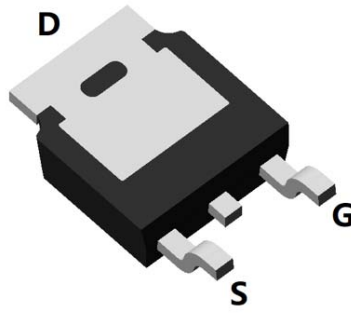
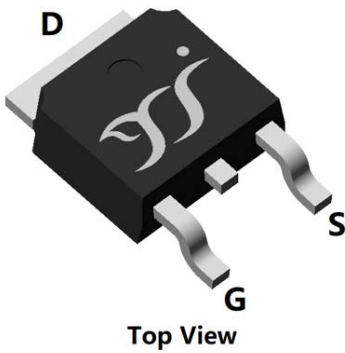
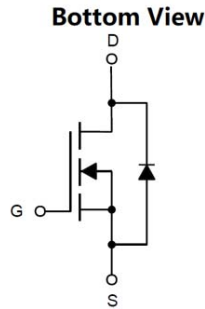


## N-Channel Enhancement Mode Field Effect Transistor



**TO-252**



### Product Summary

- $V_{DS}$  20V
- $I_D$  30A
- $R_{DS(ON)}$ ( at  $V_{GS}=4.5V$ ) < 8mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=2.5V$ ) < 9mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=1.8V$ ) < 14mohm
- 100%  $\nabla V_{DS}$  Tested
- 100% EAS Tested

### General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- High current load applications
- Load switch
- Hard switched and high frequency circuits
- Uninterruptible power supply

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	20	V
Gate-source Voltage		$V_{GS}$	$\pm 10$	V
Drain Current	$T_C=25^\circ C$	$I_D$	30	A
	$T_C=100^\circ C$		19	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	125	A
Total Power Dissipation	$T_C=25^\circ C$	$P_D$	25	W
	$T_C=100^\circ C$		10	
Single Pulse Avalanche Energy <sup>B</sup>		$E_{AS}$	64	mJ
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	5	$^\circ C/W$
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ C$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJD30N02A	F1/F2	YJD30N02A	2500	/	25000	13" reel



# YJD30N02A

## ■ 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	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C			100	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, 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	0.45	0.62	1.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A		5.6	8	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =7A		7.1	9	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =3A		10	14	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =15A, V <sub>GS</sub> =0V			1.2	V
Gate resistance	R <sub>G</sub>	f=1MHz		1.7		Ω
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz		1650		pF
Output Capacitance	C <sub>oss</sub>			266		
Reverse Transfer Capacitance	C <sub>rss</sub>			206		
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =10V, I <sub>D</sub> =30A		46.8		nC
Gate-Source Charge	Q <sub>gs</sub>			4.6		
Gate-Drain Charge	Q <sub>gd</sub>			7.3		
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =30A, di/dt=100A/us		5.8		ns
Reverse Recovery Time	t <sub>rr</sub>			19.5		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =10V, I <sub>D</sub> =30A R <sub>GEN</sub> =3Ω		13		ns
Turn-on Rise Time	t <sub>r</sub>			110		
Turn-off Delay Time	t <sub>D(off)</sub>			40		
Turn-off fall Time	t <sub>f</sub>			105		

A. Pulse Test: Pulse Width ≤ 300μs, Duty cycle ≤ 2%.

B. T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=5V, L=0.5mH, I<sub>AS</sub>=16A



■ Typical Performance Characteristics

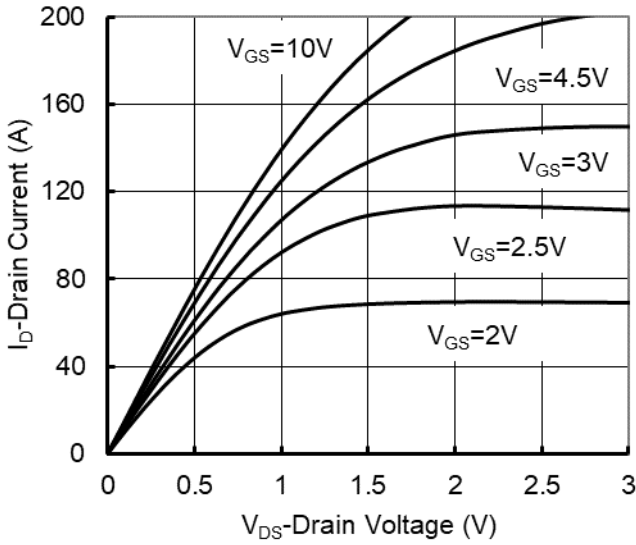


Figure1. Output Characteristics

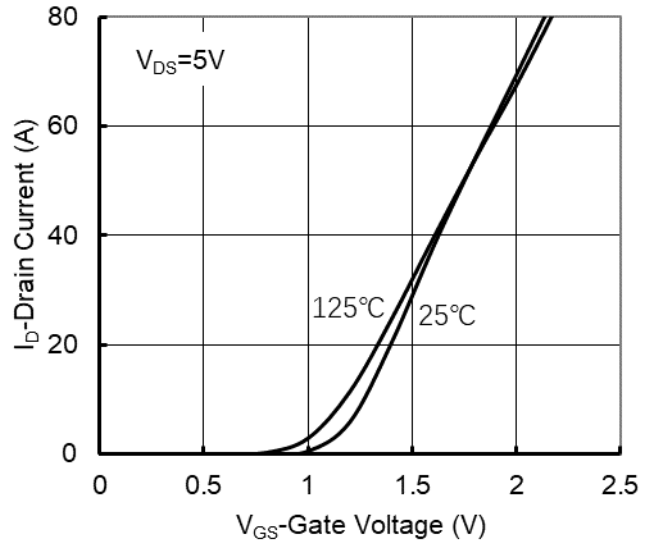


Figure2. Transfer Characteristics

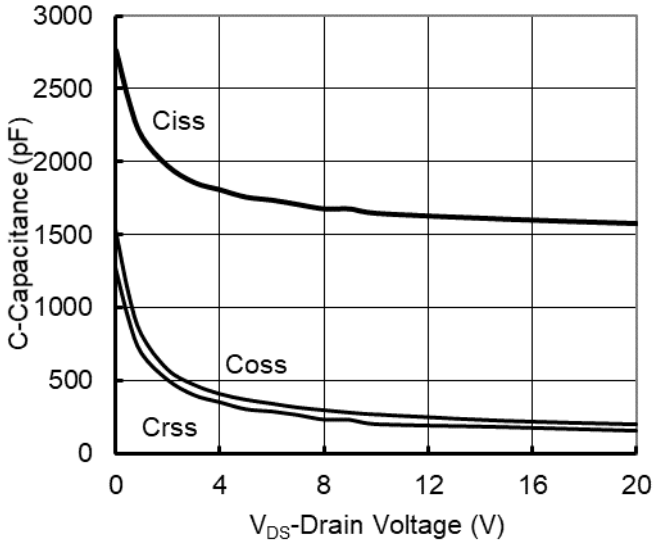


Figure3. Capacitance Characteristics

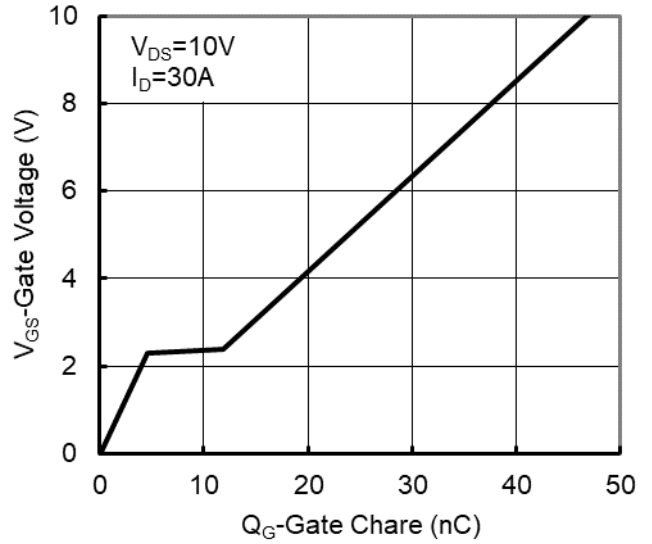


Figure4. Gate Charge

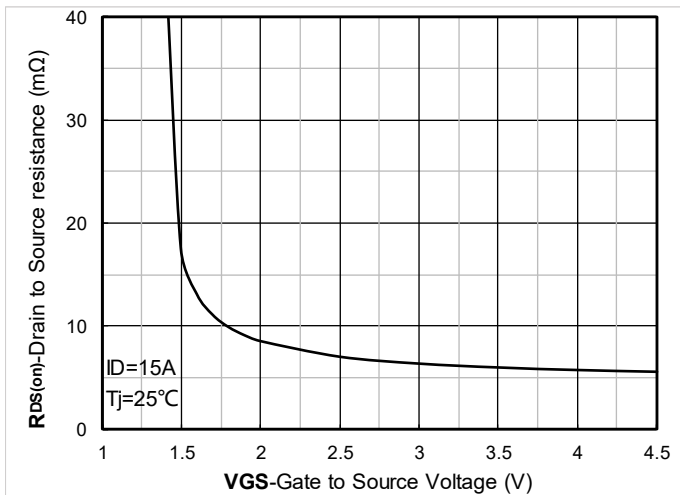


Figure5. On-Resistance vs Gate to Source Voltage

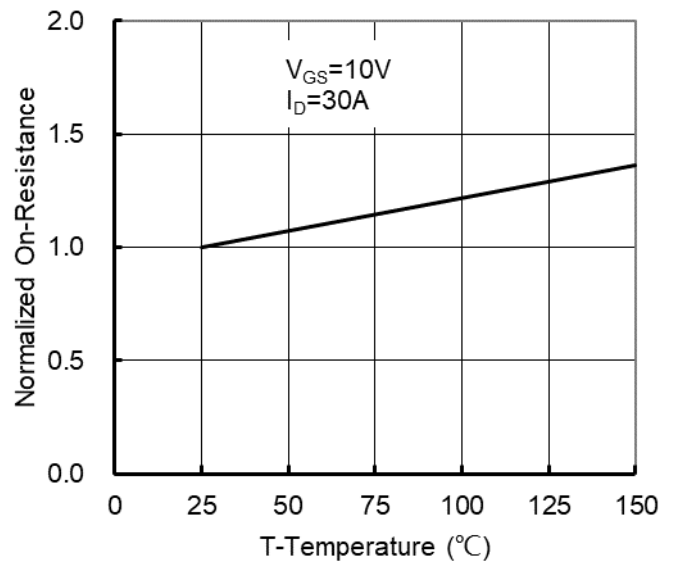


Figure6. On-Resistance vs. Junction Temperature



# YJD30N02A

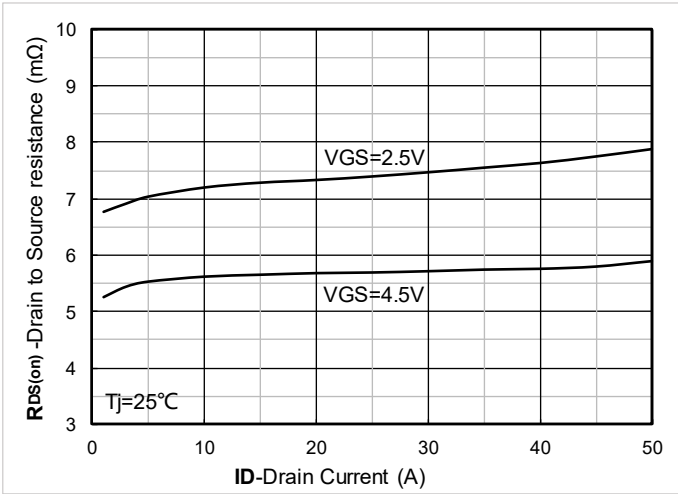


Figure 7. RDS(on) VS Drain Current

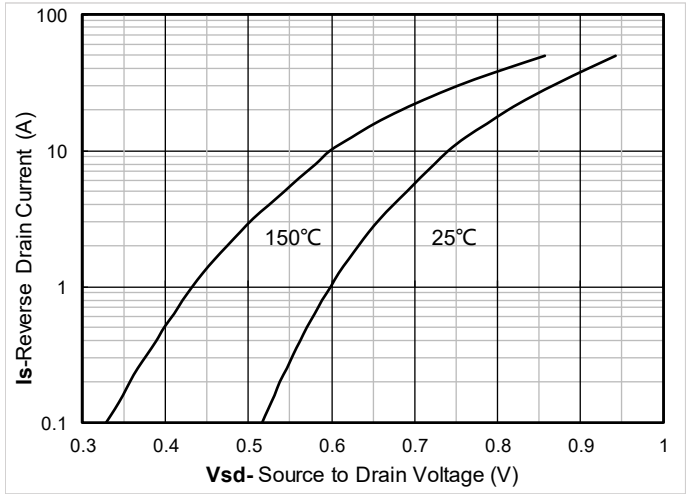


Figure 8. Forward characteristics of reverse diode

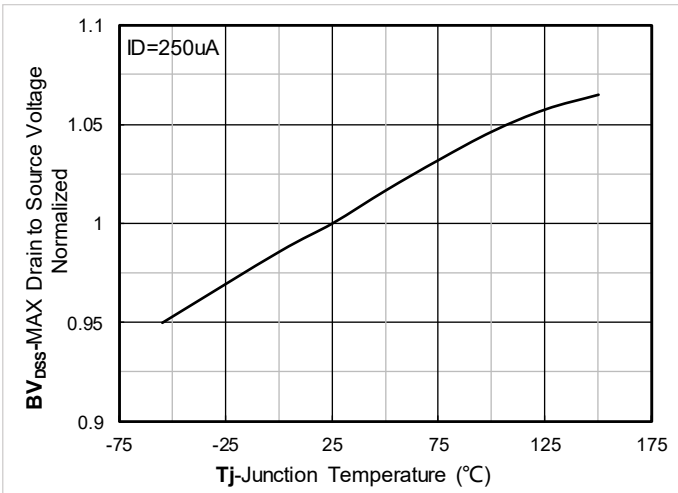


Figure 9. Normalized breakdown voltage

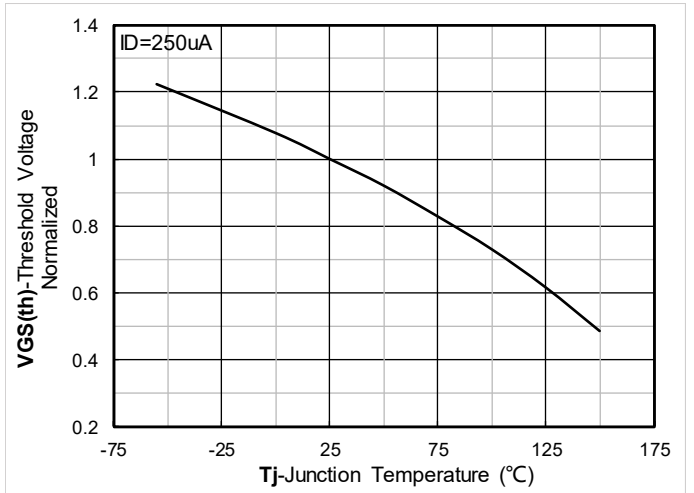


Figure 10. Normalized Threshold voltage

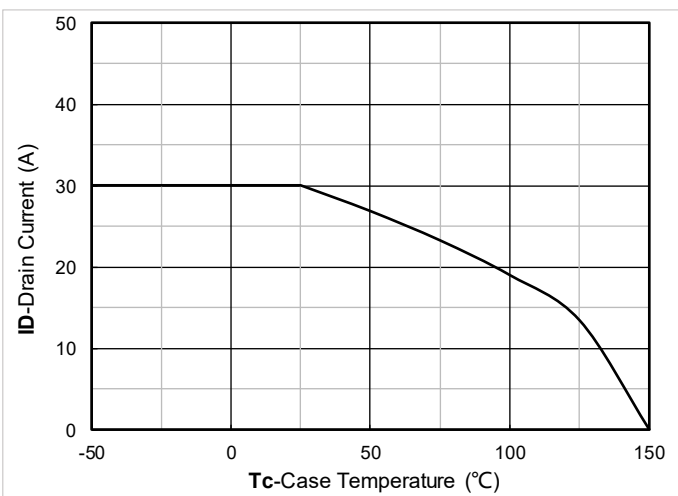


Figure 11. Current dissipation

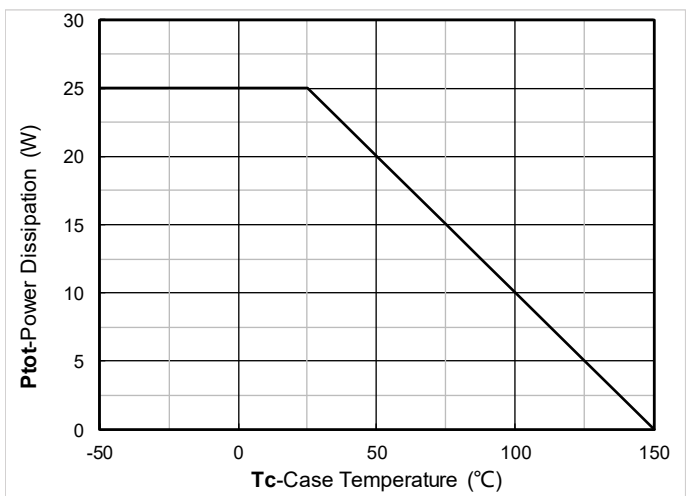


Figure 12. Power dissipation



# YJD30N02A

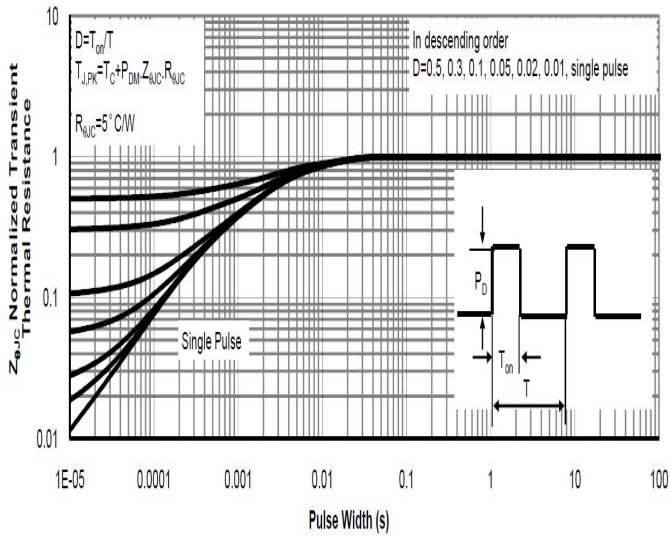


Figure 13. Normalized Maximum Transient Thermal Impedance

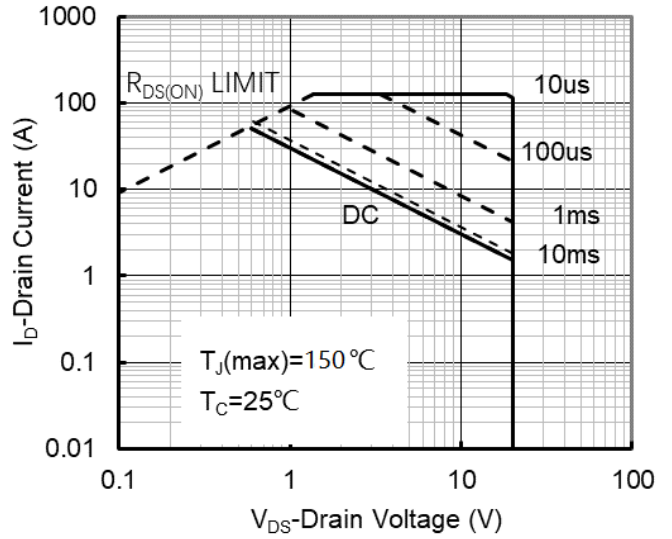
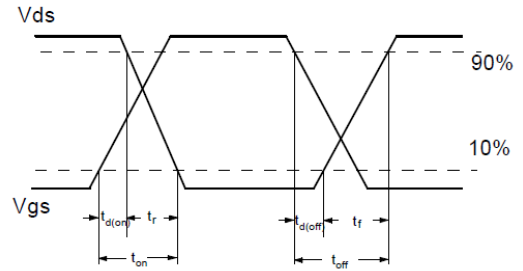
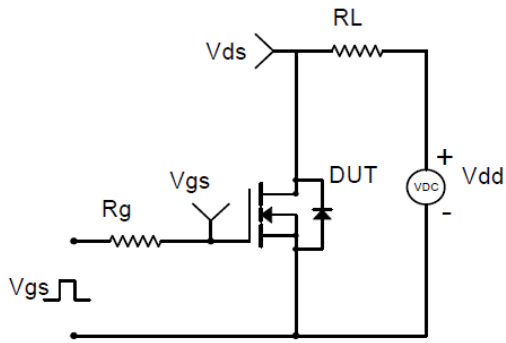
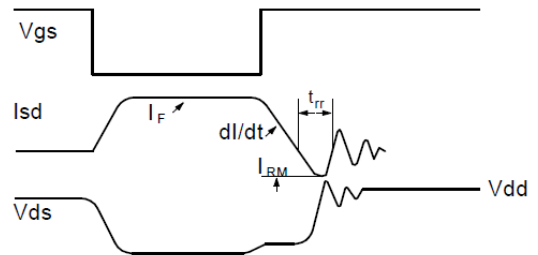
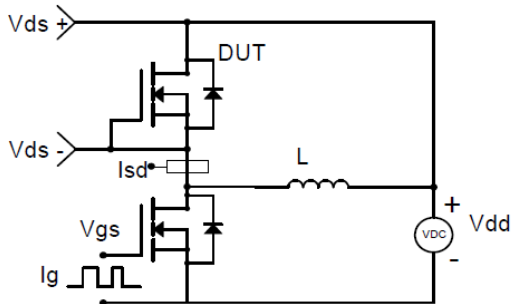


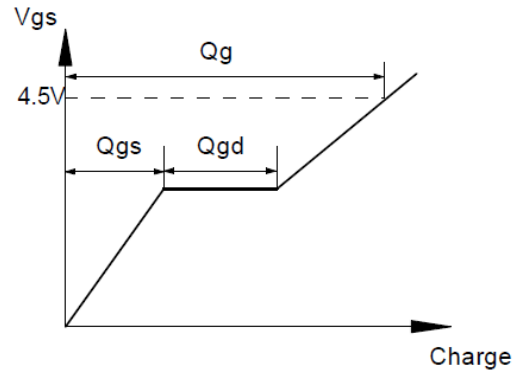
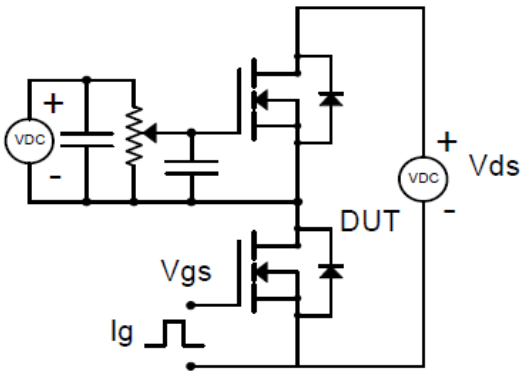
Figure 14. Safe Operation Area



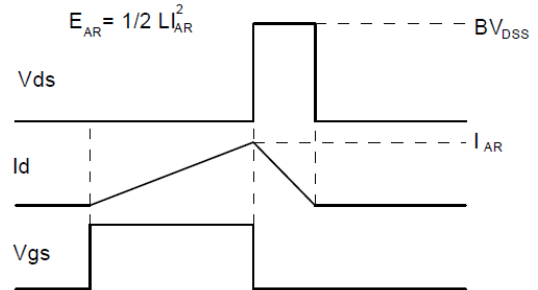
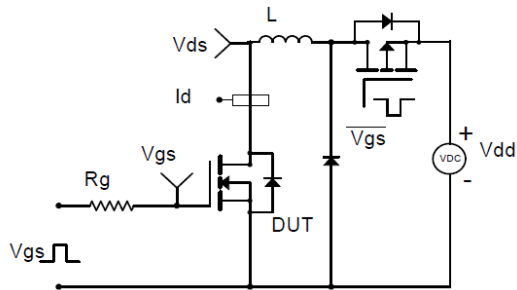
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**

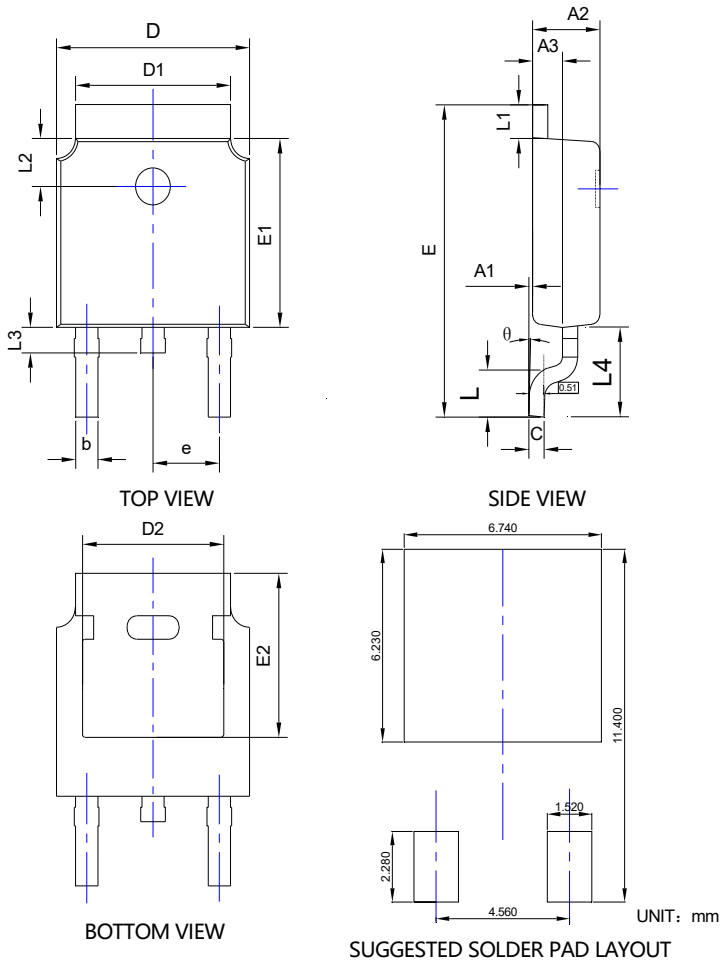


**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



# YJD30N02A

## TO-252-B Package information



SYMBOL	DIMENSIONS					
	INCHES			Millimeter		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A1	0.000	---	0.008	0.000	---	0.200
A2	0.087	0.091	0.094	2.200	2.300	2.400
A3	0.035	0.039	0.043	0.900	1.000	1.100
b	0.026	0.030	0.034	0.660	0.760	0.860
c	0.018	0.020	0.023	0.460	0.520	0.580
D	0.256	0.260	0.264	6.500	6.600	6.700
D1	0.203	0.209	0.215	5.150	5.300	5.450
D2	0.181	0.189	0.195	4.600	4.800	4.950
E	0.390	0.398	0.406	9.900	10.100	10.300
E1	0.236	0.240	0.244	6.000	6.100	6.200
E2	0.203	0.209	0.215	5.150	5.300	5.450
e	0.090BSC			2.286BSC		
L	0.049	0.059	0.069	1.250	1.500	1.750
L1	0.035	---	0.050	0.900	---	1.270
L2	0.055	---	0.075	1.400	---	1.900
L3	0.024	0.031	0.039	0.600	0.800	1.000
L4	0.114REF			2.900REF		
θ	0°	---	10°	0°	---	10°

### NOTE:

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



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