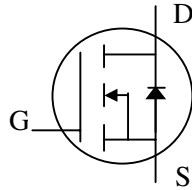




N-channel Enhancement-mode Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast Switching Performance
- RoHS-compliant, halogen-free

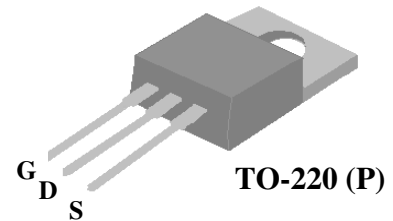


BV_{DSS}	400V
$R_{DS(ON)}$	1.0Ω
I_D	5.5A

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.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	400	V
V_{GS}	Gate-Source Voltage	±30	V
I_D at $T_C=25^\circ C$	Continuous Drain Current	5.5	A
I_D at $T_C=100^\circ C$	Continuous Drain Current	3.5	A
I_{DM}	Pulsed Drain Current ¹	23	A
P_D at $T_C=25^\circ C$	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 $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	400	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	-	0.36	-	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=2.75A$	-	-	1	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=2.75A$	-	30	-	S
I_{DSS}	Drain-Source Leakage Current ($T_j=25^\circ\text{C}$)	$V_{DS}=400V, V_{GS}=0V$	-	-	10	μA
	Drain-Source Leakage Current ($T_j=150^\circ\text{C}$)	$V_{DS}=320V, V_{GS}=0V$	-	-	100	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 30V$	-	-	± 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	$R_G=10\Omega, V_{GS}=10V$	-	47	-	ns
t_f	Fall Time	$R_D=36\Omega$	-	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	$f=1.0\text{MHz}$	-	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	$T_j=25^\circ\text{C}, I_S=5.5A, V_{GS}=0V$	-	-	1.5	V

Notes:

1. Pulse width limited by maximum junction temperature.
2. Starting $T_j=25^\circ\text{C}, V_{DD}=50V, L=15\text{mH}, R_G=25\Omega, I_{AS}=5.5A$.
2. Pulse test - pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

APEC RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.



Typical Electrical Characteristics

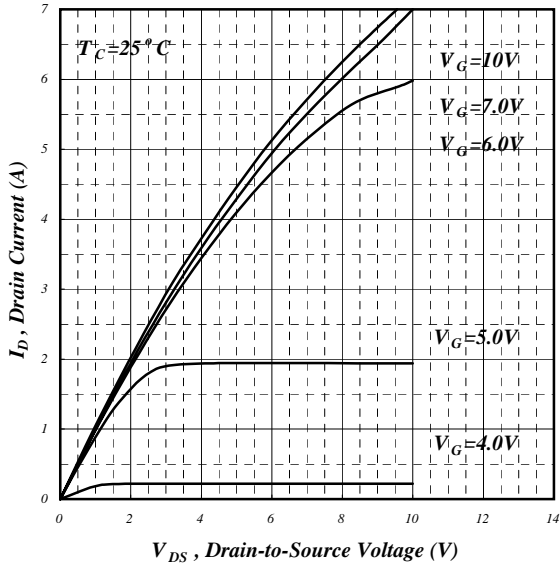


Fig 1. Typical Output Characteristics

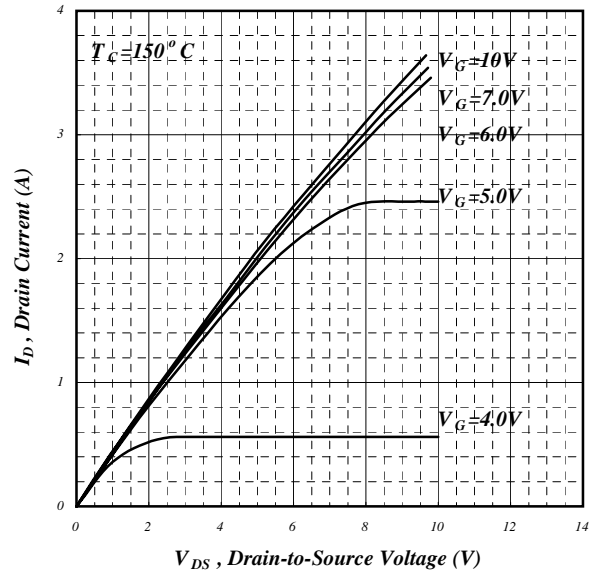


Fig 2. Typical Output Characteristics

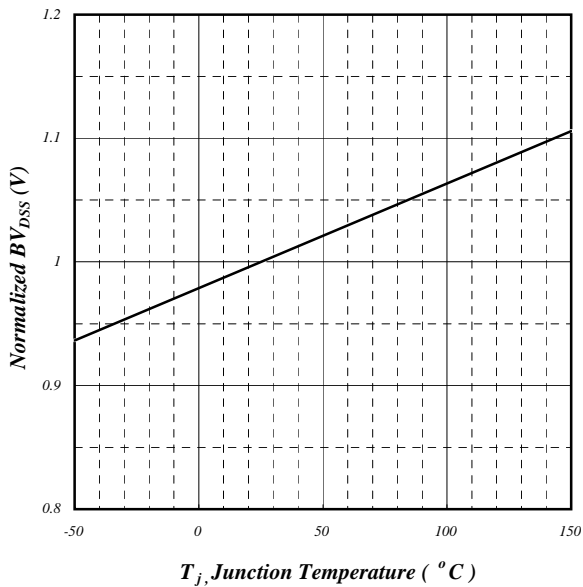


Fig 3. Normalized BV_{DS} vs.
Junction Temperature

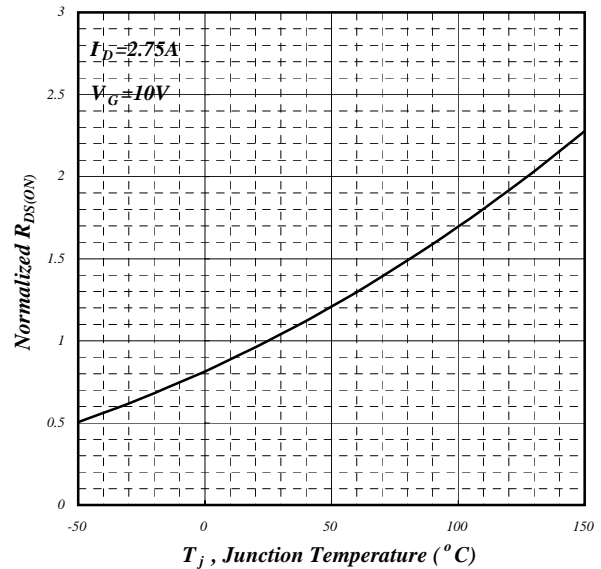


Fig 4. Normalized On-Resistance
v.s. Junction Temperature



Typical Electrical Characteristics (cont.)

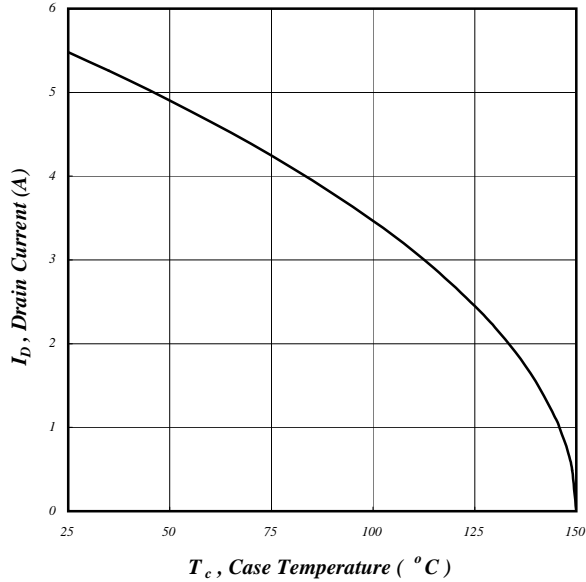


Fig 5. Maximum Drain Current vs. Case Temperature

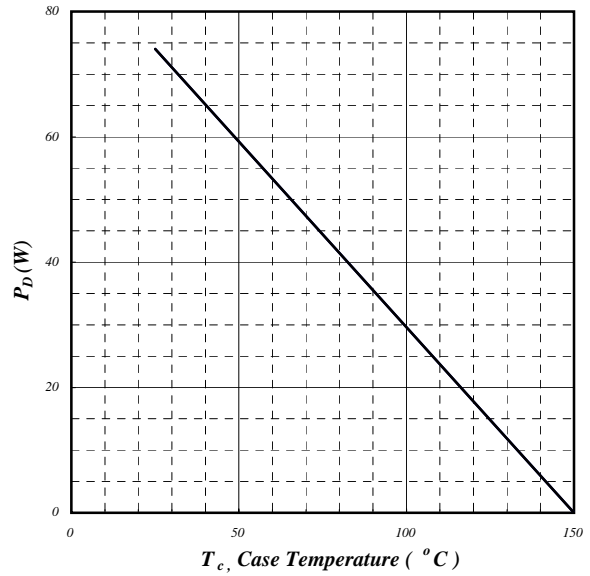


Fig 6. Typical Power Dissipation

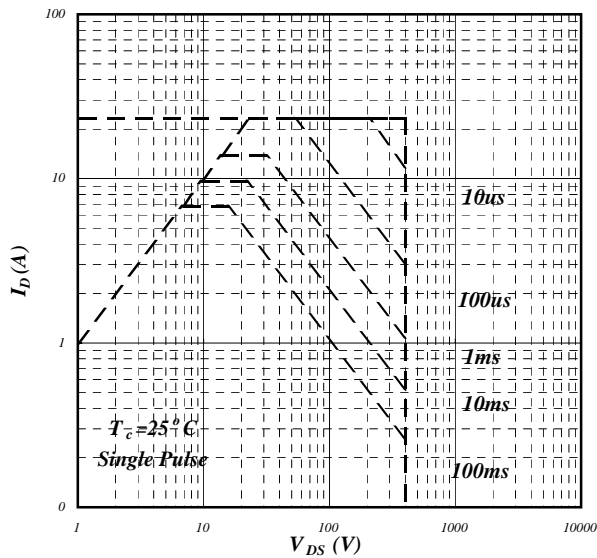


Fig 7. Maximum Safe Operating Area

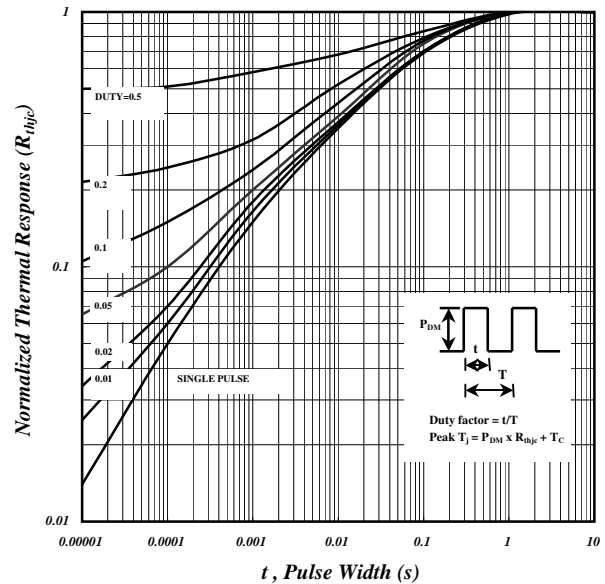


Fig 8. Effective Transient Thermal Impedance



Typical Electrical Characteristics (cont.)

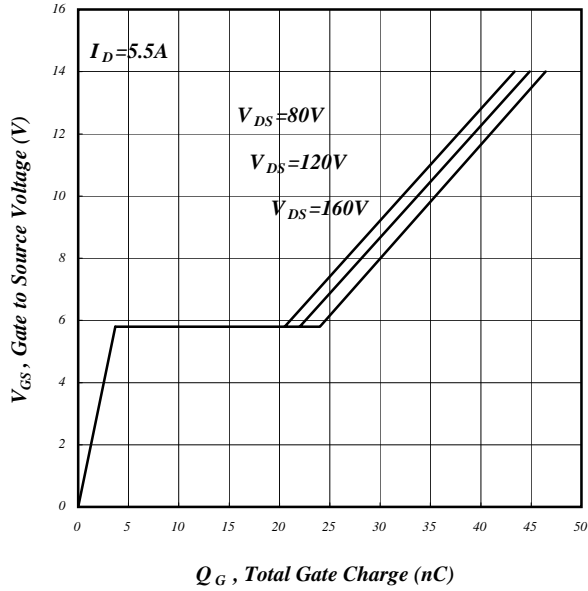


Fig 9. Gate Charge Characteristics

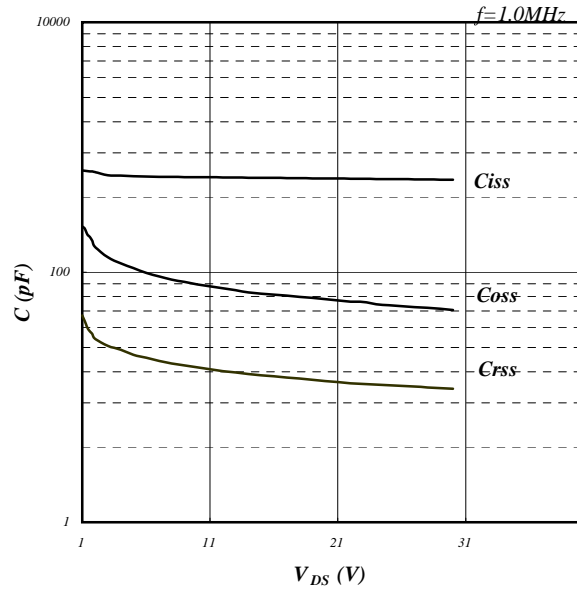


Fig 10. Typical Capacitance Characteristics

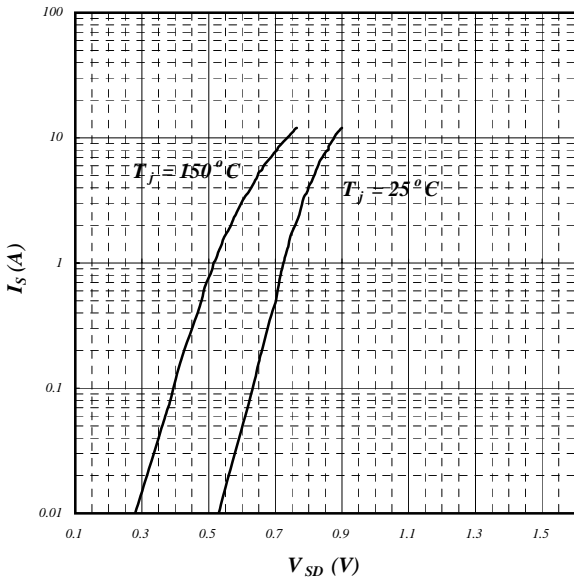


Fig 11. Forward Characteristic of
Reverse Diode

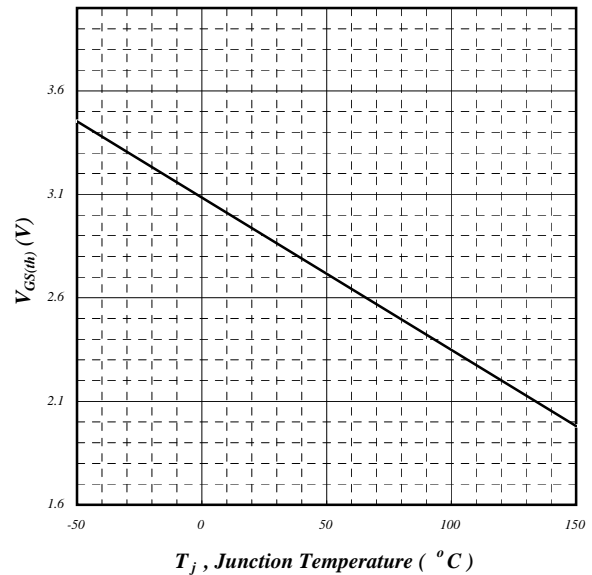


Fig 12. Gate Threshold Voltage v.s.
Junction Temperature



Typical Electrical Characteristics (cont.)

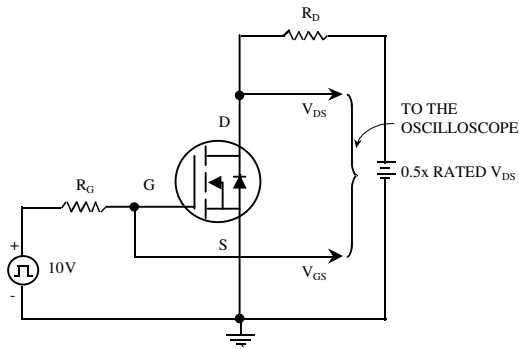


Fig 13. Switching Time Circuit

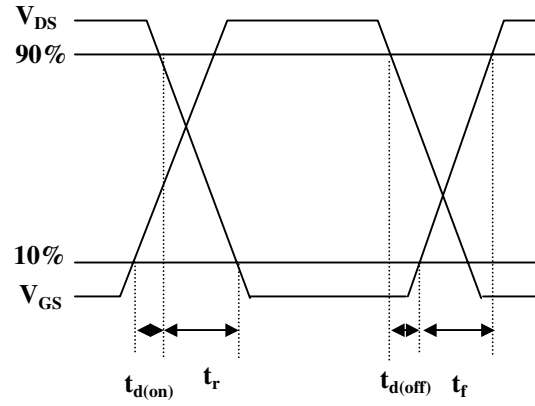


Fig 14. Switching Time Waveform

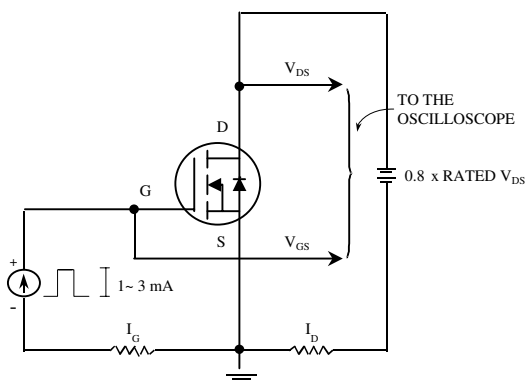


Fig 15. Gate Charge Circuit

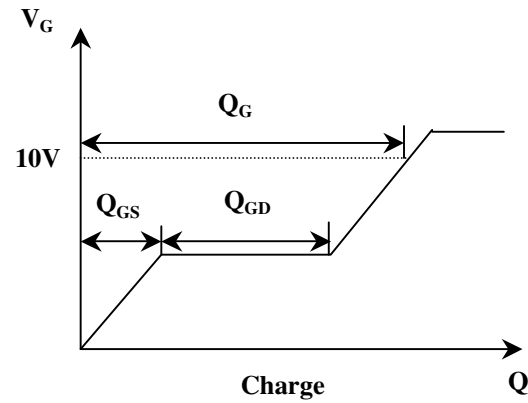
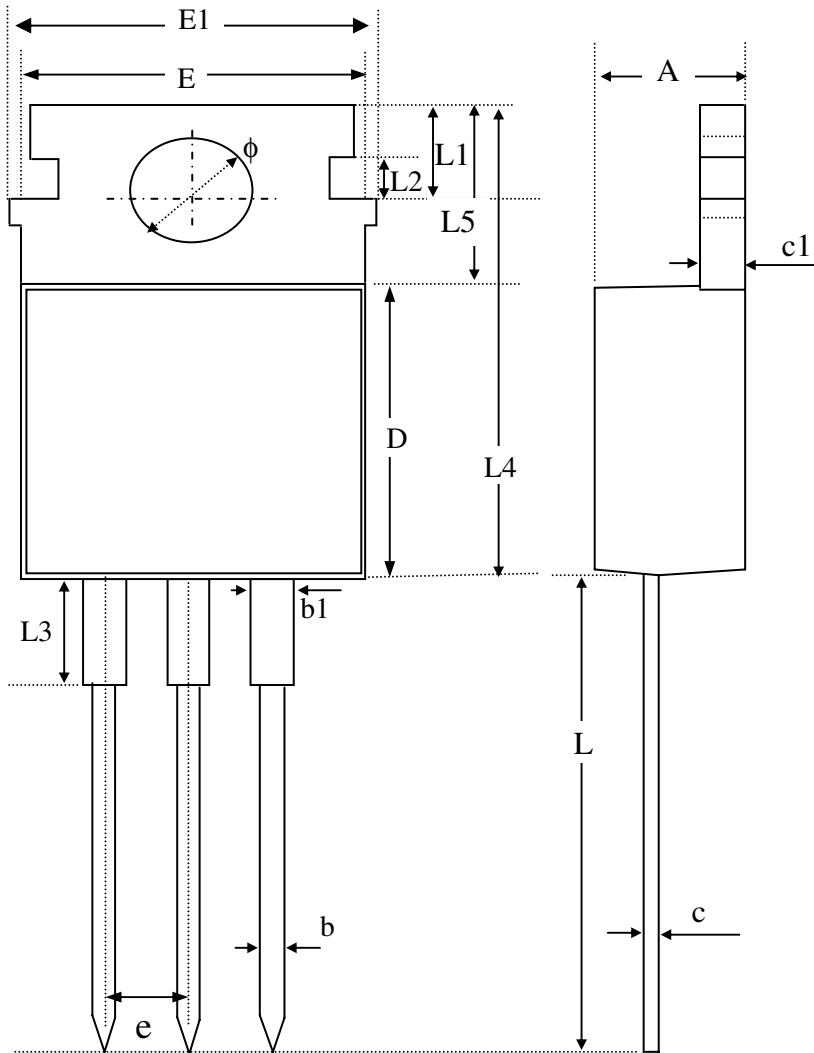


Fig 16. Gate Charge Waveform



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

