ShinDengen

P40F12SN

Power MOSFETs
120V, 40A, N-channel

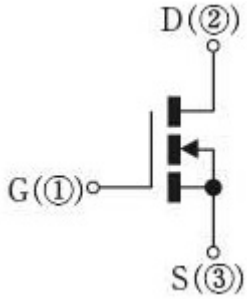
Feature

- 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 : Tc=25℃)

Item	Symbol	Conditions	Ratings	Unit
Storage temperrature	Tstg		-55 to 150	℃
Channel tempertature	Tch		150	℃
Drain-source voltage	V_{DSS}		120	V
Gate-source voltage	V_{GSS}		±20	V
Continuous drain current(DC)	I_D		40	A
Continuous drain current(Peak)	I_{DP}	Pulse width 10μs, duty=1/100	160	A
Total power dissipation	P_T		51	W
Single avalanche current	I_{AS}	Starting Tch=25℃ Tch≦150℃	40	A
Single avalanche energy	E_{AS}	Starting Tch=25℃ Tch≦150℃	80	mJ
Dielectric strenght	Vdis	Terminals to case, AC1min	2	kV
Mounting torque	TOR	(Recommended torque：0.3N･m)	0.5	N･m

※ ：See the original Specifications

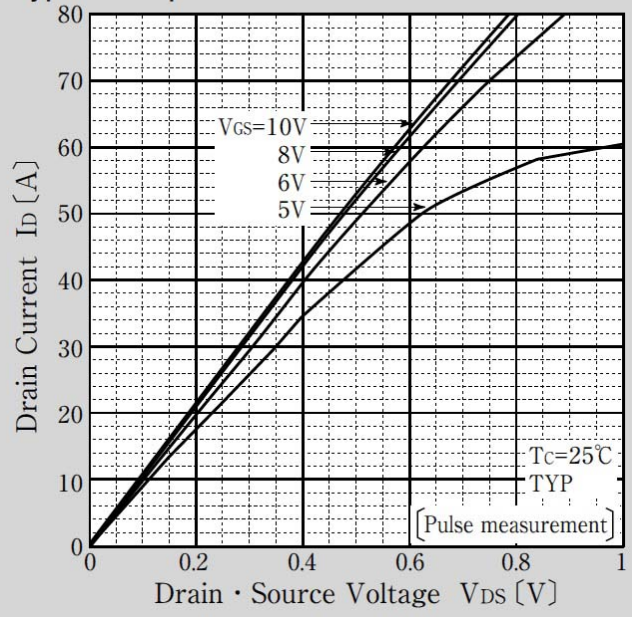
Electrical Characteristics (unless otherwise specified : Tc=25℃)

Item	Symbol	Conditions	Ratings			Unit
			MIN	TYP	MAX	
Drain-Source breakdown voltage	$V_{(BR)DSS}$	ID=1mA, VGS=0V	120			V
Zero gate voltage drain current	I_{DSS}	VDS=120V, VGS=0V			1	μA
Gate-source leakage current	I_{GSS}	VGS=±20V, VDS=0V			±0.1	μA
Forward transconductance	g_{fs}	ID=20A, VDS=10V	14			S
Static drain-source on-state resistance	$R_{DS(ON)}$	ID=20A, VGS=10V		0.0095	0.0119	Ω
Gate threshold voltage	Vth	ID=1mA, VDS=10V	2	3	4	V
Source-drain diode forward voltage	V_{SD}	IS=40A, VGS=0V			1.5	V
Thermal resistance	Rth(j-c)	Junction to case			2.45	℃/W
Total gate charge	Qg	VDD=96V, VGS=10V, ID=40A		117		nC
Gate to source charge	Qgs	VDD=96V, VGS=10V, ID=40A		29		nC
Gate to drain charge	Qgd	VDD=96V, VGS=10V, ID=40A		39		nC
Input capacitance	Ciss	VDS=25V, VGS=0V, f=1MHz		6000		pF
Reverce transfer capacitnce	Crss	VDS=25V, VGS=0V, f=1MHz		220		pF
Output capacitance	Coss	VDS=25V, VGS=0V, f=1MHz		470		pF
Turn-on delay time	td(on)	ID=20A, RL=3Ω, VDD=60V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		12		ns
Rise time	tr	ID=20A, RL=3Ω, VDD=60V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		23		ns
Turn-off delay time	td(off)	ID=20A, RL=3Ω, VDD=60V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		64		ns
Fall time	tf	ID=20A, RL=3Ω, VDD=60V, Rg=0Ω, VGS(+)=10V, VGS(-)=0V		43		ns
Diode reverse recovery time	trr	IF=40A, VGS=0V, di/dt=100A/μs		68		ns
Diode reverse recovery charge	Qrr	IF=40A, VGS=0V, di/dt=100A/μs		191		nC

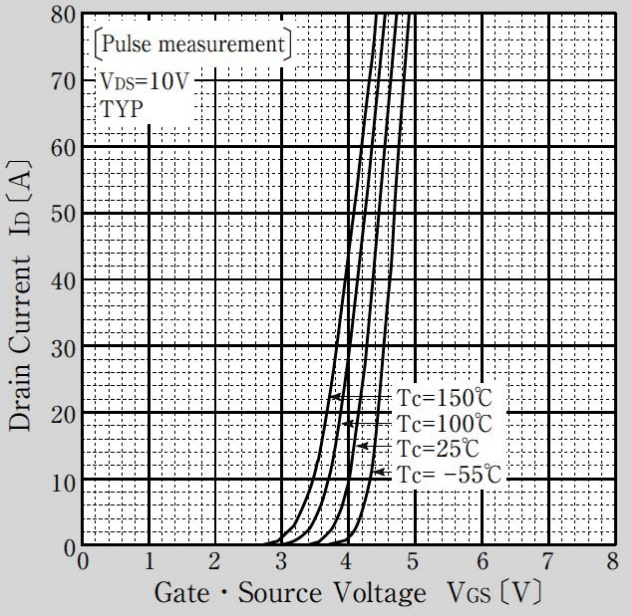
※ ：See the original Specifications

CHARACTERISTIC DIAGRAMS

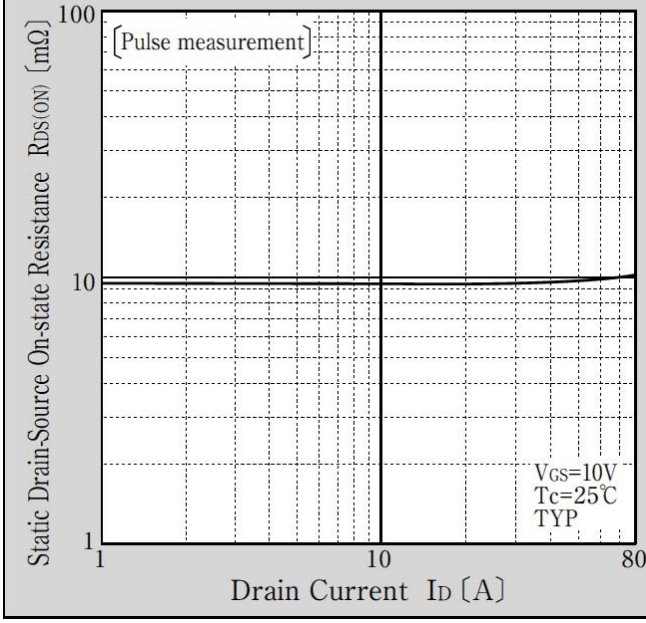
Typical Output Characteristics



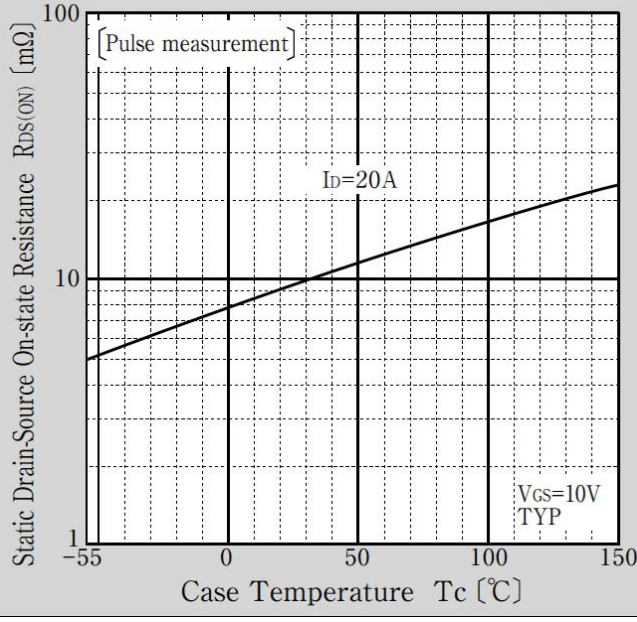
Transfer Characteristics



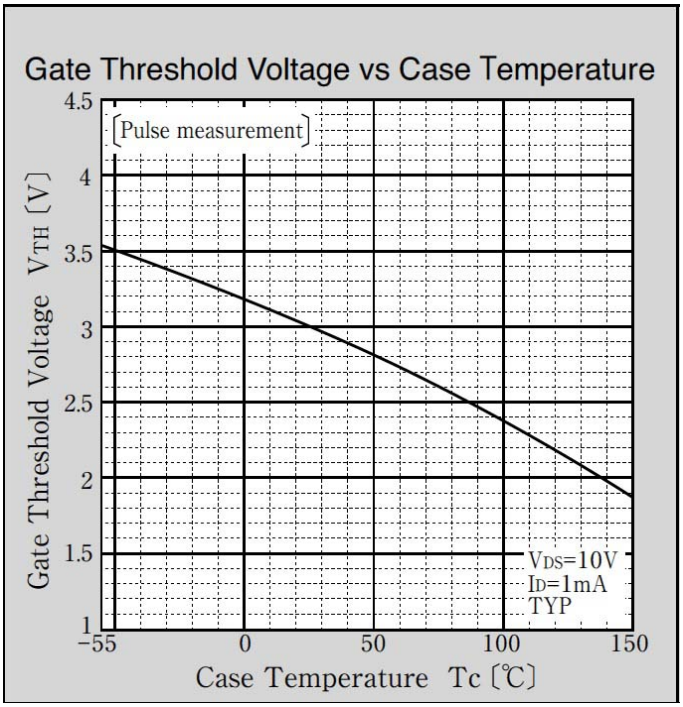
Static Drain-Source On-state Resistance vs Drain Current



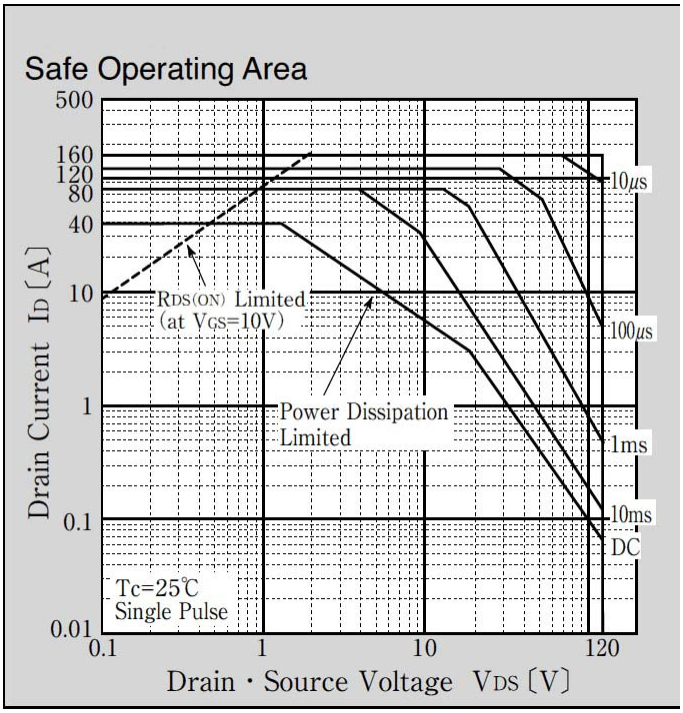
Static Drain-Source On-state Resistance vs Case Temperature



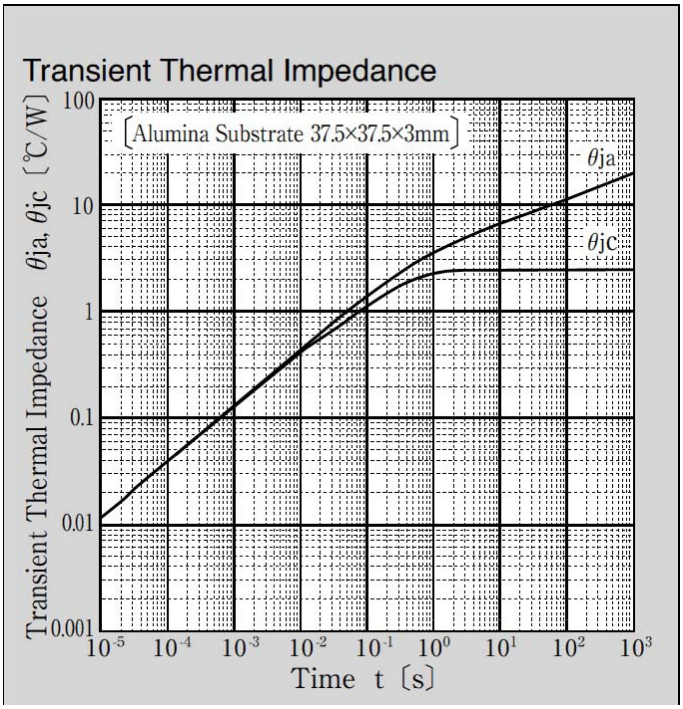
Gate Threshold Voltage vs Case Temperature



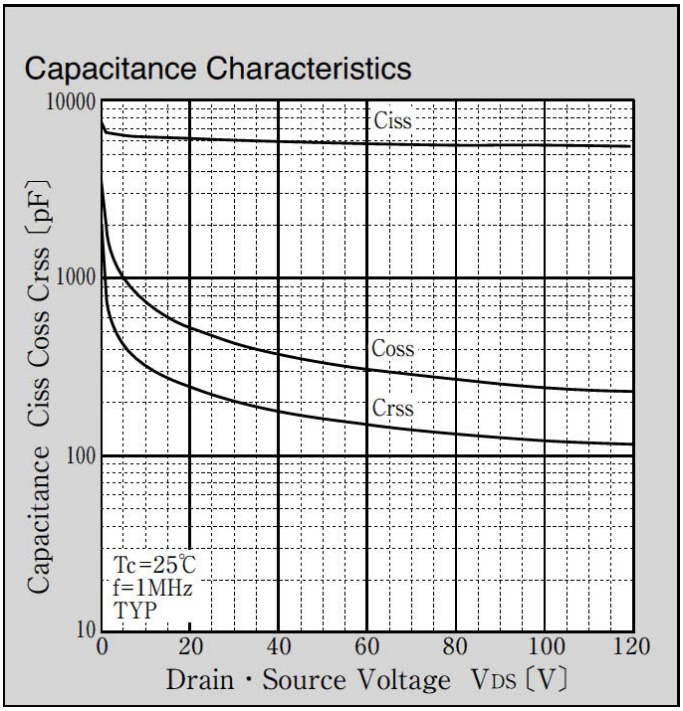
Safe Operating Area

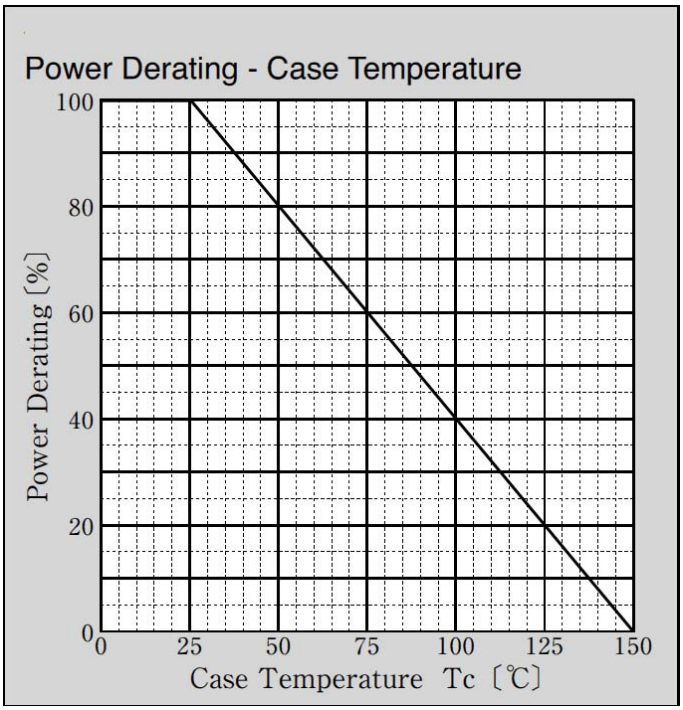


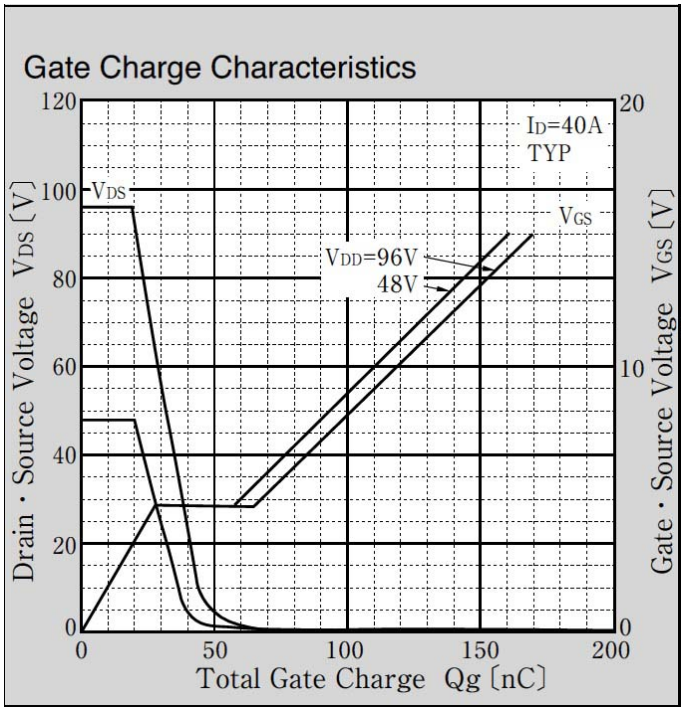
Transient Thermal Impedance

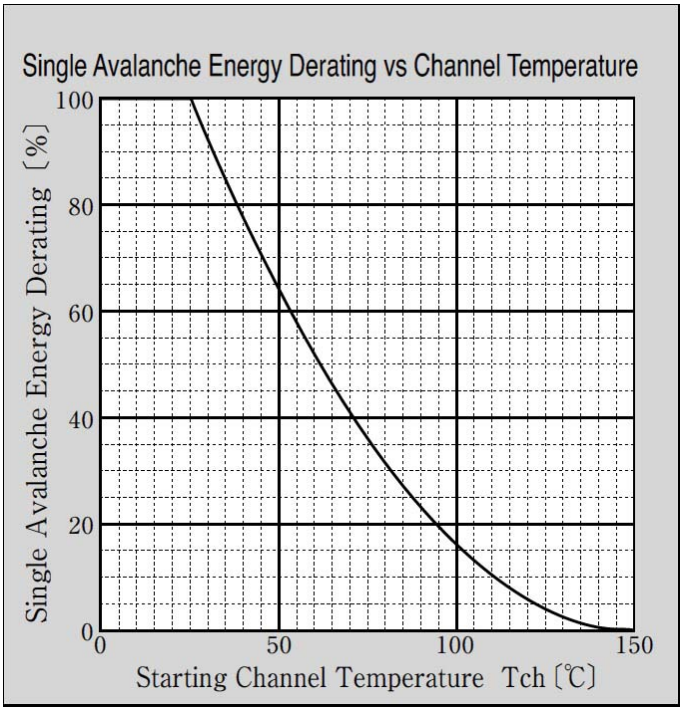


Capacitance Characteristics




Power Derating - Case Temperature
Power Derating〔%〕
Case Temperature Tc〔℃〕
100
80
60
40
20
0
0
25
50
75
100
125
150


Gate Charge Characteristics
Drain・Source Voltage VDS〔V〕
Gate・Source Voltage VGS〔V〕
Total Gate Charge Qg〔nC〕
ID=40A
TYP
VDS
VGS
VDD=96V
48V
120
100
80
60
40
20
0
20
10
0
0
50
100
150
200


Single Avalanche Energy Derating vs Channel Temperature
Single Avalanche Energy Derating〔%〕
Starting Channel Temperature Tch〔℃〕
100
80
60
40
20
0
0
50
100
150

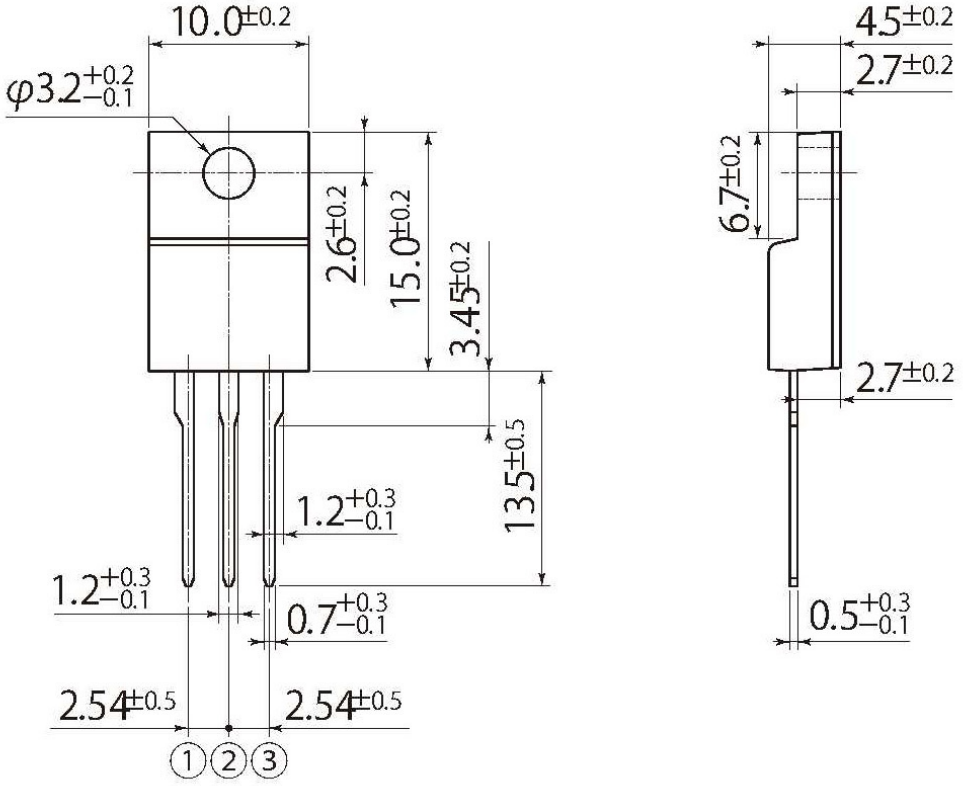
Outline Dimensions

unit:mm

scale: 2/1

J8

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



Notes

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