

# P86F6SN

## Power MOSFETs

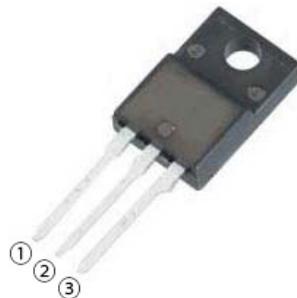
### 60V, 86A, N-channel

#### Feature

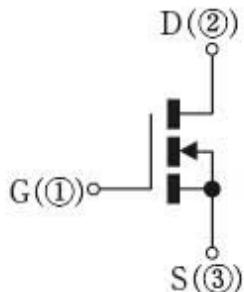
- N-channel
- Isolated Package
- Low Ron
- 10V Gate Drive
- Low Capacitance
- Pb free terminal
- RoHS:Yes

#### OUTLINE

Package (House Name): FTO-220AG  
 Package (JEITA Code): SC-91



#### Equivalent circuit



#### Absolute Maximum Ratings (unless otherwise specified : $T_c=25^\circ\text{C}$ )

Item	Symbol	Conditions	Ratings	Unit
Storage temperature	$T_{stg}$		-55 to 150	°C
Channel temperature	$T_{ch}$		150	°C
Drain-source voltage	$V_{DSS}$		60	V
Gate-source voltage	$V_{GSS}$		$\pm 20$	V
Continuous drain current(DC)	$I_D$		86	A
Continuous drain current(Peak)	$I_{DP}$	Pulse width 10μs, duty=1/100	344	A
Total power dissipation	$P_T$		58	W
Single avalanche current	$I_{AS}$	Starting $T_{ch}=25^\circ\text{C}$ $T_{ch}\leq 150^\circ\text{C}$	76	A
Single avalanche energy	$E_{AS}$	Starting $T_{ch}=25^\circ\text{C}$ $T_{ch}\leq 150^\circ\text{C}$	288	mJ
Dielectric strength	$V_{dis}$	Terminals to case, AC1min	2	kV
Mounting torque	$T_{OR}$	(Recommended torque : 0.3N·m)	0.5	N·m

※ :See the original Specifications

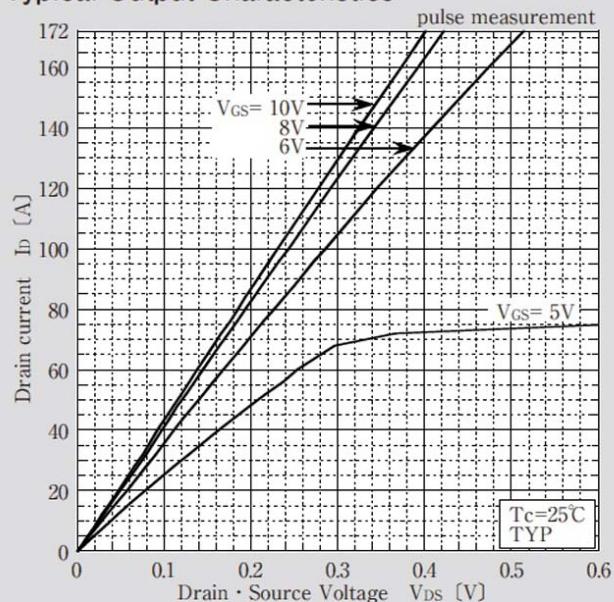
**Electrical Characteristics** (unless otherwise specified :  $T_c=25^\circ\text{C}$ )

Item	Symbol	Conditions	Ratings			Unit
			MIN	TYP	MAX	
Drain-Source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$ \text{D} =1\text{mA}, \text{VGS}=0\text{V}$	60			V
Zero gate voltage drain current	$I_{\text{DSS}}$	$\text{VDS}=60\text{V}, \text{VGS}=0\text{V}$			1	$\mu\text{A}$
Gate-source leakage current	$I_{\text{GSS}}$	$\text{VGS}=\pm 20\text{V}, \text{VDS}=0\text{V}$			$\pm 0.1$	$\mu\text{A}$
Forward transconductance	$g_{\text{fs}}$	$ \text{D} =43\text{A}, \text{VDS}=10\text{V}$	30			S
Static drain-source on-state resistance	$R_{\text{DS}(\text{ON})}$	$ \text{D} =43\text{A}, \text{VGS}=10\text{V}$		0.0024	0.003	$\Omega$
Gate threshold voltage	$V_{\text{th}}$	$ \text{D} =1\text{mA}, \text{VDS}=10\text{V}$	2	3	4	V
Source-drain diode forward voltage	$V_{\text{SD}}$	$ \text{S} =86\text{A}, \text{VGS}=0\text{V}$			1.5	V
Thermal resistance	$R_{\text{th}}(\text{j-c})$	Junction to case			2.15	$^\circ\text{C}/\text{W}$
Total gate charge	$Q_g$	$\text{VDD}=48\text{V}, \text{VGS}=10\text{V},  \text{D} =86\text{A}$		181		nC
Gate to source charge	$Q_{\text{gs}}$	$\text{VDD}=48\text{V}, \text{VGS}=10\text{V},  \text{D} =86\text{A}$		46		nC
Gate to drain charge	$Q_{\text{gd}}$	$\text{VDD}=48\text{V}, \text{VGS}=10\text{V},  \text{D} =86\text{A}$		68		nC
Input capacitance	$C_{\text{iss}}$	$\text{VDS}=25\text{V}, \text{VGS}=0\text{V}, f=1\text{MHz}$		9380		pF
Reverse transfer capacitance	$C_{\text{rss}}$	$\text{VDS}=25\text{V}, \text{VGS}=0\text{V}, f=1\text{MHz}$		570		pF
Output capacitance	$C_{\text{oss}}$	$\text{VDS}=25\text{V}, \text{VGS}=0\text{V}, f=1\text{MHz}$		1190		pF
Turn-on delay time	$t_{\text{d}(\text{on})}$	$ \text{D} =43\text{A}, \text{RL}=0.7\Omega, \text{VDD}=30\text{V}, \text{Rg}=0\Omega, \text{VGS}(+)=10\text{V}, \text{VGS}(-)=0\text{V}$		14		ns
Rise time	$t_r$	$ \text{D} =43\text{A}, \text{RL}=0.7\Omega, \text{VDD}=30\text{V}, \text{Rg}=0\Omega, \text{VGS}(+)=10\text{V}, \text{VGS}(-)=0\text{V}$		49		ns
Turn-off delay time	$t_{\text{d}(\text{off})}$	$ \text{D} =43\text{A}, \text{RL}=0.7\Omega, \text{VDD}=30\text{V}, \text{Rg}=0\Omega, \text{VGS}(+)=10\text{V}, \text{VGS}(-)=0\text{V}$		112		ns
Fall time	$t_f$	$ \text{D} =43\text{A}, \text{RL}=0.7\Omega, \text{VDD}=30\text{V}, \text{Rg}=0\Omega, \text{VGS}(+)=10\text{V}, \text{VGS}(-)=0\text{V}$		70		ns
Diode reverse recovery time	$t_{\text{rr}}$	$ \text{F} =86\text{A}, \text{VGS}=0\text{V}, \text{di}/\text{dt}=100\text{A}/\mu\text{s}$		57		ns
Diode reverse recovery charge	$Q_{\text{rr}}$	$ \text{F} =86\text{A}, \text{VGS}=0\text{V}, \text{di}/\text{dt}=100\text{A}/\mu\text{s}$		104		nC

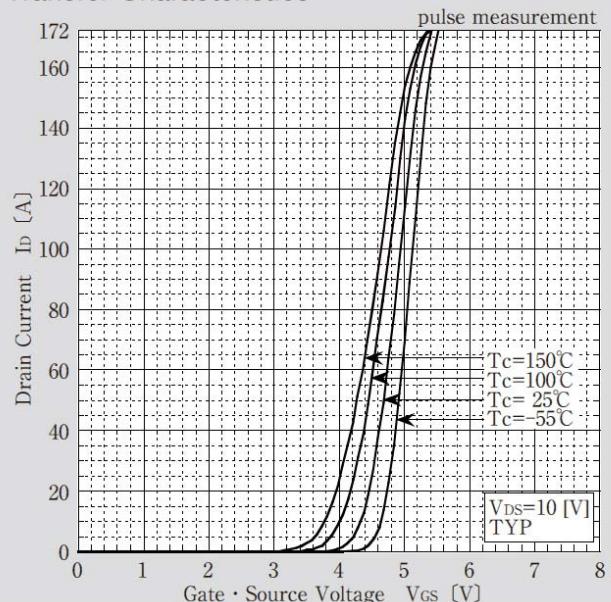
※ : See the original Specifications

## CHARACTERISTIC DIAGRAMS

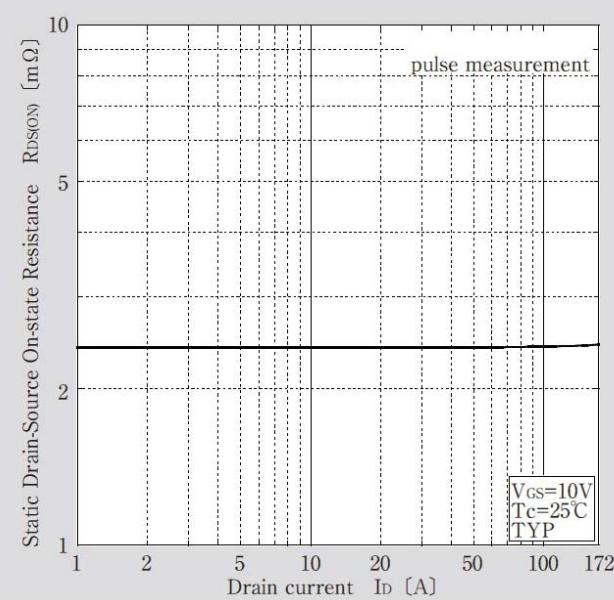
Typical Output Characteristics



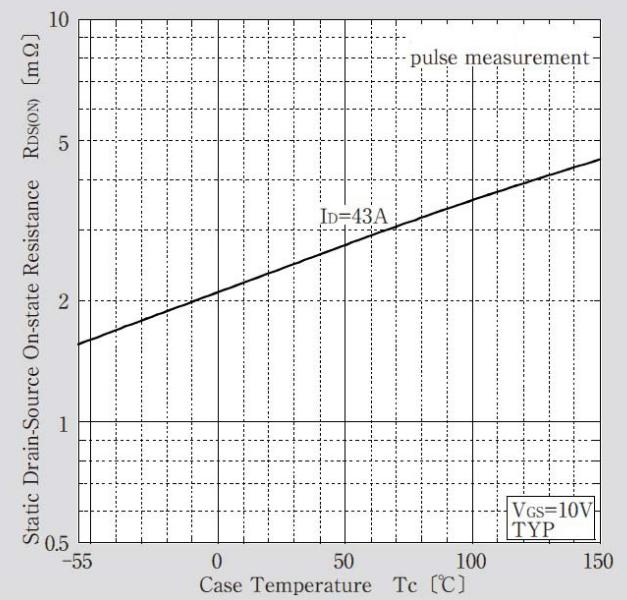
Transfer Characteristics



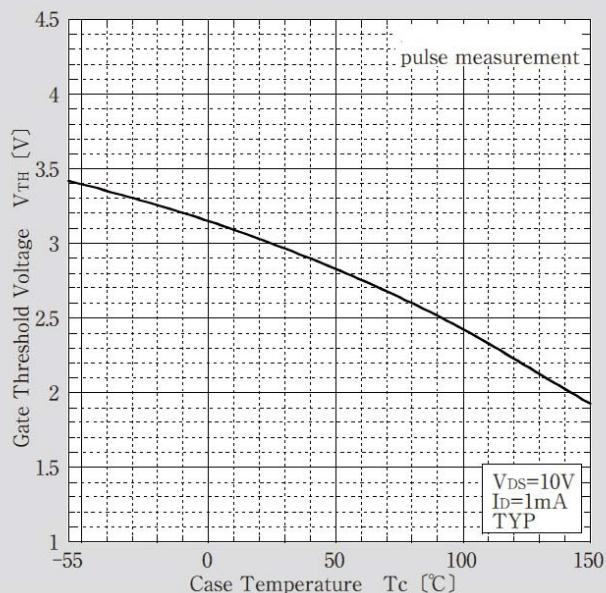
Static Drain-Source On-state Resistance vs Drain Current



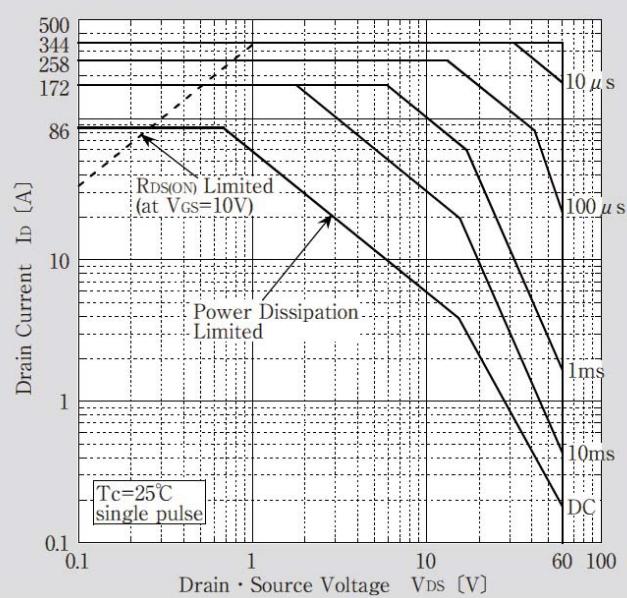
Static Drain-Source On-state Resistance vs Case Temperature



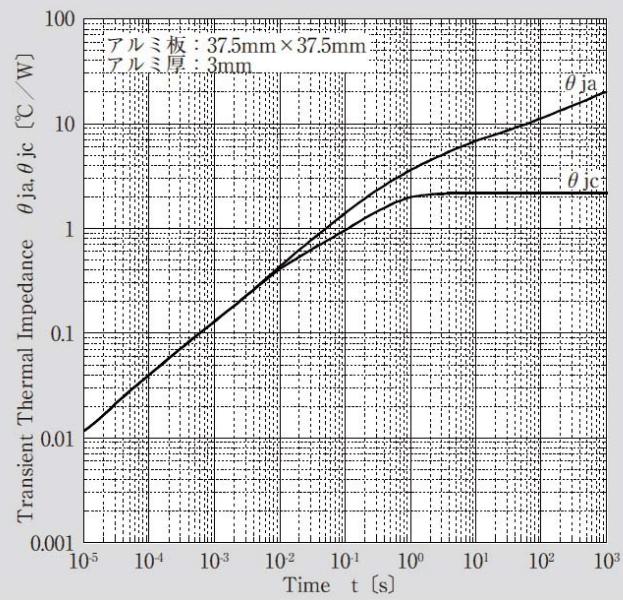
### Gate Threshold Voltage vs Case Temperature



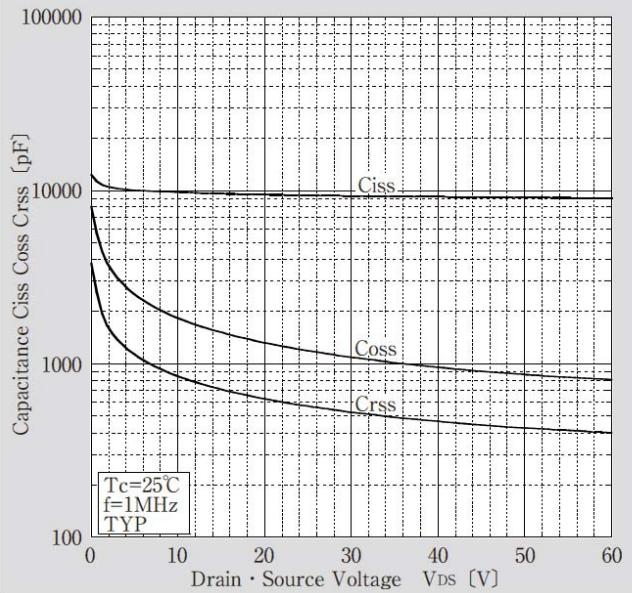
### Safe Operating Area



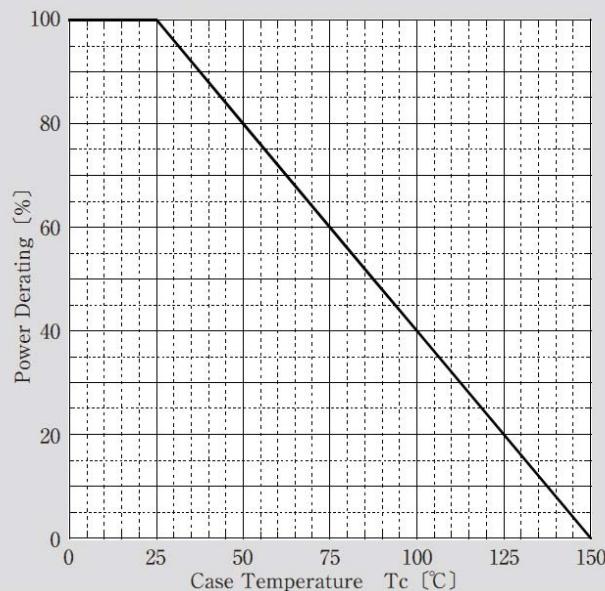
### Transient Thermal Impedance



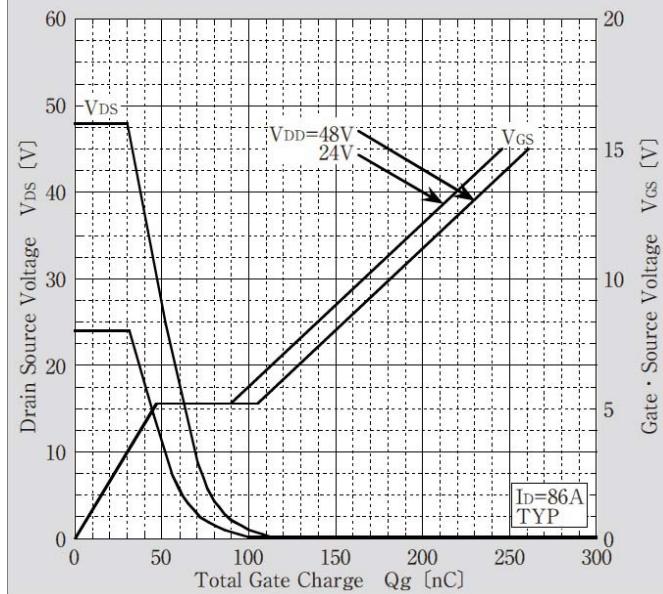
### Capacitance Characteristics



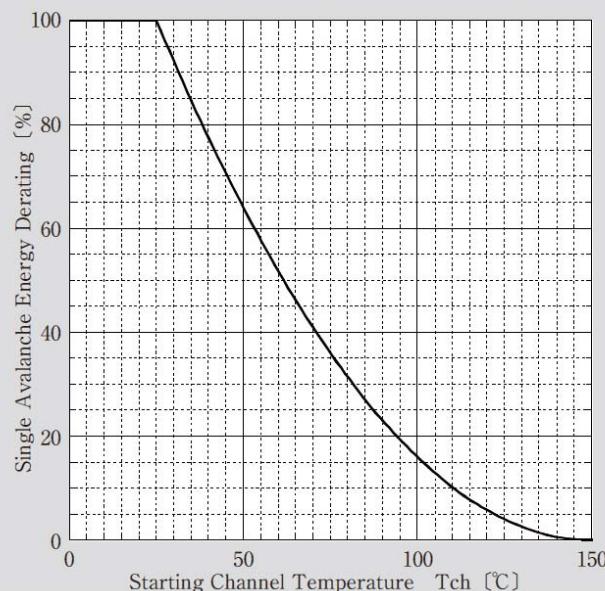
### Power Derating - Case Temperature



### Gate Charge Characteristics



### Single Avalanche Energy Derating vs Channel Temperature

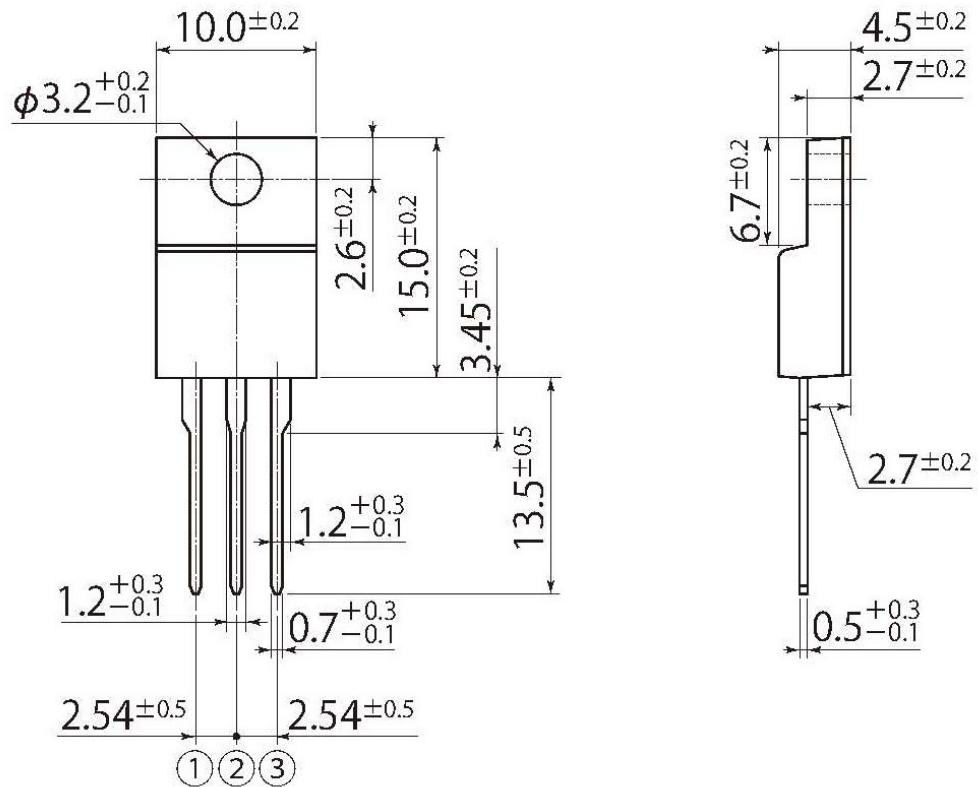


## Outline Dimensions

unit:mm

J8

JEDEC Code	—
JEITA Code	SC-91
House Name	FTO-220AG(3pin)



## Notes

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