Ordering number : ENA1597A

# ATP106

## P-Channel Power MOSFET
## −40V, −30A, 25mΩ, Single ATPAK

ON Semiconductor®
http://onsemi.com

### Features

- Low ON-resistance
- Slim package
- Halogen free compliance
- Large current
- 4.5V drive
- Protection diode in

### Specifications

**Absolute Maximum Ratings** at Ta=25°C

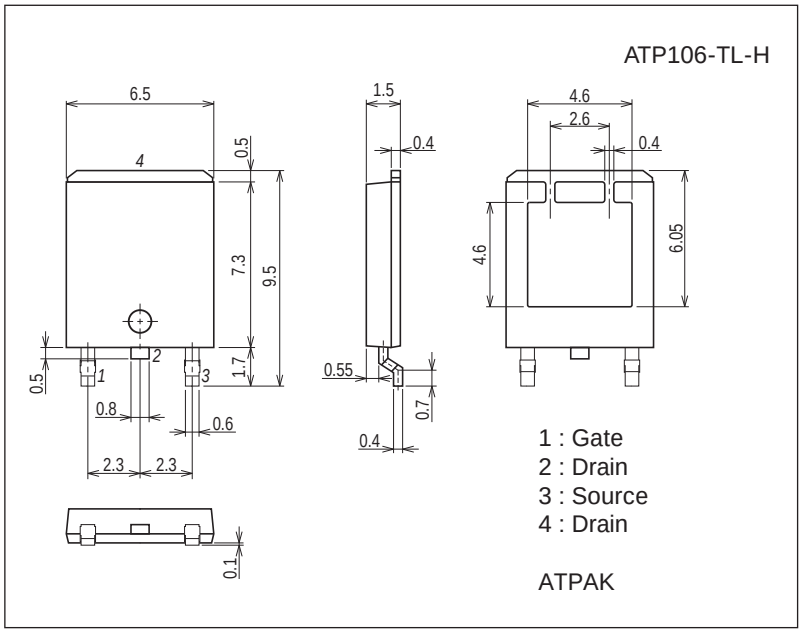
| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | | −40 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±20 | V |
| Drain Current (DC) | $I_D$ | | −30 | A |
| Drain Current (PW≤10μs) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | −90 | A |
| Allowable Power Dissipation | $P_D$ | Tc=25°C | 40 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | −55 to +150 | °C |
| Avalanche Energy (Single Pulse) *1 | $E_{AS}$ | | 30 | mJ |
| Avalanche Current *2 | $I_{AV}$ | | −15 | A |

Note :*1 $V_{DD}$=−10V, L=200μH, $I_{AV}$=−15A
*2 L≤200μH, Single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

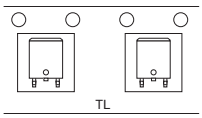
unit : mm (typ)
7057-001



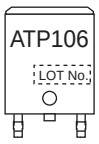

### Product & Package Information

- Package : ATPAK
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

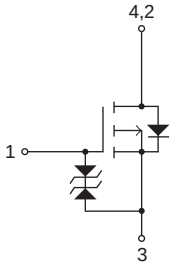
### Packing Type: TL




### Marking



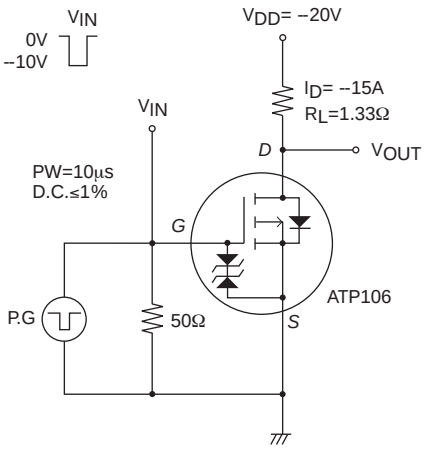

### Electrical Connection



## Electrical Characteristics at Ta=25°C

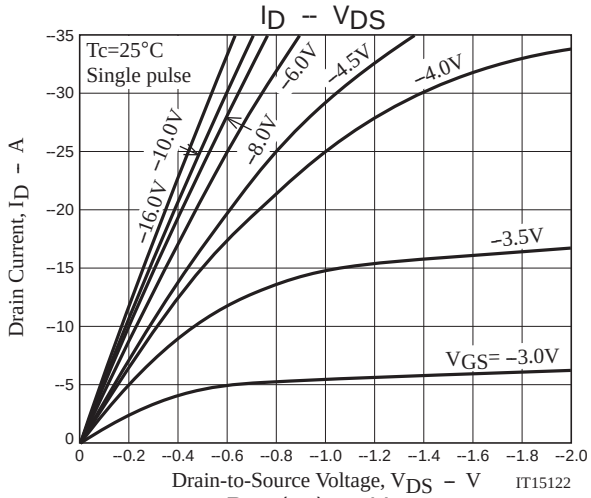
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=−1mA, $V_{GS}$=0V | −40 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=−40V, $V_{GS}$=0V | | | −1 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±16V, $V_{DS}$=0V | | | ±10 | μA |
| Cutoff Voltage | $V_{GS}$(off) | $V_{DS}$=−10V, $I_D$=−1mA | −1.5 | | −2.6 | V |
| Forward Transfer Admittance | \| yfs \| | $V_{DS}$=−10V, $I_D$=−15A | | 28 | | S |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on)1 | $I_D$=−15A, $V_{GS}$=−10V | | 19 | 25 | mΩ |
| | $R_{DS}$(on)2 | $I_D$=−8A, $V_{GS}$=−4.5V | | 29 | 41 | mΩ |
| Input Capacitance | Ciss | $V_{DS}$=−20V, f=1MHz | | 1380 | | pF |
| Output Capacitance | Coss | | | 210 | | pF |
| Reverse Transfer Capacitance | Crss | | | 150 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See specified Test Circuit. | | 12 | | ns |
| Rise Time | $t_r$ | | | 120 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | | | 110 | | ns |
| Fall Time | $t_f$ | | | 90 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=−20V, $V_{GS}$=−10V, $I_D$=−30A | | 29 | | nC |
| Gate-to-Source Charge | Qgs | | | 6.4 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | | | 5.9 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=−30A, $V_{GS}$=0V | | −0.97 | −1.5 | V |

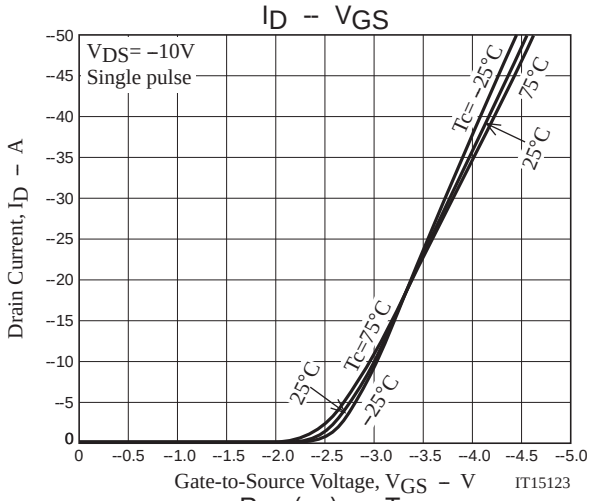
## Switching Time Test Circuit

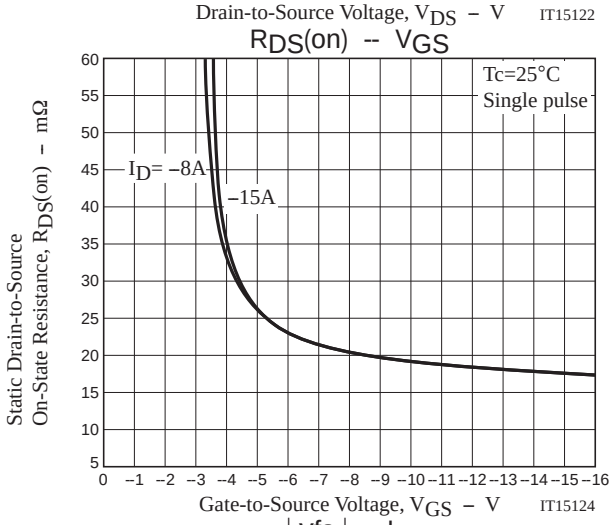


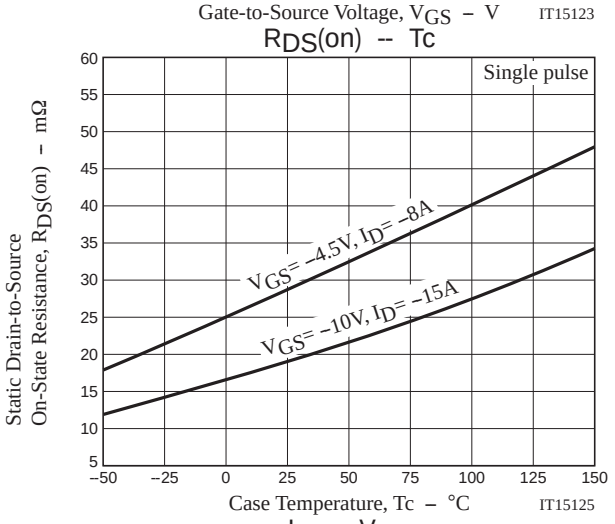

## Ordering Information

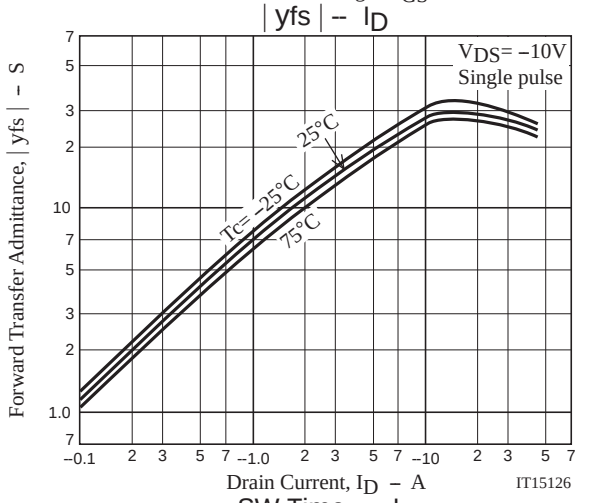
| Device | Package | Shipping | memo |
|---|---|---|---|
| ATP106-TL-H | ATPAK | 3,000pcs./reel | Pb Free and Halogen Free |

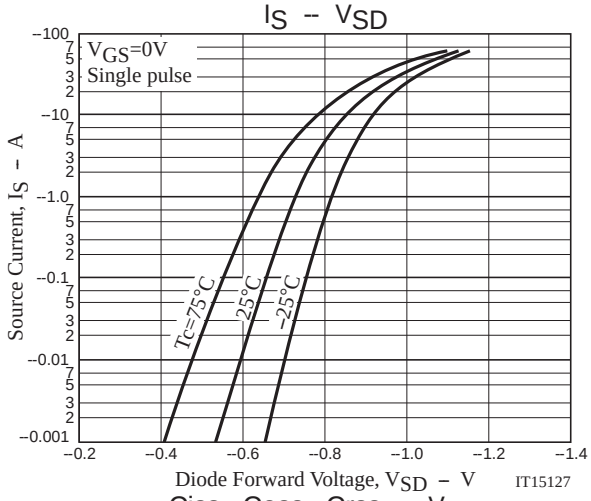

ID -- VDS
Tc=25°C
Single pulse
–16.0V
–10.0V
–8.0V
–6.0V
–4.5V
–4.0V
–3.5V
VGS= –3.0V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15122

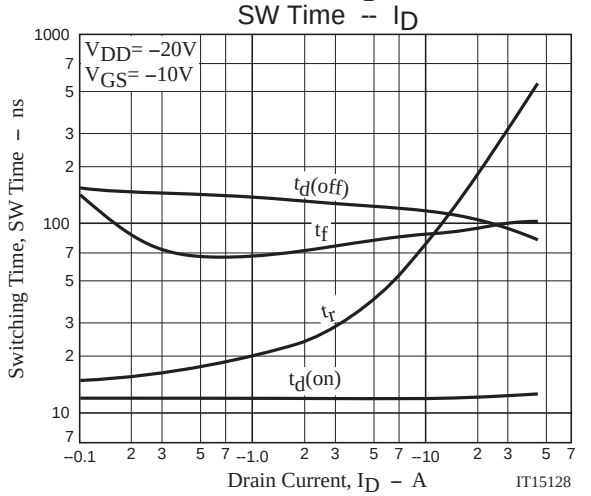

ID -- VGS
VDS= –10V
Single pulse
Tc= –25°C
75°C
25°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT15123

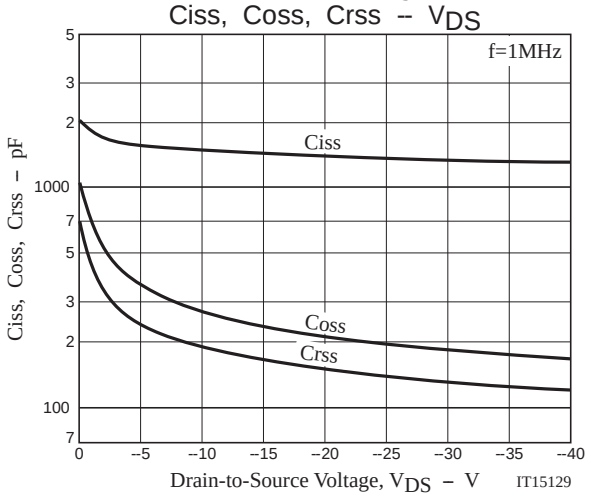

RDS(on) -- VGS
Tc=25°C
Single pulse
ID= –8A
–15A
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT15124

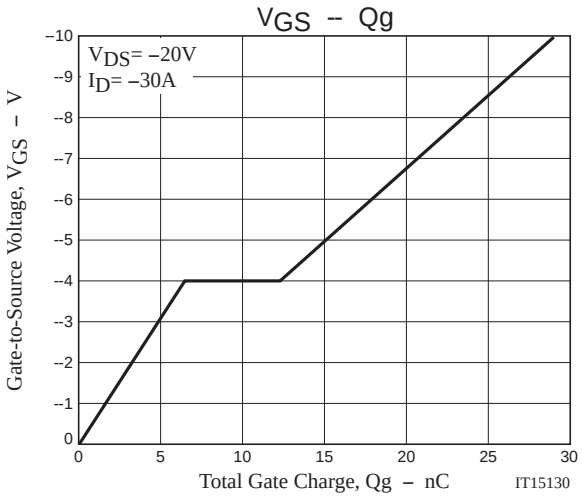

RDS(on) -- Tc
Single pulse
VGS= –4.5V, ID= –8A
VGS= –10V, ID= –15A
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT15125

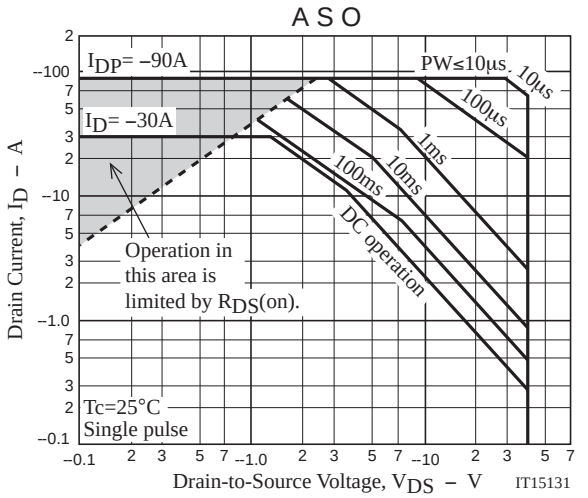

| yfs | -- ID
VDS= –10V
Single pulse
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT15126

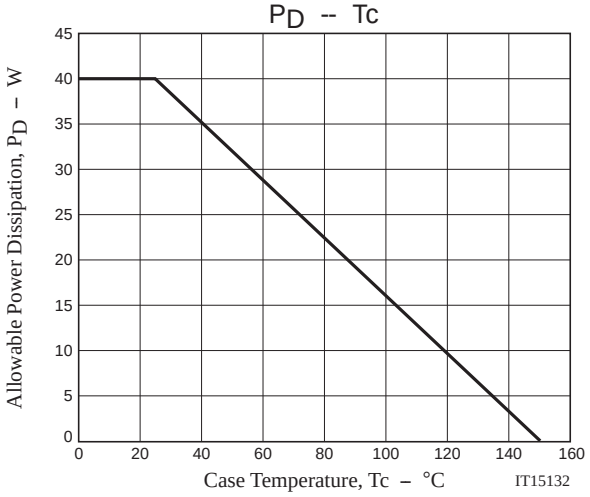

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT15127

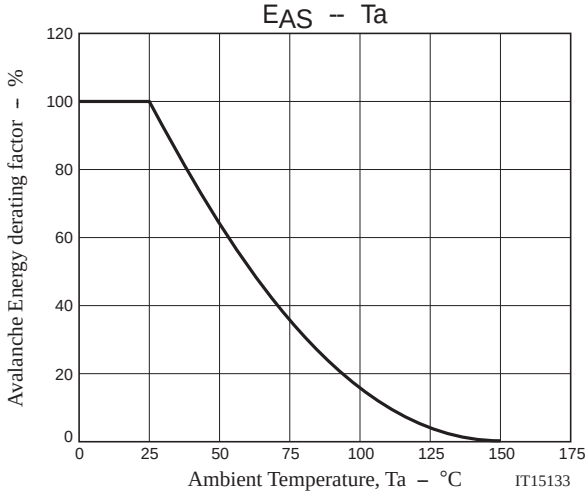

SW Time -- ID
VDD= –20V
VGS= –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT15128


Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT15129


VGS – Qg
VDS= –20V
ID= –30A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15130


A S O
IDP= –90A
PW≤10μs
10μs
100μs
1ms
10ms
100ms
DC operation
ID= –30A
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15131


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT15132


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT15133

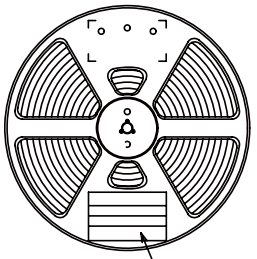
**Taping Specification**

ATP106-TL-H

## 1. Packing Format (TL)

| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) | | | Packing format | |
|---|---|---|---|---|---|---|
| | | Reel | Inner box | Outer box | INNER BOX SD-C-18 | OUTER BOX SD-A-18 |
| ATPAK | ATP | 3,000 | 3,000 | 15,000 | 1 reels contained<br>Dimensions:mm (external)<br>340×340×28 | 5 inner boxes contained<br>Dimensions:mm (external)<br>355×355×165 |

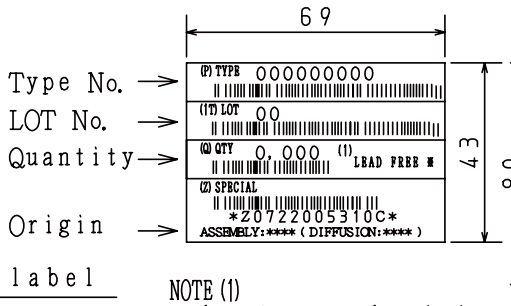
Packing method



Reel label

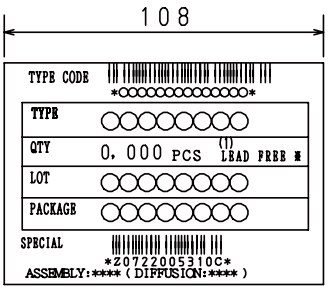
Reel label, Inner box label

(unit:mm)




Outer box label

It is a label at the time of factory shipments. The form of a label may change in physical distribution process.



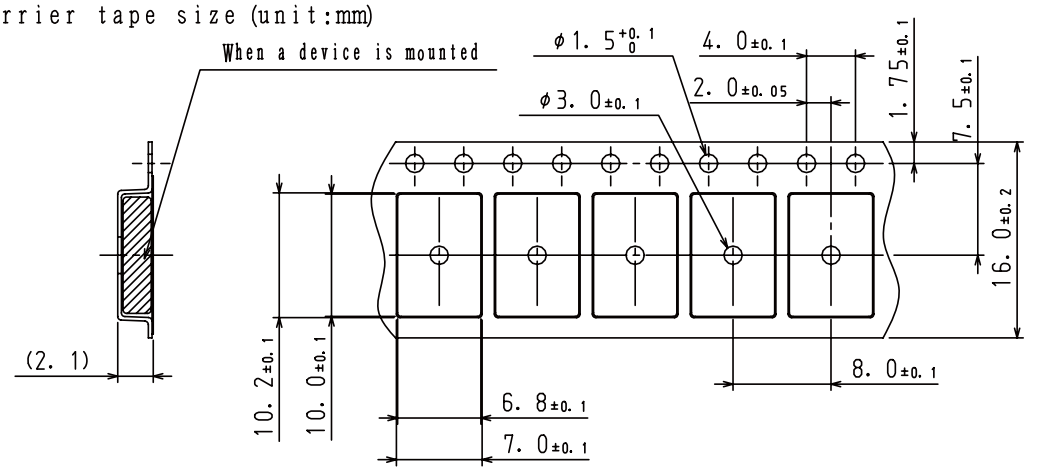

NOTE (1)

The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

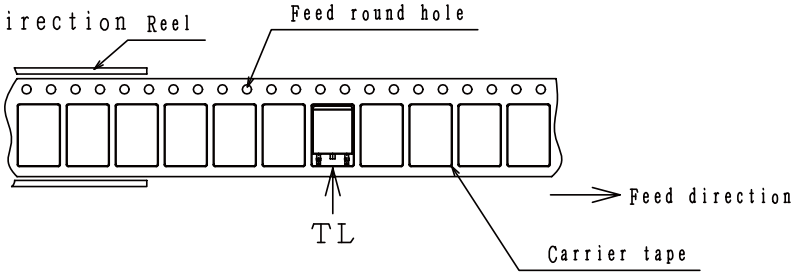
| Label | JEITA Phase |
|---|---|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |

## 2. Taping configuration

### 2-1. Carrier tape size (unit:mm)



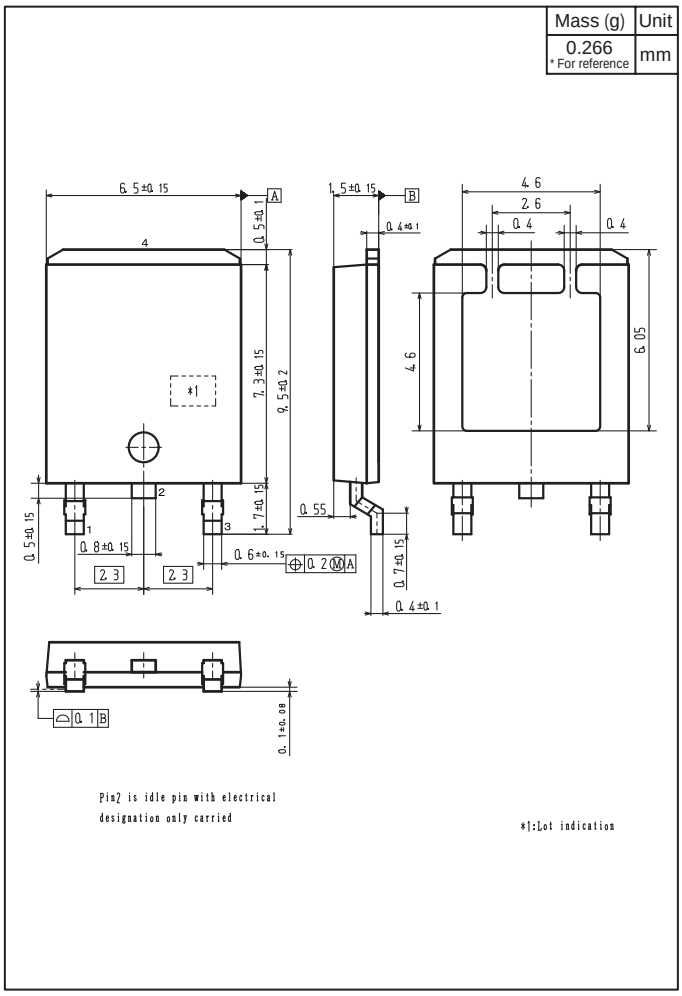

### 2-2. Device placement direction



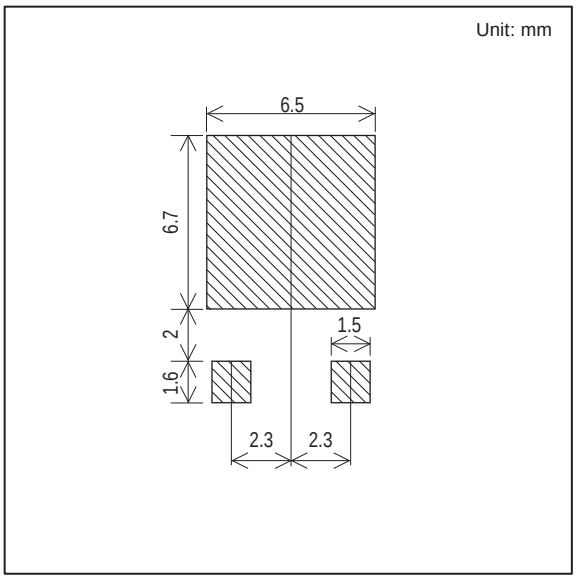

The one erectrode terminals on feed hole side····TL

## Outline Drawing

ATP106-TL-H




## Land Pattern Example



Note on usage : Since the ATP106 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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- ON Semiconductor Information

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