



# H7N1004FN

Silicon N-Channel MOSFET  
High-Speed Power Switching

REJ03G1593-0100

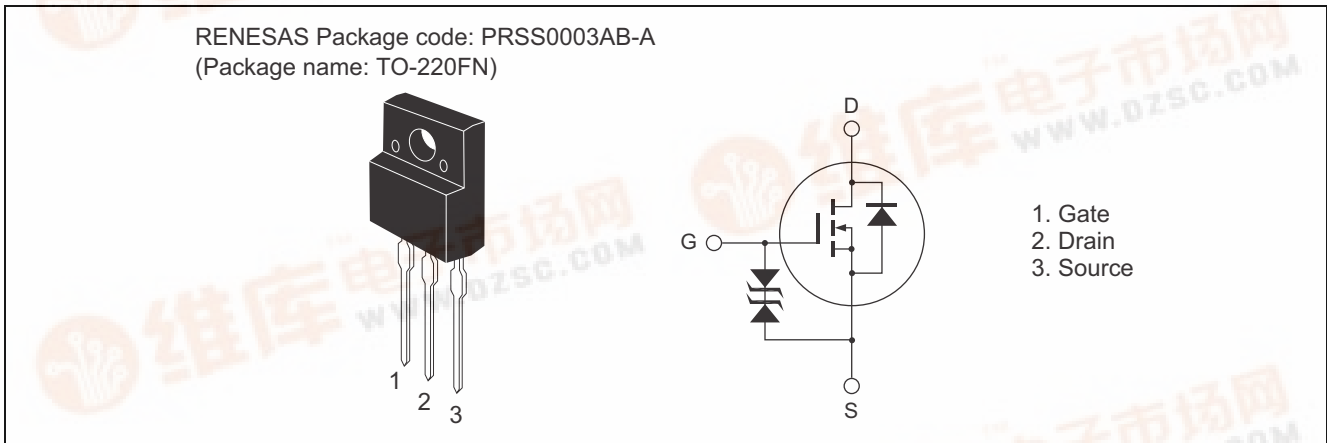
Rev.1.00

Oct 23, 2007

## Features

- Low on-resistance
- $R_{DS(on)} = 25 \text{ m}\Omega$  typ.
- Low drive current
- Available for 4.5 V gate drive

## Outline



## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Value	Unit
Drain to source voltage	$V_{DSS}$	100	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	25	A
Drain peak current	$I_D$ (pulse) <sup>Note 1</sup>	100	A
Body-drain diode reverse drain current	$I_{DR}$	25	A
Avalanche current	$I_{AP}$ <sup>Note 3</sup>	15	A
Avalanche energy	$E_{AR}$ <sup>Note 3</sup>	22.5	mJ
Channel dissipation	$P_{ch}$ <sup>Note 2</sup>	25	W
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Notes: 1.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$

2. Value at  $T_c = 25^\circ\text{C}$

3. Value at  $T_{ch} = 25^\circ\text{C}$ ,  $R_g \geq 50 \Omega$



## Electrical Characteristics

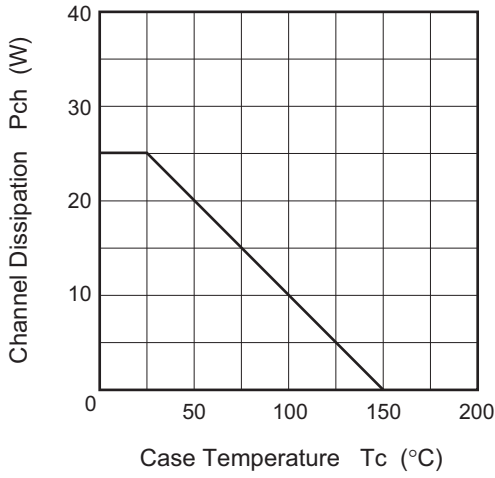
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 100 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	$I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$ <sup>Note 4</sup>
Static drain to source on state resistance	$R_{DS(on)}$	—	25	35	$\text{m}\Omega$	$I_D = 12.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
		—	30	45	$\text{m}\Omega$	$I_D = 12.5 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note 4</sup>
Forward transfer admittance	$ y_{fs} $	20	35	—	S	$I_D = 12.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note 4</sup>
Input capacitance	$C_{iss}$	—	2800	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	$C_{oss}$	—	240	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	140	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	50	—	nC	$V_{DD} = 50 \text{ V}$
Gate to source charge	$Q_{gs}$	—	9	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	11	—	nC	$I_D = 25 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 12.5 \text{ A}$
Rise time	$t_r$	—	110	—	ns	$R_L = 2.4 \Omega$
Turn-off delay time	$t_{d(off)}$	—	70	—	ns	$R_g = 4.7 \Omega$
Fall time	$t_f$	—	9.5	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.89	—	V	$I_F = 25 \text{ A}$ , $V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	45	—	ns	$I_F = 25 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

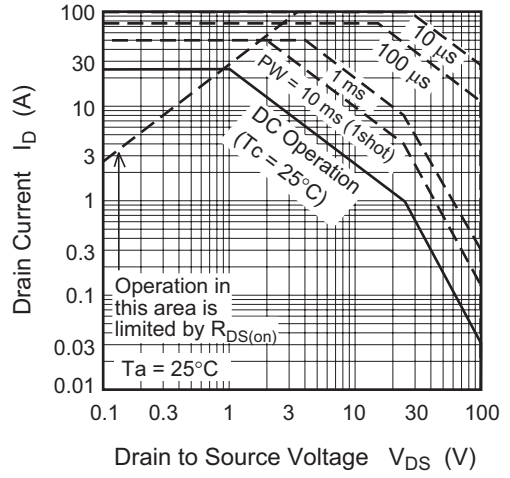
Notes: 4. Pulse test

Main Characteristics

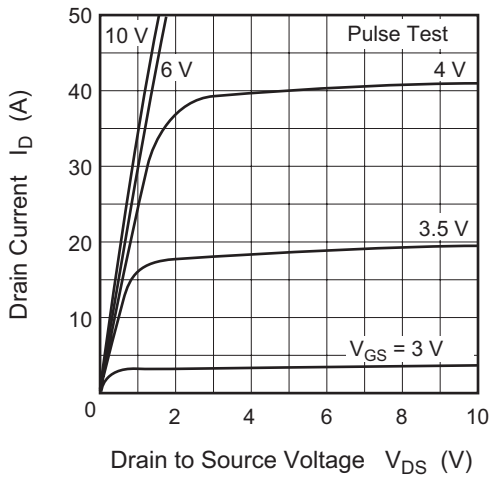
Power vs. Temperature Derating



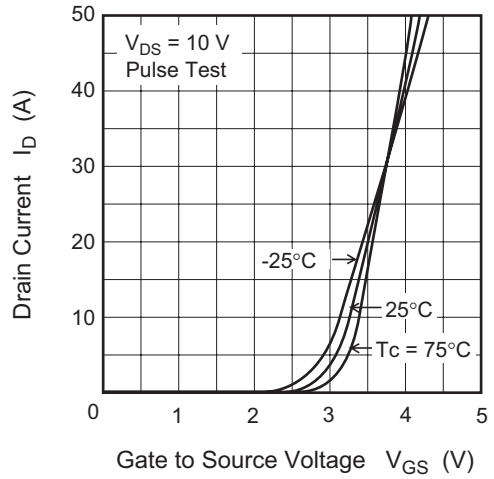
Maximum Safe Operation Area



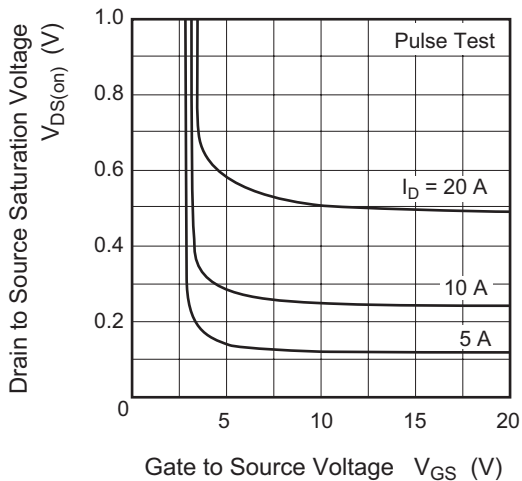
Typical Output Characteristics



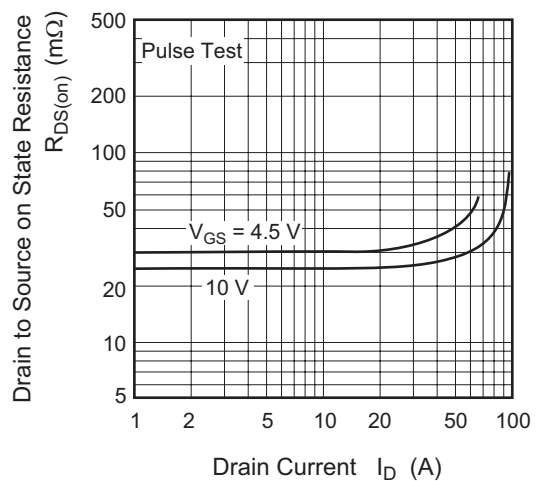
Typical Transfer Characteristics

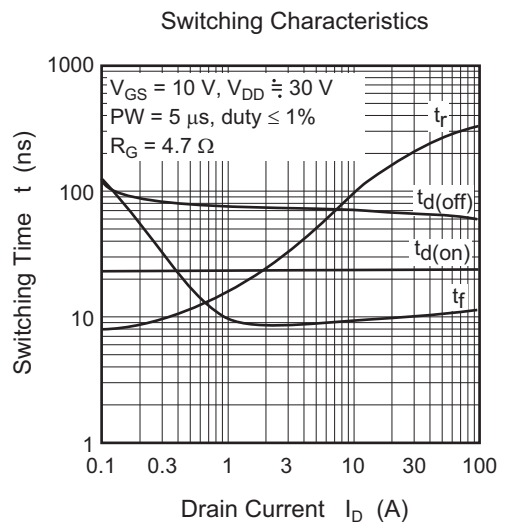
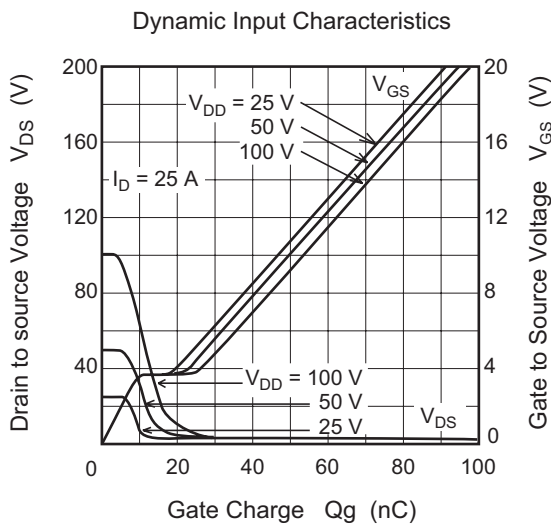
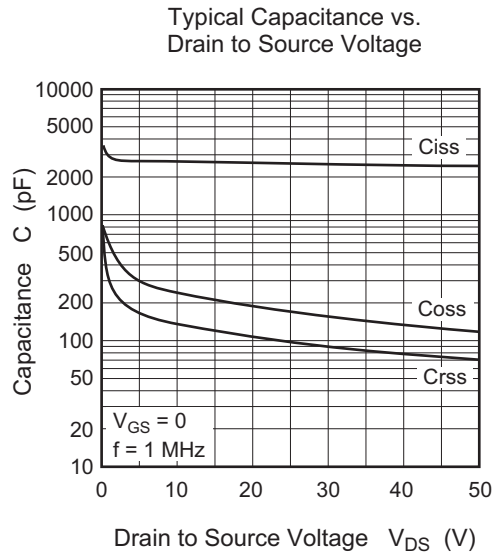
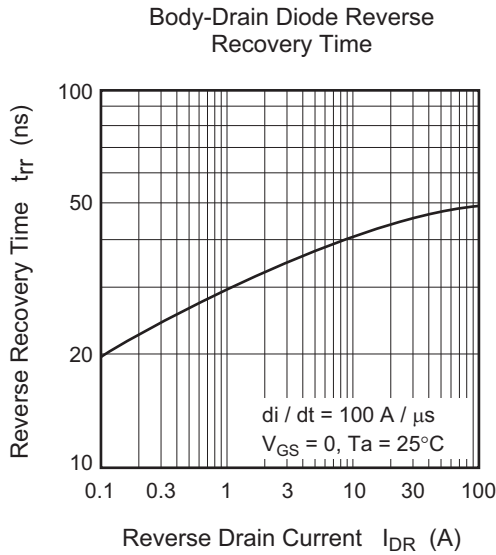
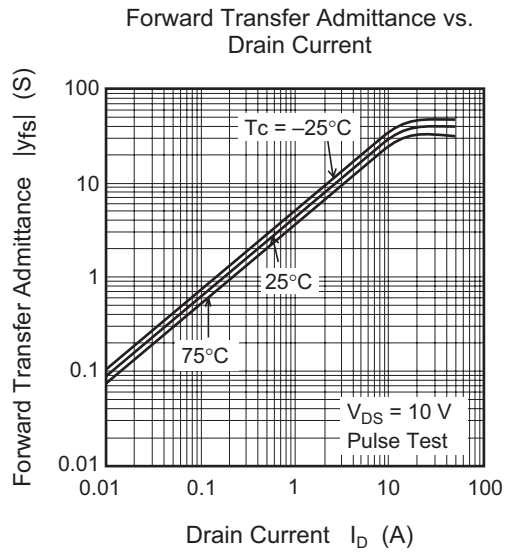
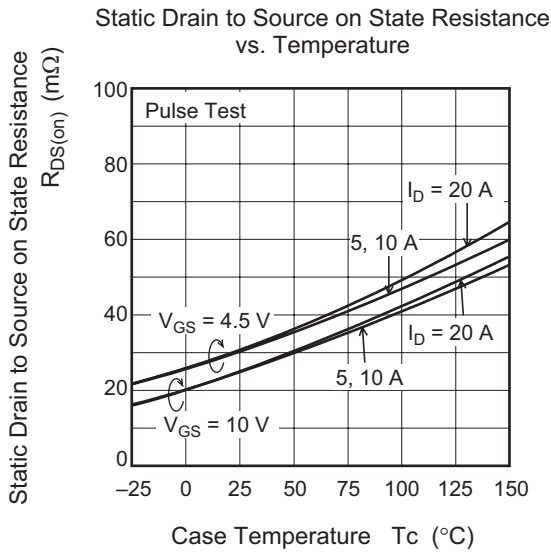


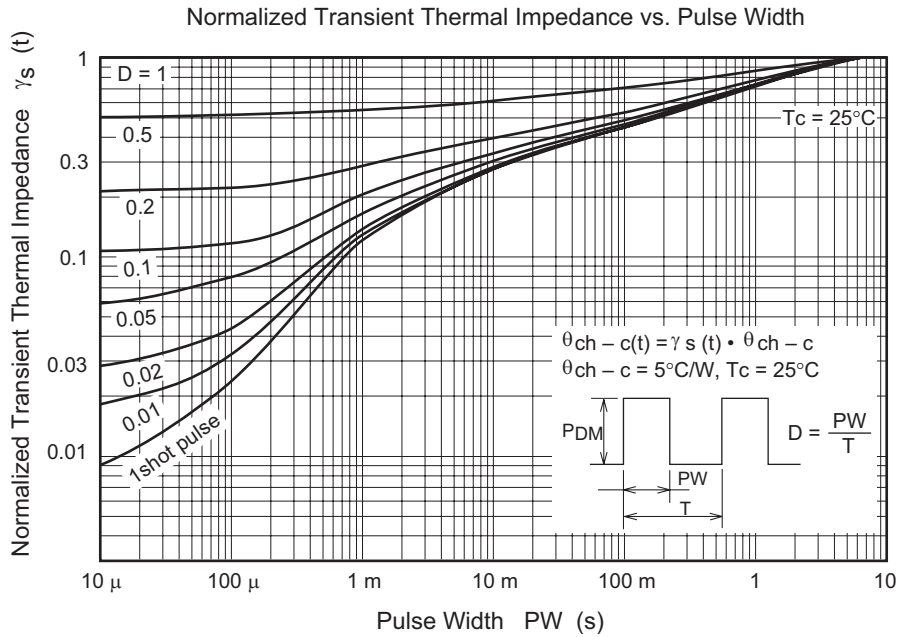
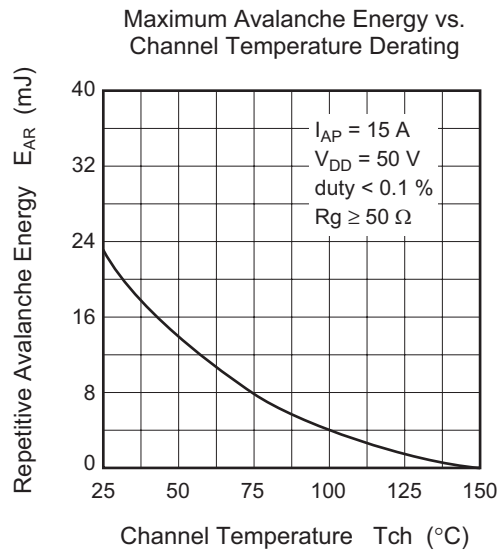
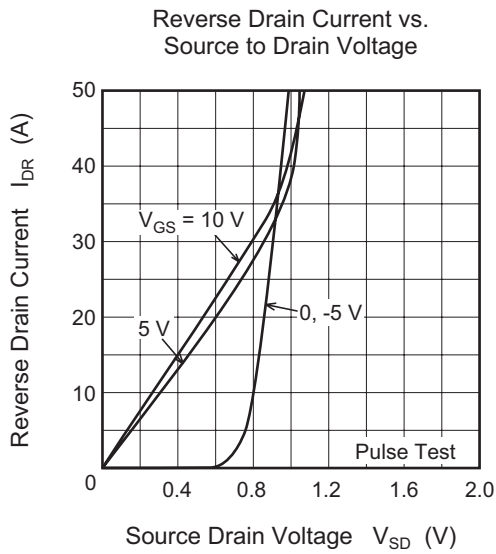
Drain to Source Saturation Voltage VS. Gate to Source Voltage



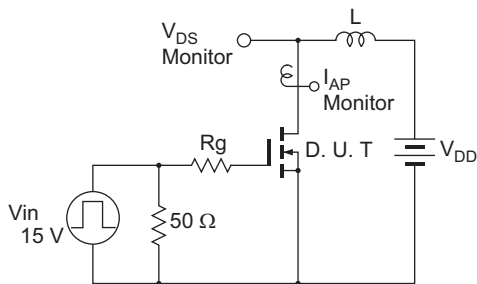
Static Drain to Source on State Resistance vs. Drain Current





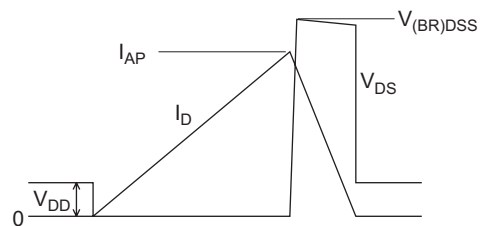


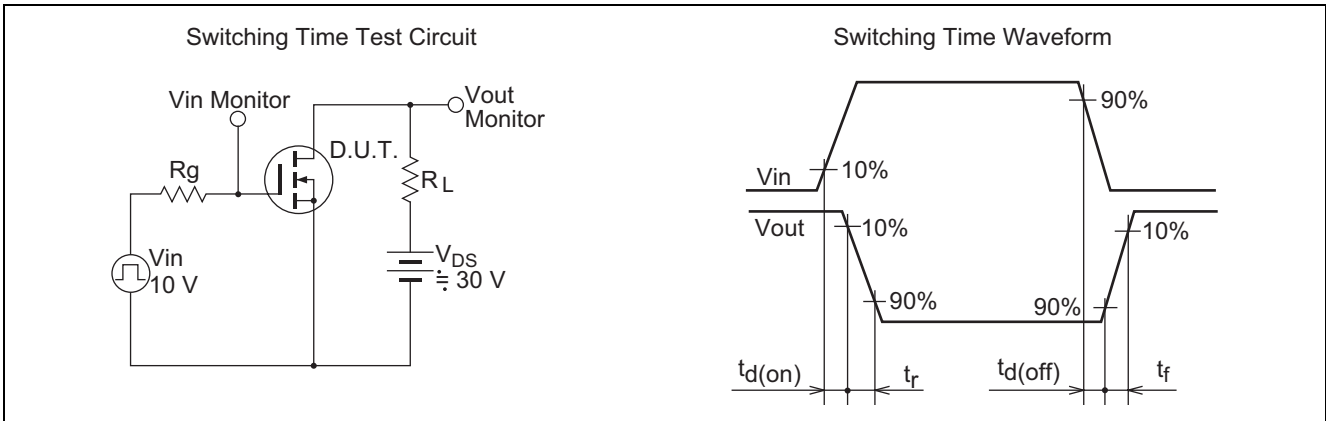
Avalanche Test Circuit



Avalanche Waveform

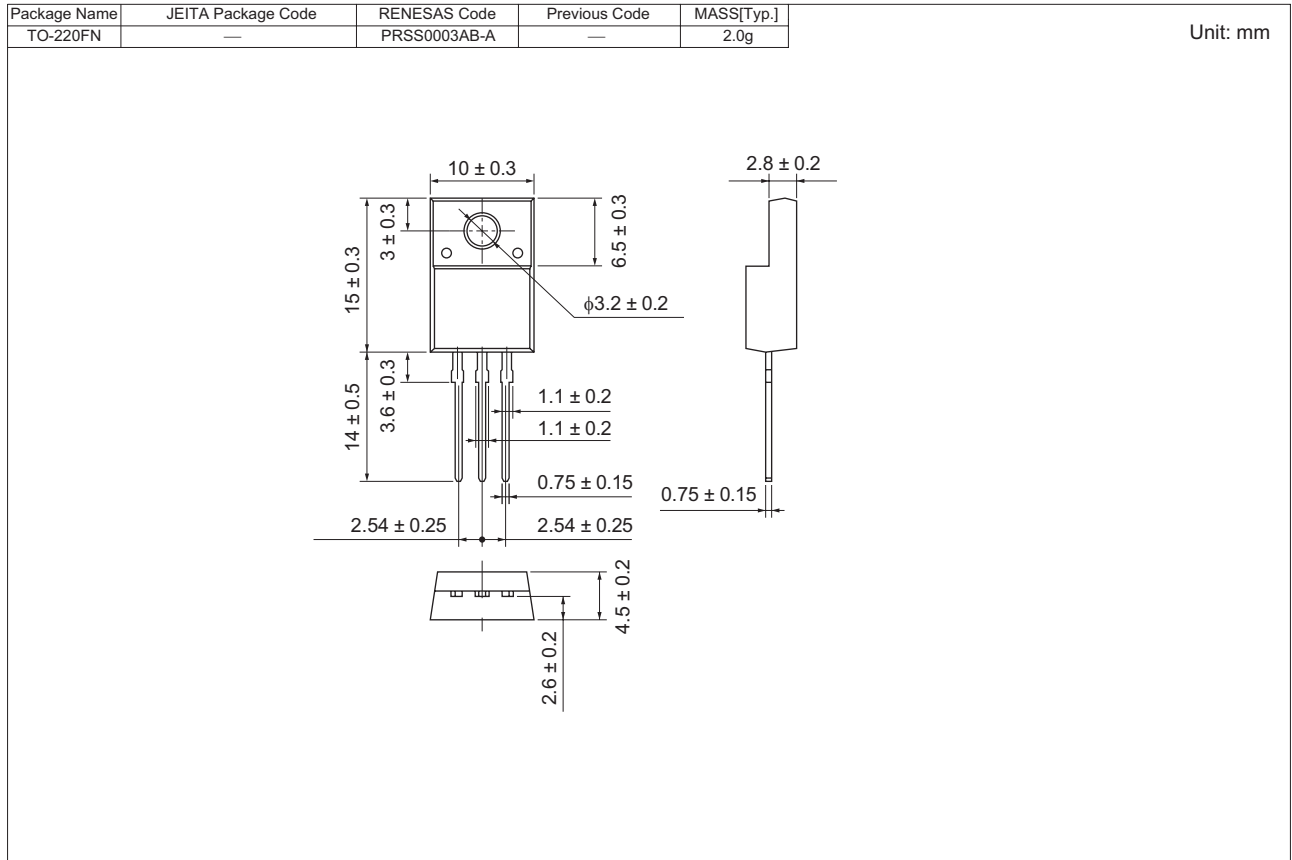
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$





# H7N1004FN

## Package Dimensions



## Ordering Information

Part No.	Quantity	Shipping Container
H7N1004FN	50 pcs	Plastic Magazine (Tube)

Notes:

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