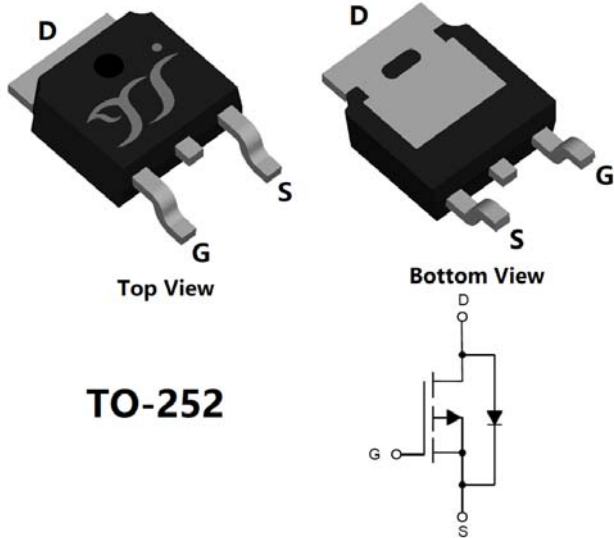


## P-Channel Enhancement Mode Field Effect Transistor



TO-252

### Product Summary

- $V_{DS}$  -100V
- $I_D$  -18A
- $R_{DS(ON)}$  ( at  $V_{GS}=-10V$  ) < 110 m $\Omega$
- $R_{DS(ON)}$  ( at  $V_{GS}=-4.5V$  ) < 120 m $\Omega$
- 100% UIS Tested
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Split gate trench MOSFET technology
- Low  $R_{DS(ON)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Power management
- Portable equipment

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	-100	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_c=25^\circ\text{C}$	$I_D$	-18	A
	$T_c=100^\circ\text{C}$		-12	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	-72	A
Avalanche energy <sup>B</sup>		EAS	36	mJ
Total Power Dissipation <sup>C</sup>	$T_c=25^\circ\text{C}$	$P_D$	72	W
	$T_c=100^\circ\text{C}$		29	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### ■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient <sup>D</sup>	Steady-State	$R_{\theta JA}$	40	50	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.35	1.7	

### ■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD18GP10AQ	F1	YJD18GP10A	2500	2500	25000	13" reel



# YJD18GP10AQ

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA	-100	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V	-	-	-1	μA
		V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C	-	-	-100	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.8	-2.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	-	83	110	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	-	95	120	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-10A, V <sub>GS</sub> =0V	-	-	-1.3	V
Gate resistance	R <sub>G</sub>	f=1MHz, Open drain	-	10	-	Ω
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	-18	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-50V, V <sub>GS</sub> =0V, f=1MHz	-	1051	-	pF
Output Capacitance	C <sub>oss</sub>		-	119	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	25	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-50V, I <sub>D</sub> =-5A	-	20.1	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.9	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	4.3	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =-5A, di/dt=100A/us	-	140	-	ns
Reverse Recovery Time	t <sub>rr</sub>		-	70	-	
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-10V, V <sub>DD</sub> =-50V, R <sub>L</sub> =2.5Ω R <sub>GEN</sub> =6Ω	-	10	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	30	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	77	-	
Turn-off fall Time	t <sub>f</sub>		-	81	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T<sub>J</sub>=25°C, V<sub>DD</sub>=-50V, V<sub>G</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>D</sub>=-12A.

C. P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R<sub>θJA</sub> is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



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## Typical Electrical and Thermal Characteristics Diagrams

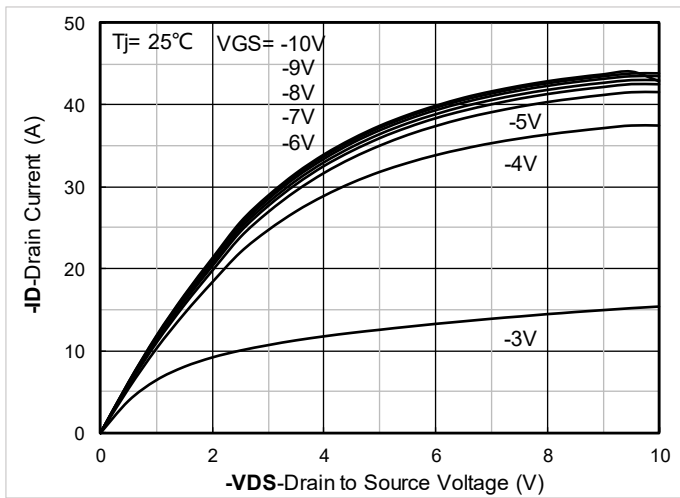


Figure1. Output Characteristics

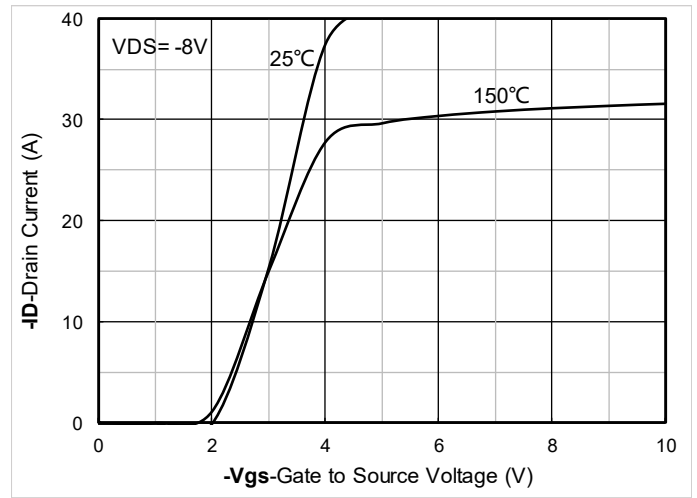


Figure2. Transfer Characteristics

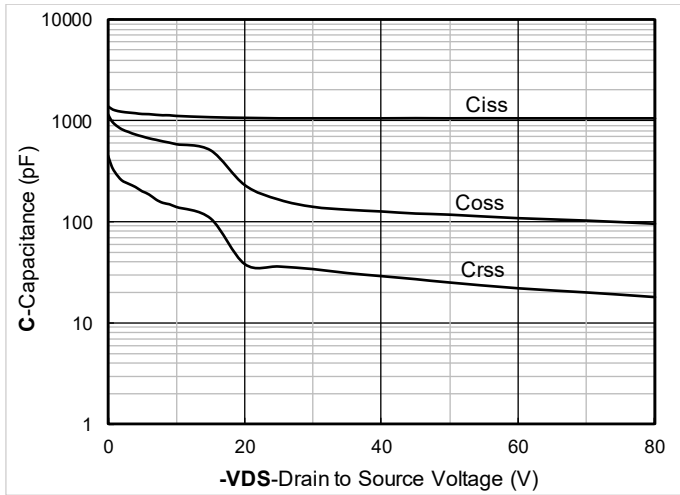


Figure3. Capacitance Characteristics

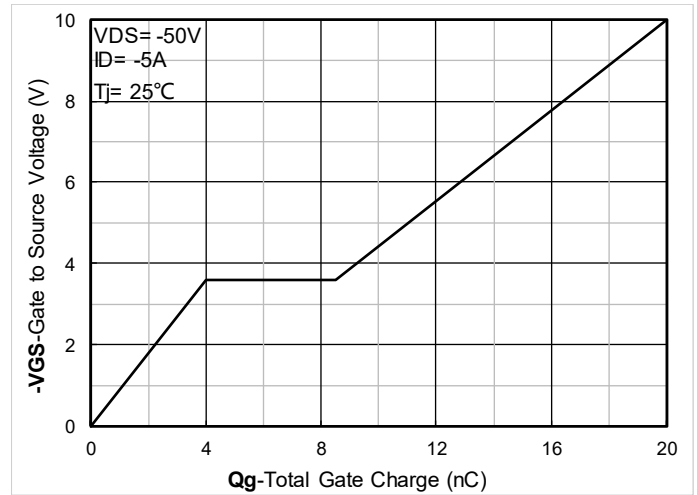


Figure4. Gate Charge

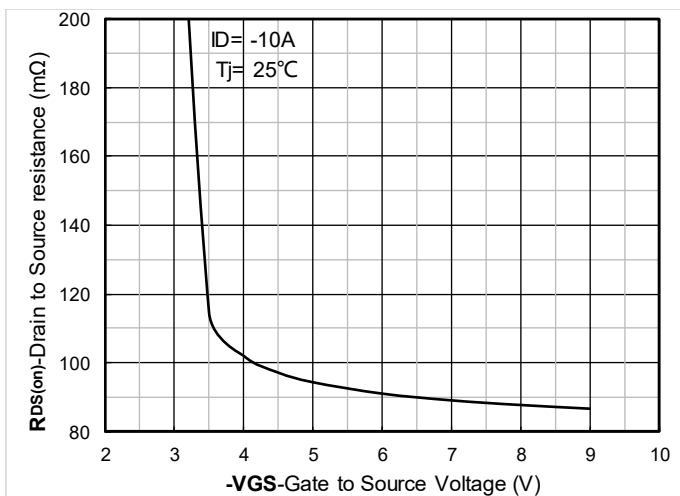


Figure5. On-Resistance vs Gate to Source Voltage

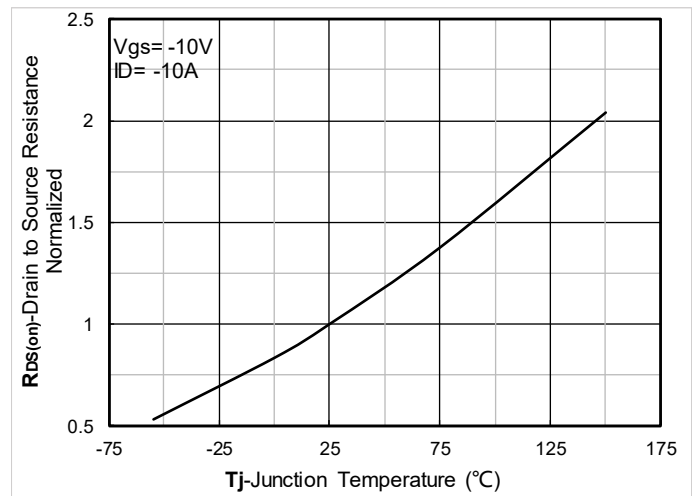


Figure6. Normalized On-Resistance



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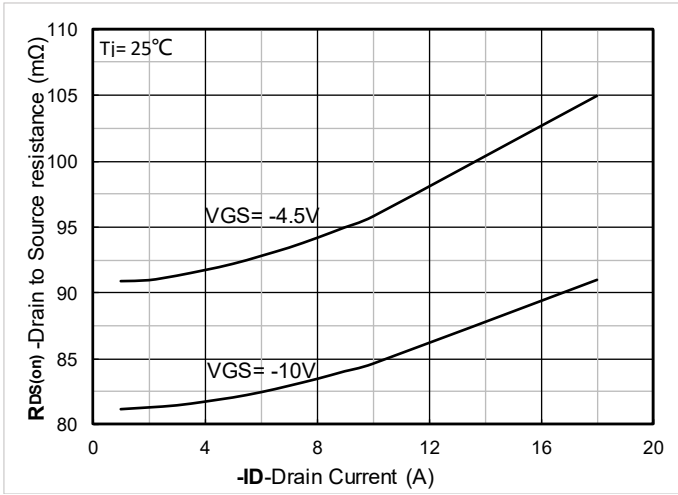


Figure7. RDS(on) VS Drain Current

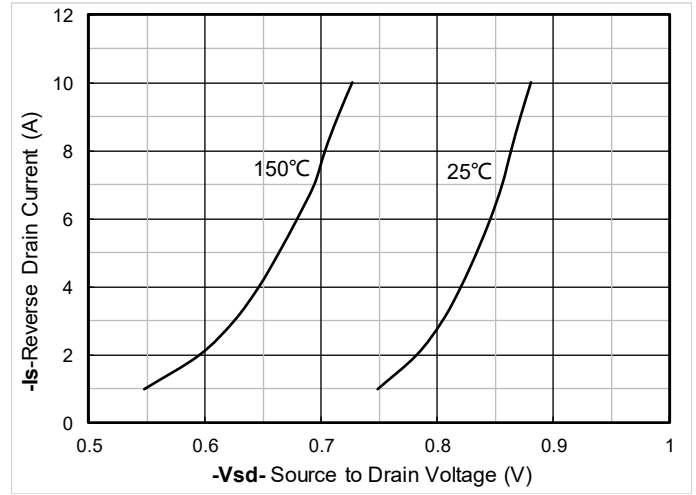


Figure8. Forward characteristics of reverse diode

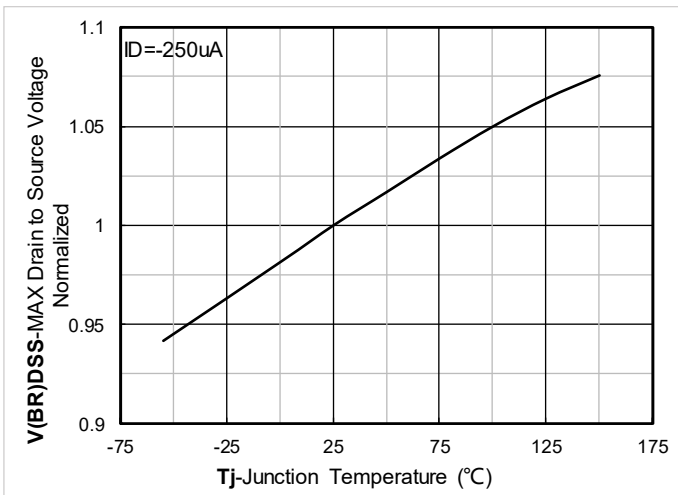


Figure9. Normalized breakdown voltage

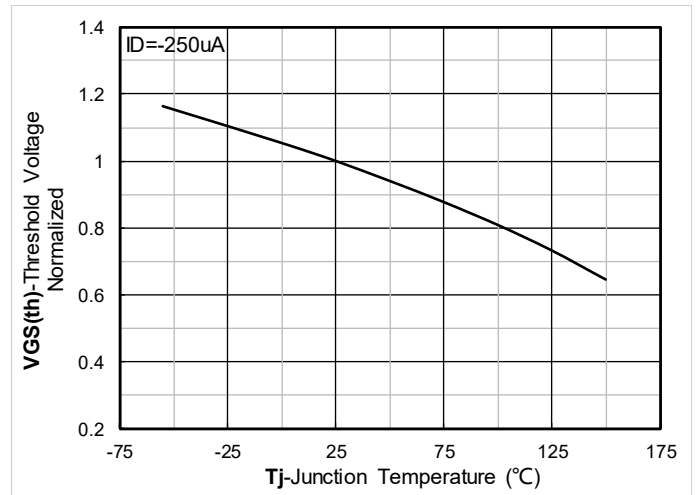


Figure10. Normalized Threshold voltage

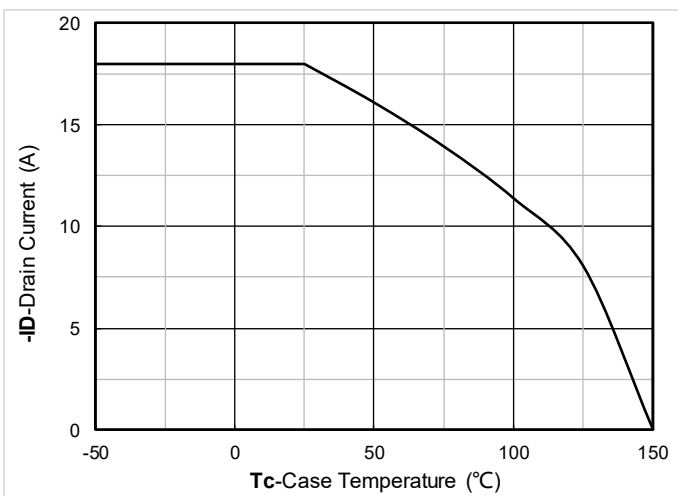


Figure11. Current dissipation

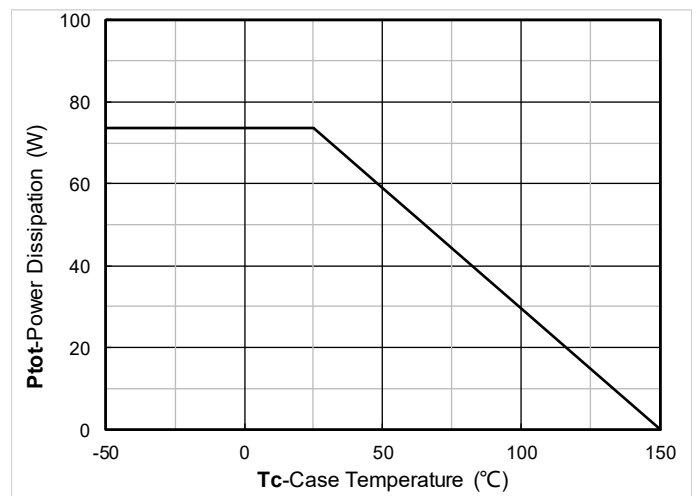


Figure12. Power dissipation



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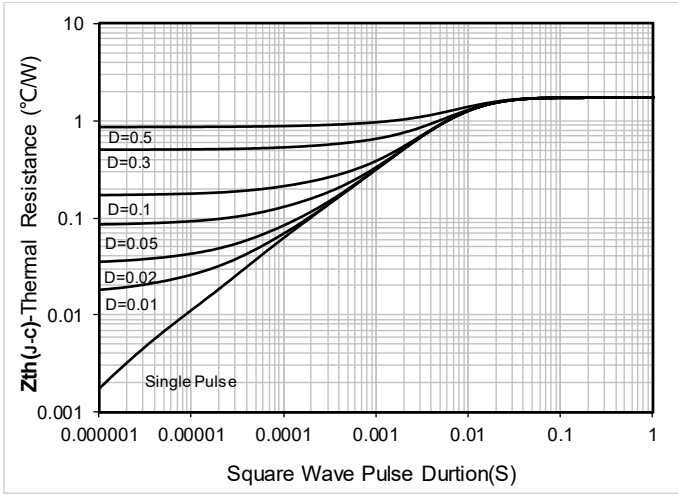


Figure13. Maximum Transient Thermal Impedance

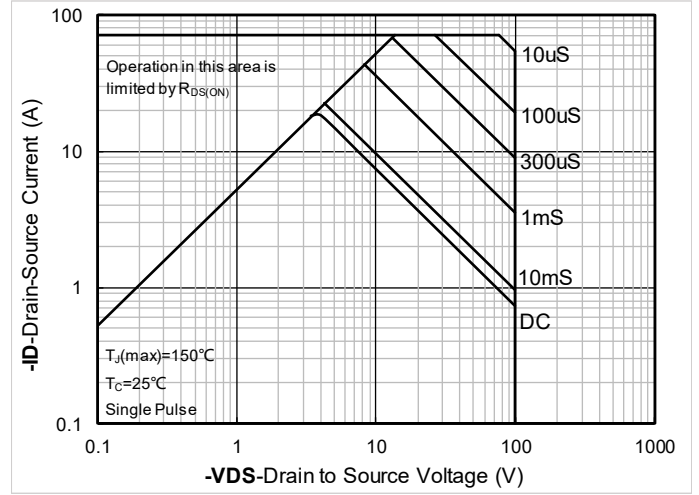
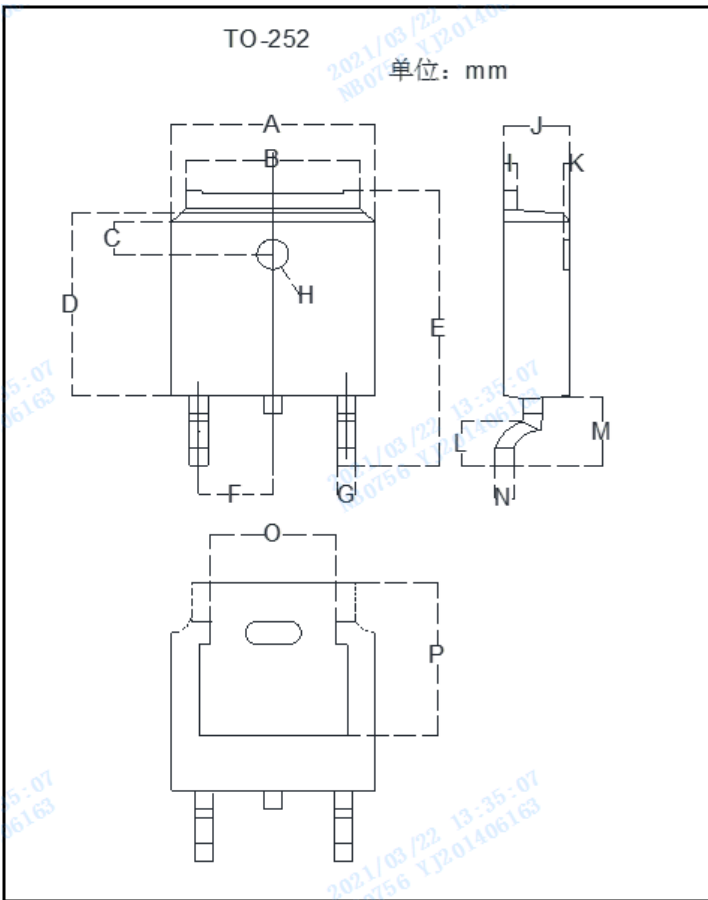


Figure14. Safe Operation Area



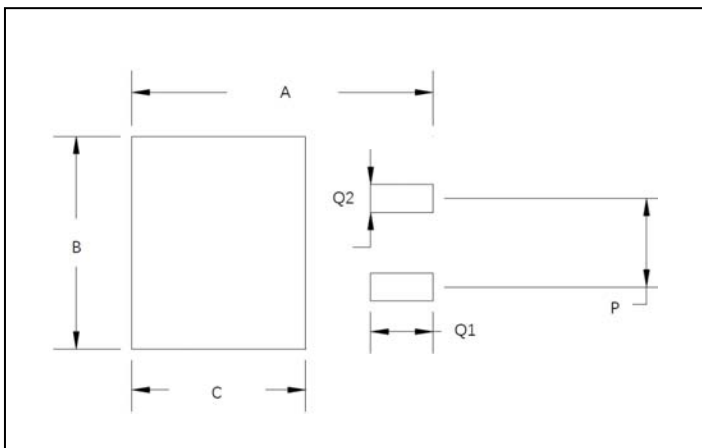
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## ■ TO-252 Package information



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.256	0.264	6.50	6.70	
B	0.201	0.215	5.10	5.46	
C	0.055	0.071	1.40	1.80	
D	0.236	0.244	6.00	6.20	
E	0.394	0.409	10.00	10.40	
F	0.085	0.093	2.17	2.37	
G	0.026	0.034	0.66	0.86	
H	Φ0.041	Φ0.531	Φ1.050	Φ1.350	
I	0.018	0.023	0.46	0.58	
J	0.087	0.094	2.20	2.40	
K	0.000	0.012	0.00	0.30	
L	0.035	0.090	0.89	2.29	
M	0.107	0.121	2.73	3.08	
N	0.017	0.023	0.43	0.58	
O	0.165	0.195	4.20	4.95	
P	0.203	0.215	5.15	5.45	

## ■ Suggested Pad Layout



Dim	Millimeters
A	11.4
B	6.74
C	6.23
P	4.56
Q1	2.28
Q2	1.52



## YJD18GP10AQ

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