



N-Channel Silicon MOSFET

# ATP613 — General-Purpose Switching Device Applications

## Features

- Reverse recovery time  $t_{rr}=60\text{ns}(\text{typ.})$
- Input Capacitance  $C_{iss}=350\text{pF}(\text{typ.})$
- Halogen free compliance
- ON-resistance  $R_{DS(\text{on})}=1.55\Omega(\text{typ.})$
- 10V drive

## Specifications

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		500	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 30$	V
Drain Current (DC)	$I_D$		5.5	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	19	A
Source-to-Drain Diode Forward Current (DC)	$I_S$		5.5	A
Source-to-Drain Diode Forward Current (Pulse)	$I_{SP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	19	A
Allowable Power Dissipation	$P_D$	$T_c=25^\circ\text{C}$	70	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	EAS		93	mJ
Avalanche Current *2	$I_{AV}$		5.5	A

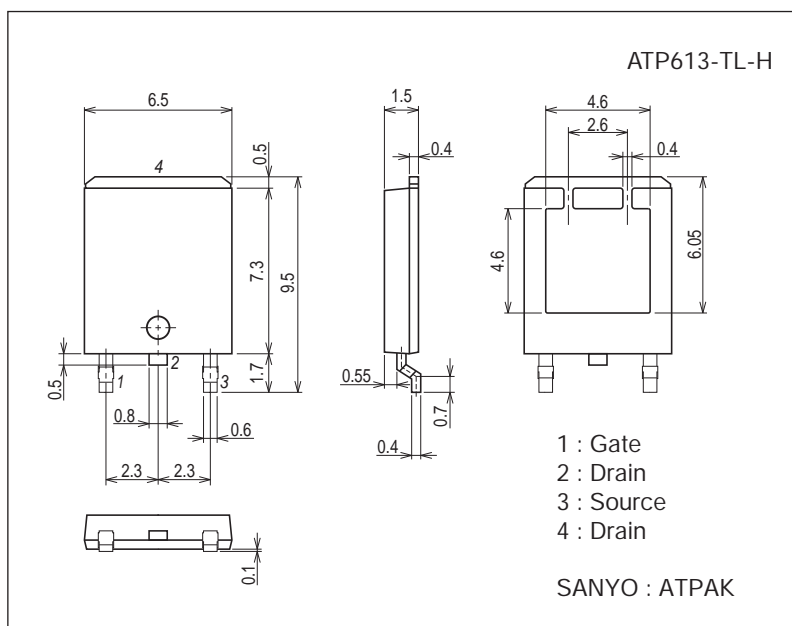
Note : \*1  $V_{DD}=99\text{V}$ ,  $L=5\text{mH}$ ,  $I_{AV}=5.5\text{A}$  (Fig.1)

\*2  $L \leq 5\text{mH}$ , Single pulse

## Package Dimensions

unit : mm (typ)

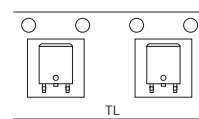
7057-001



## Product & Package Information

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

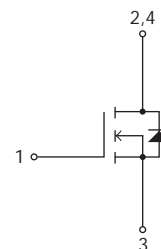
## Packing Type: TL



## Marking



## Electrical Connection



# ATP613

## 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	$\mu A$	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA	
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	3		5	V	
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=2.75A$	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	$\Omega$	
Input Capacitance	$C_{iss}$	$V_{DS}=30V, f=1MHz$		350		pF	
Output Capacitance	$C_{oss}$				68		pF
Reverse Transfer Capacitance	$C_{rss}$				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	$Q_g$	$V_{DS}=200V, V_{GS}=10V, I_D=5.5A$		13.8		nC	
Gate-to-Source Charge	$Q_{gs}$				3.2		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$				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	$Q_{rr}$	$I_S=5.5A, V_{GS}=0V, di/dt=100A/\mu s$		120		nC	

Fig.1 Unclamped Inductive Switching Test Circuit

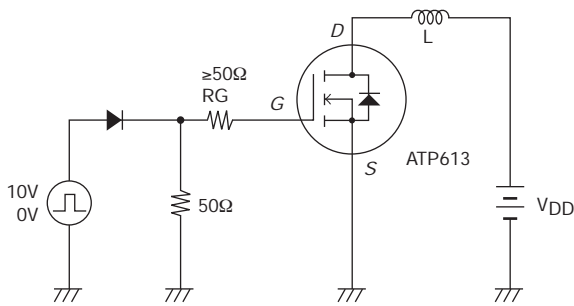


Fig.2 Switching Time Test Circuit

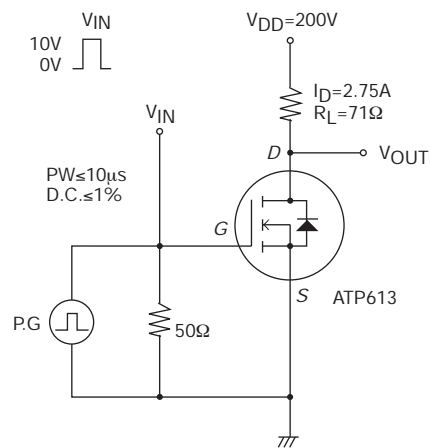
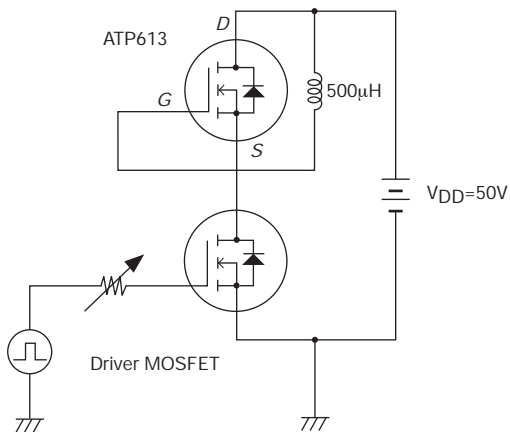
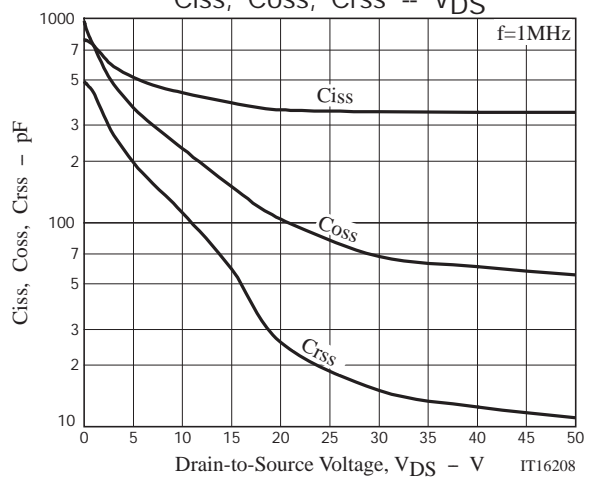
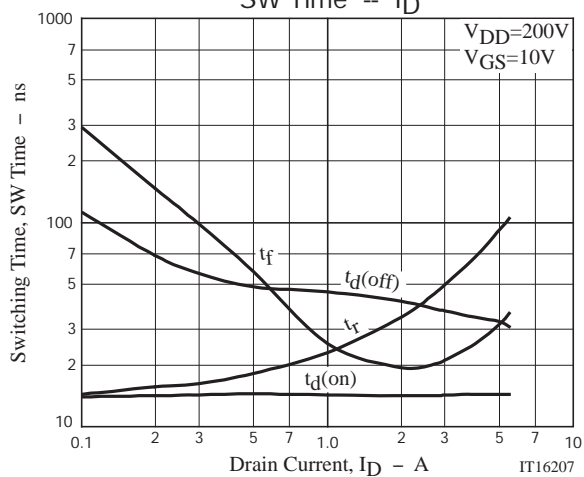
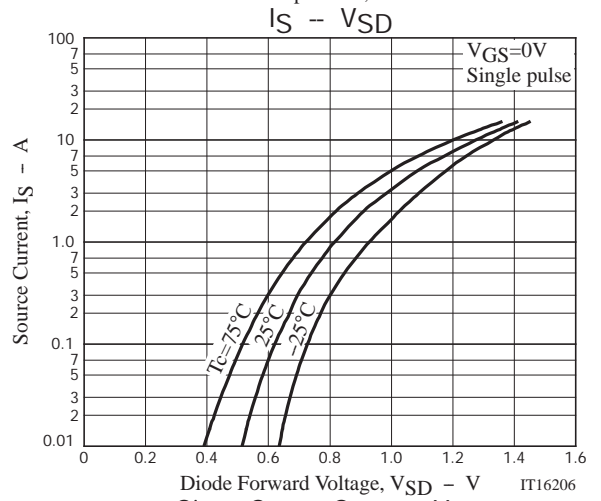
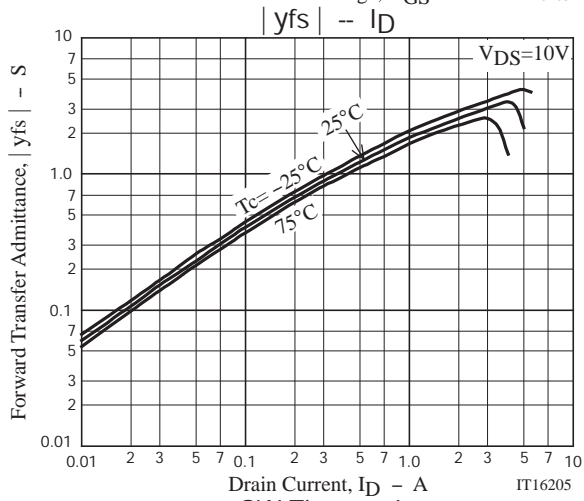
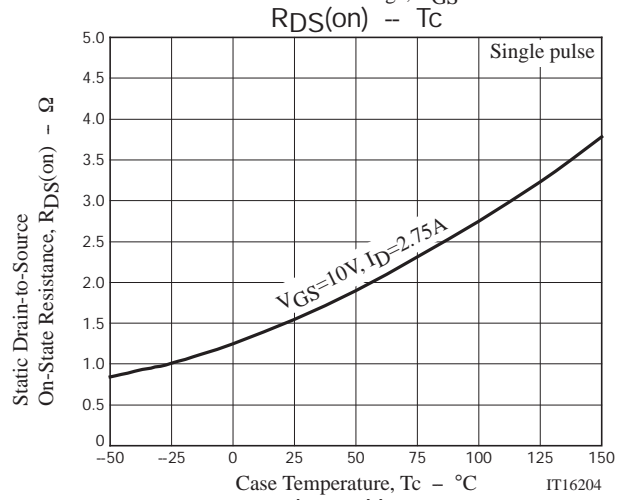
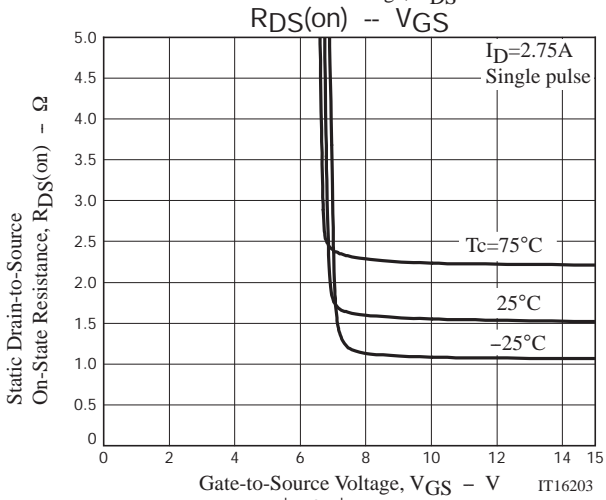
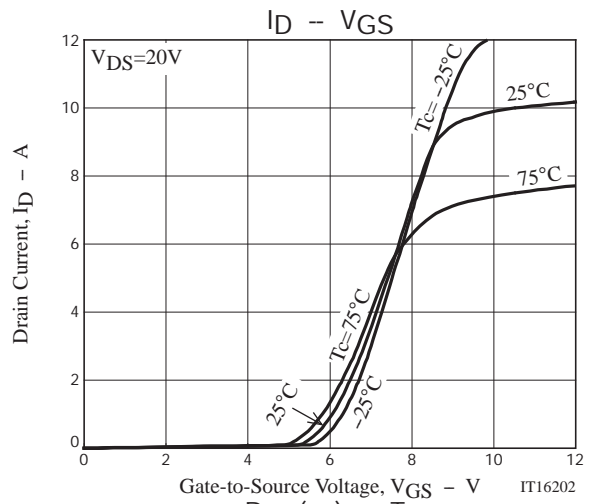
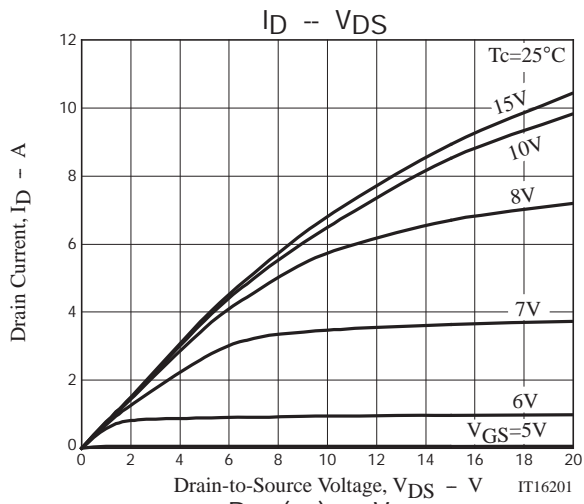


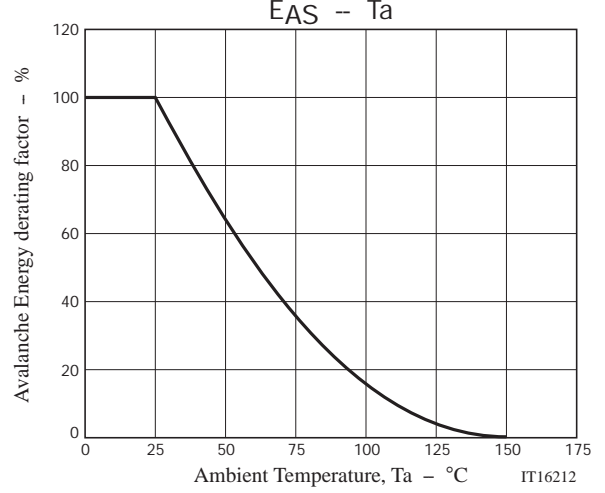
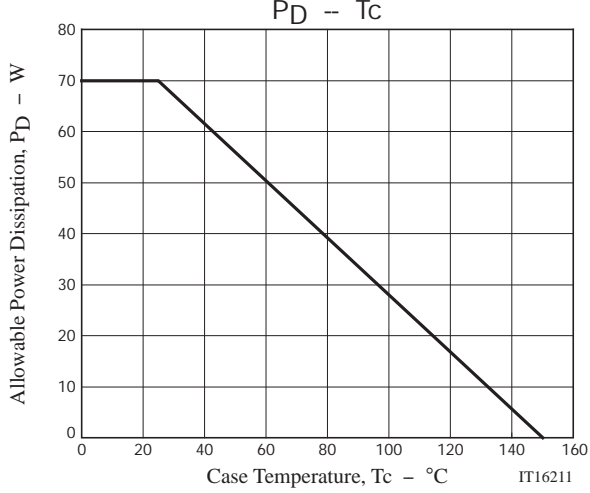
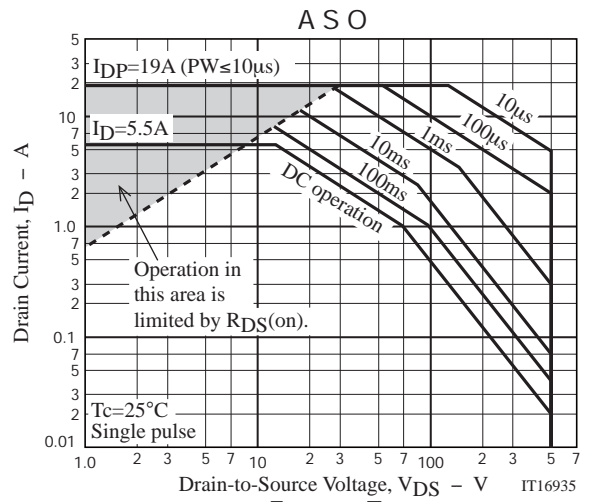
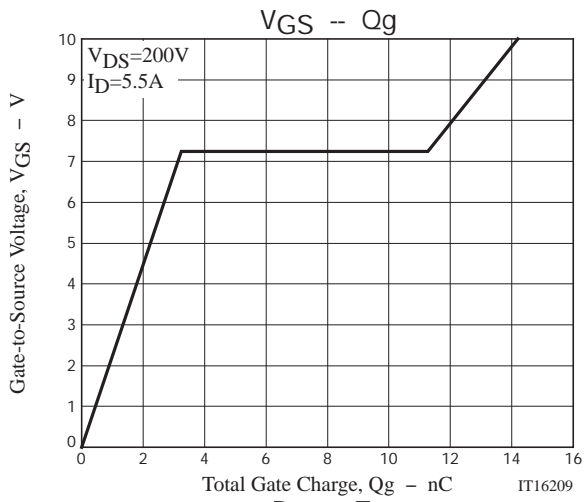
Fig.3 Reverse Recovery Time Test Circuit



## Ordering Information

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





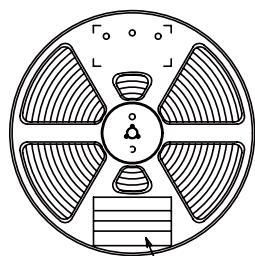
Taping Specification

ATP613-TL-H

1. Packing Format (TL)

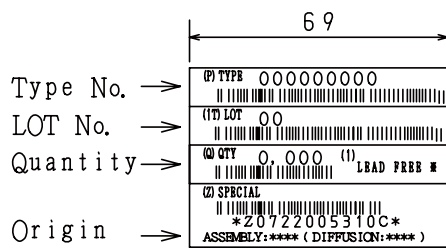
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	INNER BOX SD-C-18	OUTER BOX SD-A-18
ATPAK	ATP	3,000	3,000	15,000	1 reels contained Dimensions:mm (external) 340×340×28	5 inner boxes contained Dimensions:mm (external) 355×355×165

Packing method



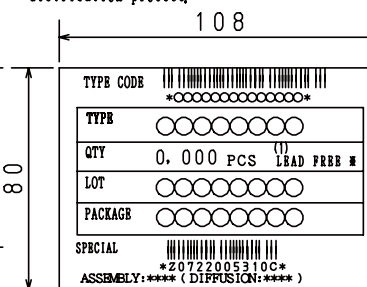
Reel label

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.



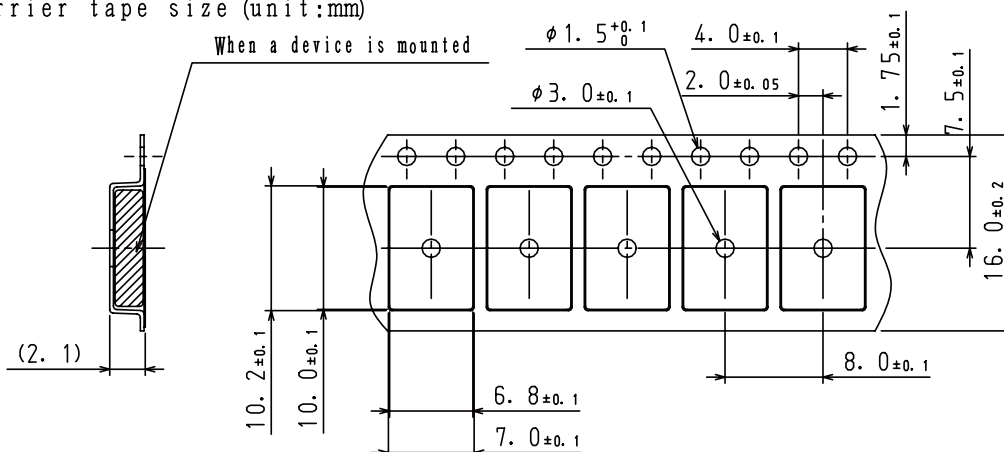
NOTE (1)

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

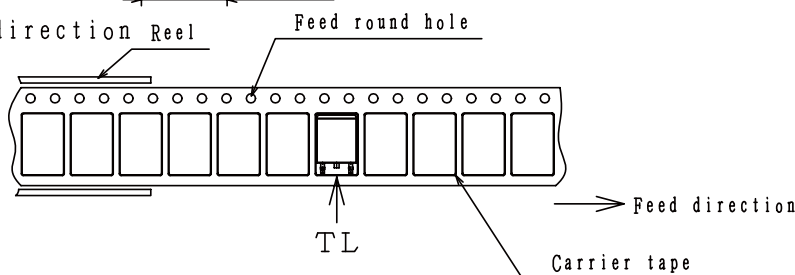
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



2-2. Device placement direction Reel



The one electrode terminals on feed hole side...TL

# ATP613

## 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.

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