Ordering number : ENA1903A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel Silicon MOSFET

ATP613 — General-Purpose Switching Device Applications

Features

- Reverse recovery time t_{rr}=60ns(typ.)
- Input Capacitance Ciss=350pF(typ.)
- Halogen free compliance
- ON-resistance R_{DS}(on)=1.55Ω(typ.)
- 10V drive

Specifications

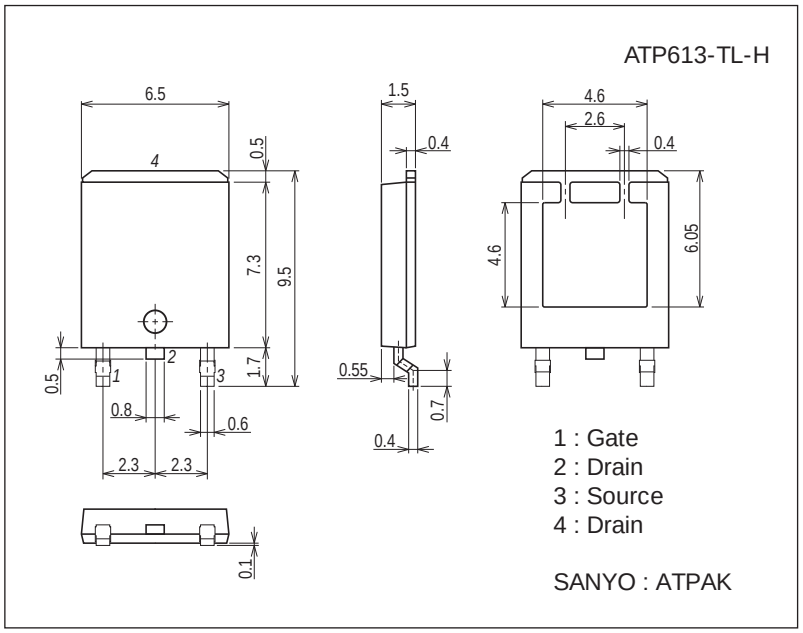
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		500	V
Gate-to-Source Voltage	V_{GSS}		±30	V
Drain Current (DC)	I_D		5.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	19	A
Source-to-Drain Diode Forward Current (DC)	I_S		5.5	A
Source-to-Drain Diode Forward Current (Pulse)	I_{SP}	PW≤10μs, duty cycle≤1%	19	A
Allowable Power Dissipation	P_D	Tc=25°C	70	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		93	mJ
Avalanche Current *2	I_{AV}		5.5	A

Note :*1 V_{DD}=99V, L=5mH, I_{AV}=5.5A (Fig.1)
*2 L≤5mH, Single pulse

Package Dimensions

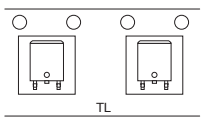
unit : mm (typ)
7057-001



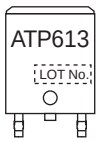
Product & Package Information

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

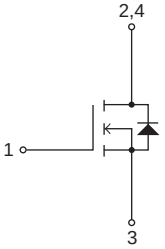
Packing Type: TL



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=10mA, V_{GS}=0V	500			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=400V, V_{GS}=0V			100	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	3		5	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=2.75A	1.5	2.9		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)	I_D=2.75A, V_{GS}=10V		1.55	2.0	Ω
Input Capacitance	Ciss	V_{DS}=30V, f=1MHz		350		pF
Output Capacitance	Coss			68		pF
Reverse Transfer Capacitance	Crss			15		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		14.2		ns
Rise Time	t_r			46		ns
Turn-OFF Delay Time	t_d(off)			37.6		ns
Fall Time	t_f			20.4		ns
Total Gate Charge	Qg	V_{DS}=200V, V_{GS}=10V, I_D=5.5A		13.8		nC
Gate-to-Source Charge	Qgs			3.2		nC
Gate-to-Drain “Miller” Charge	Qgd			7.6		nC
Diode Forward Voltage	V_{SD}	I_S=5.5A, V_{GS}=0V		1.1	1.5	V
Reverse Recovery Time	t_{rr}	See Fig.3		60		ns
Reverse Recovery Charge	Q_{rr}	I_S=5.5A, V_{GS}=0V, di/dt=100A/μs		120		nC

Fig.1 Unclamped Inductive Switching Test Circuit

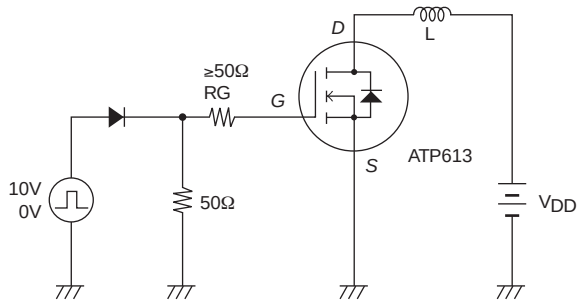


Fig.2 Switching Time Test Circuit

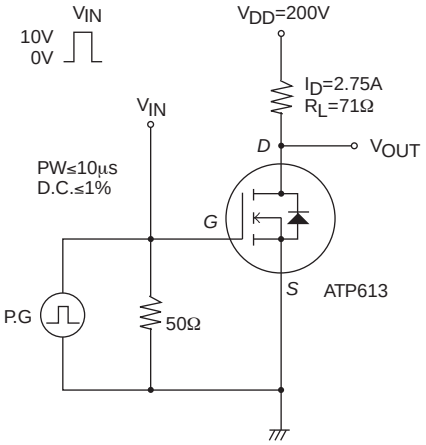
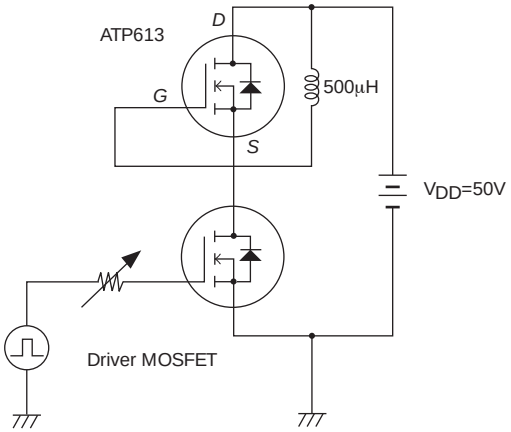
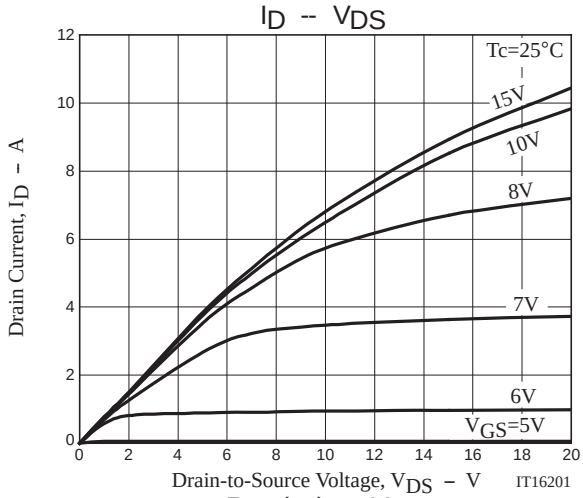


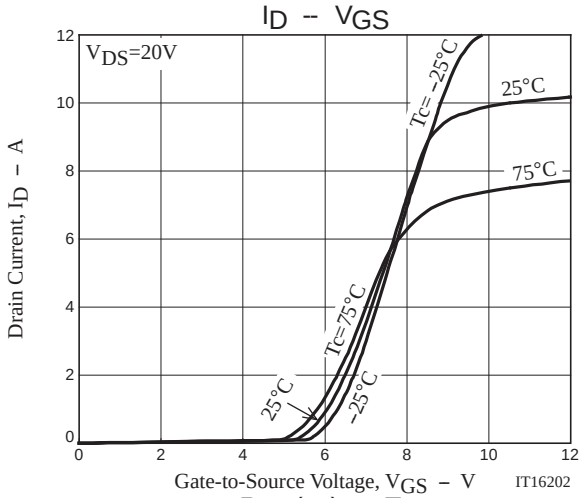
Fig.3 Reverse Recovery Time Test Circuit

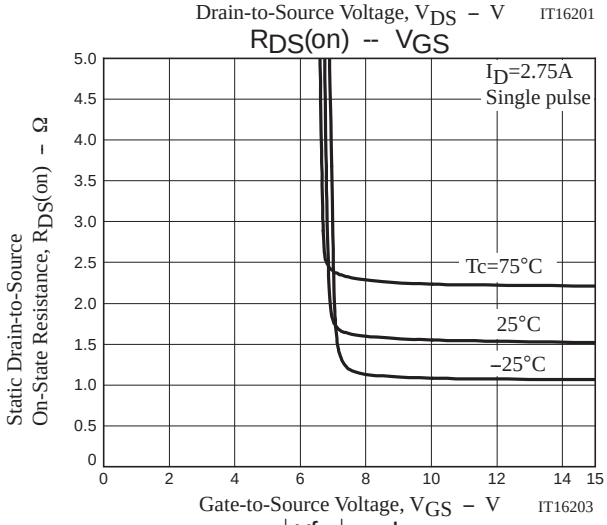


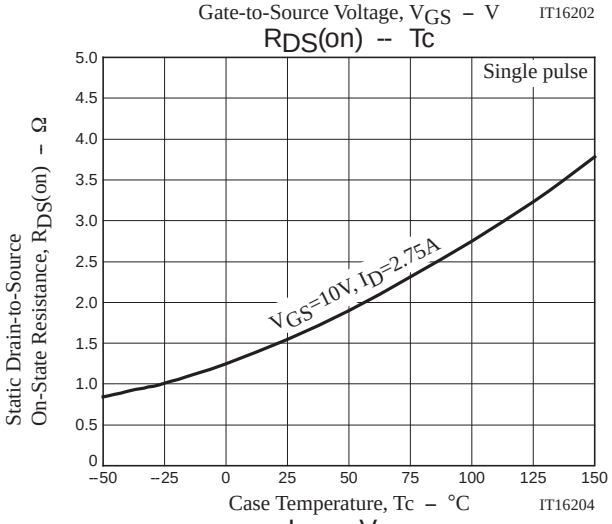
Ordering Information

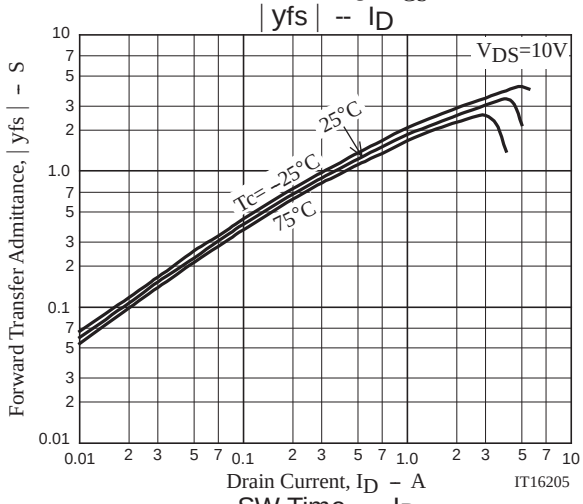
Device	Package	Shipping	memo
ATP613-TL-H	ATPAK	3,000pcs./reel	Pb Free and Halogen Free

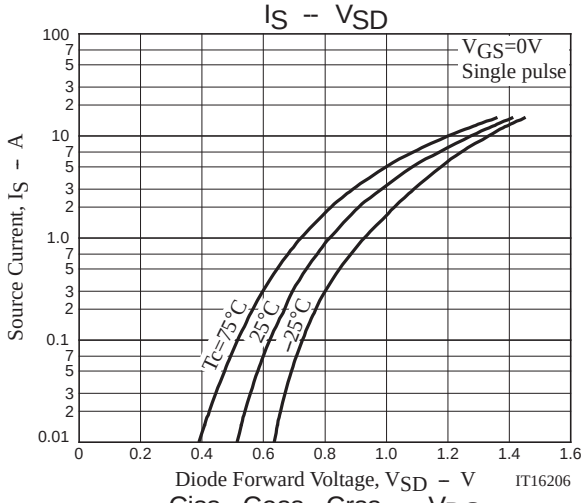

ID -- VDS
Tc=25°C
15V
10V
8V
7V
6V
VGS=5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16201

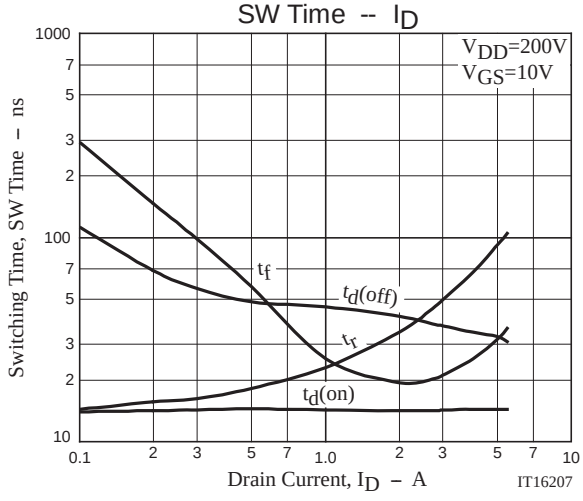

ID -- VGS
VDS=20V
Tc=–25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT16202

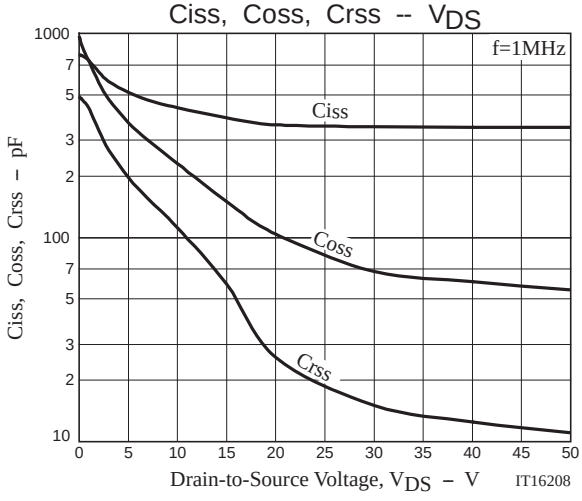

RDS(on) -- VGS
ID=2.75A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT16203

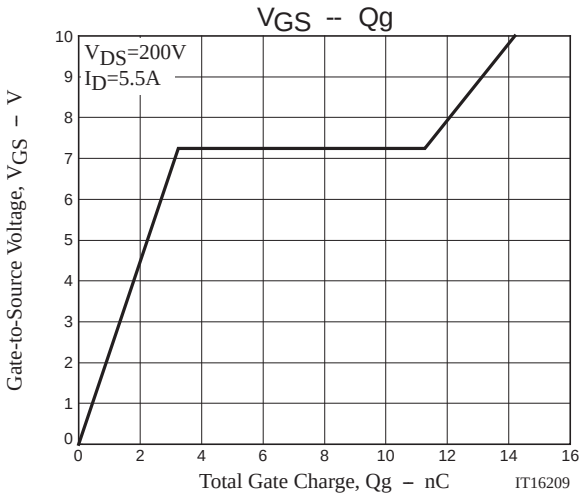

RDS(on) -- Tc
Single pulse
VGS=10V, ID=2.75A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT16204

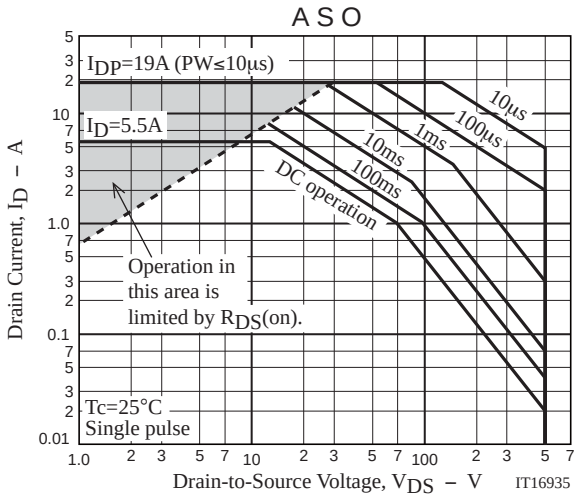

| yfs | -- ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16205

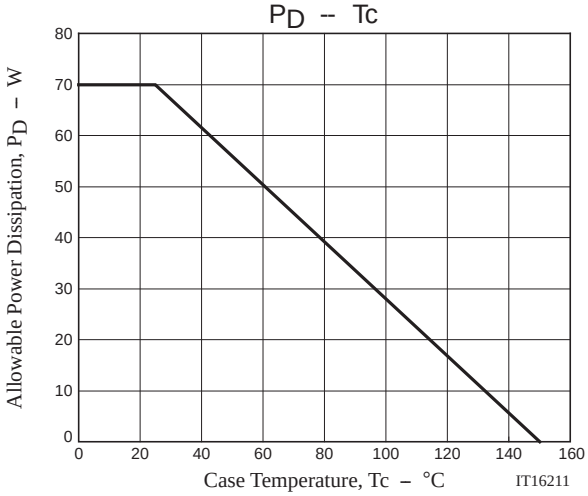

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT16206

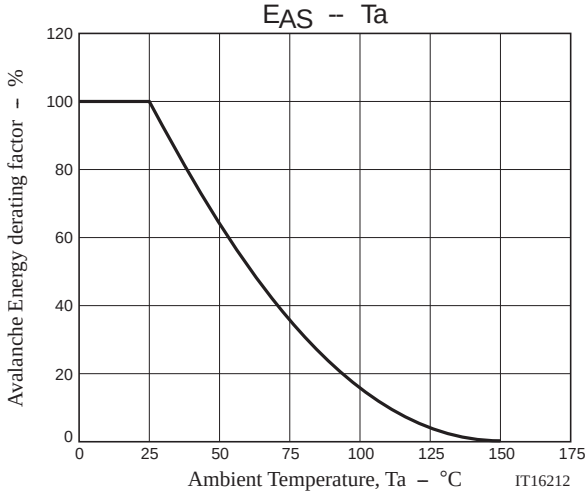

SW Time -- ID
VDD=200V
VGS=10V
tf
td(off)
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT16207


Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT16208


VGS -- Qg
VDS=200V
ID=5.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16209


A S O
IDP=19A (PW≤10μs)
ID=5.5A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16935


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT16211


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT16212

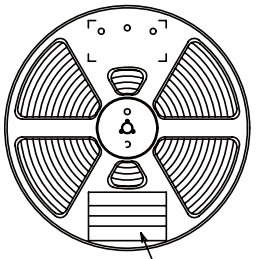
Taping Specification

ATP613-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 Dimensions:mm (external) 340×340×28	5 inner boxes contained Dimensions:mm (external) 355×355×165

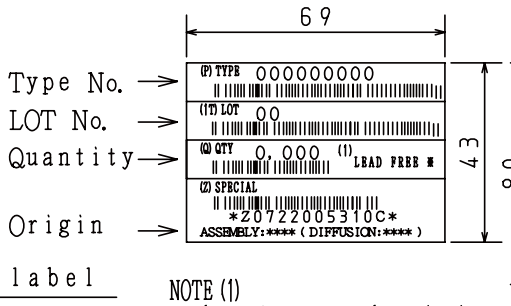
Packing method



Reel label

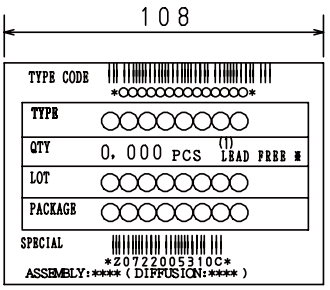
Reel label, Inner box label

(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.



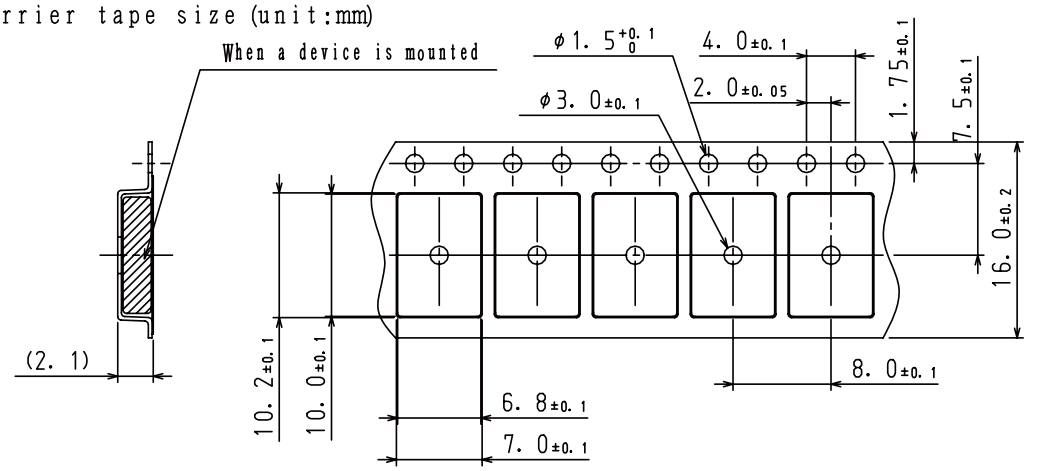
NOTE (1)

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

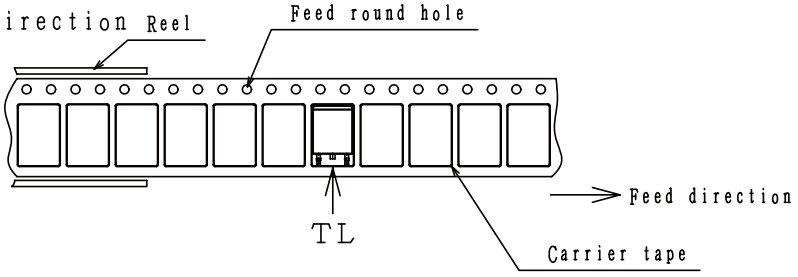
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



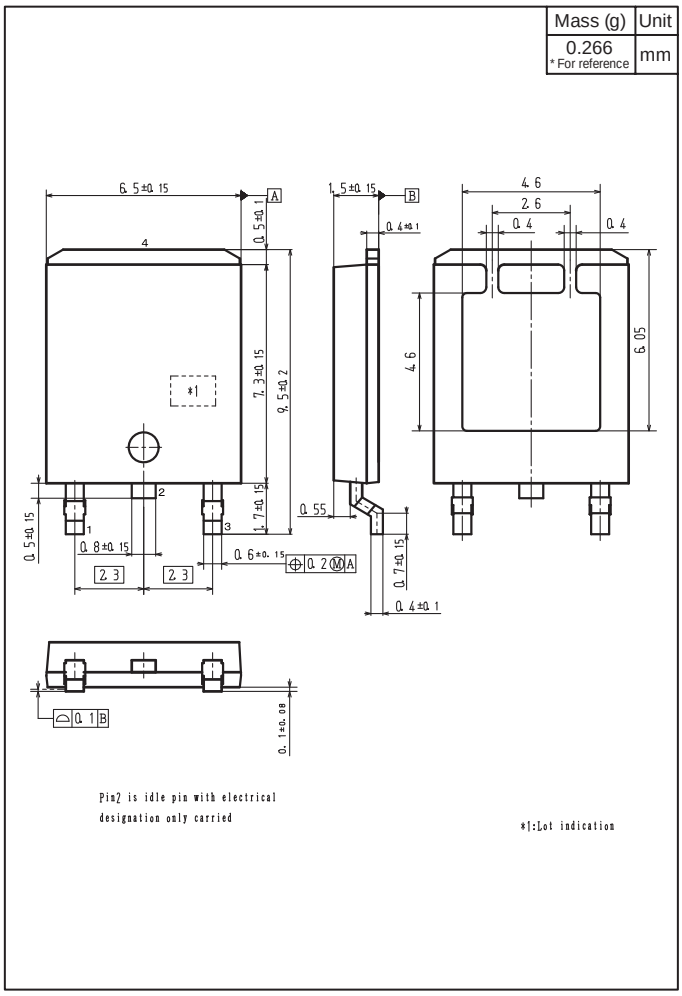
2-2. Device placement direction



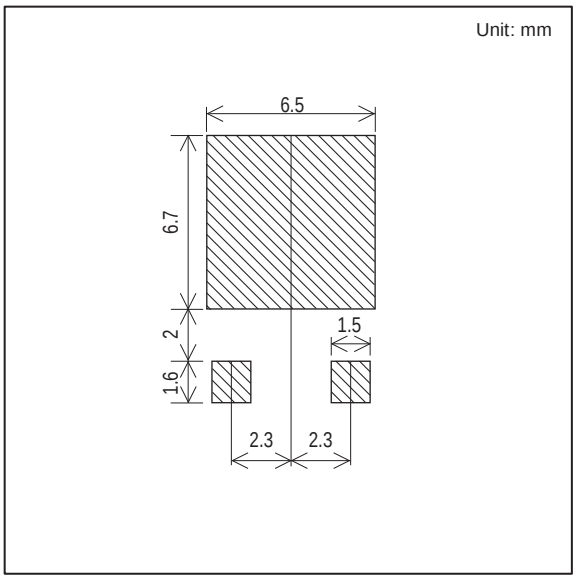
The one erectrode terminals on feed hole side····TL

Outline Drawing

ATP613-TL-H



Land Pattern Example



Note on usage : Since the ATP613 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of December, 2012. Specifications and information herein are subject to change without notice.