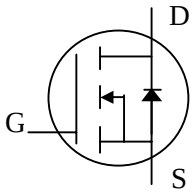
N-channel Enhancement-mode Power MOSFET

Dynamic dv/dt Rating

Repetitive Avalanche Rated

Fast Switching Performance

RoHS-compliant, halogen-free

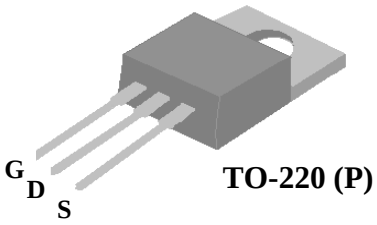


BV_{DSS}	400V
$R_{DS(ON)}$	1.0Ω
I_D	5.5A

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The AP730P-HF-3 is in the TO-220 package, which is widely used for commercial and industrial applications, and is well-suited for high voltage applications such as switch mode power supplies, DC-AC converters and high-current high-speed switching circuits.



TO-220 (P)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	400	V
V_{GS}	Gate-Source Voltage	±30	V
I_D at T_C=25°C	Continuous Drain Current	5.5	A
I_D at T_C=100°C	Continuous Drain Current	3.5	A
I_{DM}	Pulsed Drain Current[1]	23	A
P_D at T_C=25°C	Total Power Dissipation	74	W
	Linear Derating Factor	0.59	W/°C
E_{AS}	Single Pulse Avalanche Energy[2]	260	mJ
I_{AR}	Avalanche Current	5.5	A
E_{AR}	Repetitive Avalanche Energy	7	mJ
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance Junction-case	1.7	°C/W
Rthj-a	Maximum Thermal Resistance Junction-ambient	62	°C/W

Ordering Information

AP730P-HF-3TB **RoHS-compliant halogen-free TO-220, shipped in tubes**

Electrical Specifications at T_j=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	400	-	-	V
$\Delta BV_{DSS}/\Delta Tj$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=1mA	-	0.36	-	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=2.75A	-	-	1	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=2.75A	-	30	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=400V, V_{GS}=0V	-	-	10	uA
	Drain-Source Leakage Current (T_j=150°C)	V_{DS}=320V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= ± 30V	-	-	±100	nA
Q_g	Total Gate Charge[3]	I_D=5.5A	-	35	-	nC
Q_{gs}	Gate-Source Charge	V_{DS}=320V	-	3.7	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	20	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=200V	-	8	-	ns
t_r	Rise Time	I_D=5.5A	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω , V_{GS}=10V	-	47	-	ns
t_f	Fall Time	R_D=36Ω	-	18	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	565	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	70	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	38	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)	V_D=V_G=0V , V_S=1.5V	-	-	5.5	A
I_{SM}	Pulsed Source Current (Body Diode)[1]		-	-	23	A
V_{SD}	Forward On Voltage[3]	T_j=25°C, I_S=5.5A, V_{GS}=0V	-	-	1.5	V

Notes:

1.Pulse width limited by maximum junction temperature.

2.Starting T_j =25°C, V_{DD}=50V, L=15mH , R_G=25Ω , I_{AS}=5.5A.

2.Pulse test - pulse width ≤ 300μs , duty cycle ≤ 2%

Typical Electrical Characteristics

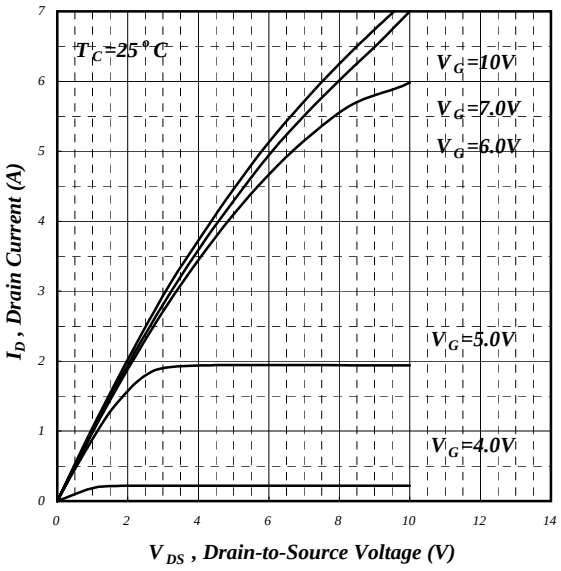


Fig 1. Typical Output Characteristics

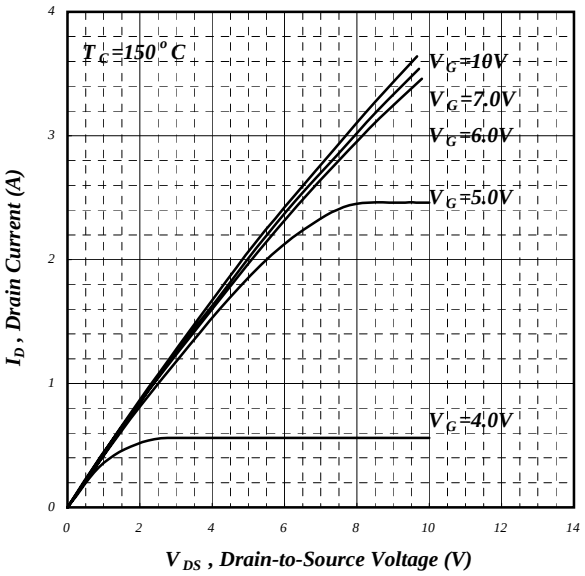


Fig 2. Typical Output Characteristics

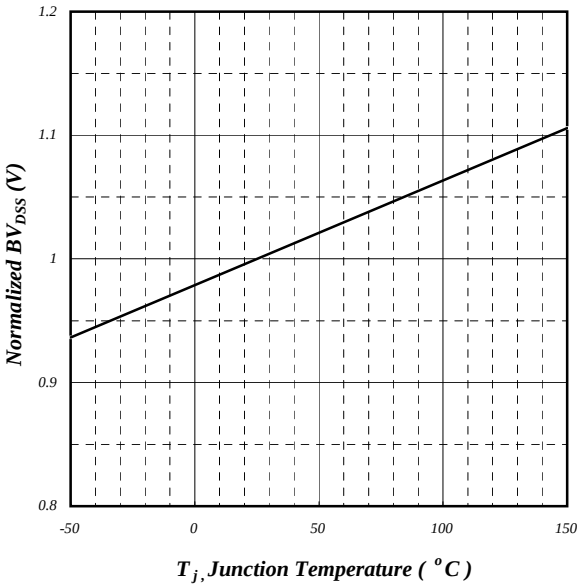


Fig 3. Normalized BV_{DSS} vs. Junction Temperature

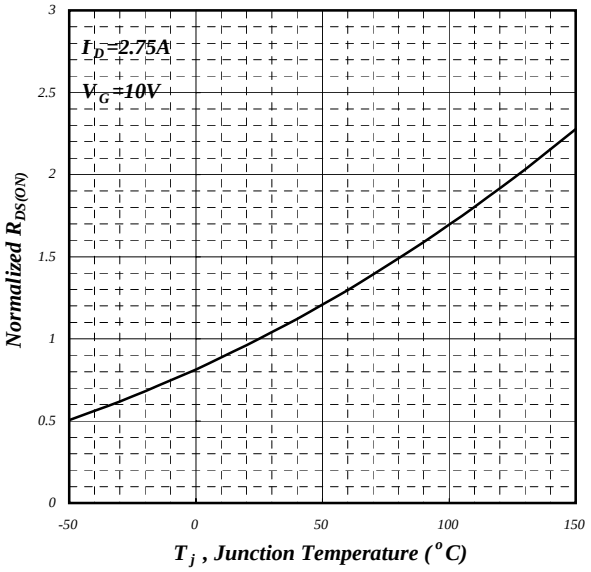


Fig 4. Normalized On-Resistance v.s. Junction Temperature

Typical Electrical Characteristics (cont.)

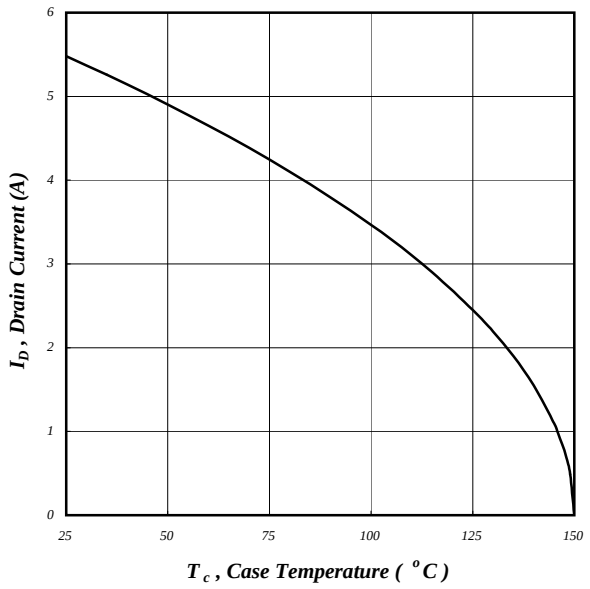


Fig 5. Maximum Drain Current vs. Case Temperature

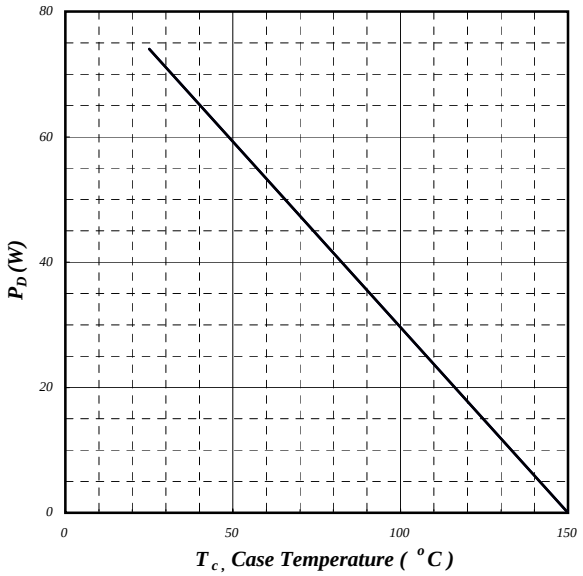


Fig 6. Typical Power Dissipation

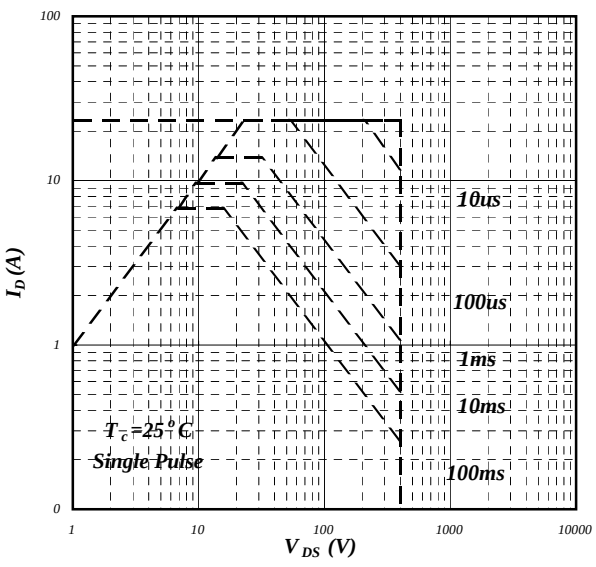


Fig 7. Maximum Safe Operating Area

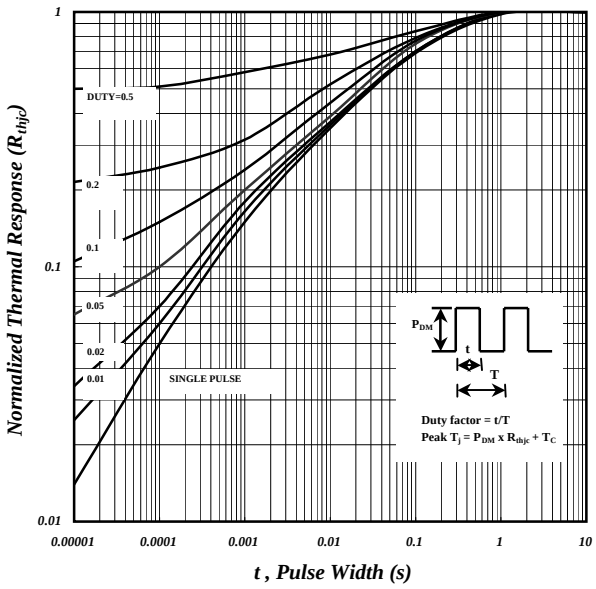


Fig 8. Effective Transient Thermal Impedance

Typical Electrical Characteristics (cont.)

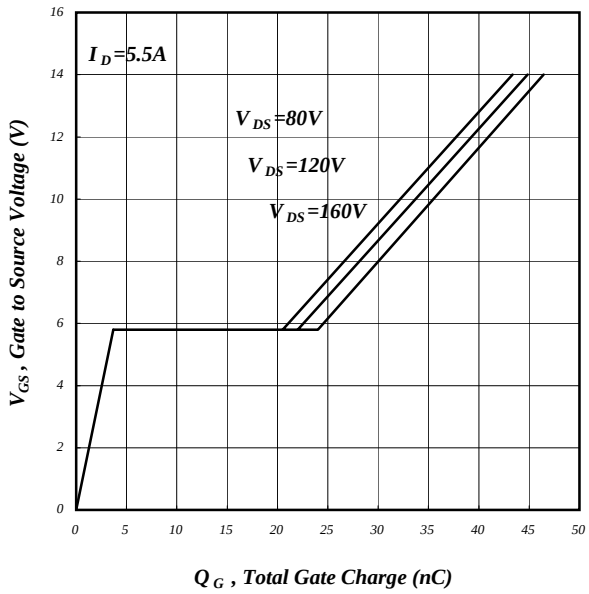


Fig 9. Gate Charge Characteristics

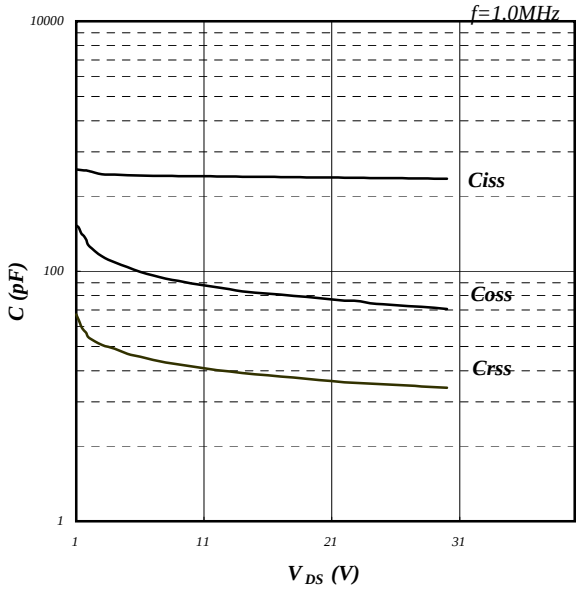


Fig 10. Typical Capacitance Characteristics

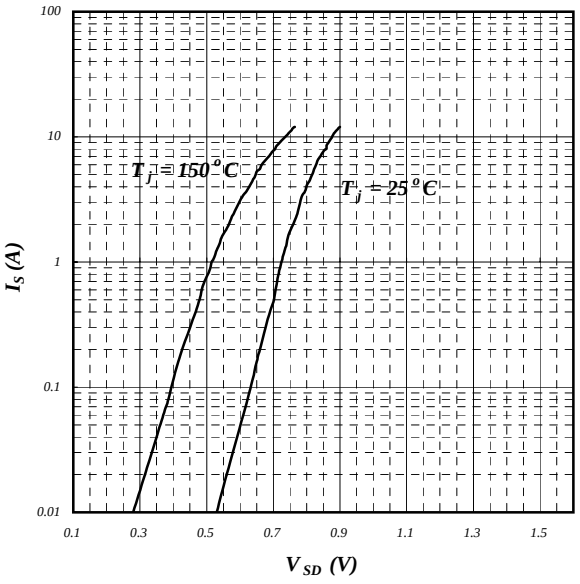


Fig 11. Forward Characteristic of Reverse Diode

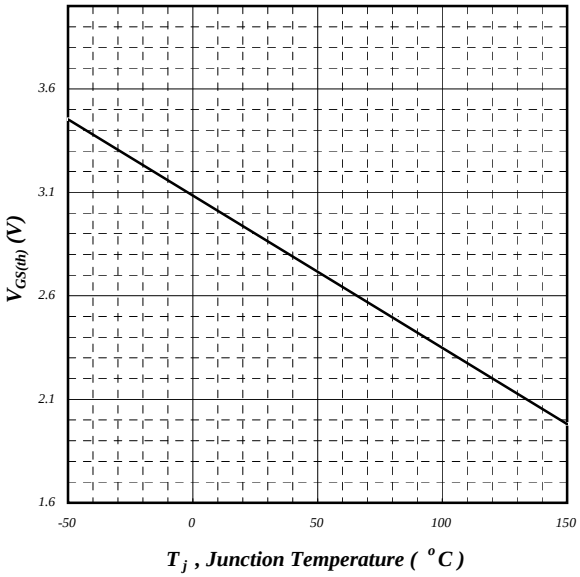


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

Typical Electrical Characteristics (cont.)

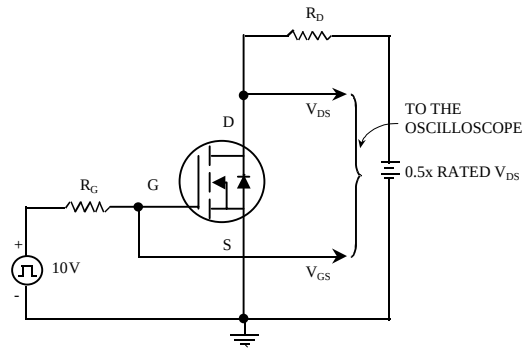


Fig 13. Switching Time Circuit

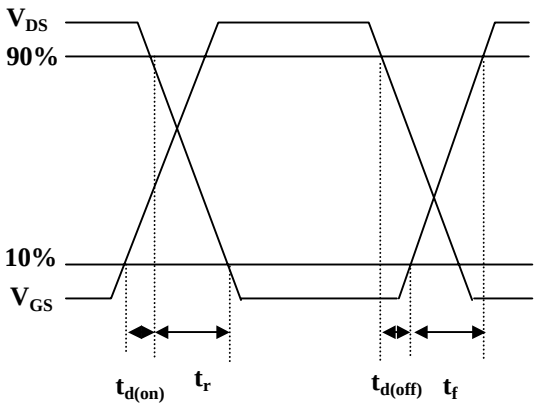


Fig 14. Switching Time Waveform

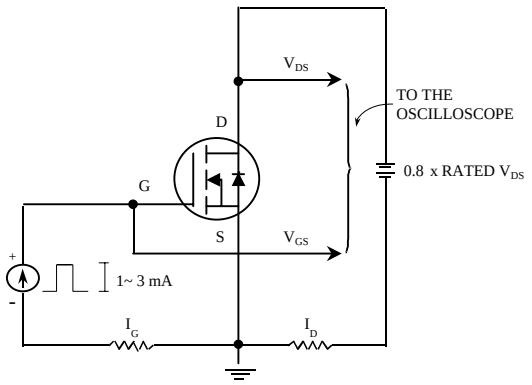


Fig 15. Gate Charge Circuit

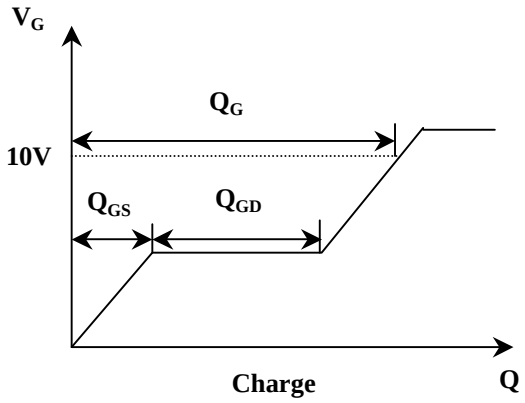
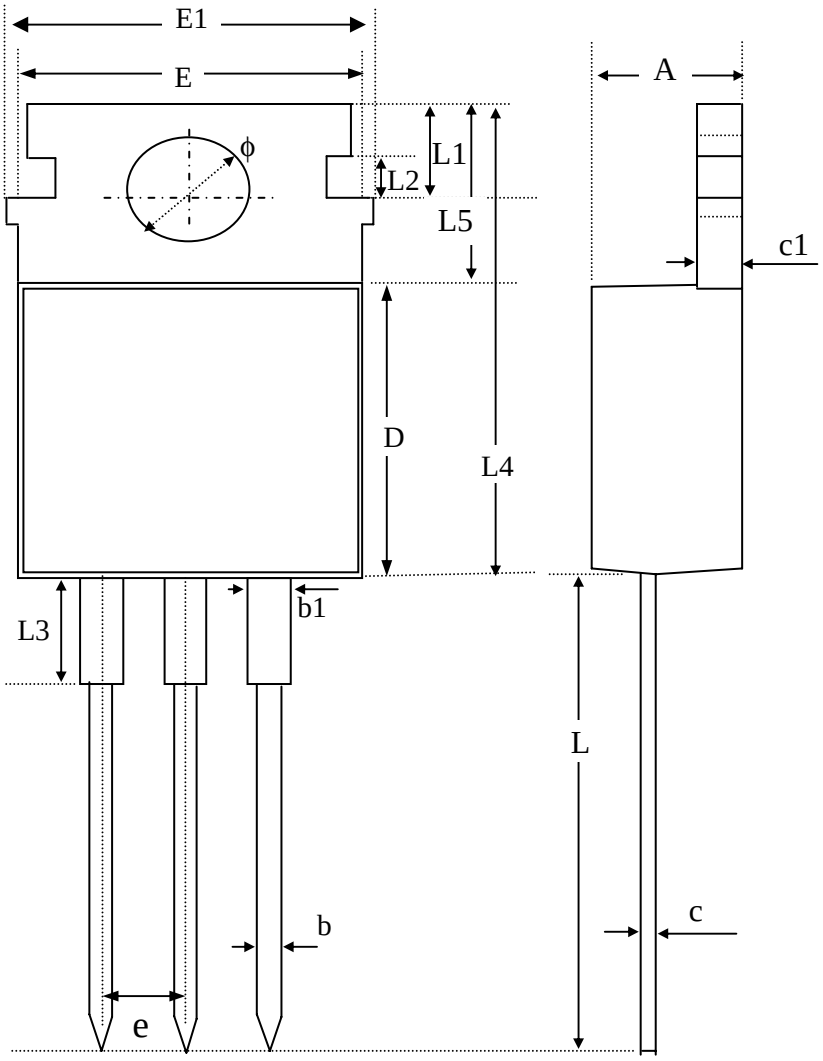


Fig 16. Gate Charge Waveform

Package Dimensions: TO-220



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.48	4.70
b	0.65	0.80	0.90
b1	1.15	1.38	1.60
c	0.40	0.50	0.60
c1	1.00	1.20	1.40
E	9.70	10.00	10.40
E1	---	---	11.50
e	----	2.54	----
L	12.70	13.60	14.50
L1	2.60	2.80	3.00
L2	1.00	1.40	1.80
L3	2.6	3.10	3.6
L4	14.70	15.50	16
L5	6.30	6.50	6.70
ϕ	3.50	3.60	3.70
D	8.40	8.90	9.40

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information: TO-220