



# ATP304

## P-Channel Power MOSFET -60V, -100A, 6.5mΩ, ATPAK

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### Features

- On-resistance  $R_{DS(on)} = 5.0\text{m}\Omega$  (typ.)
- Input Capacitance  $C_{iss} = 13000\text{pF}$  (typ.)
- 4.5V drive
- Halogen Free compliance

### Specifications

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

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)	$I_D$		-100	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	-400	A
Allowable Power Dissipation	$P_D$	$T_c = 25^\circ\text{C}$	90	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	$E_{AS}$		656	mJ
Avalanche Current *2	$I_{AV}$		-75	A

 Note : \*1  $V_{DD} = -36\text{V}$ ,  $L = 100\mu\text{H}$ ,  $I_{AV} = -75\text{A}$ 

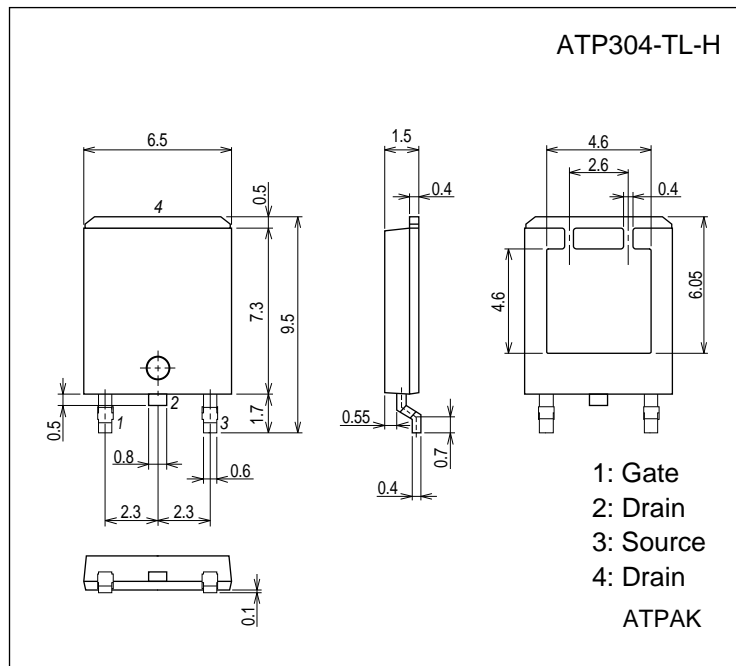
 \*2  $L \leq 100\mu\text{H}$ , Single pulse

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)

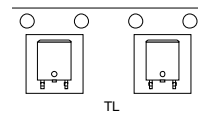
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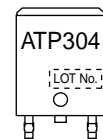
### Ordering & Package Information

Device	Package	Shipping	note
ATP304-TL-H	ATPAK	3,000 pcs. / reel	Pb-Free and Halogen-Free

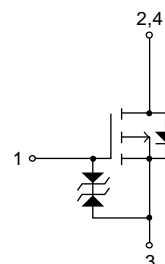
### Packing Type: TL



### Marking



### Electrical Connection

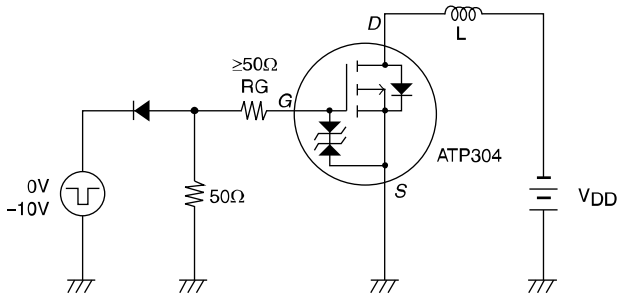


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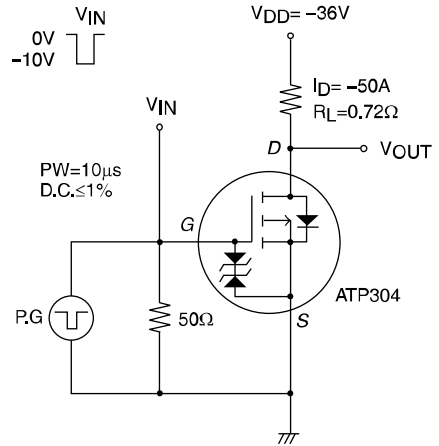
## Electrical Characteristics at Ta = 25°C

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	$I_{DSS}$	$V_{DS} = -60\text{V}, V_{GS} = 0\text{V}$			-10	$\mu\text{A}$
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} $	$V_{DS} = -10\text{V}, I_D = -50\text{A}$		100		S
Static Drain to Source On-State Resistance	$R_{DS(on)1}$	$I_D = -50\text{A}, V_{GS} = -10\text{V}$		5.0	6.5	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D = -50\text{A}, V_{GS} = -4.5\text{V}$		6.4	8.9	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = -20\text{V}, f = 1\text{MHz}$		13000		pF
Output Capacitance	$C_{oss}$			1080		pF
Reverse Transfer Capacitance	$C_{rss}$			760		pF
Turn-ON Delay Time	$t_{d(on)}$		See Fig.2		80	
Rise Time	$t_r$			650		ns
Turn-OFF Delay Time	$t_{d(off)}$			780		ns
Fall Time	$t_f$			460		ns
Total Gate Charge	$Q_g$	$V_{DS} = -36\text{V}, V_{GS} = -10\text{V}, I_D = -100\text{A}$			250	
Gate to Source Charge	$Q_{gs}$			55		nC
Gate to Drain "Miller" Charge	$Q_{gd}$			50		nC
Diode Forward Voltage	$V_{SD}$		$I_S = -100\text{A}, V_{GS} = 0\text{V}$		-1.0	-1.5
Reverse Recovery Time	$t_{rr}$	See Fig.3		90		ns
Reverse Recovery Charge	$Q_{rr}$	$I_S = -100\text{A}, V_{GS} = 0\text{V}, di/dt = -100\text{A}/\mu\text{s}$		245		nC

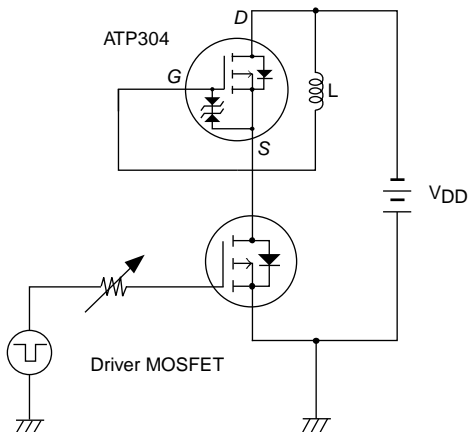
**Fig.1 Unclamped Inductive Switching Test Circuit**

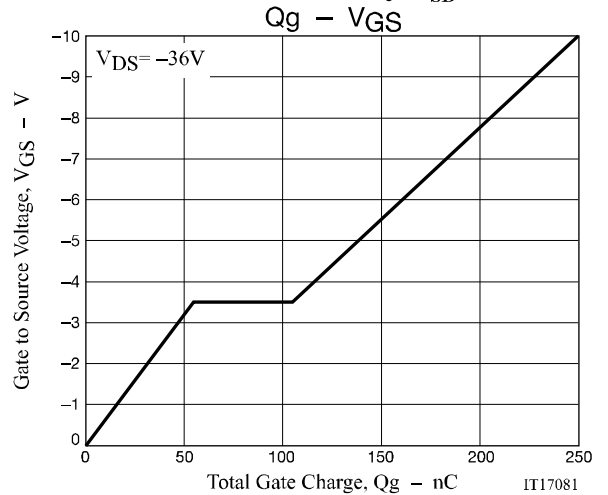
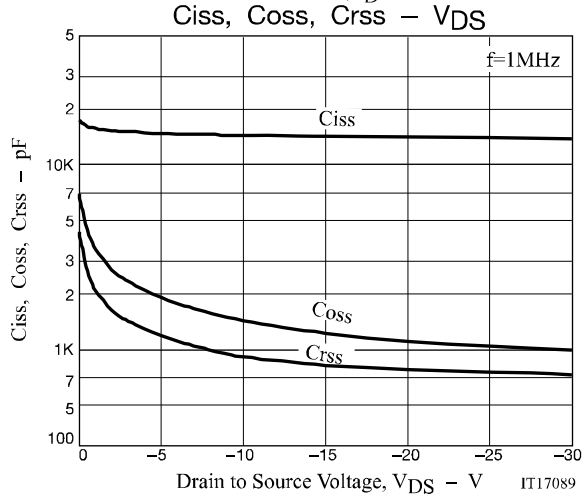
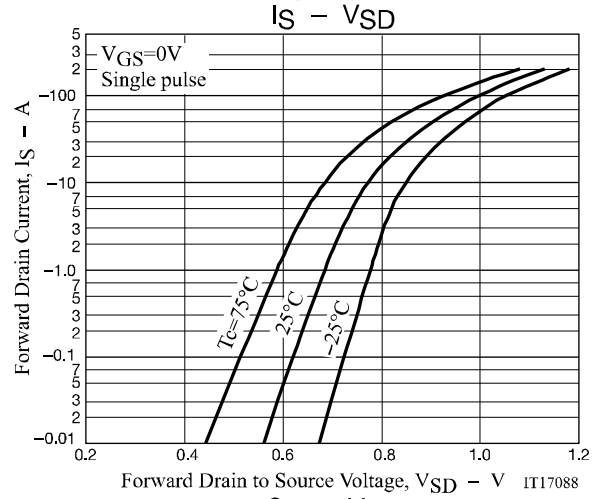
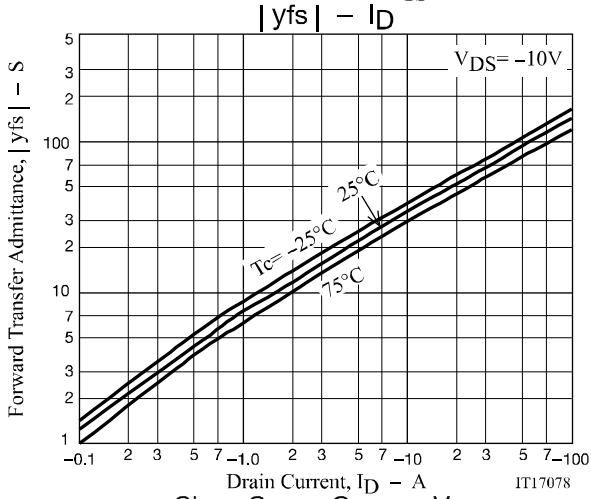
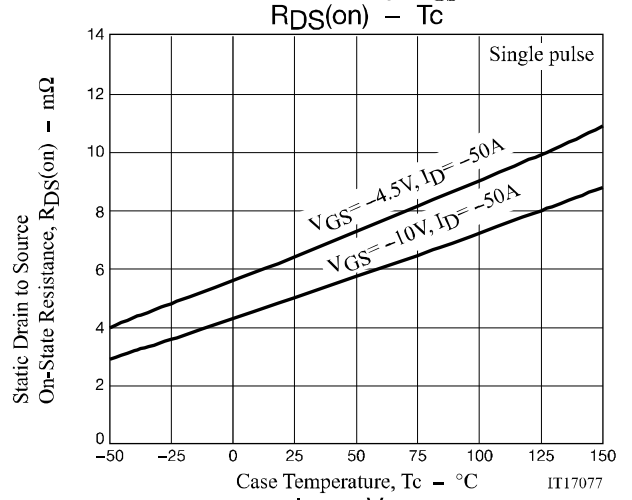
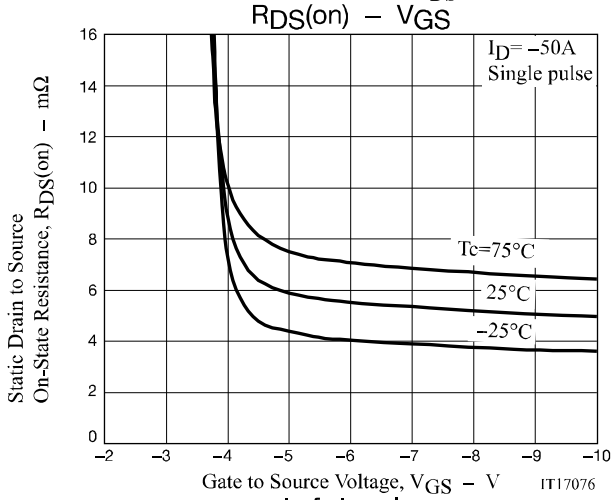
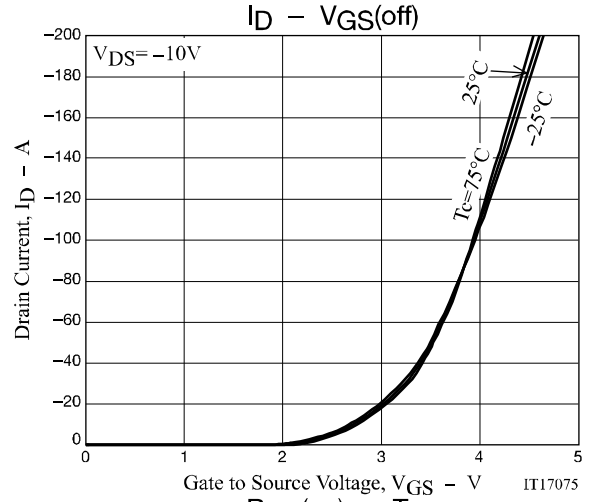
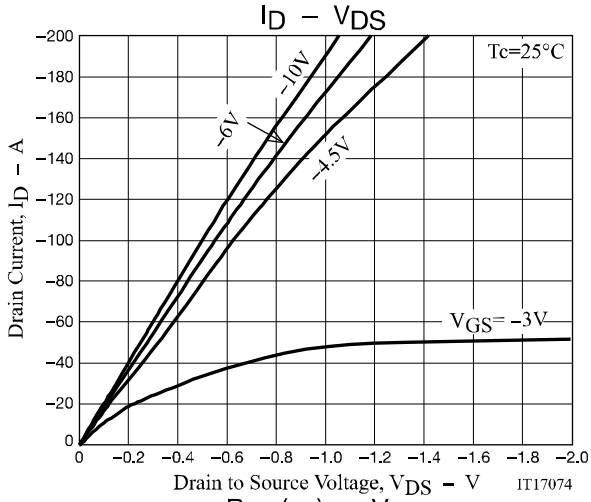


**Fig.2 Switching Time Test Circuit**

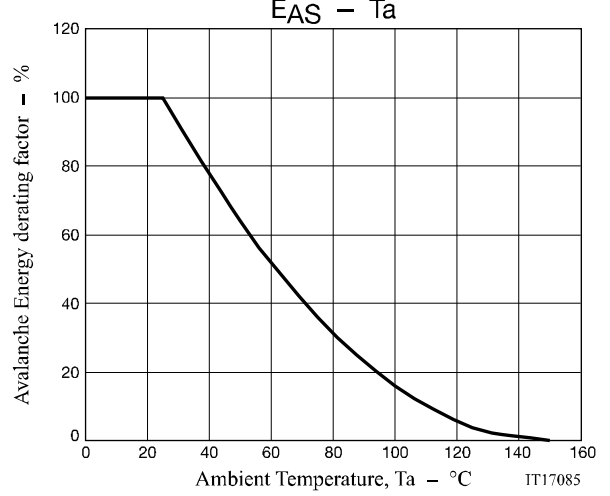
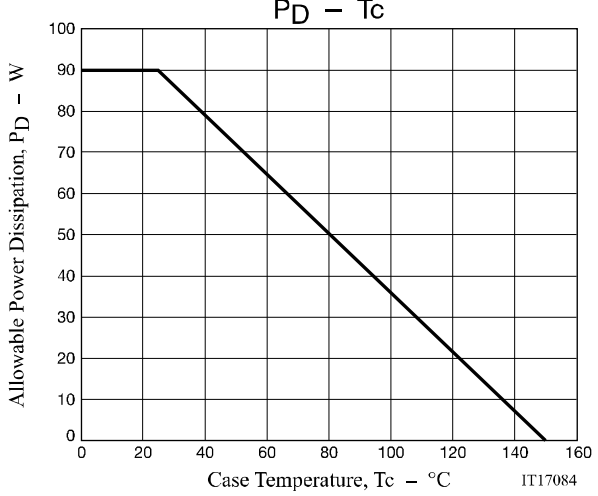
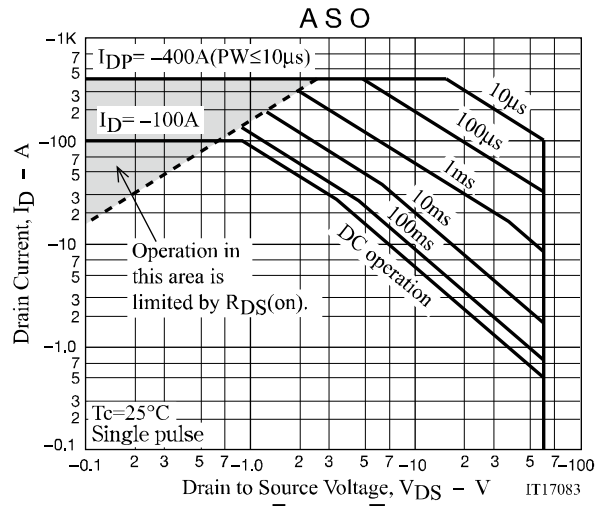
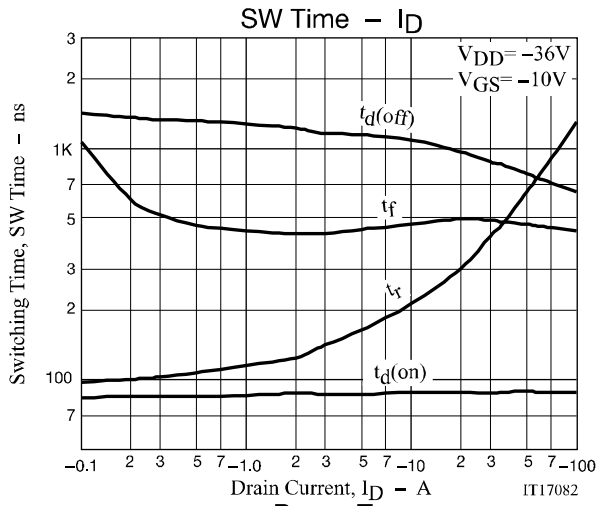


**Fig.3 Reverse Recovery Time Test Circuit**





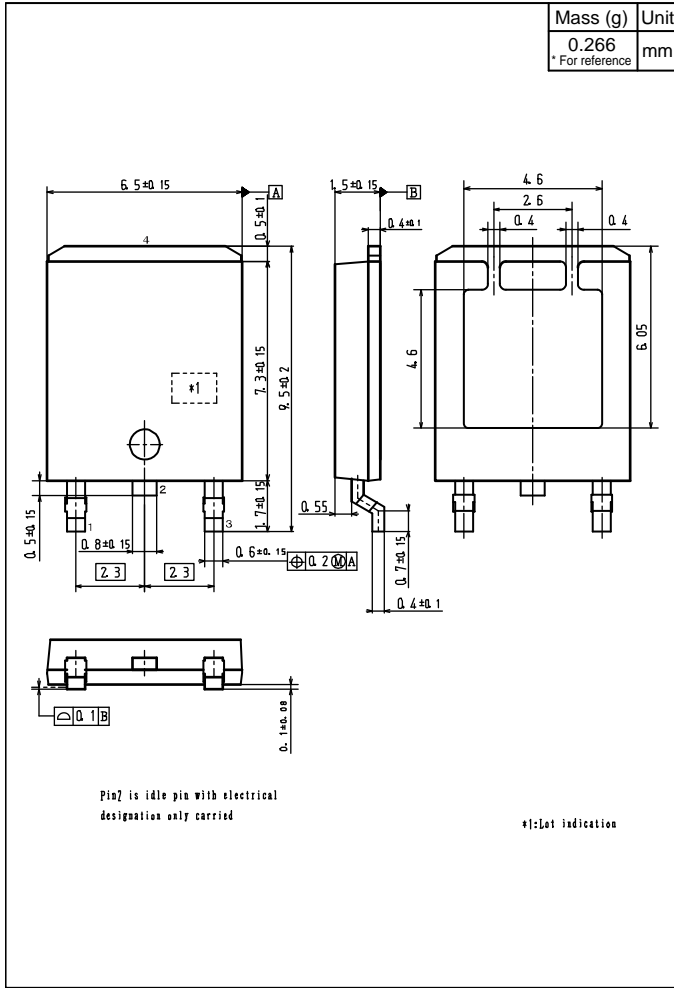
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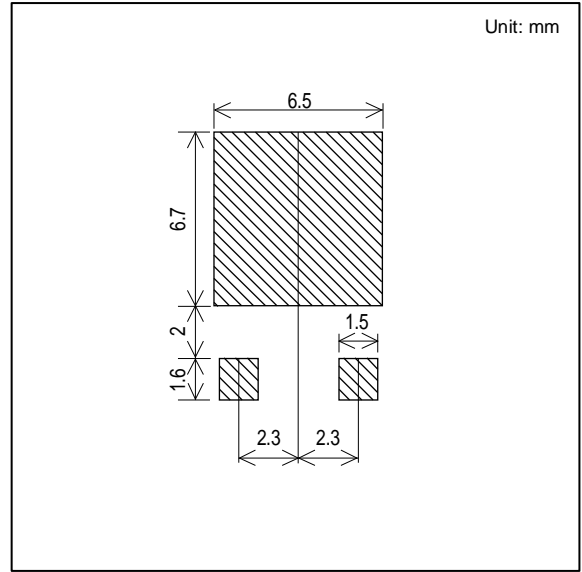
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## Outline Drawing

ATP304-TL-H



## Land Pattern Example



Note on usage : Since the ATP304 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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