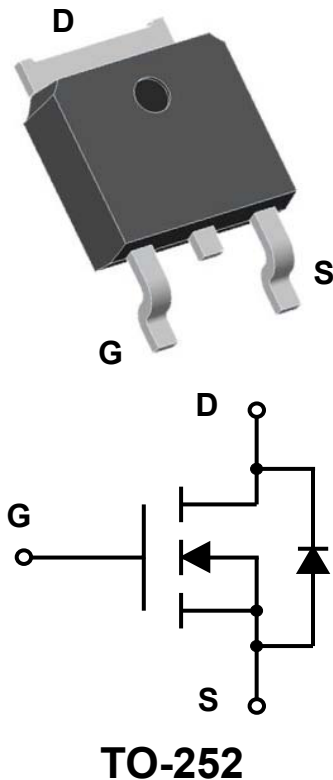


## N-Channel Enhancement Mode Field Effect Transistor



### Product Summary

- Epoxy meets UL-94 V-0 flammability rating and halogen free
- Moisture Sensitivity Level 1
- $V_{DS}$  100V
- $I_D$  40A
- $R_{DS(ON)}$ ( at  $V_{GS}=10V$ ) <20 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=4.5V$ ) <26 mohm
- 100% UIS Tested
- 100%  $\nabla V_{DS}$  Tested
- Part no. with suffix "Q" means AEC-Q101 qualified

### General Description

- Low  $R_{DS(on)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery

### Applications

- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor
- Invertors

### ■ 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 <sup>A</sup>	$I_D$	40	A
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	120	A
Avalanche energy <sup>C</sup>	EAS	30	mJ
Total Power Dissipation <sup>D</sup>	$P_D$	72	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.74	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-to-Ambient <sup>E</sup>	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

### ■ Ordering Information (Example)

PREFERRED P/N	UNIT WEIGHT (g)	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD40G10AQ	Approximate 0.32	YJD40G10A	2500	2500	25000	13" reel



# YJD40G10AQ

## ■ 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
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> =8A		17	20	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =6A		20	26	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V			1.3	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				40	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHZ		1190		pF
Output Capacitance	C <sub>oss</sub>			195		
Reverse Transfer Capacitance	C <sub>rss</sub>			4.1		
<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> =8A		20		nC
Gate-Source Charge	Q <sub>gs</sub>			2.4		
Gate-Drain Charge	Q <sub>gd</sub>			5.3		
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =8A, di/dt=100A/us		95		
Reverse Recovery Time	t <sub>rr</sub>			50		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =10A R <sub>GEN</sub> =2.2Ω		17.5		ns
Turn-on Rise Time	t <sub>r</sub>			3.9		
Turn-off Delay Time	t <sub>D(off)</sub>			33.5		
Turn-off fall Time	t <sub>f</sub>			3.2		

- A. Calculated continuous current based on maximum allowable junction temperature.  
 B. Repetitive rating; pulse width limited by max. junction temperature.  
 C. V<sub>DD</sub>=50 V, R<sub>G</sub>=25 Ω, L=0.3 mH, starting T<sub>J</sub>=25 °C.  
 D. P<sub>D</sub> is based on max. junction temperature, using junction-case thermal resistance.  
 E. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25 °C.



## ■ Typical Performance Characteristics

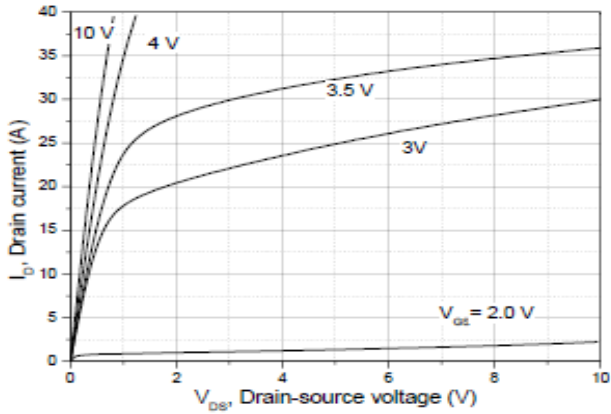


Figure1. Output Characteristics

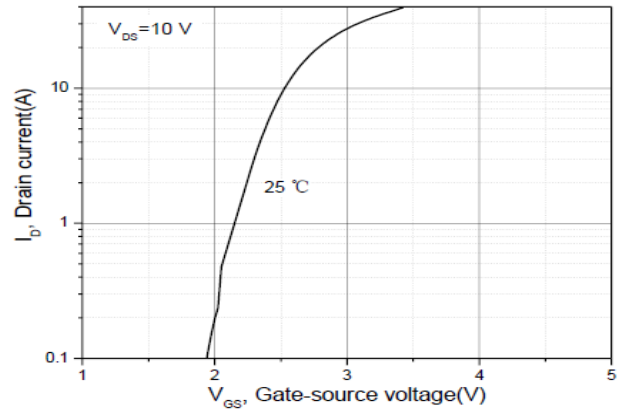


Figure2. Transfer Characteristics

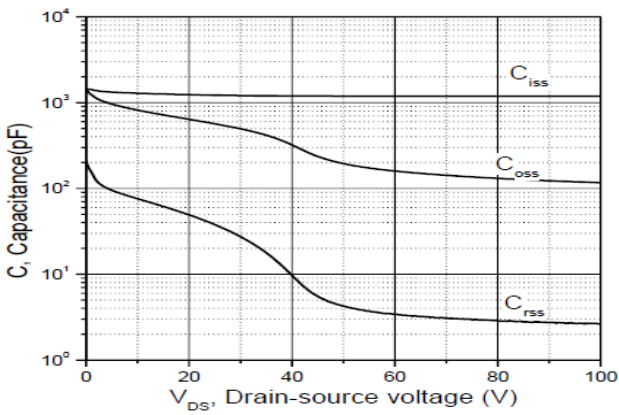


Figure3. Capacitance Characteristics

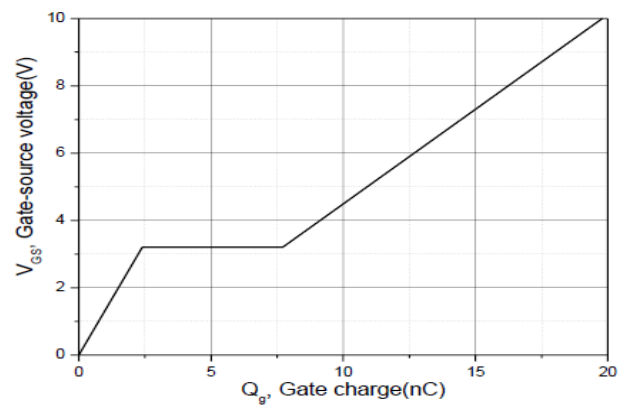


Figure4. Gate Charge

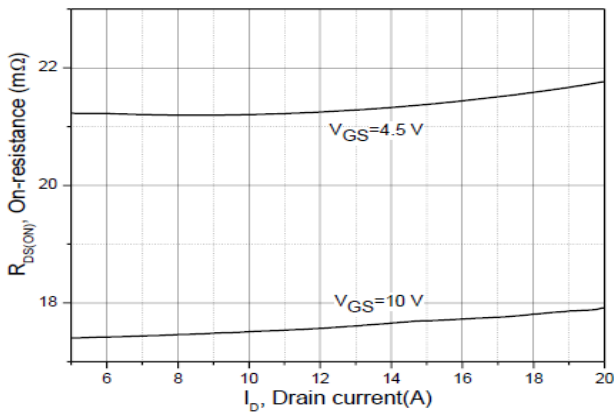


Figure5. Drain-Source on Resistance

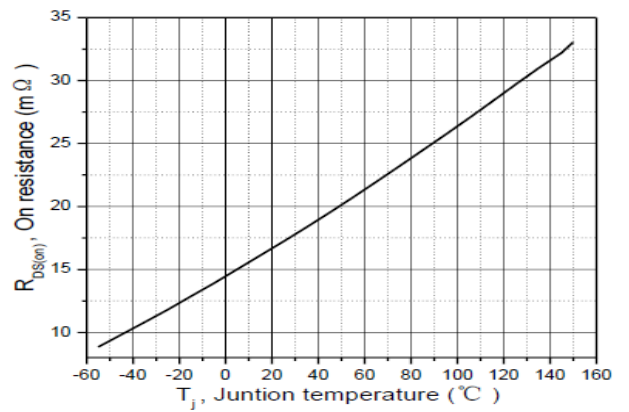


Figure6. Drain-Source on Resistance



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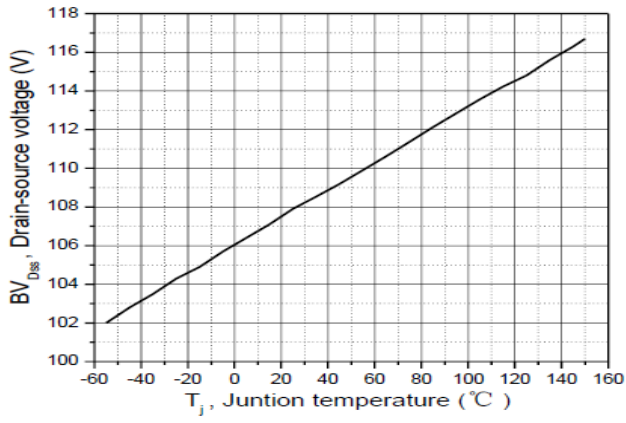


Figure7. Drain-source breakdown voltage

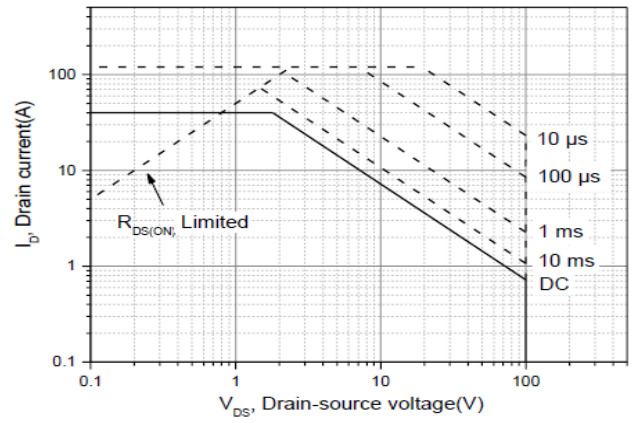
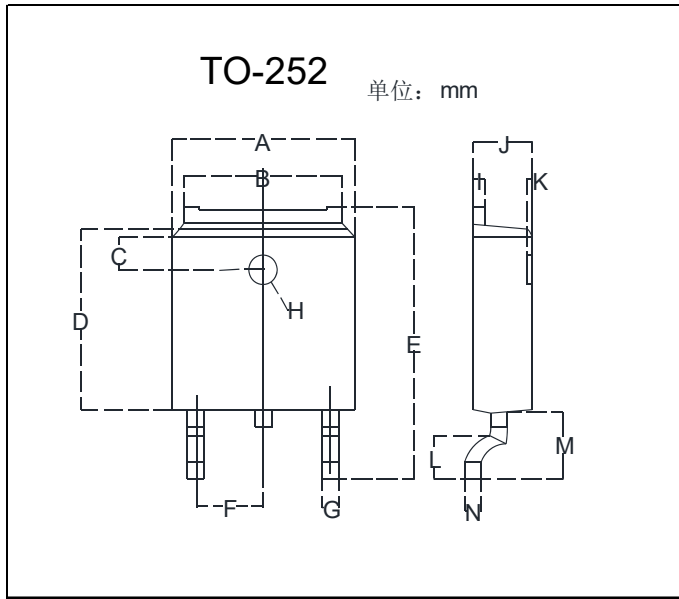


Figure8.Safe Operation Area



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## ■ TO-252 Package information



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.256	0.264	6.500	6.700	
B	0.201	0.215	5.100	5.460	
C	0.055	0.071	1.400	1.800	
D	0.236	0.244	6.000	6.200	
E	0.394	0.409	10.000	10.400	
F	0.085	0.093	2.166	2.366	
G	0.026	0.034	0.660	0.860	
H	Φ0.041	Φ0.531	Φ1.050	Φ1.350	
I	0.018	0.023	0.460	0.580	
J	0.087	0.094	2.200	2.400	
K	0.000	0.012	0.000	0.300	
L	0.035	0.090	0.890	2.290	
M	0.107	0.121	2.730	3.080	
N	0.017	0.023	0.430	0.580	



## YJD40G10AQ

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