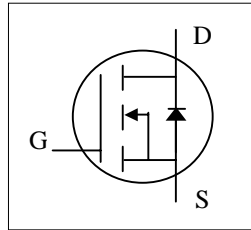




- ▼ Low Gate Charge
- ▼ Fast Switching Characteristics
- ▼ Simple Drive Requirement
- ▼ RoHS Compliant & Halogen-Free

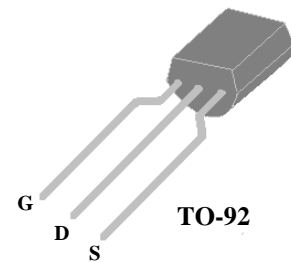


$BV_{DSS}$	600V
$R_{DS(ON)}$	12 $\Omega$
$I_D$	160mA

## Description

Advanced Power MOSFETs utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.

The TO-92 package is widely used for all commercial-industrial applications.



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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D @ T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	160	mA
$I_D @ T_A=100^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	100	mA
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	300	mA
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	0.83	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Maximum Thermal Resistance, Junction-ambient	150	$^\circ\text{C}/\text{W}$



# AP01L60T-HF

## Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =1mA	600	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	-	0.8	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A	-	-	12	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =0.5A	-	0.8	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	10	uA
	Drain-Source Leakage Current (T <sub>j</sub> =70°C)	V <sub>DS</sub> =480V, V <sub>GS</sub> =0V	-	-	500	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =100mA	-	7	11	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =480V	-	1.4	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	3.4	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DD</sub> =300V	-	8	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =1A	-	5	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =10Ω	-	13	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	9	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	260	420	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	20	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	3	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	3	-	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =160mA, V <sub>GS</sub> =0V	-	-	1.5	V
t <sub>rr</sub>	Reverse Recovery Time <sup>2</sup>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V,	-	345	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	1	-	μC

### Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test

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.

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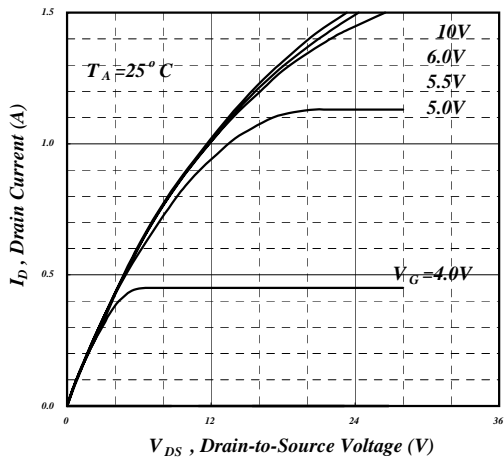


Fig 1. Typical Output Characteristics

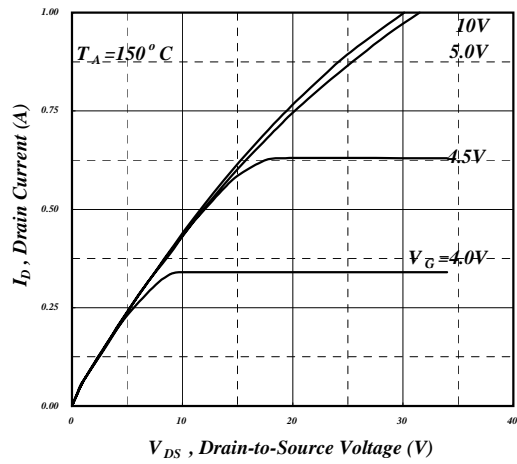


Fig 2. Typical Output Characteristics

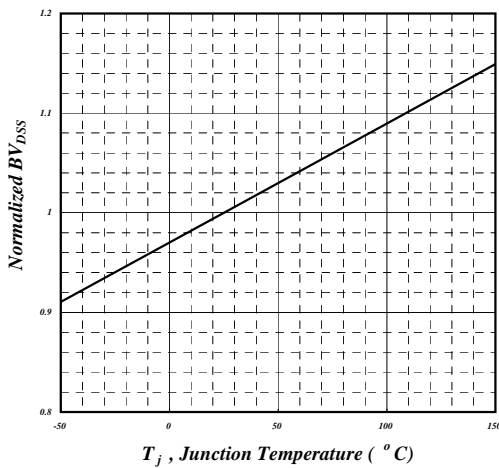


Fig 3. Normalized  $BV_{DSS}$  v.s. Junction Temperature

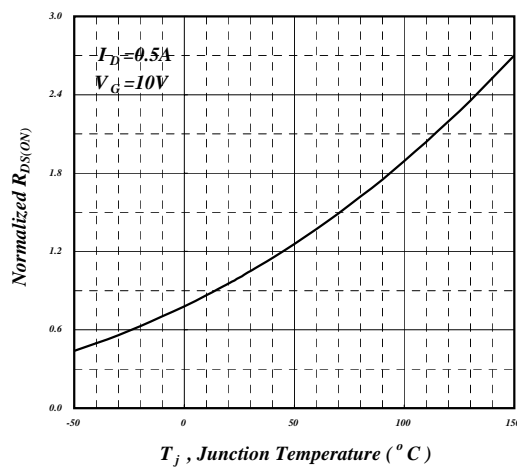


Fig 4. Normalized On-Resistance v.s. Junction Temperature

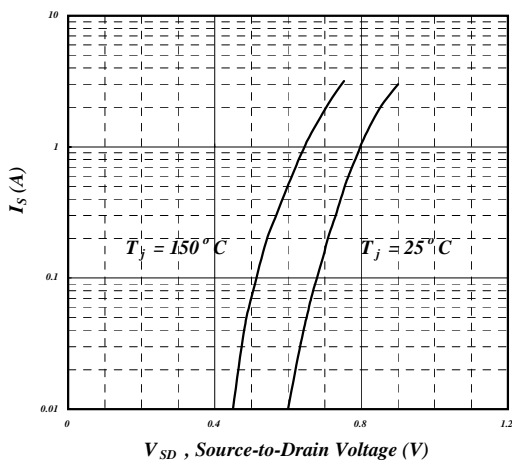


Fig 5. Forward Characteristic of Reverse Diode

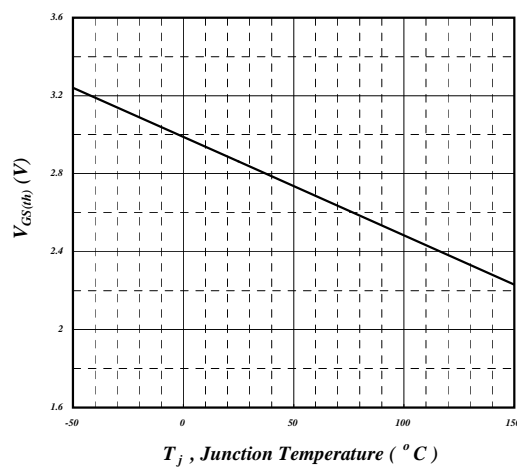


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

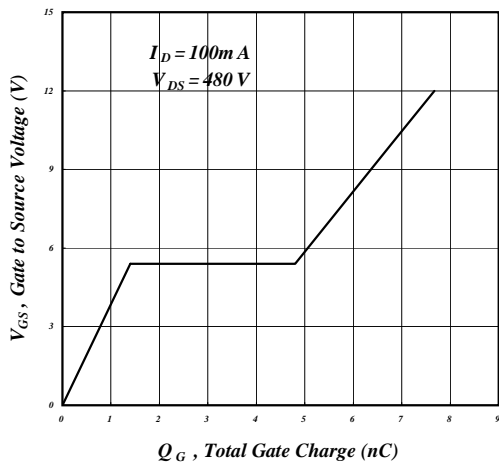


Fig 7. Gate Charge Characteristics

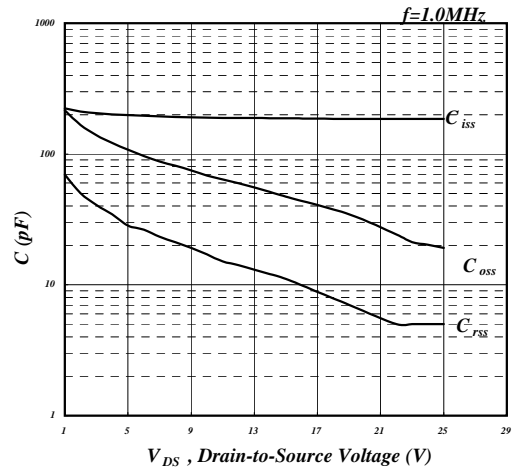


Fig 8. Typical Capacitance Characteristics

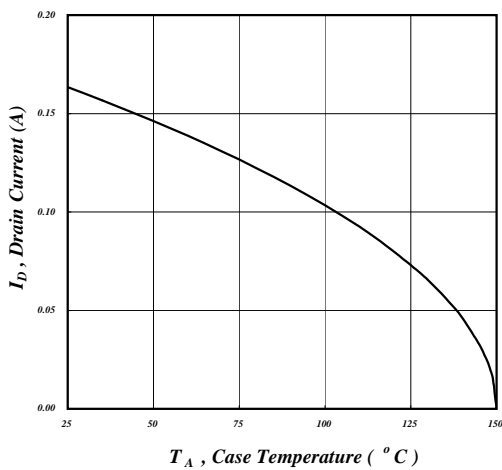


Fig 9. Maximum Drain Current v.s. Case Temperature

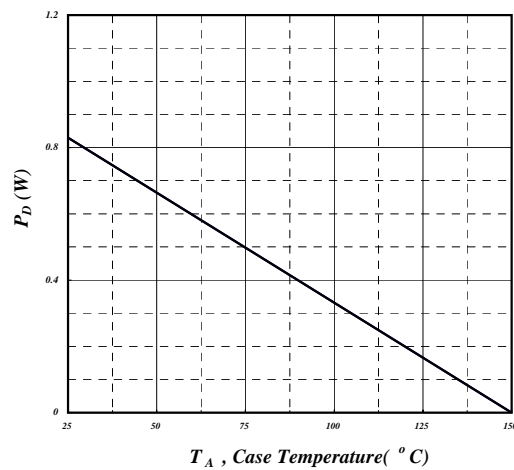


Fig 10. Typical Power Dissipation

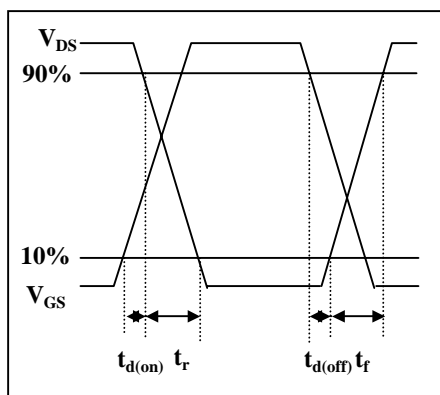


Fig 11. Switching Time Waveform

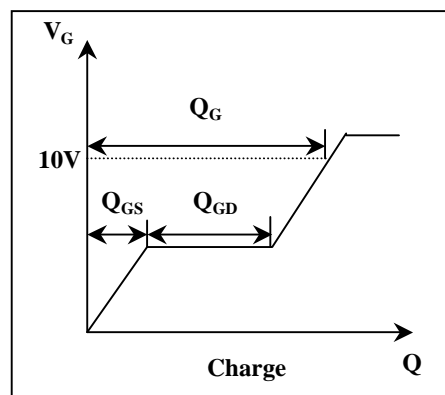
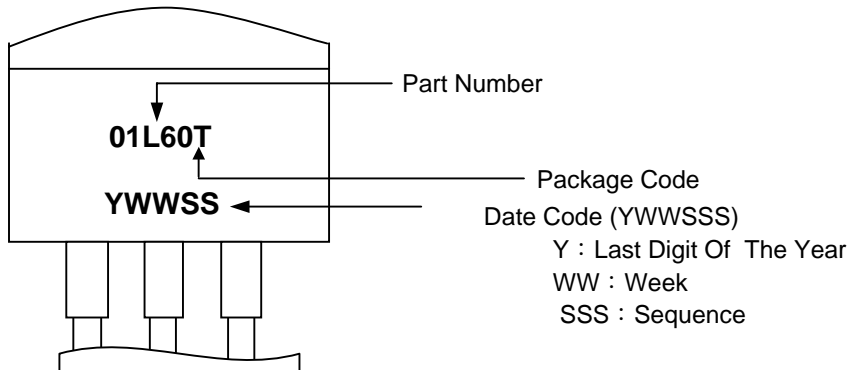


Fig 12. Gate Charge Waveform



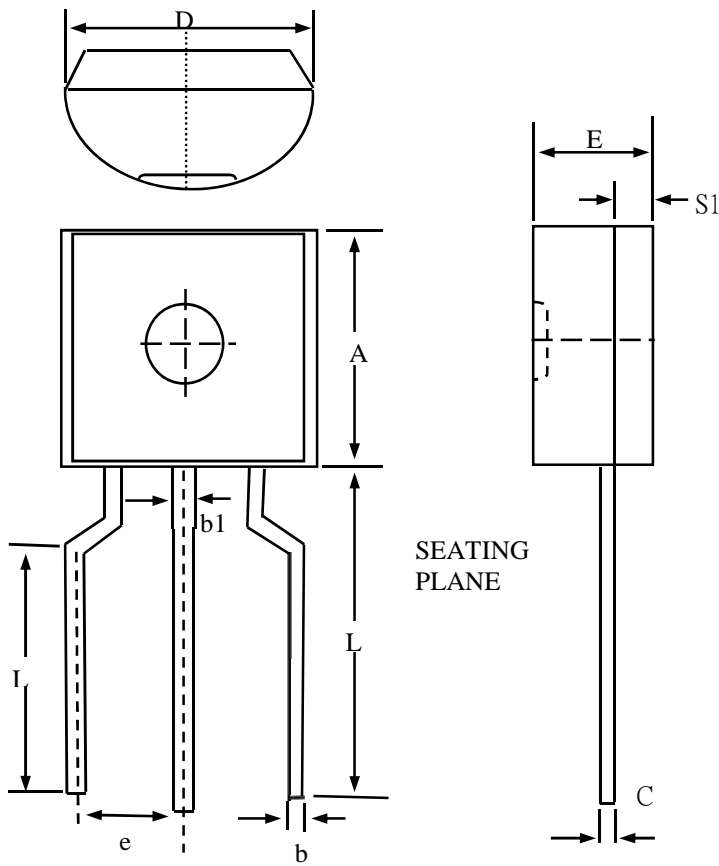
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**MARKING INFORMATION**





**Package Outline : TO-92 ( Ammo Pak )**



SYMBOL	Millimeters		
	MIN	NOM	MAX
A	4.38	4.58	4.78
D	4.43	4.58	4.83
E	3.30	3.60	3.90
b	0.36	0.46	0.56
L	-	13 (ref.)	-
e	2.40	2.50	2.90
b1	0.36	0.56	0.76
S1	0.92	-	-
C	0.33	0.42	0.51
L3	-	10 (ref.)	-

1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.



**TO-92(AMMO.) FOOTPRINT :**

