H7N1004FM

Silicon N-Channel MOSFET
High-Speed Power Switching

REJ03G0073-0100Z
(Previous ADE-208-1463A(Z))
Rev.1.00
Aug.27.2003

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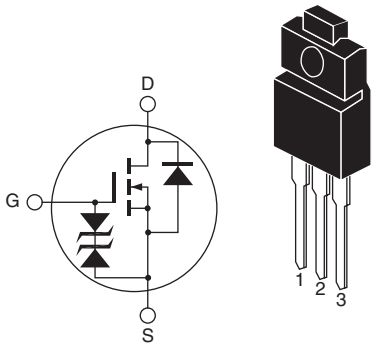
Features

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

Outline

TO-220FM



1. Gate
2. Drain
3. Source

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Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	100	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	25	A
Drain peak current	I_D (pulse)[Note1]	100	A
Body-drain diode reverse drain current	I_{DR}	100	A
Avalanche current	I_{AP} [Note 3]	15	A
Avalanche energy	E_{AR} [Note 3]	22.5	mJ
Channel dissipation	Pch [Note 2]	25	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. Value at Tch = 25°C, Rg ≥ 50 Ω

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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 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 100 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.5	—	2.5	V	I_D = 1 mA, V_{DS} = 10 V Note 1
Static drain to source on state resistance	$R_{DS(on)}$	—	25	35	mΩ	I_D = 12.5 A, V_{GS} = 10 V Note 1
		—	30	45	mΩ	I_D = 12.5 A, V_{GS} = 4.5 V Note 1
Forward transfer admittance	|yfs|	20	35	—	S	I_D = 12.5 A, V_{GS} = 10 V Note 1
Input capacitance	Ciss	—	2800	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	240	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	140	—	pF	f = 1 MHz
Total gate charge	Qg	—	50	—	nC	V_{DD} = 50 V
Gate to source charge	Qgs	—	9	—	nC	V_{GS} = 10 V
Gate to drain charge	Qgd	—	11	—	nC	I_D = 25 A
Turn-on delay time	td(on)	—	23	—	ns	V_{GS} = 10 V, I_D = 12.5 A
Rise time	tr	—	110	—	ns	R_L = 2.4 Ω
Turn-off delay time	td(off)	—	70	—	ns	Rg = 4.7 Ω
Fall time	tf	—	9.5	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.89	—	V	I_F = 25 A, V_{GS} = 0
Body-drain diode reverse recovery time	trr	—	45	—	ns	I_F = 25 A, V_{GS} = 0 diF/dt = 100 A/µs

Notes: 1. Pulse test

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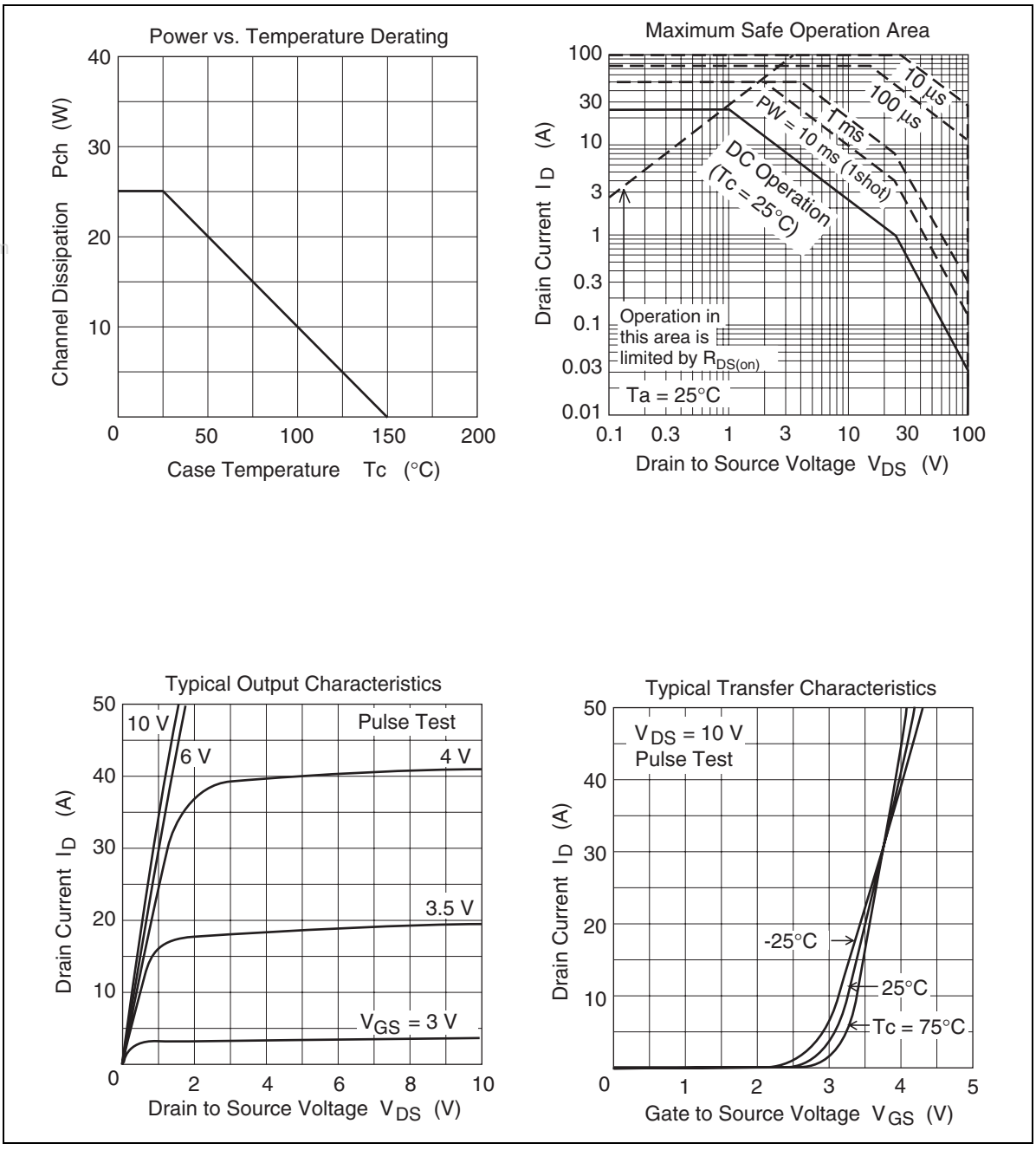
Main Characteristics



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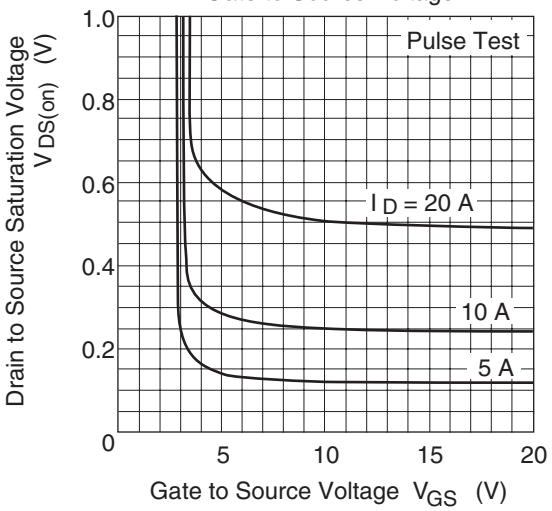
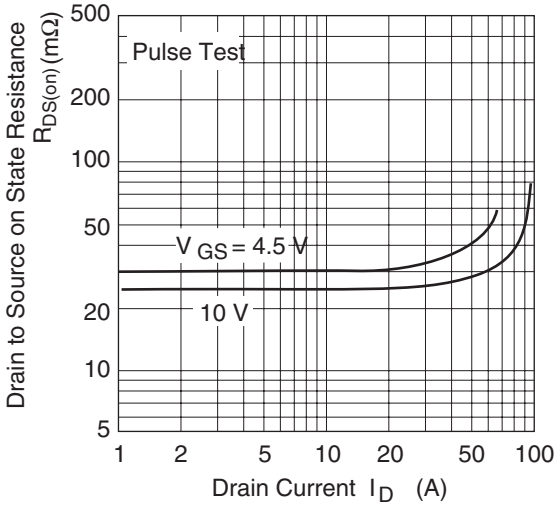
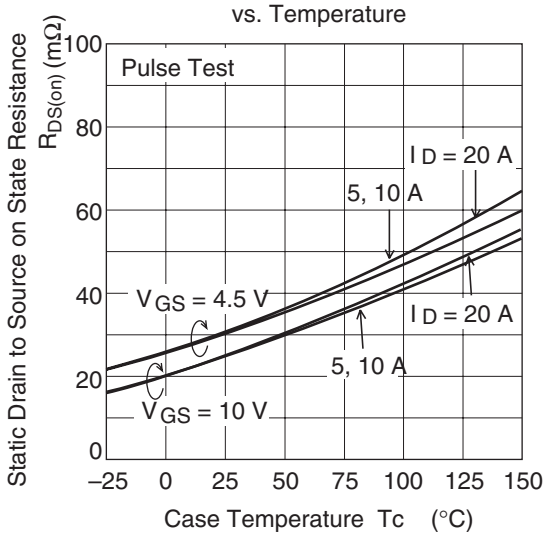
Drain to Source Saturation Voltage VS. Gate to Source Voltage



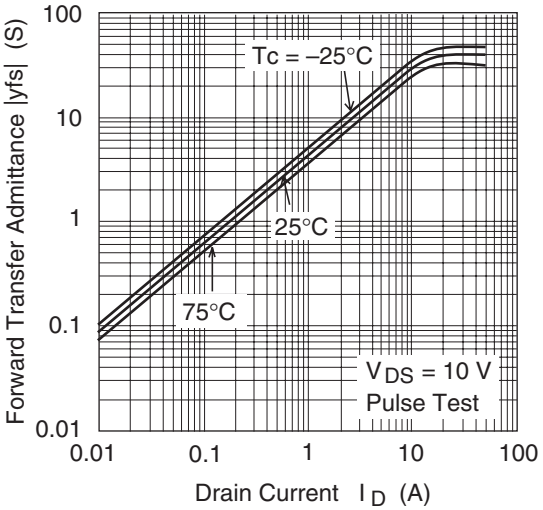
Static Drain to Source on State Resistance vs. Drain Current



Static Drain to Source on State Resistance vs. Temperature



Forward Transfer Admittance vs. Drain Current



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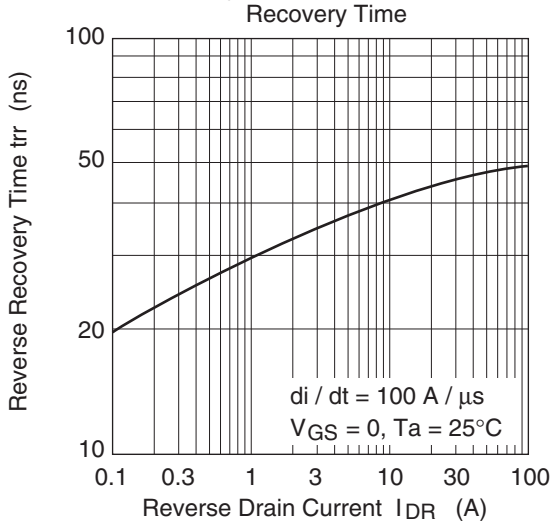
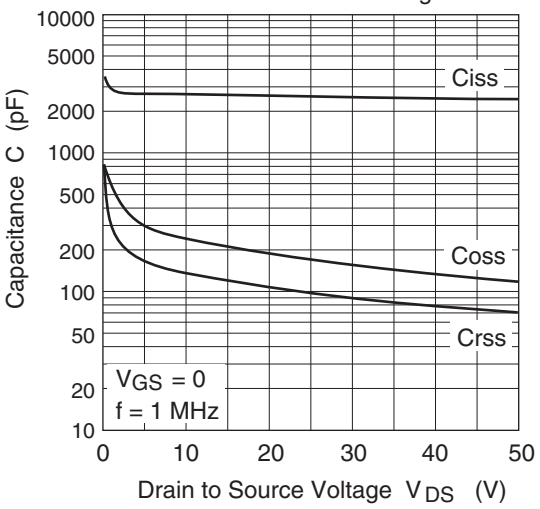
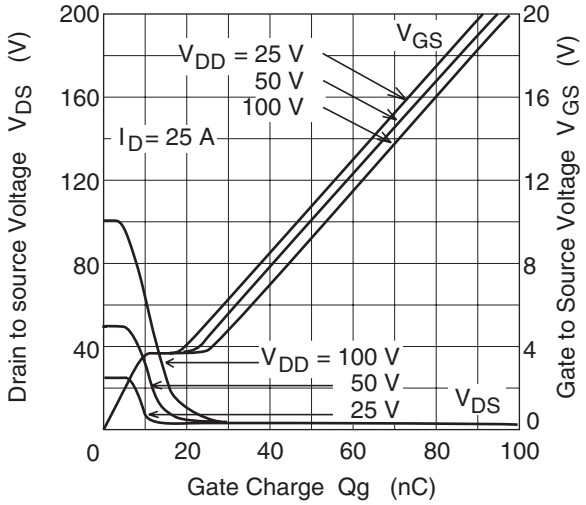
Body-Drain Diode Reverse Recovery Time



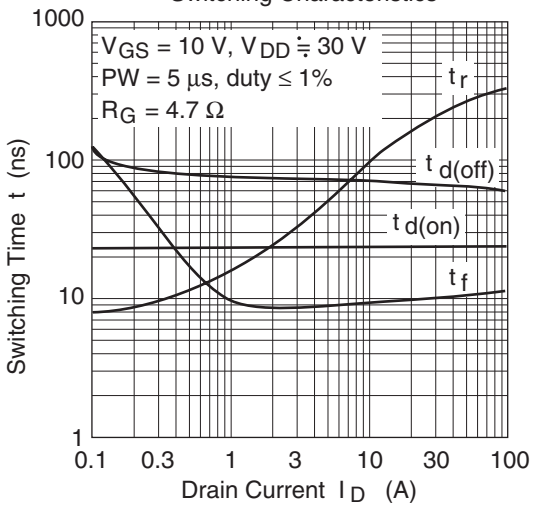
Typical Capacitance vs. Drain to Source Voltage



Dynamic Input Characteristics



Switching Characteristics



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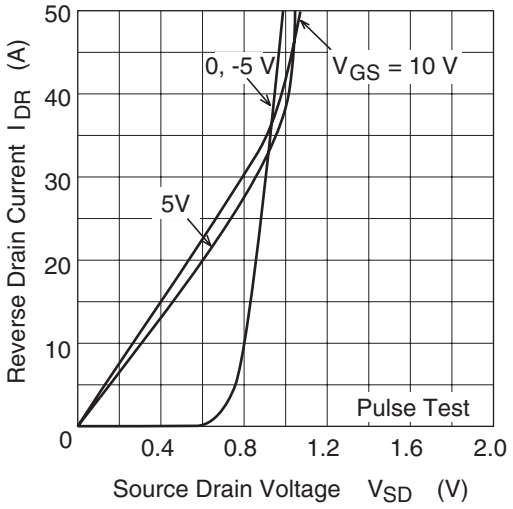
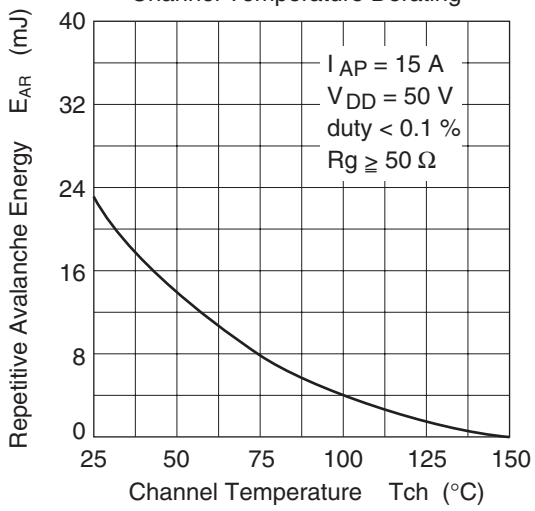
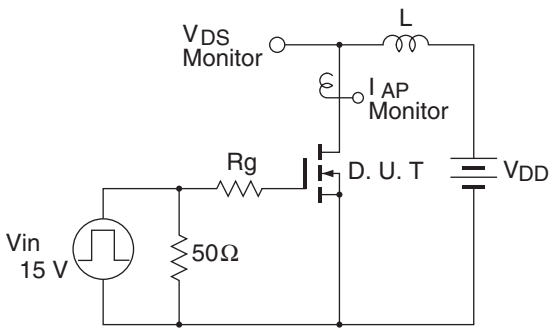
Reverse Drain Current vs. Source to Drain Voltage



Maximum Avalanche Energy vs. Channel Temperature Derating

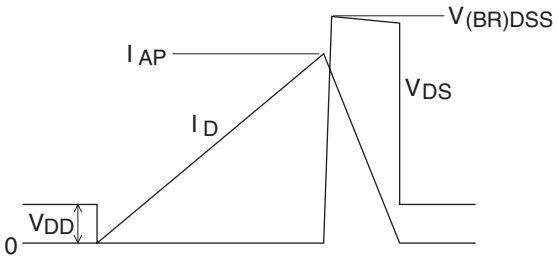


Avalanche Test Circuit



Avalanche Waveform

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



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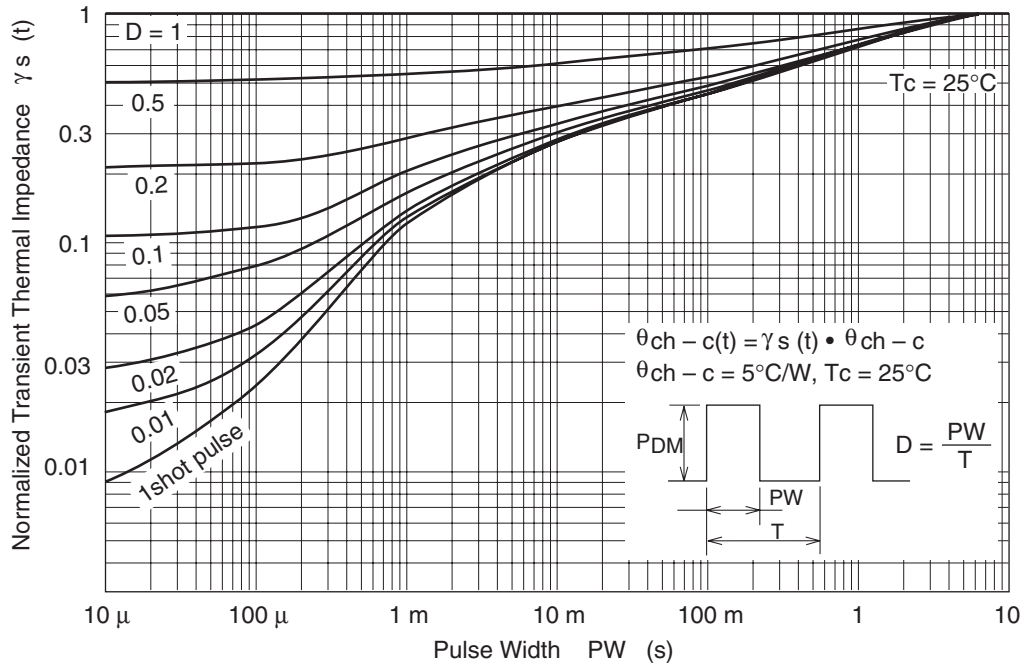
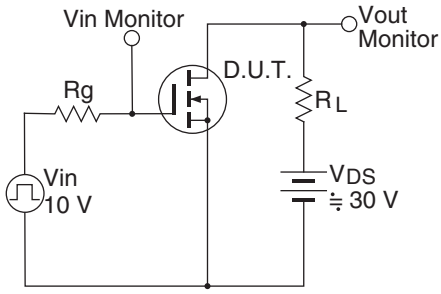
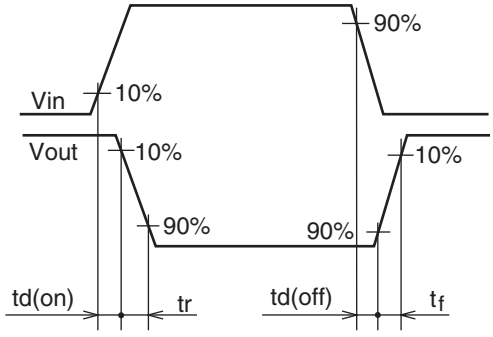
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Switching Time Waveform



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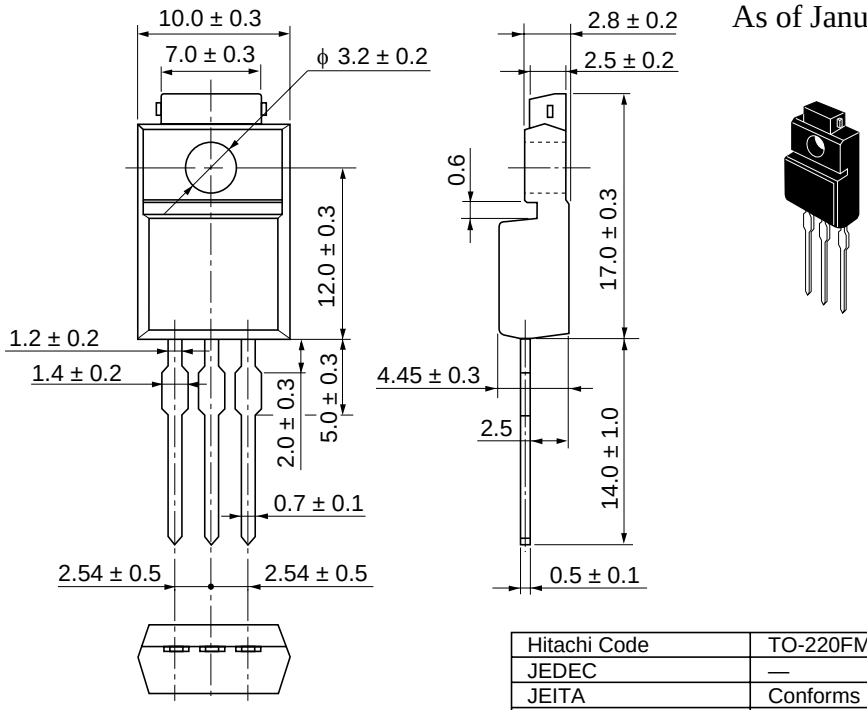
Package Dimensions



As of January, 2003

Unit: mm

Hitachi Code	TO-220FM
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.8 g

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