



YJD40N04A

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

V_{DS}	40 V
D	40 A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	13.0 mohm
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	23.0 mohm
100% EAS Tested	
100% V_{DS} Tested	

General Description

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 switching
Hard switched and high frequency circuits
Uninterruptible power supply

Absolute Maximum Ratings ($T_A=25$ unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-source Voltage	V_{DS}	40	V	
Gate-source Voltage	V_{GS}	20	V	
Drain Current	I_D	$T_C=25$	40	A
		$T_C=100$	25	

Pulsed Drain Current ^A



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Electrical Characteristics (T_J=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	T _J =25		1	
			T _J =150		100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = 20V, V _{DS} =0V			100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =20A		10.6	13	m
		V _{GS} = 4.5V, I _D =10A		15	23	
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V		0.85	1.2	V
Maximum Body-Diode Continuous Current	I _S				40	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHZ		917		pF
Output Capacitance	C _{oss}			128		
Reverse Transfer Capacitance	C _{rss}			108		
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =20A		23.6		nC
Gate-Source Charge	Q _{gs}			4.4		
Gate-Drain Charge	Q _{gd}			6.3		
Reverse Recovery Charge	Q _{rr}	I _r =20A, di/dt=100A/us		0.4		
Reverse Recovery Time	t _{rr}			7		
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =20V, I _D =2A, R _L =1 R _{GEN} =3		10		ns
Turn-on Rise Time	t _r			56		
Turn-off Delay Time	t _{D(off)}			27		
Turn-off fall Time	t _f			72		

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

B. T_J=25, V_{DD}=20V, V_G=10V, L=0.5mH, I_{AS}=14A

C. R_{JA} is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. R_{JC} is guaranteed by design, while R_{JA} is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



Typical Performance Characteristics

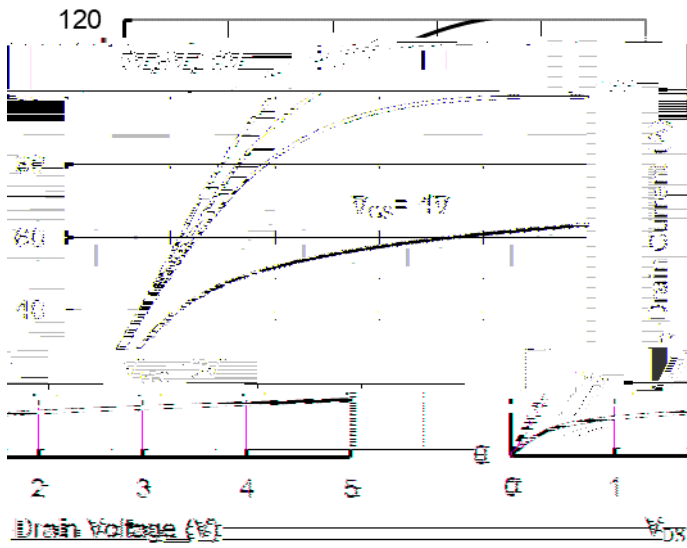


Figure 1. Output Characteristics

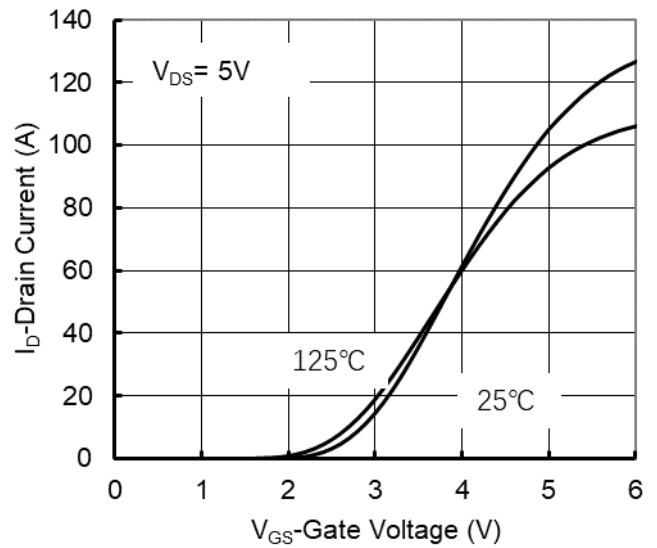


Figure 2. Transfer Characteristics

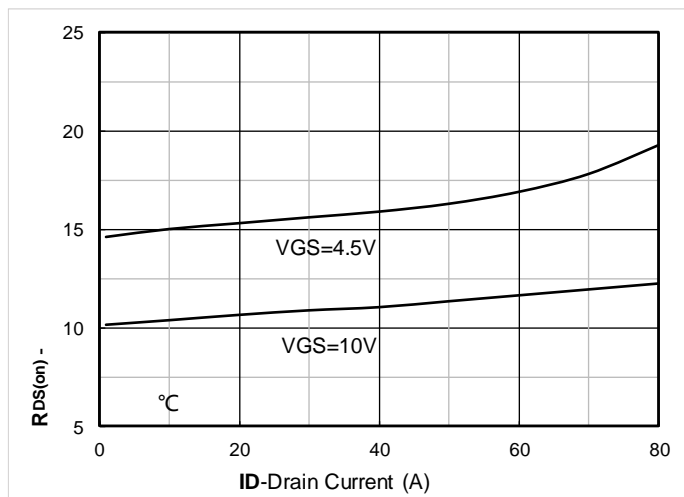


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

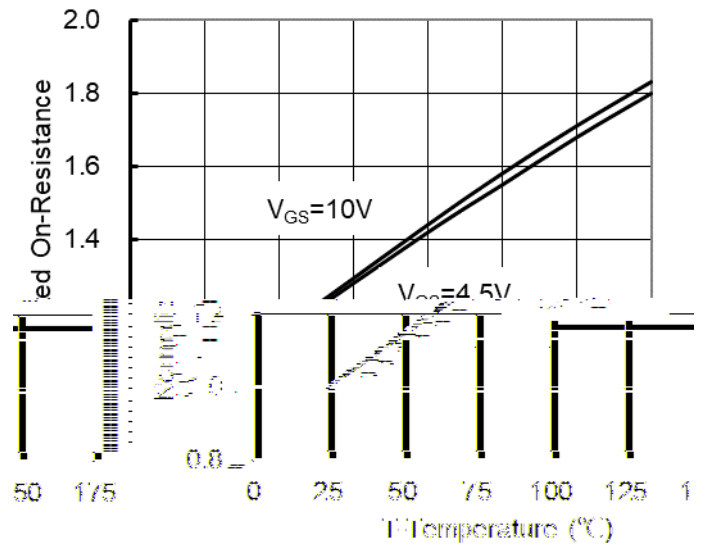


Figure 4. On-Resistance vs. Junction Temperature

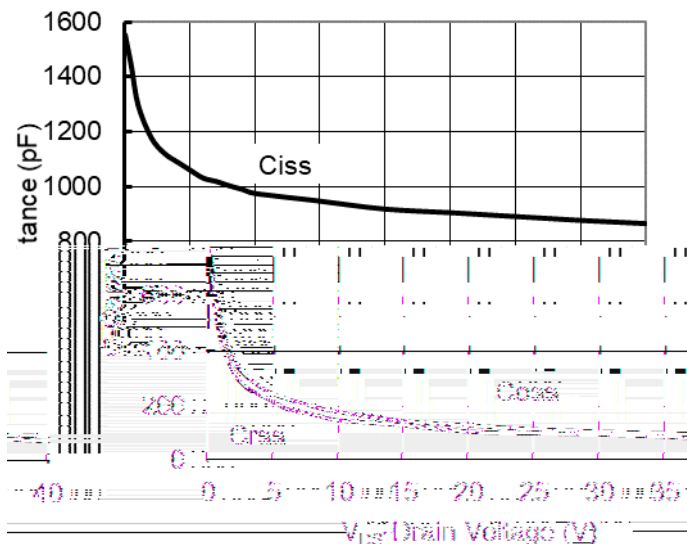


Figure 5. Capacitance Characteristics

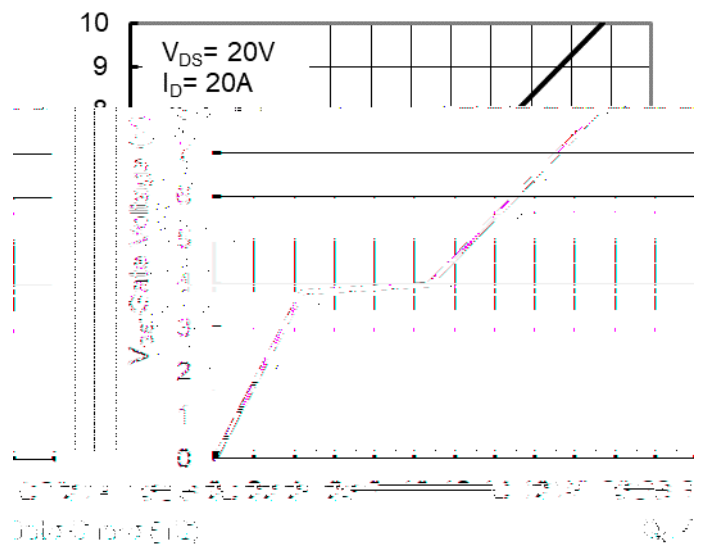


Figure 6. Gate Charge



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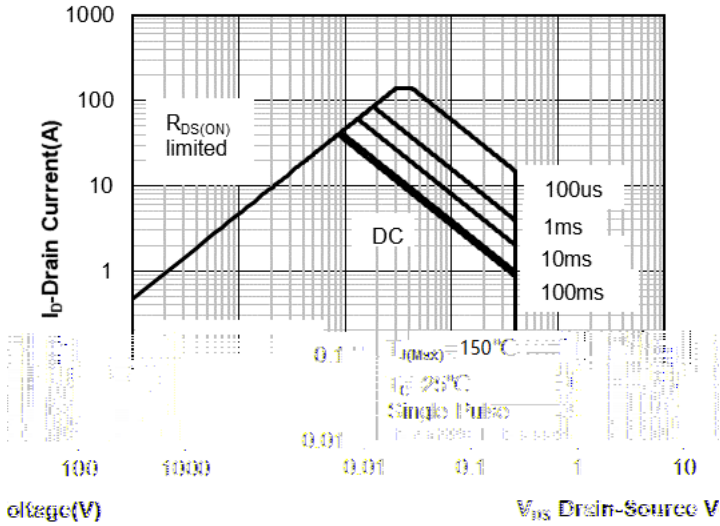


Figure 7. Safe Operation Area

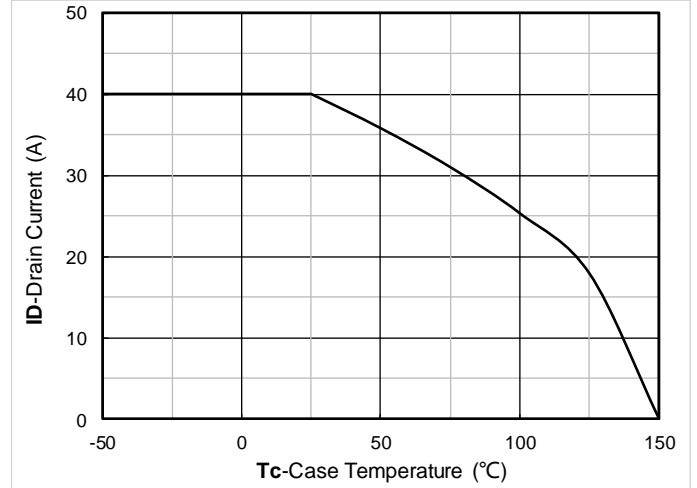


Figure 8. Maximum Continuous Drain Current vs Case Temperature

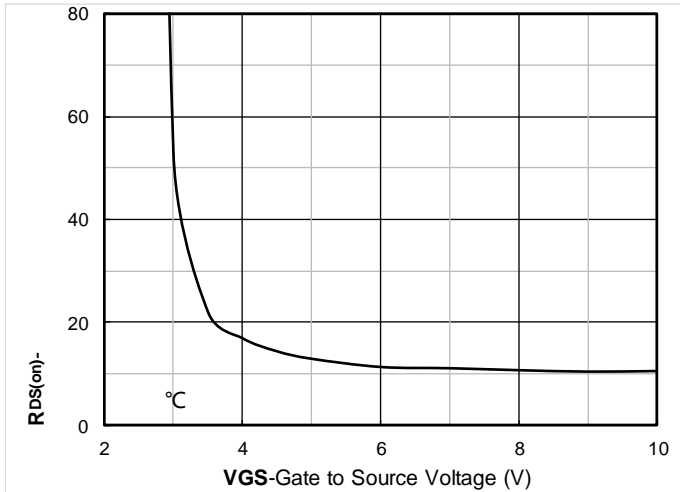


Figure 9. On-Resistance vs Gate to Source Voltage

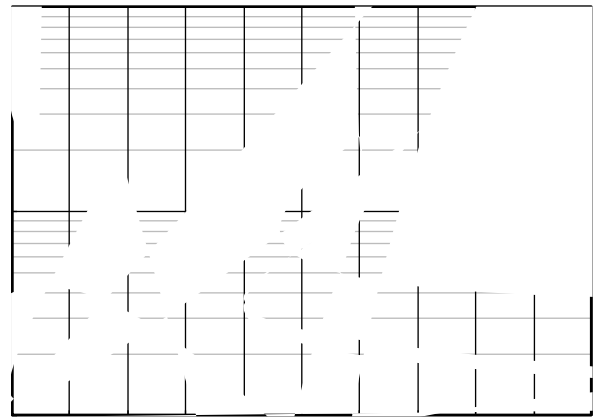


Figure 10. Forward characteristics of reverse diode

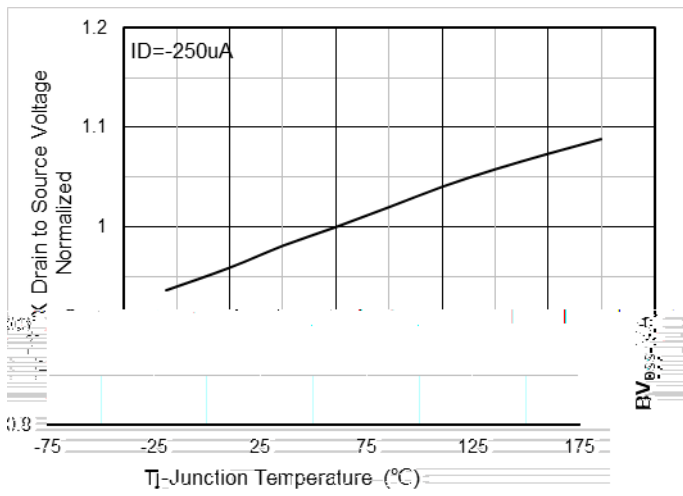


Figure 11. Normalized breakdown voltage

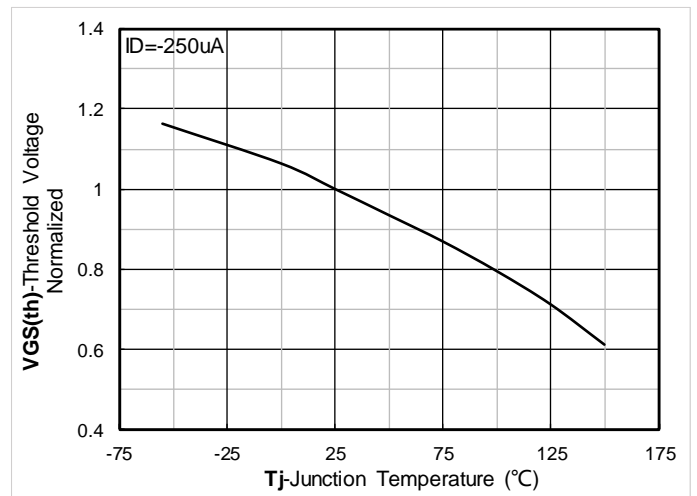


Figure 12. Normalized Threshold voltage



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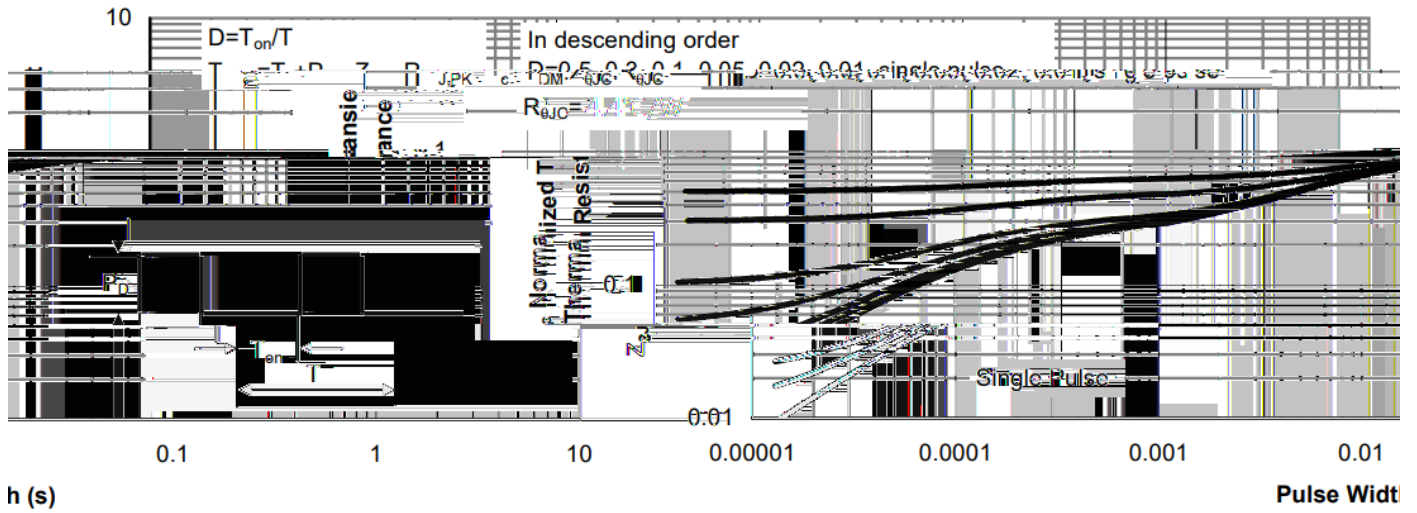
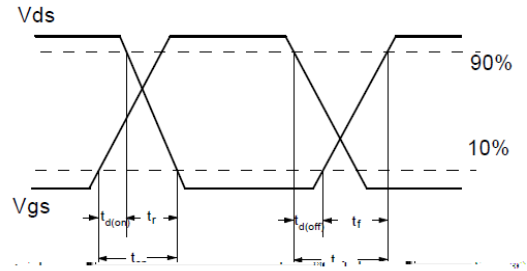
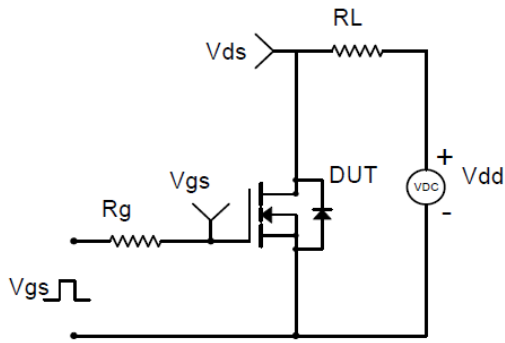
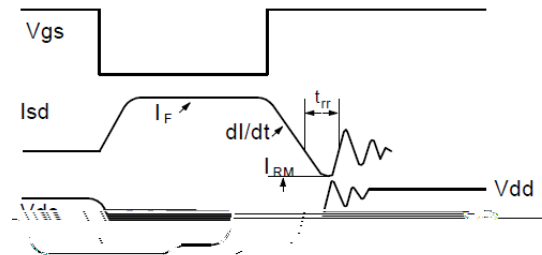
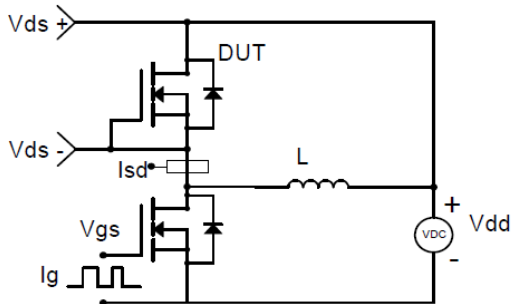


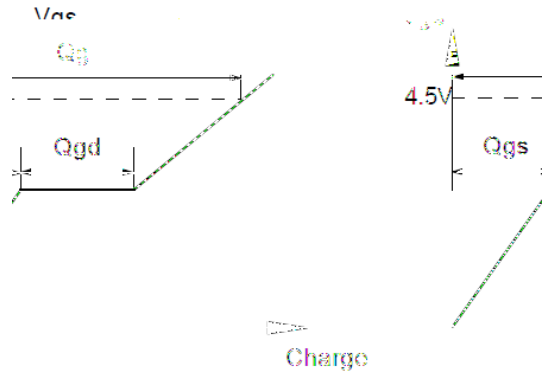
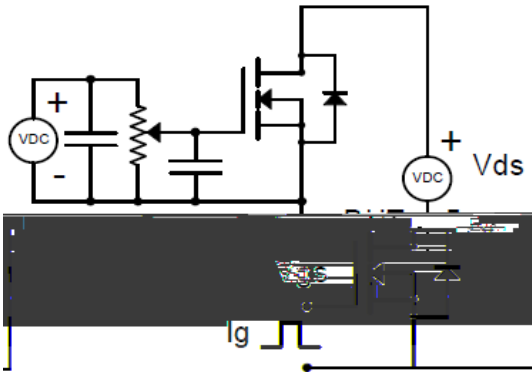
Figure 13. Normalized Maximum Transient Thermal Impedance



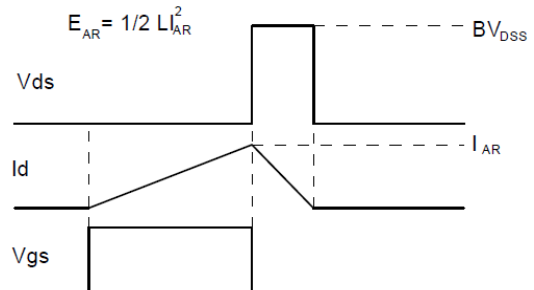
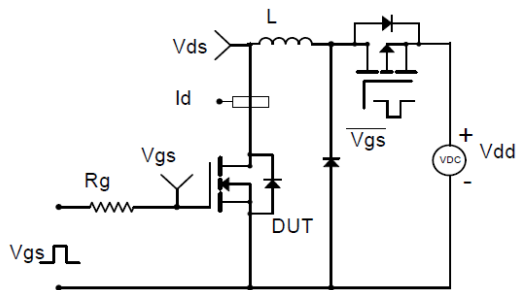
Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Gate Charge Test Circuit & Waveform

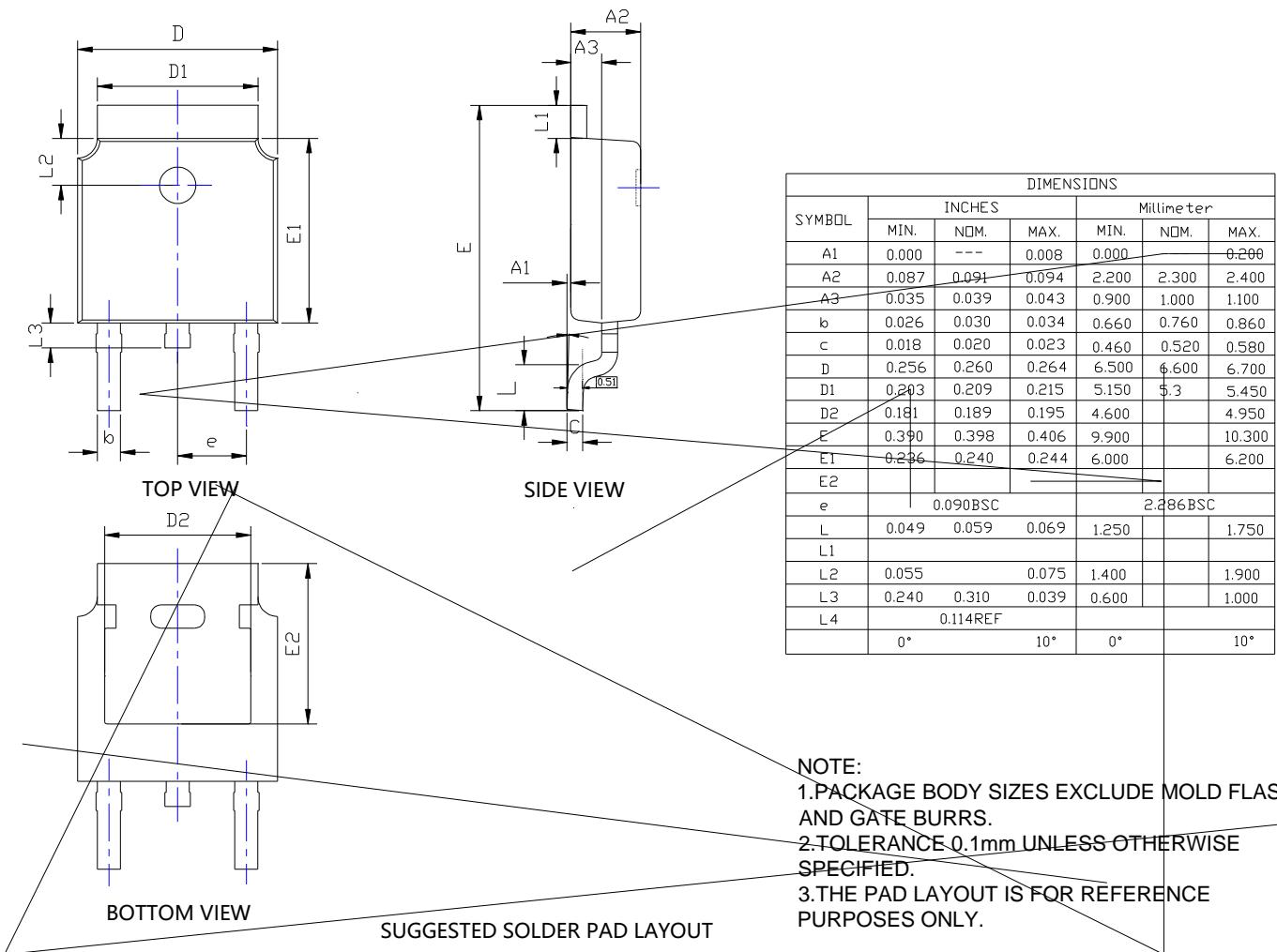


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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TO-252-B Package information





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