ShinDengen

# P36F25HP2

## Power MOSFETs
## 250V, 36A, N-channel

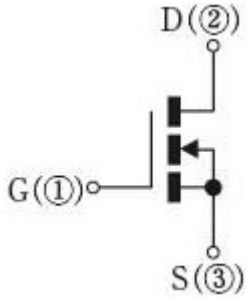
### Feature

- N-channel
- High Voltage
- High Speed Switching
- Low Ron
- Low Capacitance
- High Avalanche Durability, High di/dt Durability
- 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 temperature | Tstg | | -55 to 150 | ℃ |
| Channel tempertature | Tch | | -55 to 150 | ℃ |
| Drain-source voltage | $V_{DSS}$ | | 250 | V |
| Gate-source voltage | $V_{GSS}$ | | ±30 | V |
| Continuous drain current(DC) | $I_D$ | | 36 | A |
| Continuous drain current(Peak) | $I_{DP}$ | Pulse width 10μs, duty=1/100 | 144 | A |
| Continuous source current(DC) | Is | | 36 | A |
| Total power dissipation | $P_T$ | | 77 | W |
| Repetitive avalanche current | $I_{AR}$ | Starting Tch=25℃ Tch≦150℃ | 26 | A |
| Single avalanche energy | $E_{AS}$ | Starting Tch=25℃ Tch≦150℃ | 65 | mJ |
| Repetitive avalanche energy | $E_{AR}$ | Starting Tch=25℃ Tch≦150℃ | 6.5 | mJ |
| Drain-source diode di/dt strength | di/dt | Is=36A, Tc=25℃ | 350 | A/μs |
| Dielectric strenght | Vdis | Terminals to case, AC1minute | 2 | kV |
| Mounting torque | TOR | (Recommended torque：0.3N･m) | 0.5 | N･m |

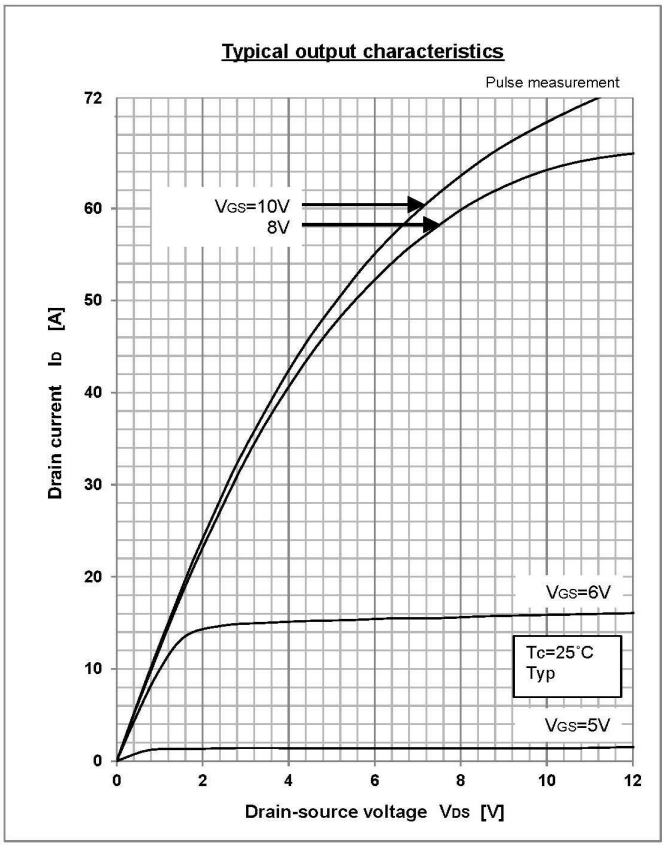
※ ：See the original Specifications

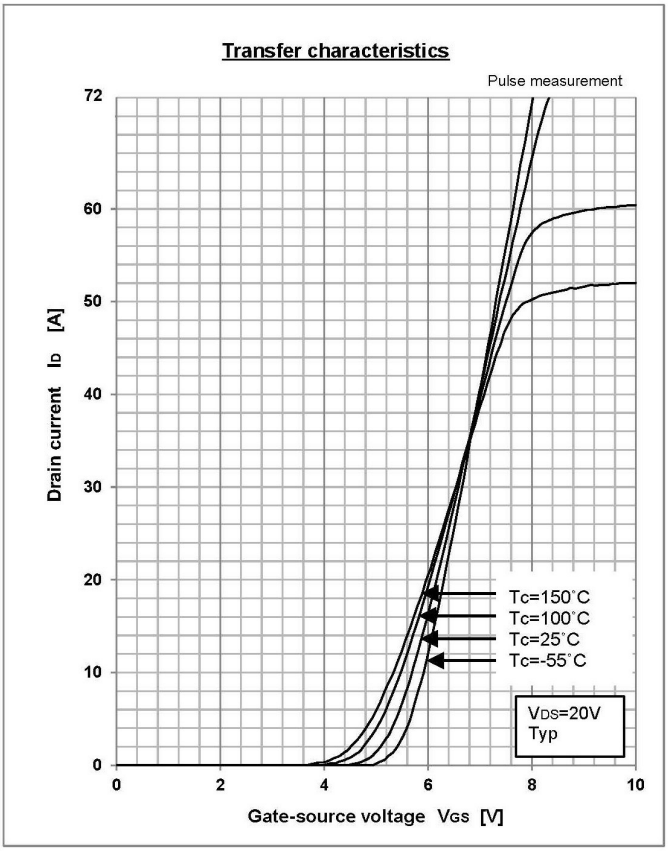
## Electrical Characteristics (unless otherwise specified : Tc=25℃)

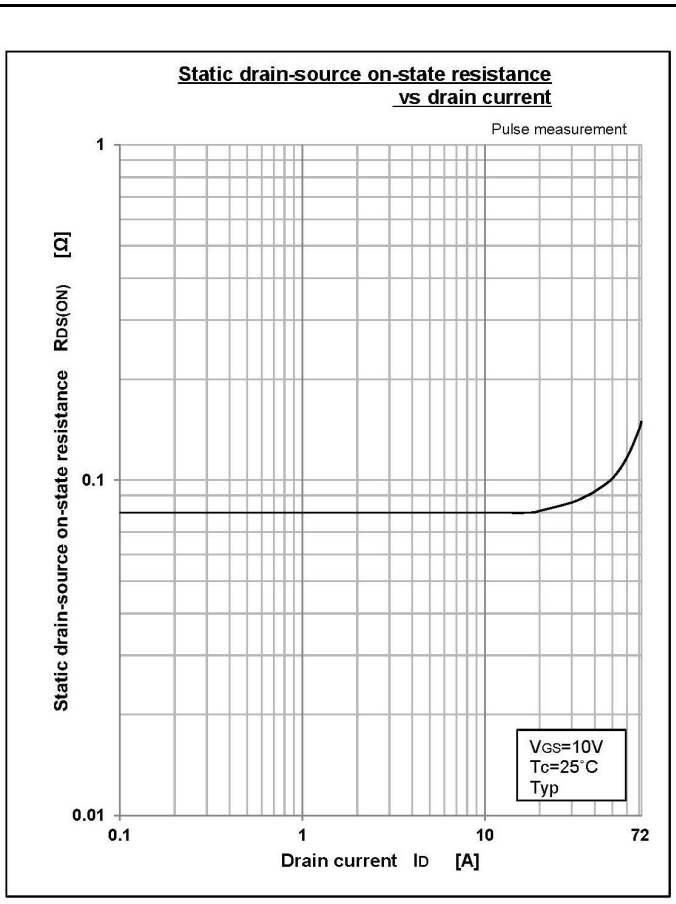
| Item | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | ID=1mA, VGS=0V | 250 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | VDS=250V, VGS=0V | | | 100 | μA |
| Gate-source leakage current | $I_{GSS}$ | VGS=±30V, VDS=0V | | | ±0.1 | μA |
| Forward transconductance | $g_{fs}$ | ID=18A, VDS=10V | 10 | 20 | | S |
| Static drain-source on-state resistance | $R_{DS(ON)}$ | ID=18A, VGS=10V | | 0.08 | 0.12 | Ω |
| Gate threshold voltage | Vth | ID=1mA, VDS=10V | 3 | | 4.5 | V |
| Source-drain diode forward voltage | $V_{SD}$ | IS=18A, VGS=0V | | | 1.5 | V |
| Thermal resistance | Rth(j-c) | Junction to case, with heatsink | | | 1.62 | ℃/W |
| Total gate charge | Qg | VDS=200V, VGS=10V, ID=36A | | 35 | | nC |
| Input capacitance | Ciss | VDS=50V, VGS=0V, f=1MHz | | 1313 | | pF |
| Reverce transfer capacitnce | Crss | VDS=50V, VGS=0V, f=1MHz | | 14 | | pF |
| Output capacitance | Coss | VDS=50V, VGS=0V, f=1MHz | | 201 | | pF |
| Turn-on delay time | td(on) | ID=18A, RL=8.3Ω, VDS=150V, Rg=50Ω, +VGS=10V,- VGS=0V | | 37 | | ns |
| Rise time | tr | ID=18A, RL=8.3Ω, VDS=150V, Rg=50Ω, +VGS=10V,- VGS=0V | | 95 | | ns |
| Turn-off delay time | td(off) | ID=18A, RL=8.3Ω, VDS=150V, Rg=50Ω, +VGS=10V,- VGS=0V | | 120 | | ns |
| Fall time | tf | ID=18A, RL=8.3Ω, VDS=150V, Rg=50Ω, +VGS=10V,- VGS=0V | | 59 | | ns |

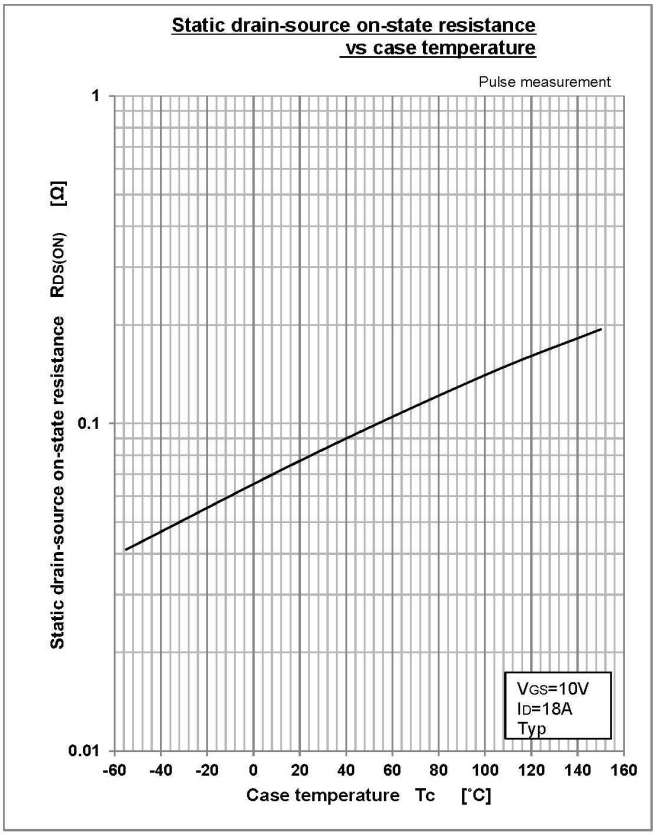
※ ：See the original Specifications

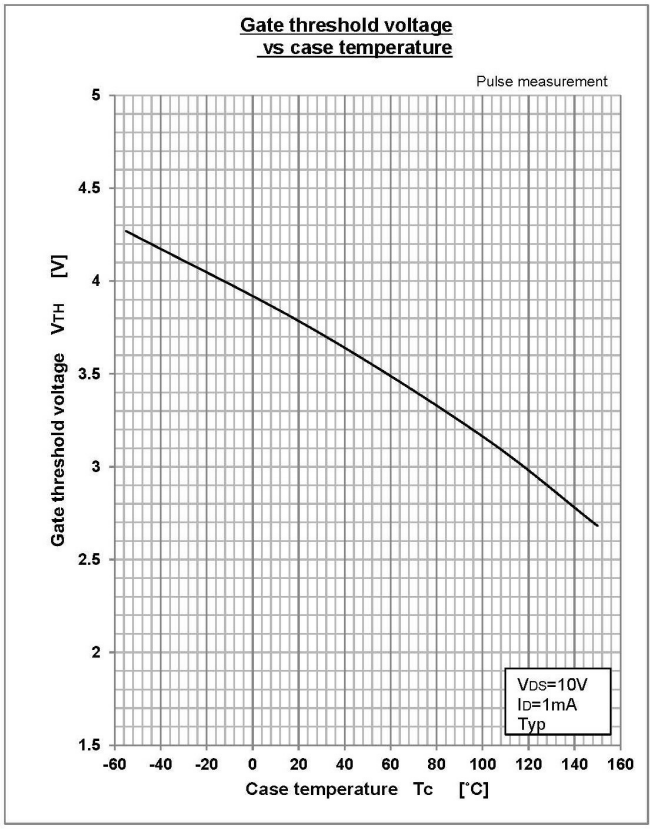
## CHARACTERISTIC DIAGRAMS

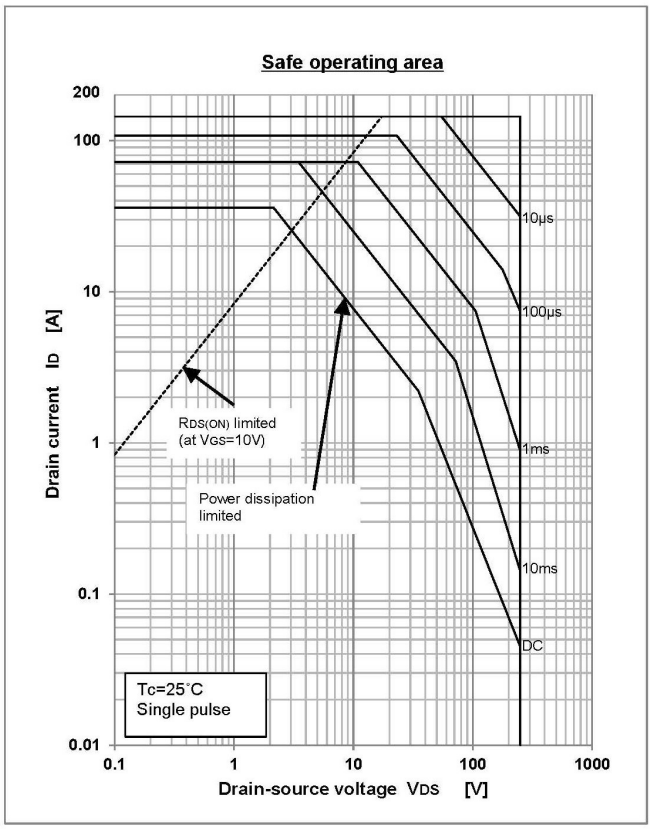


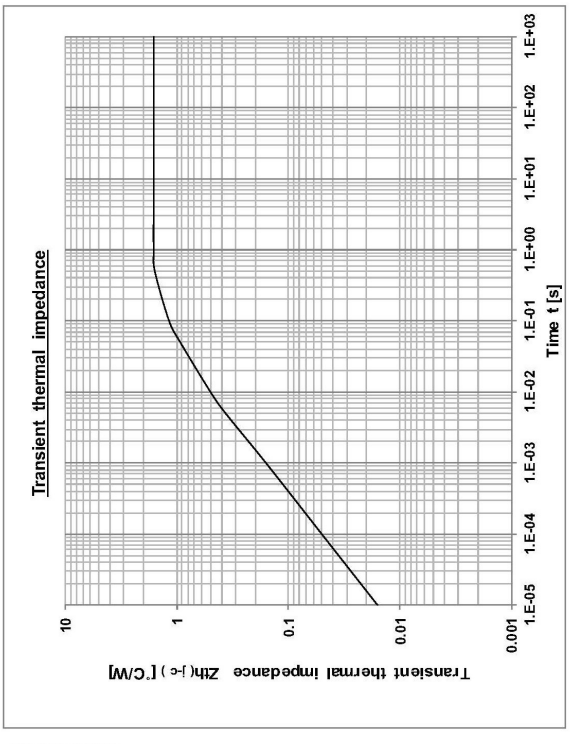



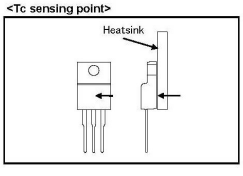



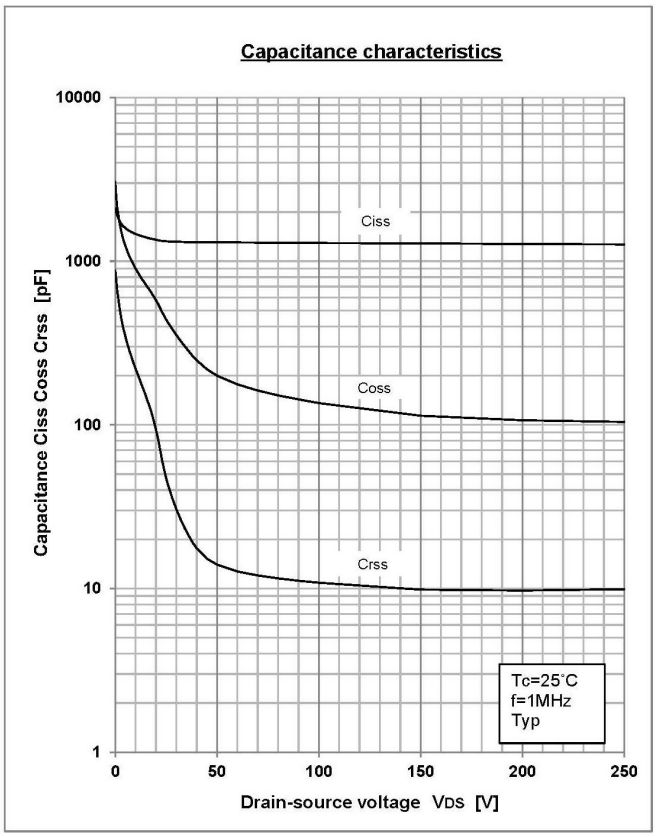



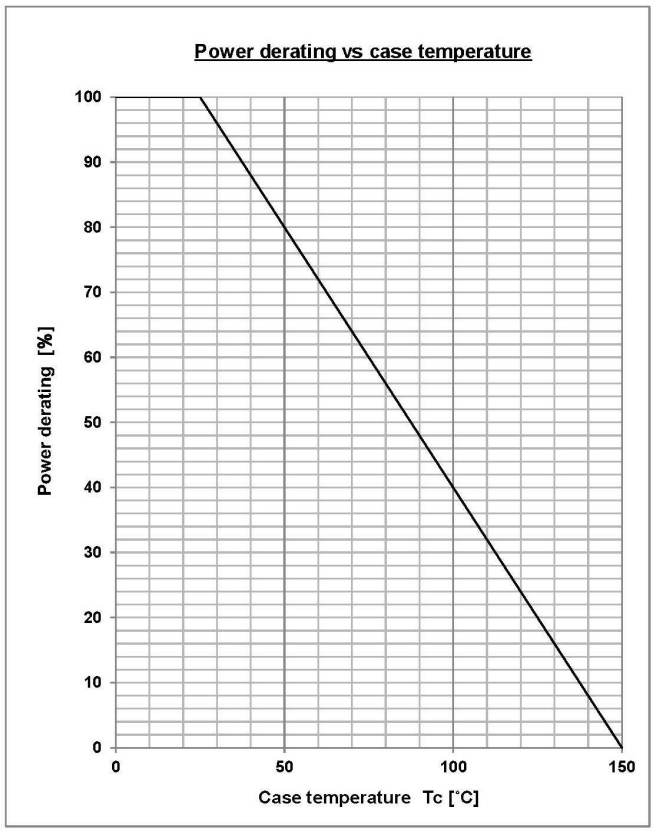

Gate threshold voltage
vs case temperature
Pulse measurement
Gate threshold voltage VTH [V]
Case temperature Tc [°C]
VDS=10V
ID=1mA
Typ

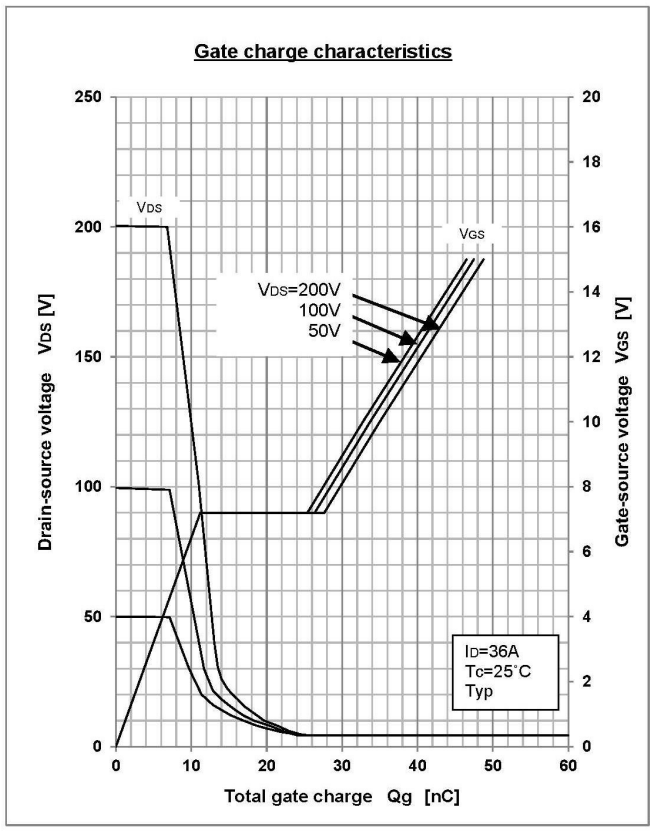

Safe operating area
Drain current ID [A]
Drain-source voltage VDS [V]
RDS(ON) limited
(at VGS=10V)
Power dissipation
limited
10μs
100μs
1ms
10ms
DC
Tc=25°C
Single pulse

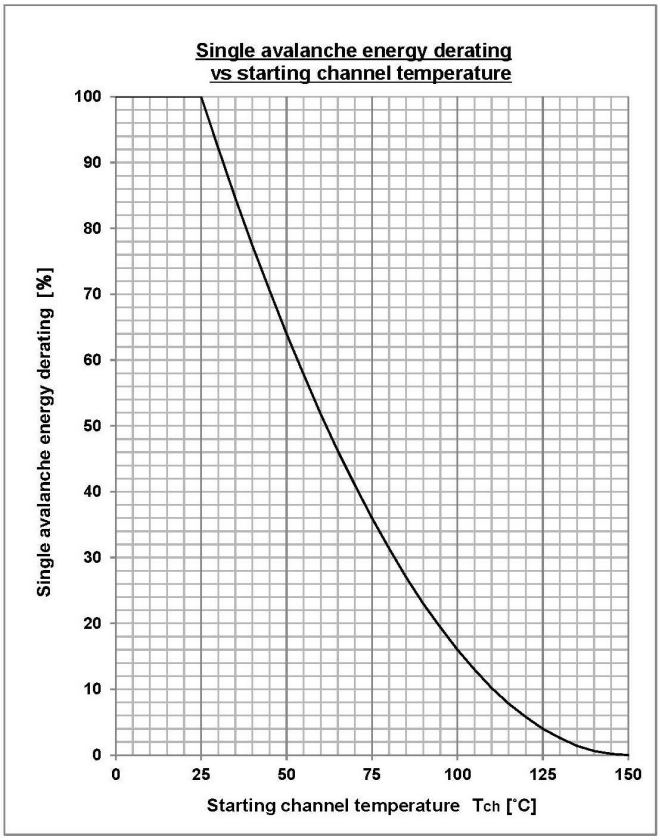

Transient thermal impedance
Time t [s]
Transient thermal impedance Zth(j-c) [°C/W]

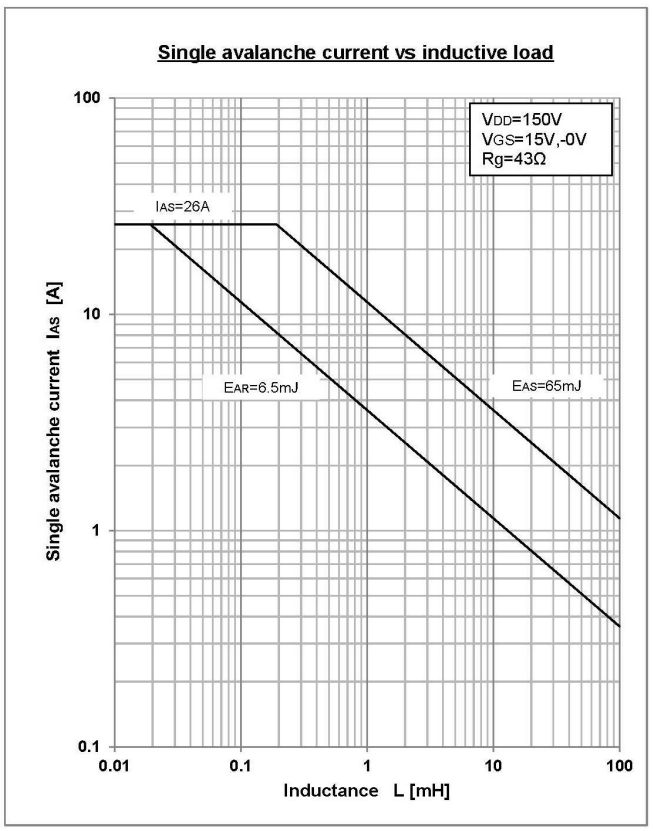

<Tc sensing point>
Heatsink


Capacitance characteristics
Capacitance Ciss Coss Crss [pF]
Drain-source voltage VDS [V]
Ciss
Coss
Crss
Tc=25°C
f=1MHz
Typ


Power derating vs case temperature
Power derating [%]
Case temperature Tc [°C]
0
10
20
30
40
50
60
70
80
90
100
0
50
100
150


Gate charge characteristics
Drain-source voltage VDS [V]
Gate-source voltage VGS [V]
Total gate charge Qg [nC]
VDS
VGS
VDS=200V
100V
50V
ID=36A
Tc=25°C
Typ
0
50
100
150
200
250
0
2
4
6
8
10
12
14
16
18
20
0
10
20
30
40
50
60


Single avalanche energy derating
vs starting channel temperature
Single avalanche energy derating [%]
Starting channel temperature Tch [°C]
0
10
20
30
40
50
60
70
80
90
100
0
25
50
75
100
125
150

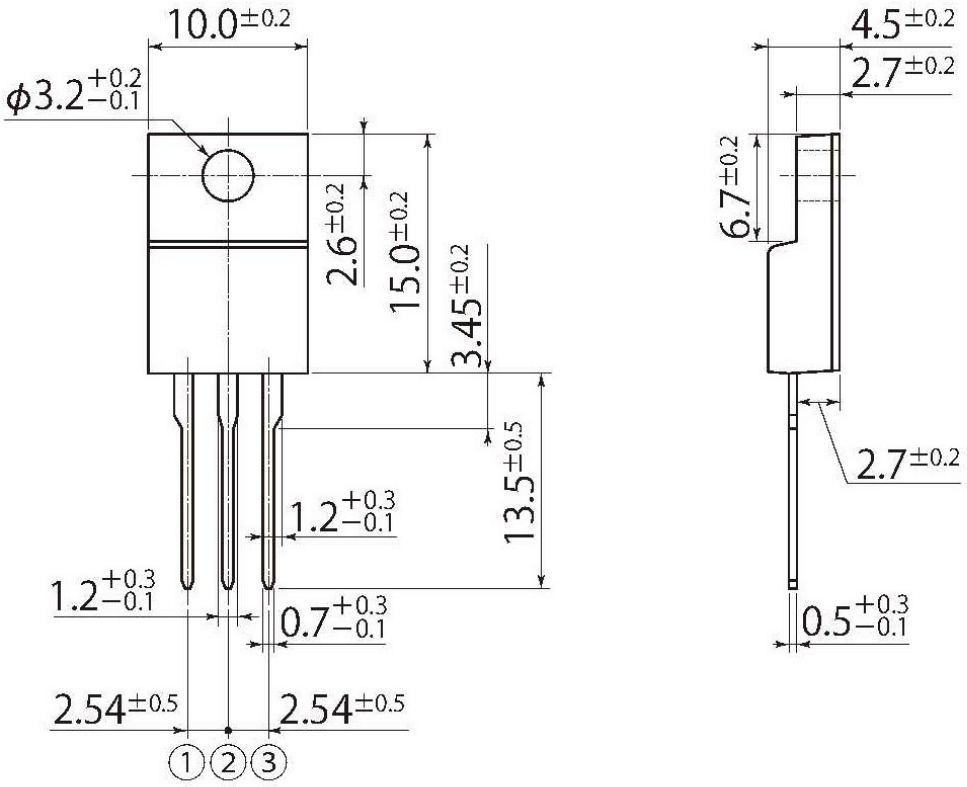

Single avalanche current vs inductive load
Single avalanche current IAS [A]
Inductance L [mH]
VDD=150V
VGS=15V,-0V
Rg=43Ω
IAS=26A
EAR=6.5mJ
EAS=65mJ
0.1
1
10
100
0.01
0.1
1
10
100

## Outline Dimensions

unit:mm

J8

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



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