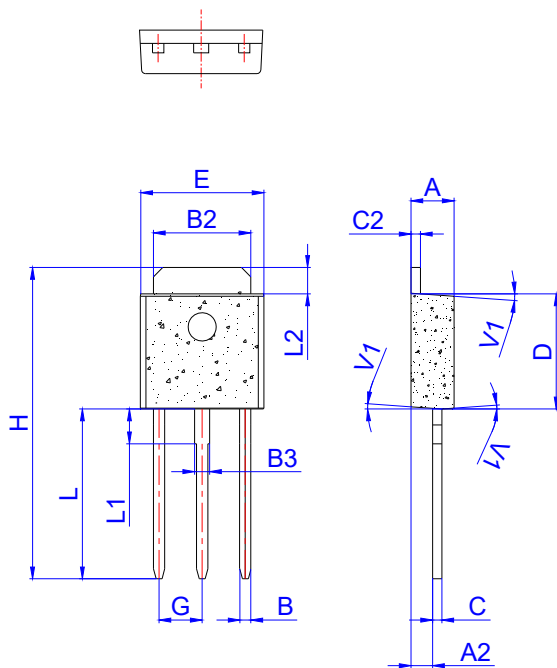
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

Package Information -TO-220C

OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON (PCS)
TUBE	50	1,000	8,000



Package Mechanical Data



TO-251

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.095
A2	0.90		1.20	0.035		0.047
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
B3	0.76		0.85	0.030		0.033
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.70	0.252		0.264
G		2.30			0.091	
H	16.0		17.0	0.630		0.669
L	8.90		9.40	0.350		0.370
L1	1.80		1.90	0.071		0.075
L2	1.37		1.50	0.054		0.059
V1		4°			4°	

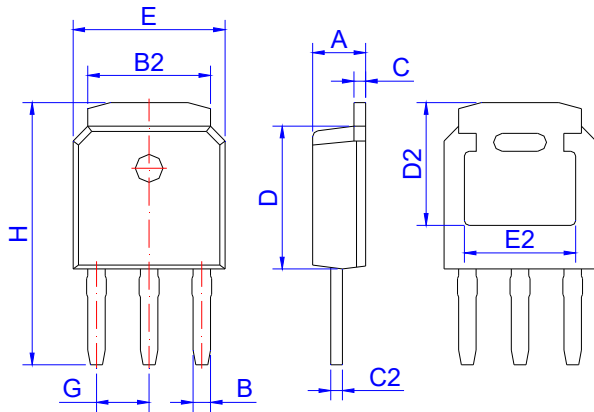
Package Information -TO-251

OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON (PCS)
TUBE	80	4,000	32,000



JMP(C.F.K.I)6N70C

Package Mechanical Data



TO-251S

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10	2.30	2.50	0.083	0.091	0.098
B	0.66	0.76	0.86	0.026	0.030	0.034
B2	5.15	5.33	5.48	0.203	0.210	0.216
C	0.44	0.51	0.58	0.017	0.020	0.023
C2	0.44	0.51	0.58	0.017	0.020	0.023
D	5.90	6.10	6.30	0.232	0.240	0.248
D2	5.30 REF			0.209 REF		
E	6.40	6.60	6.80	0.252	0.260	0.268
E2	4.83 REF			0.190 REF		
G	2.19	2.29	2.39	0.086	0.090	0.094
H	10.60	11.20	11.80	0.417	0.441	0.465

Package Information-TO-251S

OUTLINE	TUBE (PCS)	INNER BOX (PCS)	PER CARTON (PCS)
TUBE	80	4,000	32,000

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