

650V N-CHANNEL ENHANCEMENT MODE MOSFET

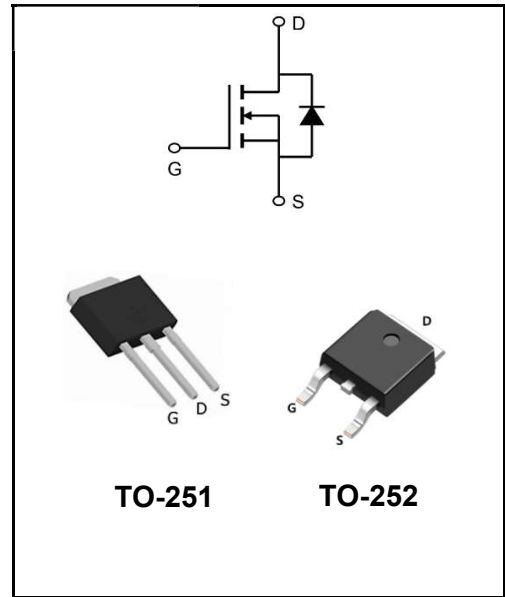
MAIN CHARACTERISTICS

I_D	4A
V_{DSS}	650V
$R_{DS(on)-typ}(@V_{GS}=10V)$	< 2.4Ω (Type:2Ω)



Application

- ◆ Uninterruptible Power Supply(UPS)
- ◆ Power Factor Correction (PFC)



Product Specification Classification

Part Number	Package	Marking	Pack
YFW4N65AD	TO-252	YFW 4N65AD XXXXX	2500PCS/Tape
YFW4N65AMJ	TO-251	YFW 4N65AMJ XXXXX	4000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DS}	650	V
Continuous Drain Current	I_D	4	A
Pulsed Drain Current (Note1)	I_{DM}	16	A
Gate - Source Voltage	V_{GS}	± 30	V
Single Pulse Avalanche Energy (Note2)	E_{AS}	160	mJ
Avalanche Current (Note1)	I_{AR}	4	A
Repetitive Avalanche Energy (Note1)	E_{AR}	20	mJ
Power Dissipation(TC=25°C)	P_D	36	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Thermal Resistance, Junction-to-case	$R_{\theta JC}$	3.47	°C/W
Thermal Resistance, Junction ambient	$R_{\theta JA}$	62.5	°C/W

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	V(BR)DSS	650	-	-	V
Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ C$	I_{DSS}	-	-	1	μA
Gate-Source Leakage	$V_{GS}=\pm 30V$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	V_{GS(th)}	3.0	-	4	V
Drain-Source On-Resistance (Note3)	$V_{GS}=10V, I_D=2.0A$	R_{DS(ON)}	-	2	2.4	Ω
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$	C_{iss}	-	580	-	pF
Output Capacitance		C_{oss}	-	69.5	-	
Reverse Transfer Capacitance		C_{rss}	-	10.9	-	
Total Gate Charge	$V_{DD}=520V$ $I_D=4A$ $V_{GS}=10V$	Q_g	-	15	-	nC
Gate-Source Charge		Q_{gs}	-	2.5	-	
Gate-Drain Charge		Q_{gd}	-	7.5	-	
Turn-on delay time	$V_{DD}=400V$ $I_D=4A$ $R_G=25\Omega$	t_{d(on)}	-	12	-	ns
Turn-on Rise Time		T_r	-	22	-	
Turn-Off Delay Time		t_{d(OFF)}	-	50	-	
Turn-on Fall Time		t_f	-	48	-	
Continuous Body Diode Current	$T_C=25^\circ C$	I_S	-	-	4	A
Pulsed Diode Forward Current		I_{SM}	-	-	16	
Body Diode Voltage	$T_J=25^\circ C, I_{SD}=4A, V_{GS}=0V$	V_{SD}	-	-	1.4	V
Reverse Recovery Time	$V_{GS}=0V, I_S=4A$ $diF/dt=100A/\mu s$	t_{rr}	-	250	-	nS
Reverse Recovery Charge		Q_{rr}	-	3.5	-	uC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS}=4A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^\circ C$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Ratings and Characteristic Curves

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

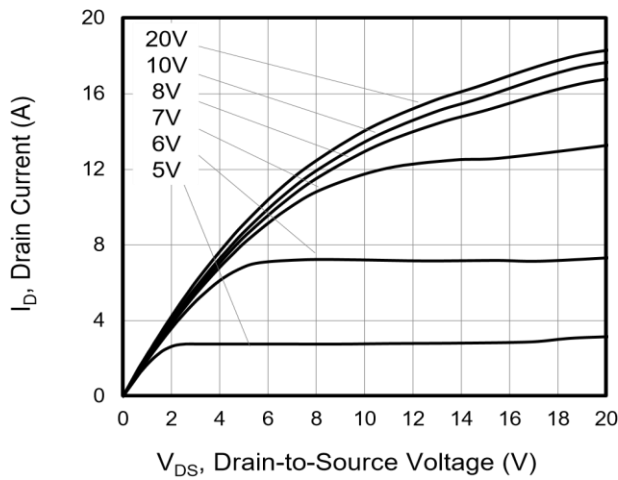
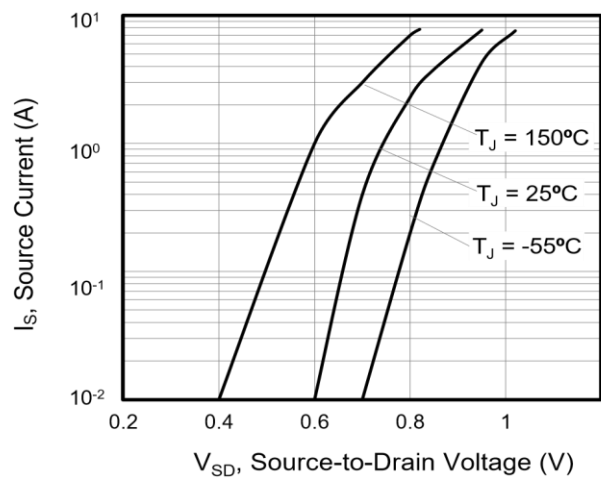


Figure 2. Body Diode Forward Voltage



1.2

Figure 3. Drain Current vs. Temperature

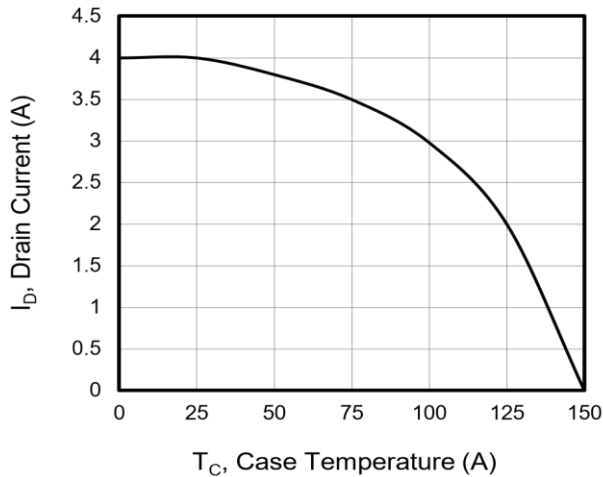


Figure 4. Power Dissipation vs. Temperature

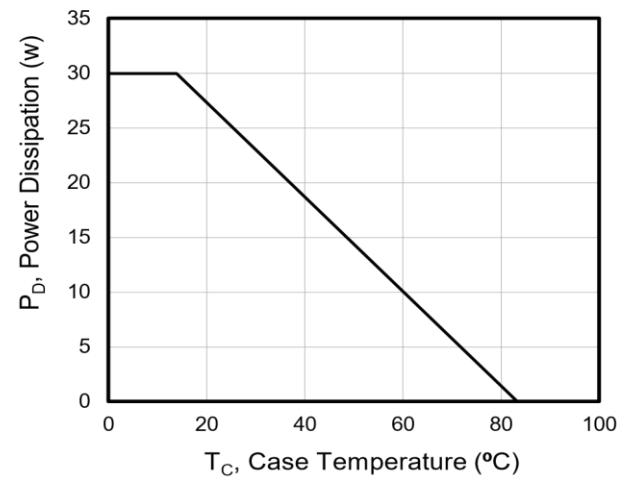


Figure 5. Transfer Characteristics

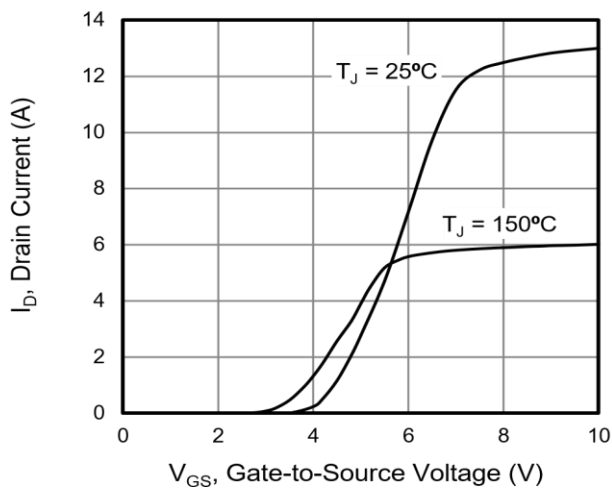
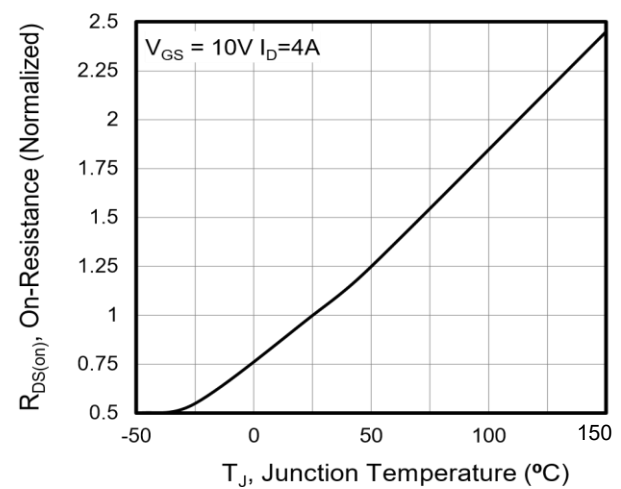


Figure 6. On-Resistance vs. Temperature



Ratings and Characteristic Curves

Figure 7. Capacitance

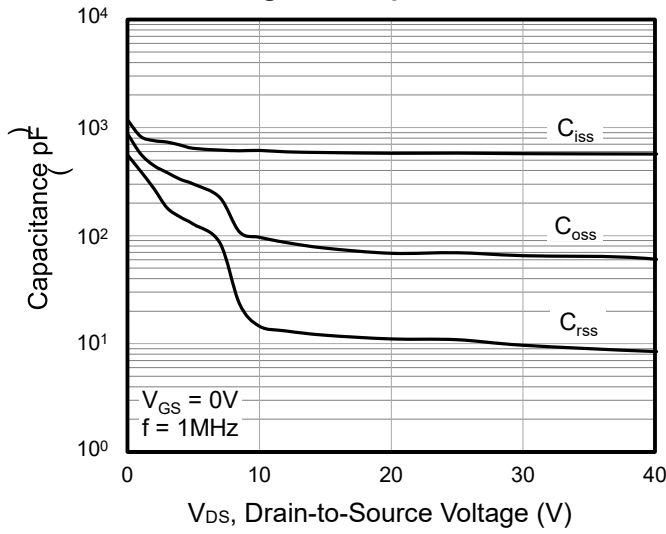


Figure 8. Gate Charge

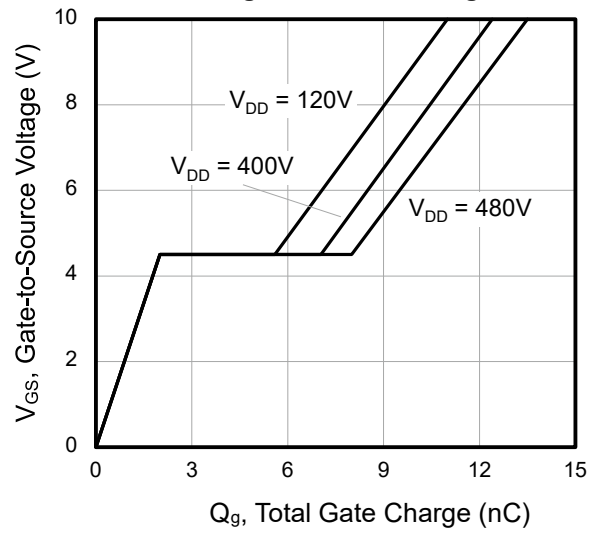


Figure 9. Transient Thermal Impedance TO-220F

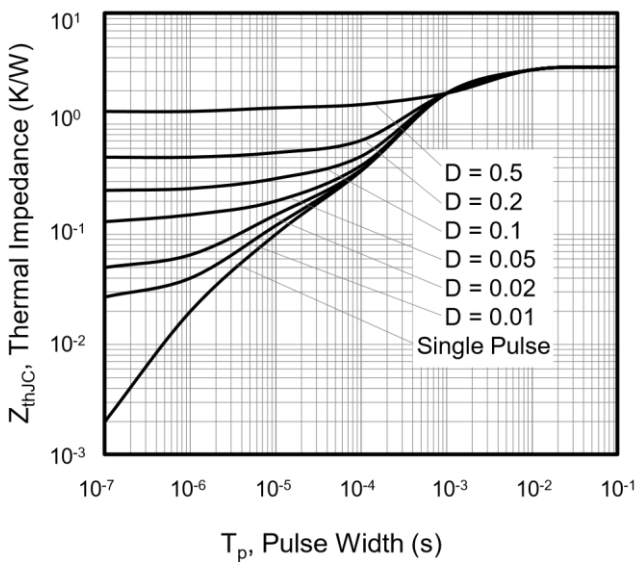
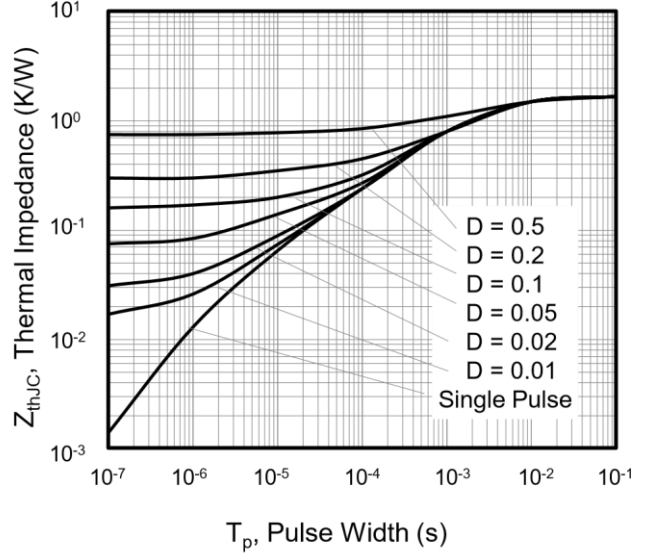


Figure 10. Transient Thermal Impedance TO-220



Ratings and Characteristic Curves

Figure A: Gate Charge Test Circuit and Waveform

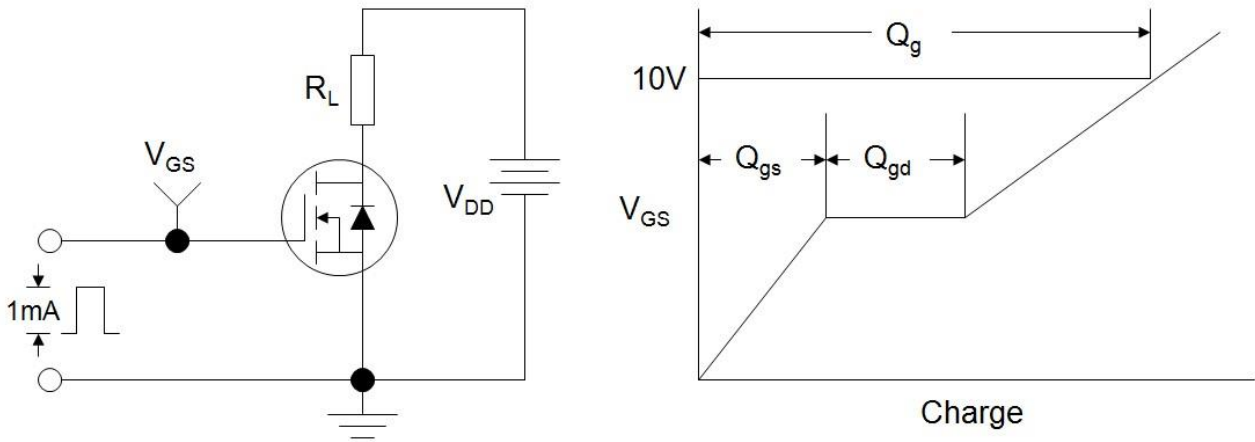


Figure B: Resistive Switching Test Circuit and Waveform

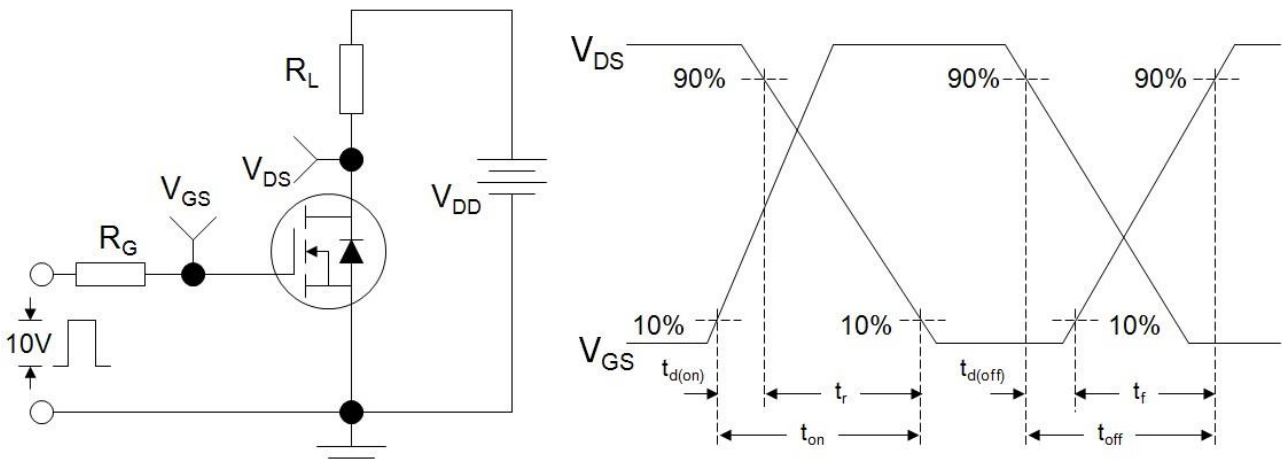
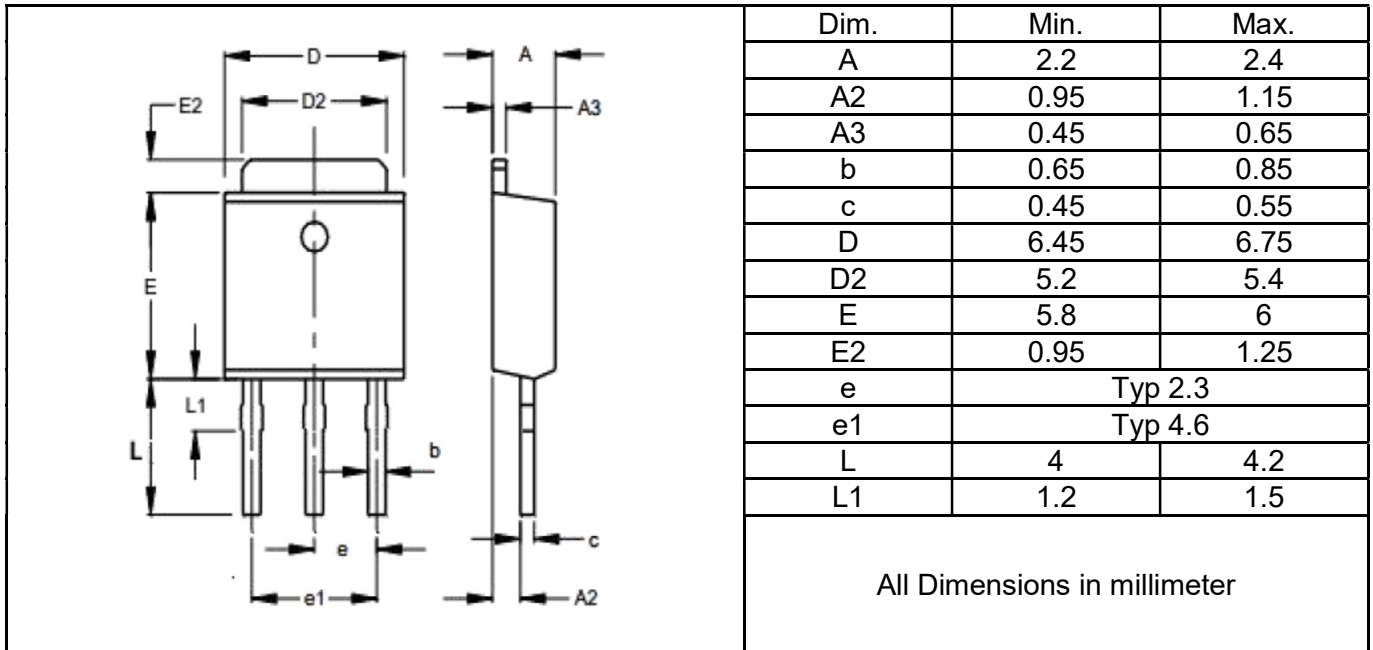


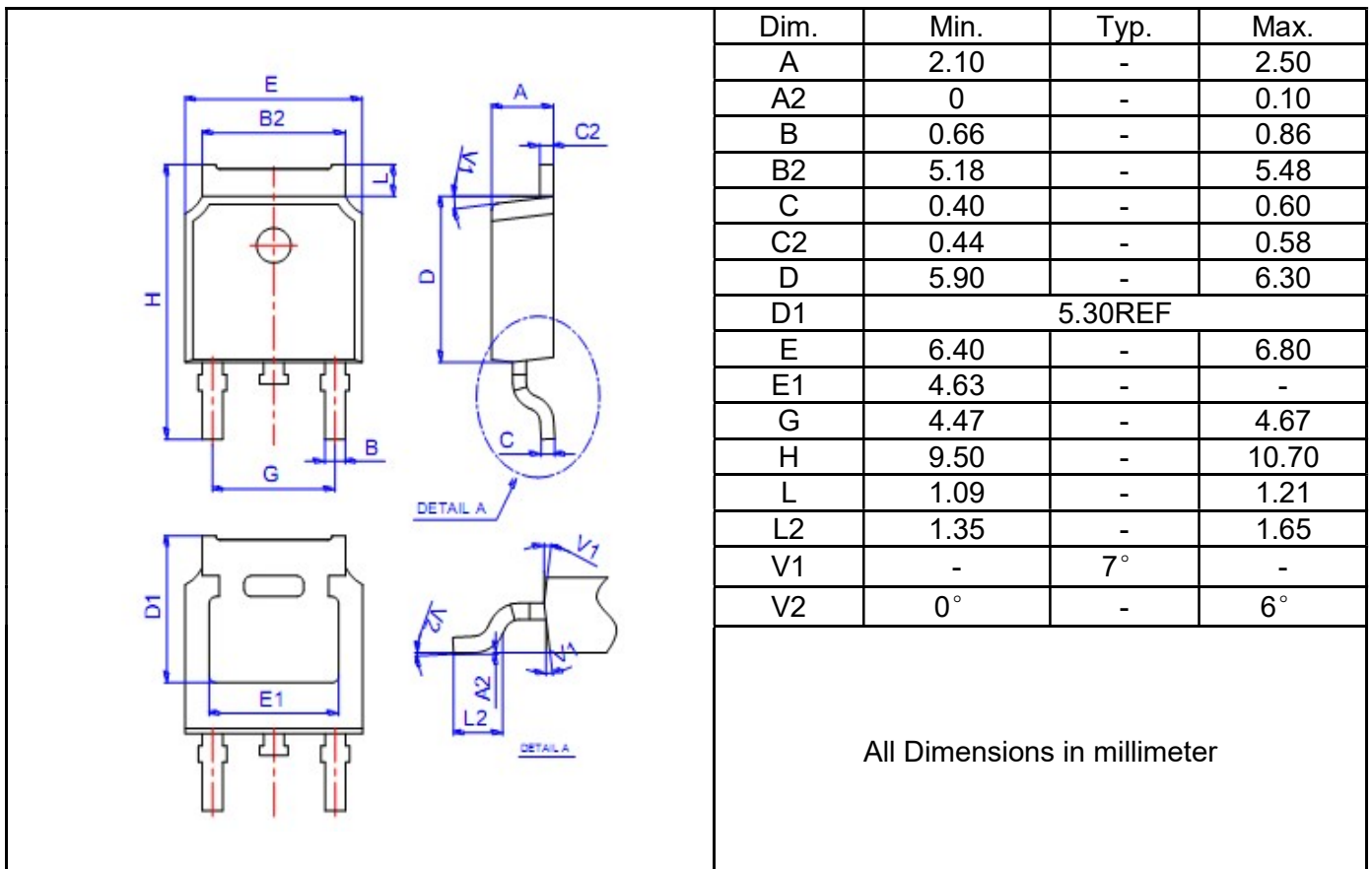
Figure C: Unclamped Inductive Switching Test Circuit and Waveform

Package Outline Dimensions Millimeters

TO-251



TO-252



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