



# ATP113

## P-Channel Power MOSFET -60V, -35A, 29.5mΩ, Single ATPAK

**ON Semiconductor®**
<http://onsemi.com>

### Features

- ON-resistance  $R_{DS(on)1}=22.5m\Omega$ (typ.)
- 4V drive
- Protection diode in
- Input Capacitance  $C_{iss}=2400pF$ (typ.)
- Halogen free compliance

### Specifications

#### Absolute Maximum Ratings at $T_a=25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		-60	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 20$	V
Drain Current (DC)	$I_D$		-35	A
Drain Current ( $PW \leq 10\mu s$ )	$I_{DP}$	$PW \leq 10\mu s$ , duty cycle $\leq 1\%$	-105	A
Allowable Power Dissipation	$P_D$	$T_c=25^\circ C$	50	W
Channel Temperature	$T_{ch}$		150	$^\circ C$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ C$
Avalanche Energy (Single Pulse) *1	$E_{AS}$		95	mJ
Avalanche Current *2	$I_{AV}$		-18	A

 Note : \*1  $V_{DD}=-10V$ ,  $L=500\mu H$ ,  $I_{AV}=-18A$ 

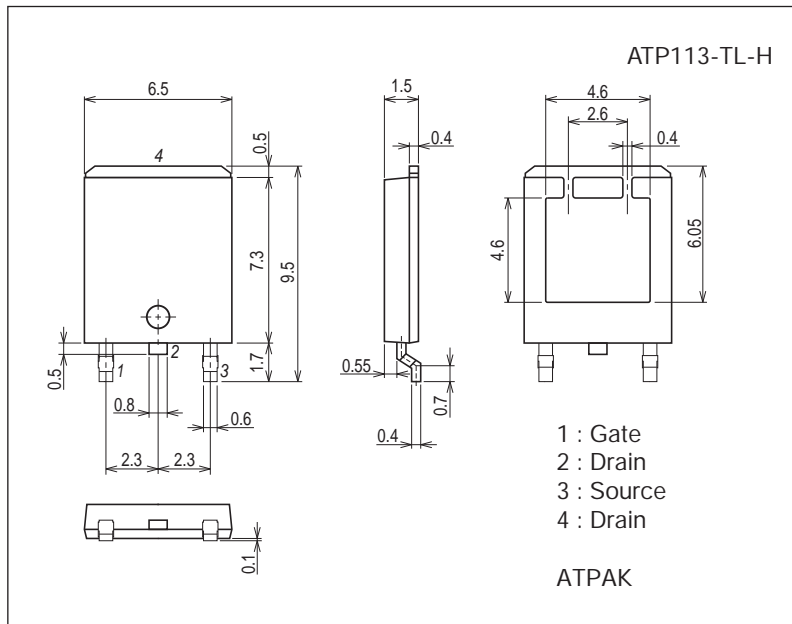
 \*2  $L \leq 500\mu H$ , Single pulse

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)

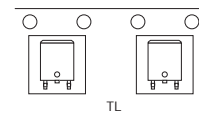
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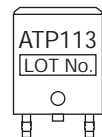
### Product & Package Information

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

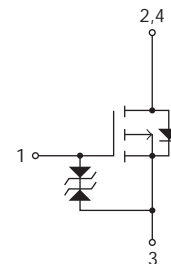
### Packing Type: TL



### Marking



### Electrical Connection

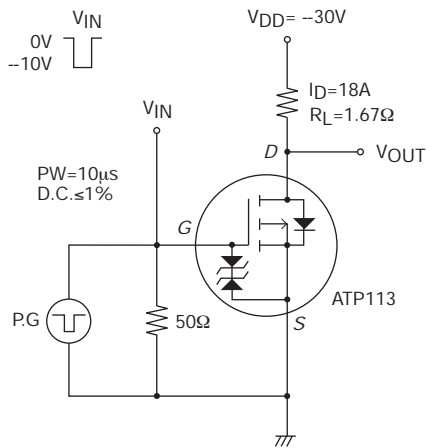


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## Electrical Characteristics at Ta=25°C

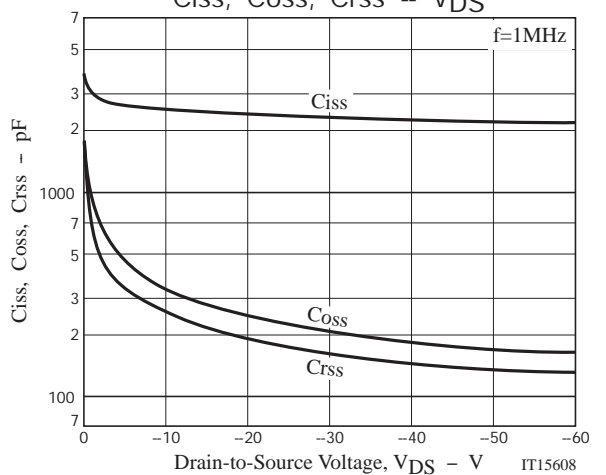
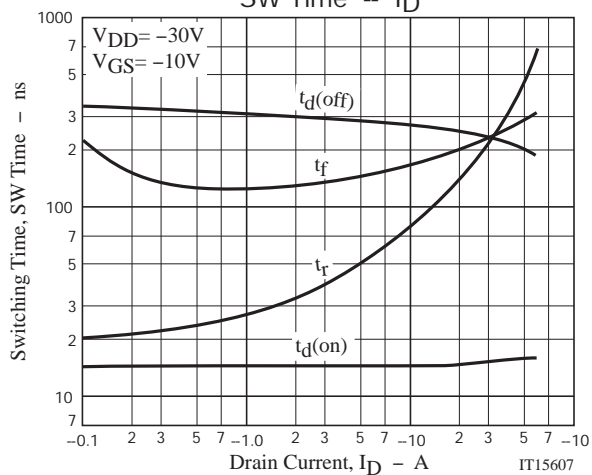
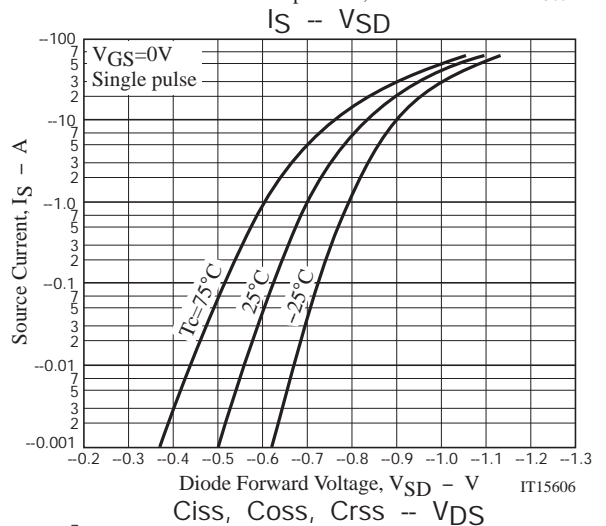
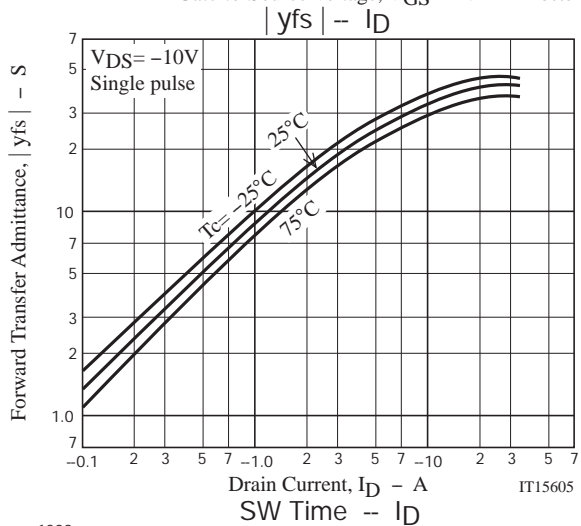
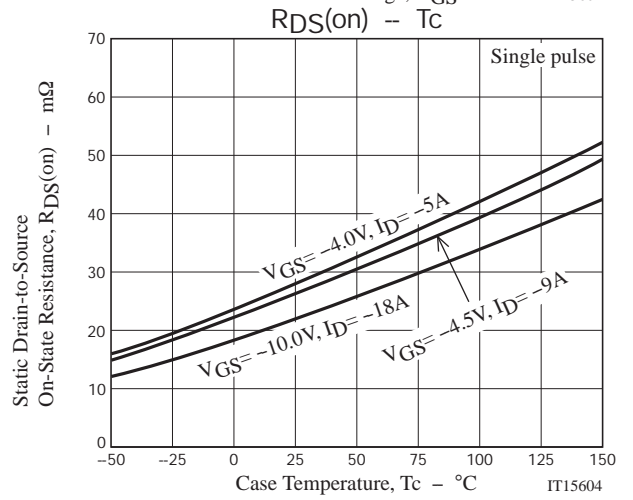
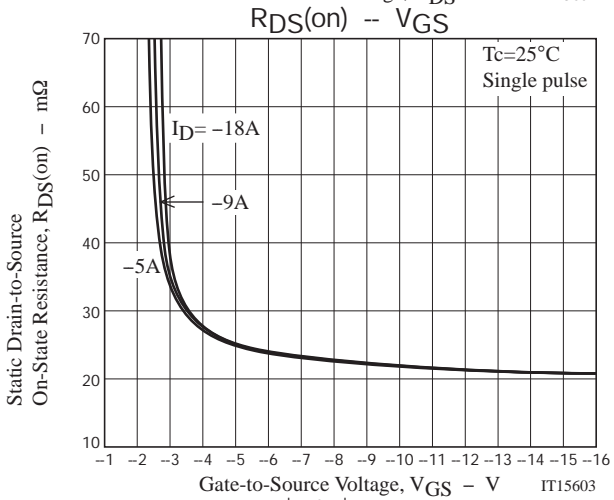
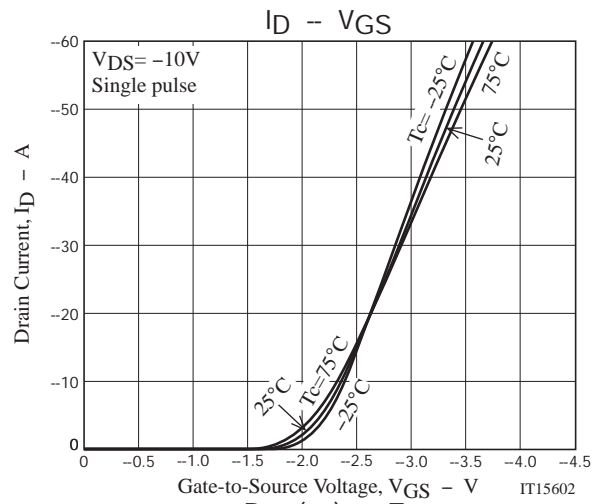
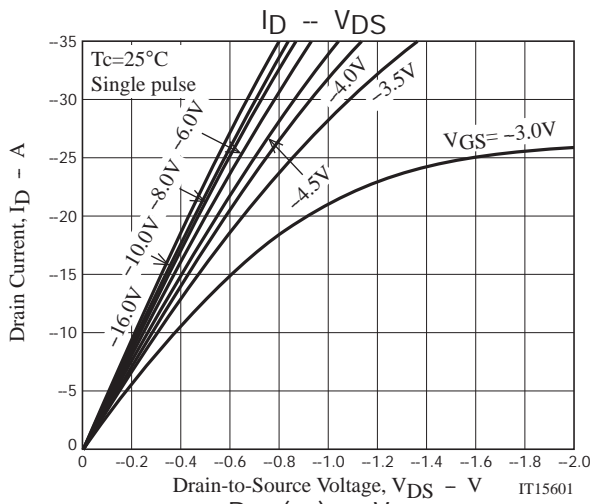
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -1\text{mA}, V_{GS} = 0\text{V}$	-60			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{V}, V_{GS} = 0\text{V}$			-1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = -10\text{V}, I_D = -1\text{mA}$	-1.2		-2.6	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = -10\text{V}, I_D = -18\text{A}$		37		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D = -18\text{A}, V_{GS} = -10\text{V}$		22.5	29.5	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D = -9\text{A}, V_{GS} = -4.5\text{V}$		27	38	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D = -5\text{A}, V_{GS} = -4\text{V}$		29	44	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = -20\text{V}, f = 1\text{MHz}$		2400		pF
Output Capacitance	$C_{oss}$			250		pF
Reverse Transfer Capacitance	$C_{rss}$			195		pF
Turn-ON Delay Time	$t_d(on)$			15		ns
Rise Time	$t_r$	See specified Test Circuit.		125		ns
Turn-OFF Delay Time	$t_d(off)$			250		ns
Fall Time	$t_f$			200		ns
Total Gate Charge	$Q_g$	$V_{DS} = -30\text{V}, V_{GS} = -10\text{V}, I_D = -35\text{A}$		55		nC
Gate-to-Source Charge	$Q_{gs}$			7.5		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$			12		nC
Diode Forward Voltage	$V_{SD}$	$I_S = -35\text{A}, V_{GS} = 0\text{V}$		-0.98	-1.5	V

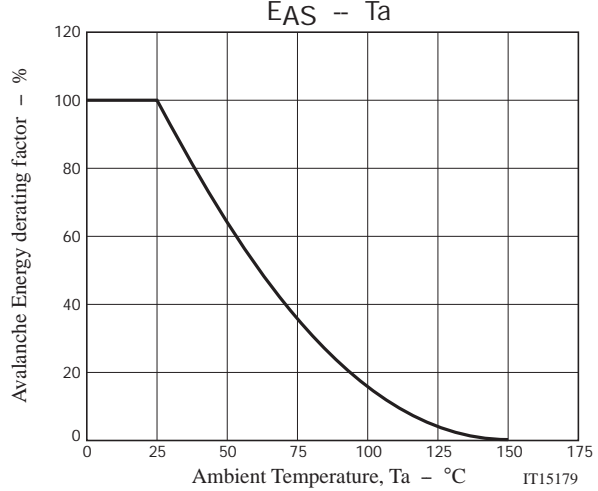
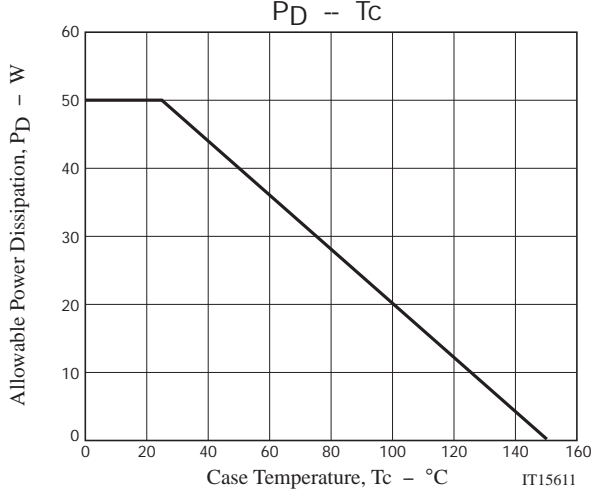
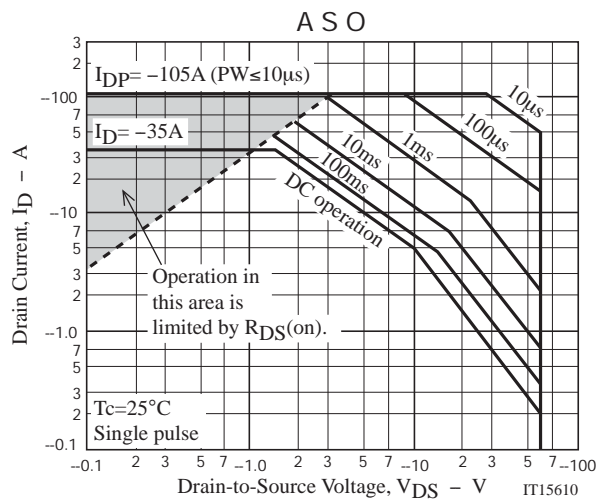
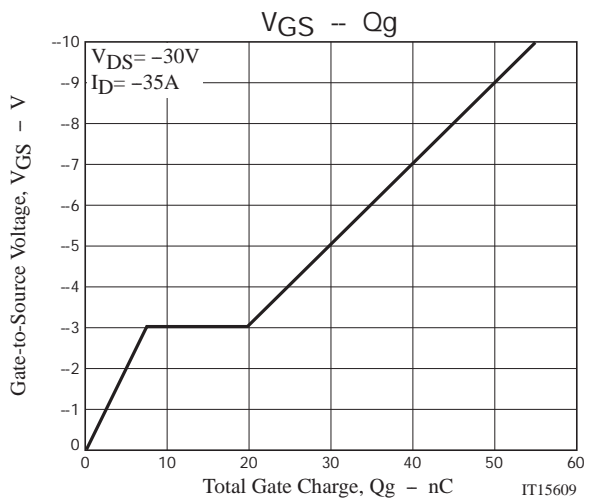
## Switching Time Test Circuit



## Ordering Information

Device	Package	Shipping	memo
ATP113-TL-H	ATPAK	3,000pcs./reel	Pb Free and Halogen Free





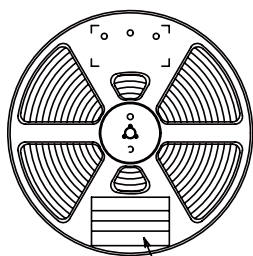
Taping Specification

ATP113-TL-H

1. Packing Format (TL)

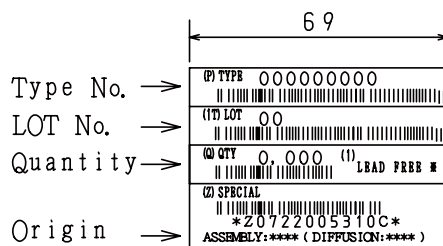
Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	INNER BOX SD-C-18	OUTER BOX SD-A-18
ATPAK	ATP	3,000	3,000	15,000	1 reels contained Dimensions:mm (external) 340×340×28	5 inner boxes contained Dimensions:mm (external) 355×355×165

Packing method



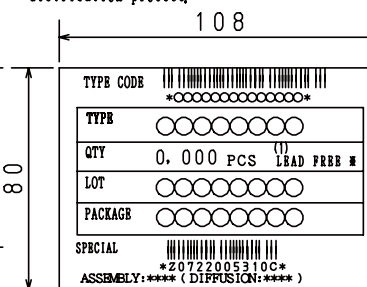
Reel label

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.



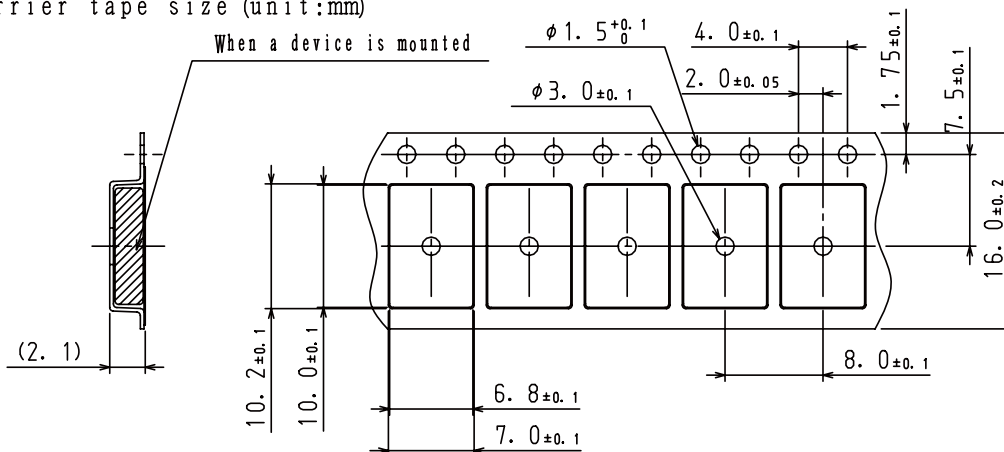
NOTE (1)

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

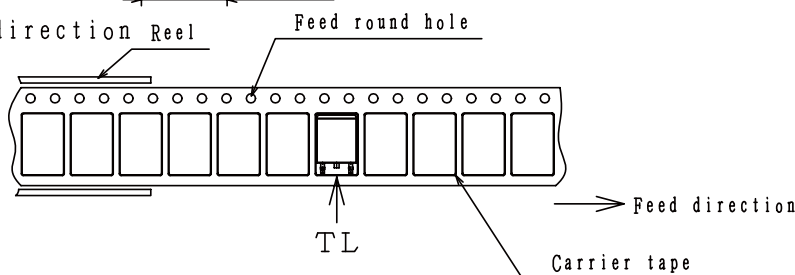
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

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



Note on usage : Since the ATP113 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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