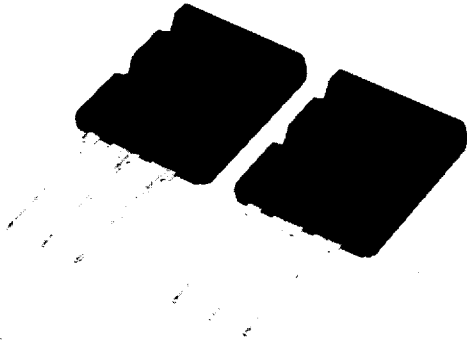


# CT60AM-20

RESONANT INVERTER USE

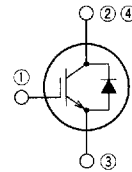
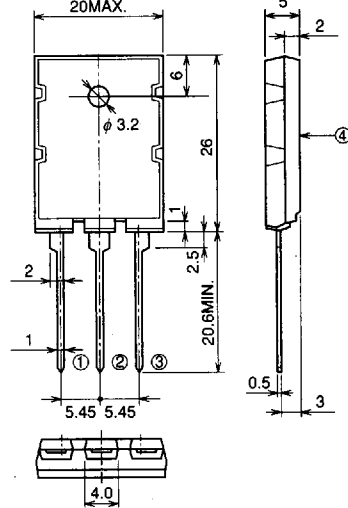
## CT60AM-20



- VCES ..... 1000V
- IC ..... 60A
- Integrated Fast Recovery Diode

## OUTLINE DRAWING

Dimensions in mm



- ① GATE
- ② COLLECTOR
- ③ EMITTER
- ④ COLLECTOR

TO-3PL

## APPLICATION

Microwave ovens, electromagnetic cooking devices, rice-cookers, voltage-resonant inverter circuit electric appliances.

## MAXIMUM RATINGS (Tc = 25°C)

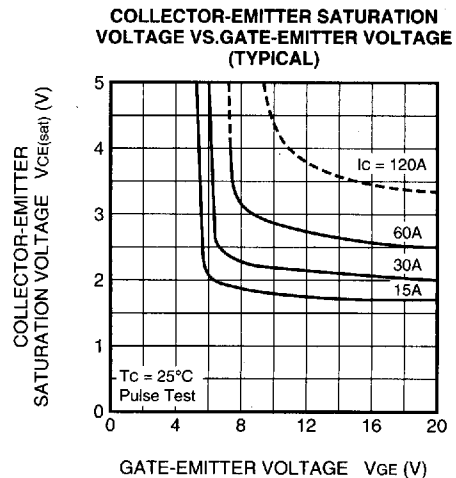
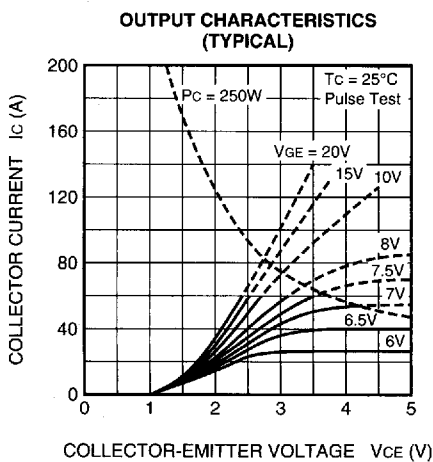
Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CE</sub> S	Collector-emitter voltage	V <sub>GE</sub> = 0V	1000	V
V <sub>GE</sub> S	Gate-emitter voltage	V <sub>CE</sub> = 0V	±20	V
V <sub>GEM</sub>	Peak gate-emitter voltage	V <sub>CE</sub> = 0V, t <sub>w</sub> = 0.5s	±30	V
I <sub>C</sub>	Collector current		60	A
I <sub>CM</sub>	Collector current (Pulsed)	t <sub>w</sub> = 1ms	120	A
I <sub>E</sub>	Emitter current		40	A
P <sub>C</sub>	Maximum power dissipation	T <sub>c</sub> = 25°C	250	W
T <sub>j</sub>	Junction temperature		-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature		-40 ~ +150	°C

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**ELECTRICAL CHARACTERISTICS** ( $T_j = 25^\circ\text{C}$  unless otherwise noted)

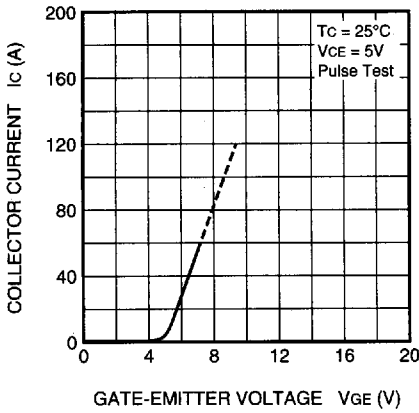
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
ICES	Collector current	$V_{CE} = 1000\text{V}, V_{GE} = 0\text{V}$	—	—	1	mA
IGES	Gate leakage current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$	—	—	$\pm 0.5$	$\mu\text{A}$
$V_{GE(th)}$	Gate-emitter threshold voltage	$V_{CE} = 10\text{V}, I_C = 6\text{mA}$	2.0	—	6.0	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C = 60\text{A}, V_{CE} = 15\text{V}$	—	2.6	3.5	V
$C_{ies}$	Input capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	—	1950	—	pF
$C_{oes}$	Output capacitance		—	170	—	pF
$C_{res}$	Reverse transfer capacitance		—	65	—	pF
$t_{d(on)}$	Turn-on delay time		—	0.04	—	$\mu\text{s}$
$t_r$	Fall time		$I_C = 60\text{A}$ , Resistance load	—	0.15	—
$t_{d(off)}$	Turn-off delay time	$V_{CC} = 300\text{V}, V_{GE} = 15\text{V}, R_G = 25\Omega$	—	0.30	—	$\mu\text{s}$
$t_f$	Rise time		—	0.30	—	$\mu\text{s}$
$E_{tail}$	Tail loss	$I_{CP} = 60\text{A}, T_j = 125^\circ\text{C}$	—	0.6	1.0	mJ/pls
$I_{Ctail}$	Collector tail current	$dv/dt = 200\text{V}/\mu\text{s}$	—	6	12	A
$V_{EC}$	Emitter-collector voltage	$I_E = 60\text{A}$	—	—	3	V
$T_{rr}$	Reverse recovery time	$I_E = 60\text{A}, di/dt = 20\text{A}/\mu\text{s}$	—	0.5	2	$\mu\text{s}$
$R_{th(j-c)}$	Thermal resistance (IGBT part)	Junction to case	—	—	0.5	$^\circ\text{C}/\text{W}$
$R_{th(j-c)}$	Thermal resistance	Junction to case	—	—	4.0	$^\circ\text{C}/\text{W}$

**PERFORMANCE CURVES**

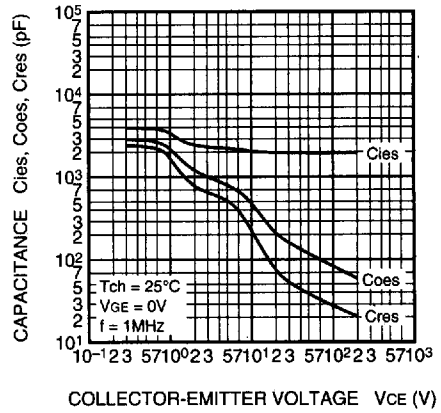


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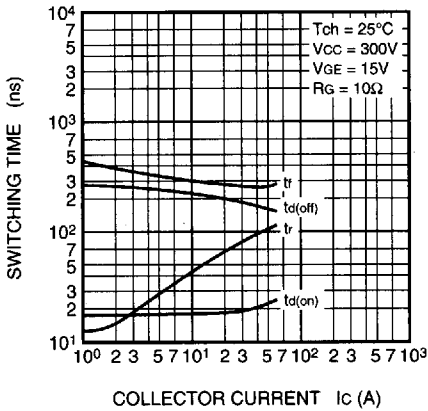
COLLECTOR CURRENT VS. GATE-EMITTER VOLTAGE (TYPICAL)



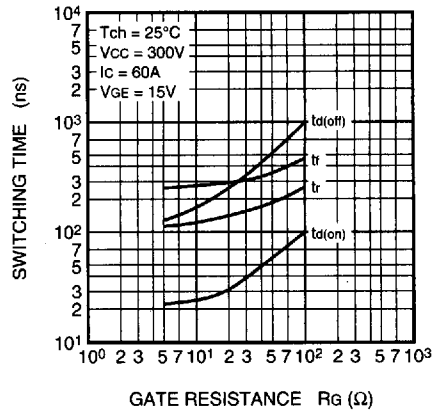
CAPACITANCE VS. COLLECTOR-EMITTER VOLTAGE (TYPICAL)



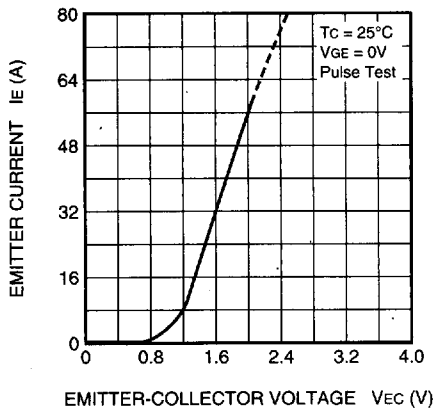
SWITCHING CHARACTERISTICS (TYPICAL)



SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)



TRANSFER CHARACTERISTICS (TYPICAL)



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# MITSUBISHI POWER MOSFET LEAD FORMING OUTLINE AND TAPING

## LEAD FORMING

### (1) TO-220 outline

Applicable device FS\*\*UM-\*\*\*A

Standard outline	Standard forming outline			
	A5	A6	A8	AA
<b>Dimensions</b> a=3.0±0.5, b=14.7±0.5, c=5.0±0.5, d=4.5±0.5, e=20.1±0.5, f=3.0±0.5, g=15.5±0.5 h=16.0±0.5, i=5.5±0.5 ※Dimensions measured during processing				Unit: mm

### (1) TO-220 full molded outline

Applicable device FS\*\*KM-\*\*\*A

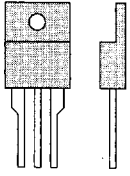
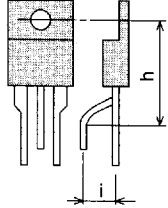
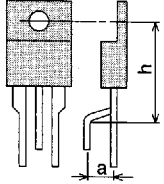
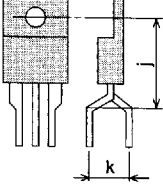
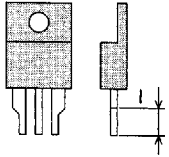
Standard outline	Standard forming outline			
	A5	A6	A8	AA
<b>Dimensions</b> a=3.0±0.5, b=14.7±0.5, c=5.0±0.5, d=4.5±0.5, e=20.1±0.5, g=15.5±0.5, h=16.0±0.5, i=5.5±0.5, j=19.0±0.5, k=7.75±0.5, l=4.0±0.5, m=15.1±0.5, n=16.5±0.5, o=3.8±0.35 ※Dimensions measured during processing				Unit: mm

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**MITSUBISHI POWER MOSFET**  
**LEAD FORMING OUTLINE AND TAPING**

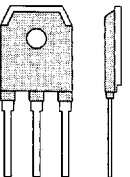
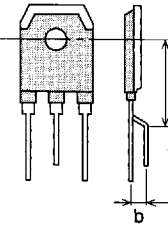
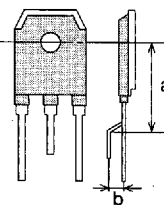
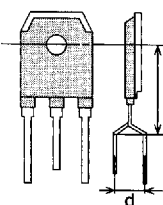
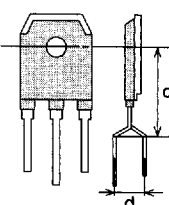
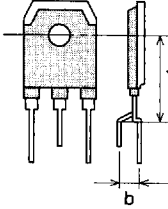
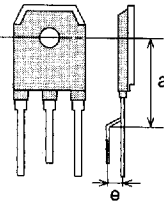
(2) TO-220 full molded outline

Applicable device FS\*\*KM-\*\*\*A

Standard outline	Standard forming outline				
	AT	AU	AV	AW	
					
Dimensions	a=3.0±0.5, b=14.7±0.5, c=5.0±0.5, d=4.5±0.5, e=20.1±0.5, g=15.5±0.5, h=16.0±0.5, i=5.5±0.5, j=19.0±0.5, k=7.75±0.5, l=4.0±0.5, m=15.1±0.5, n=16.5±0.5, o=3.8±0.35 ※Dimensions measured during processing				Unit : mm

(3) TO-3P outline

Applicable device FS\*\*SM-\*\*\*A · CT\*\*SM-\*\*\*

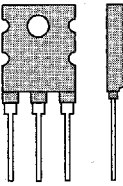
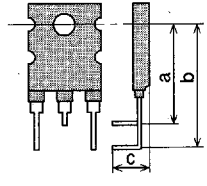
Standard outline	Standard forming outline				
	A7	A8	A9	A8	
					
					
Dimensions	a=23.5, b=5.45, c=23, d=9.5, e=4, f=21.5 ※Dimensions measured during processing				Unit : mm

MITSUBISHI POWER MOSFET

# LEAD FORMING OUTLINE AND TAPING

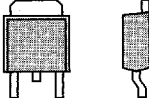
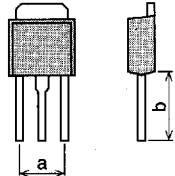
(4) TO-3PL outline

Applicable device	CT**AM-***
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Standard outline	Standard forming outline AC		
		Dimensions	<p> <math>a=24\pm0.5</math>  <math>b=31.5\pm0.5</math>  <math>c=13.3\pm0.6</math> </p> <p style="text-align: right;">Unit : mm</p> <p>※Dimensions measured during processing</p>

(5) MP-3 outline

Applicable device	FS**AS-***A · CT20A**·8
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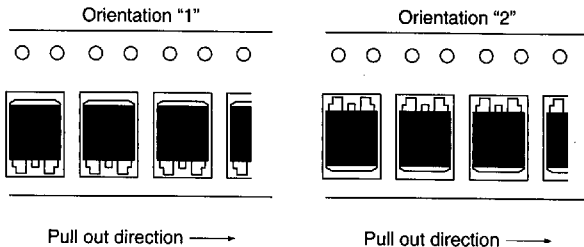
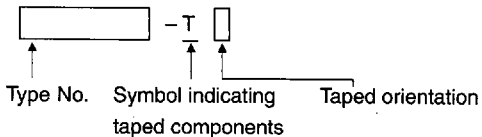
Standard outline	Standard forming outline A1		
		Dimensions	<p> <math>a=4.6</math>  <math>b=14\text{min.}</math> </p> <p style="text-align: right;">Unit : mm</p> <p>※Dimensions measured during processing</p>

# LEAD FORMING OUTLINE AND TAPING

## TAPING

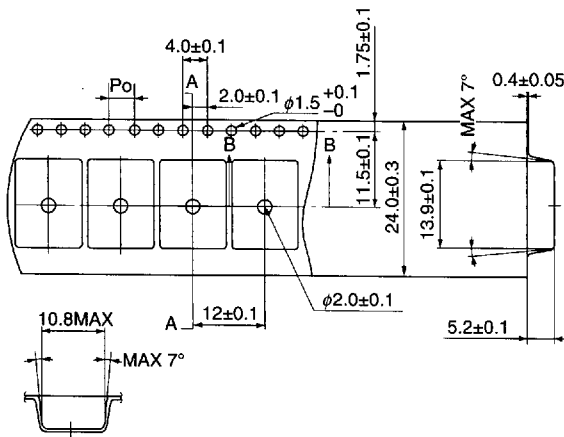
### (1) TO-220S

#### (a) Marking



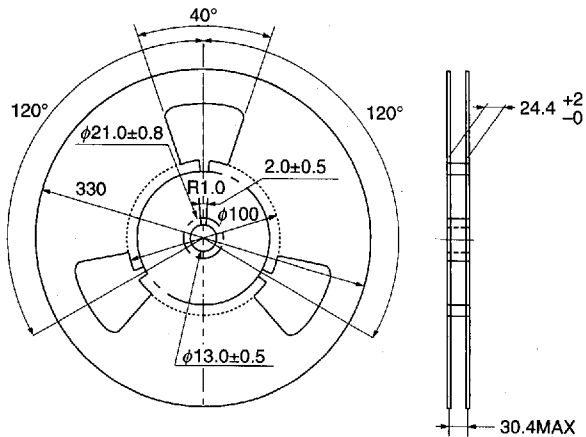
#### (b) Taping

- Tape shape and dimensions



Notice : The cumulative pitch error of Po (Free hole pitch) is  $\pm 0.2\text{mm}$  per 10 pitches.

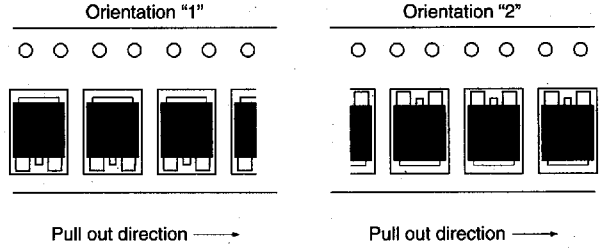
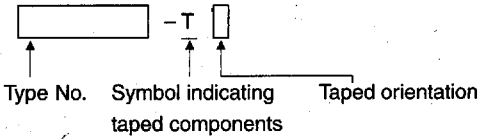
- Reel shape and dimensions



# LEAD FORMING OUTLINE AND TAPING

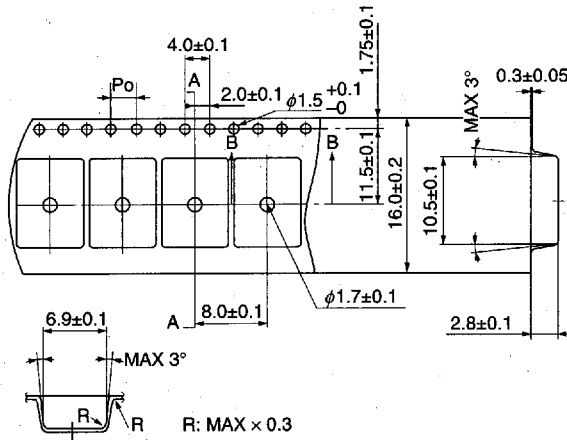
## (2) MP-3

### (a) Marking



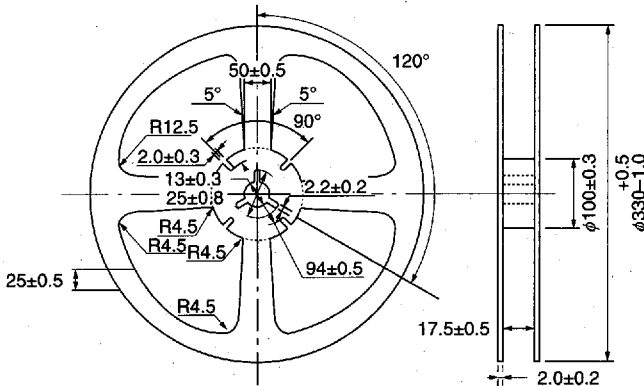
### (b) Taping

• Tape shape and dimensions



Notice : The cumulative pitch error of  $P_o$  (Free hole pitch) is  $\pm 0.2\text{mm}$  per 10 pitches.

• Reel shape and dimensions



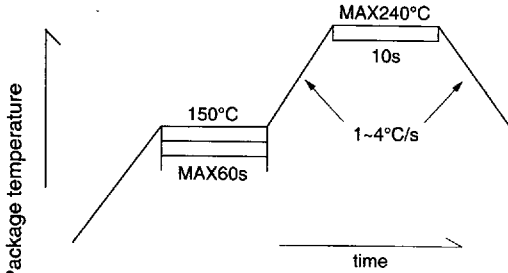


# LEAD FORMING OUTLINE AND TAPING

## Recommended conditions for surface mounting type

### Outline : TO-220S, MP-3

- (1) Board : Alumina, Insulated metal board
- (2) Solder plate thickness : 150 $\mu$ m-250 $\mu$ m
- (3) Temperature profile

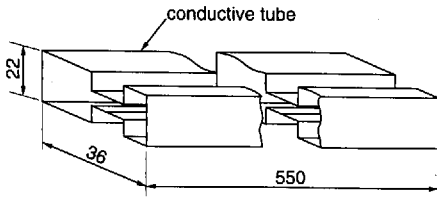


Infrared rays reflow temperature profile

## Individual package for lead forming outline

- (1) TO-220, TO-220FN, TO-220C, TO-220S

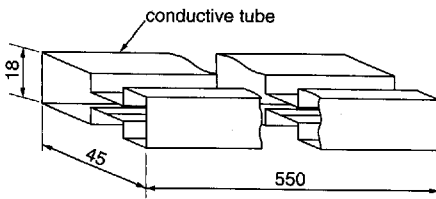
Dimensions in (Unit : mm)



The capacity is 50 p.c.s. (max.)

- (2) TO-3P

Dimensions in (Unit : mm)



The capacity is 30 p.c.s. (max.)