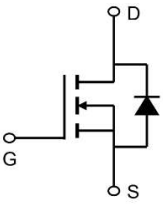
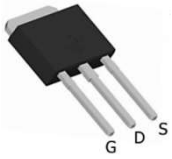
500V N-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	5A
V_{DSS}	500V
R_{DSON}-typ(@V_{GS}=10V)	< 1.6Ω(Type:1.35Ω)





TO-251 TO-252

lead-free ROHS

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)

Product Specification Classification

Part Number	Package	Marking	Pack
YFW5N50AD	TO-252	YFW 5N50AD XXXXX	2500PCS/Tape
YFW5N50AMJ	TO-251	YFW 5N50AMJ XXXXX	4000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value	Units
Drain-Source Voltage	V_{DS}	500	V
Gate - Source Voltage	V_{GS}	±30	V
Continuous Drain Current T_C=25℃	I_D	5	A
Continuous Drain Current T_C=100℃	I_D	3.4	A
Pulsed Drain Current Note1	I_{DM}	20	A
Single Pulse Avalanche Energy Note2	E_{AS}	90	mJ
Power Dissipation T_C=25℃	P_D	45	W
Thermal Resistance, Junction-case	$R_{\theta JC}$	2.8	°C/W
Thermal Resistance, Junction ambient	$R_{\theta JA}$	60	°C/W
Operating Junction and Storage Temperature Range	T_J ,T_{STG}	-55 to +150	°C

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=250uA	**V(BR)DSS**	500	-	-	**V**
Zero Gate Voltage Drain Current	V_{DS}=500V , V_{GS}=0V , T_J= 25℃	**I_{DSS}**	-	-	1	**μA**
Gate to Body Leakage Current	V_{GS}=±30V	**I_{GSS}**	-	-	±100	**nA**
Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	**$V_{GS(th)}$**	2	3	4	**V**
Static Drain-Source On-Resistance (Note3)	V_{GS}=10V, I_D=2.5A	**$R_{DS(ON)}$**	-	1.35	1.6	**Ω**
Input Capacitance	V_{DS}=25V V_{GS}=0V f=1MHz	**C_{iss}**	-	462	-	**pF**
Output Capacitance		**C_{oss}**	-	54.2	-	
Reverse Transfer Capacitance		**C_{rss}**	-	8.8	-	
Total Gate Charge	V_{DD}=400V I_D=5A V_{GS}=10V	**Q_g**	-	13.5	-	**nC**
Gate-Source Charge		**Q_{gs}**	-	2	-	
Gate-Drain("Miller") Charge		**Q_{gd}**	-	6	-	
Turn-on delay time	V_{DD}=250V I_D=5A R_G=25Ω	**$t_{d(on)}$**	-	10	-	**ns**
Turn-on Rise Time		**T_r**	-	25	-	
Turn-Off Delay Time		**$t_{d(OFF)}$**	-	40	-	
Turn-on Fall Time		**t_f**	-	52	-	
Maximum Continuous Drain to Source Diode Forward Current		**I_S**	-	-	5	**A**
Maximum Pulsed Drain to Source Diode Forward Current		**I_{SM}**	-	-	20	**A**
Drain to Source Diode Forward Voltage	V_{GS}=0V , I_{SD}=5A , T_J= 25℃	**V_{SD}**	-	-	1.4	**V**
Reverse Recovery Time	V_{GS}=0V, I_S=5A, dI_{SD}/dt=100A/μs	**t_{rr}**	-	220	-	**ns**
Reverse Recovery Charge		**Q_{rr}**	-	3	-	**nC**

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. IAS = 3A, VDD = 50V, RG = 25Ω, Starting TJ = 25°C
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Ratings and Characteristic Curves

Figure1: Output Characteristics

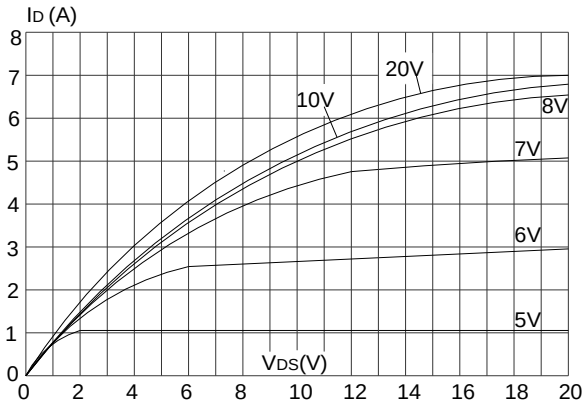


Figure 2: Typical Transfer Characteristics

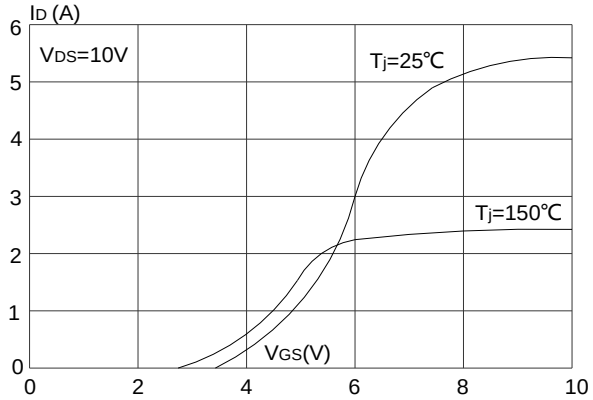


Figure 3: On-resistance vs. Drain Current

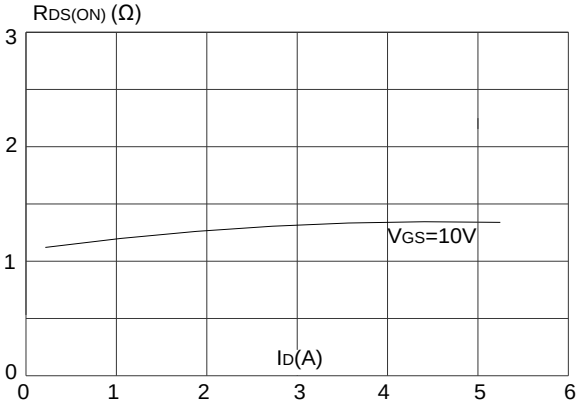


Figure 4: Body Diode Characteristics

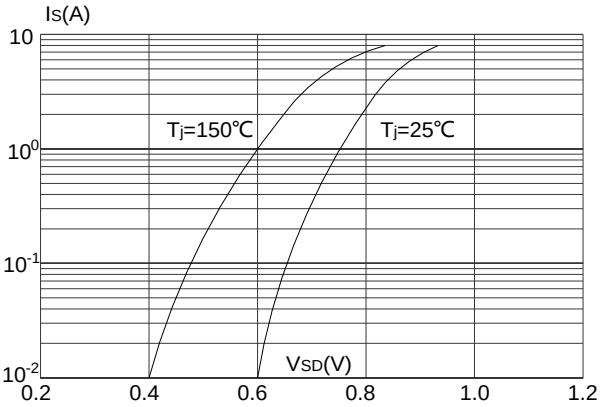


Figure 5: Gate Charge Characteristics

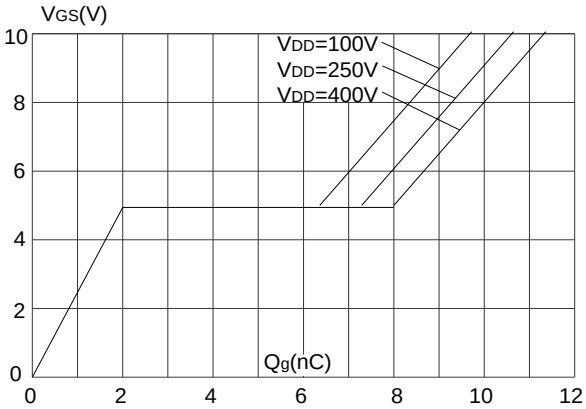
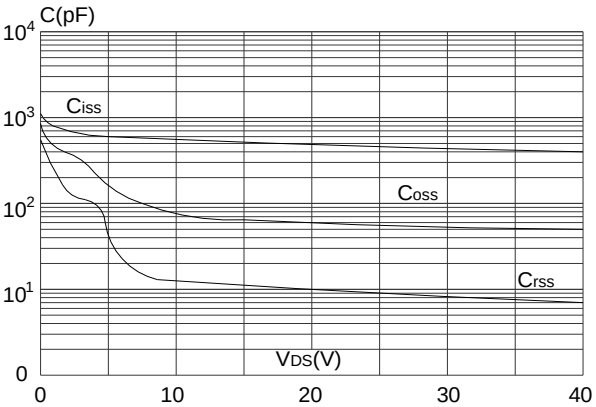


Figure 6: Capacitance Characteristics



Ratings and Characteristic Curves

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

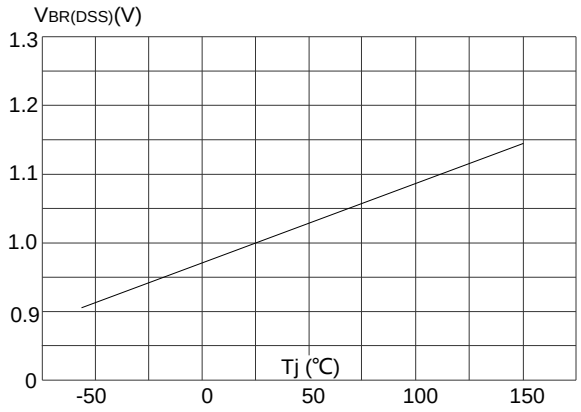


Figure 8: Normalized on Resistance vs. Junction Temperature

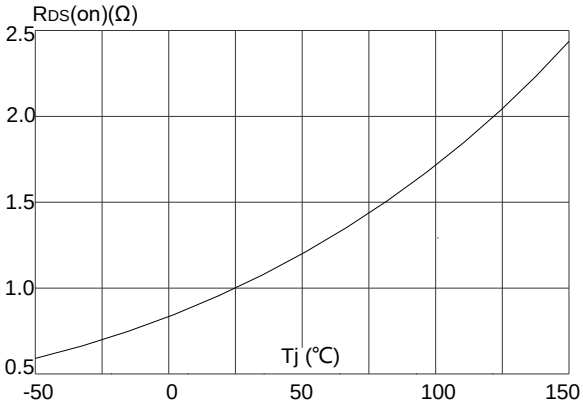


Figure 9: Maximum Safe Operating Area

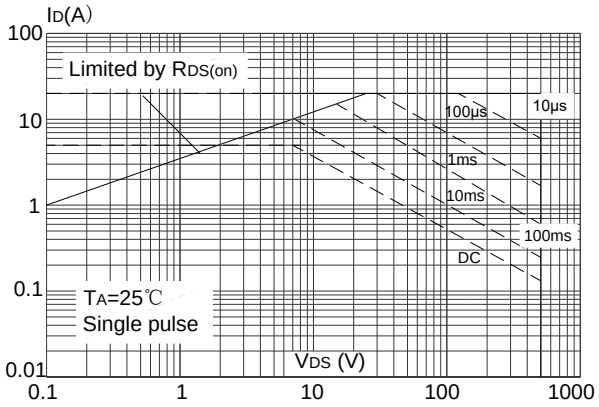


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

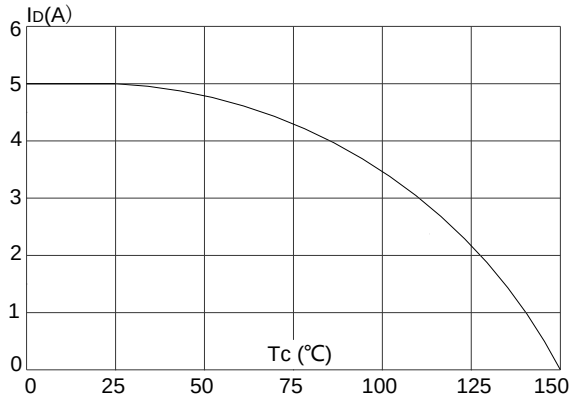


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220C,TO-251,TO-251S,TO-252)

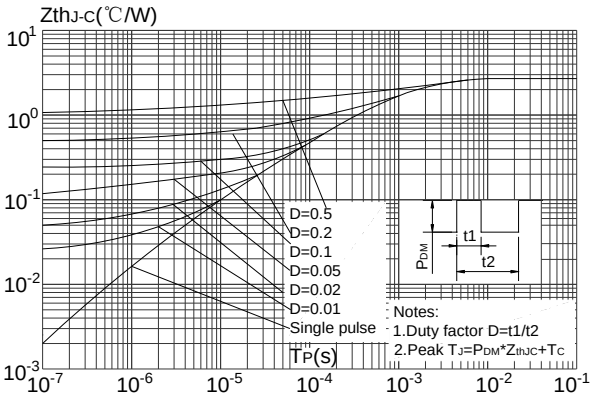
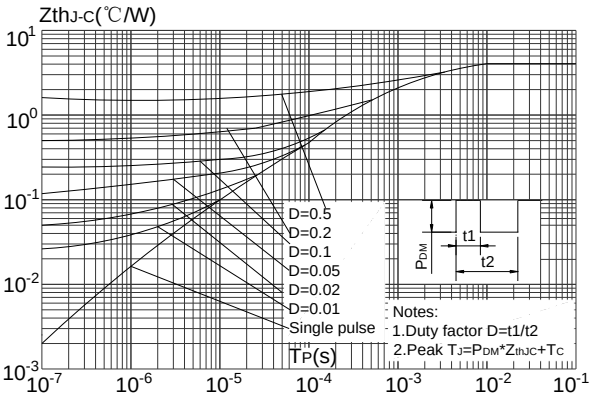


Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-220F)



Ratings and Characteristic Curves

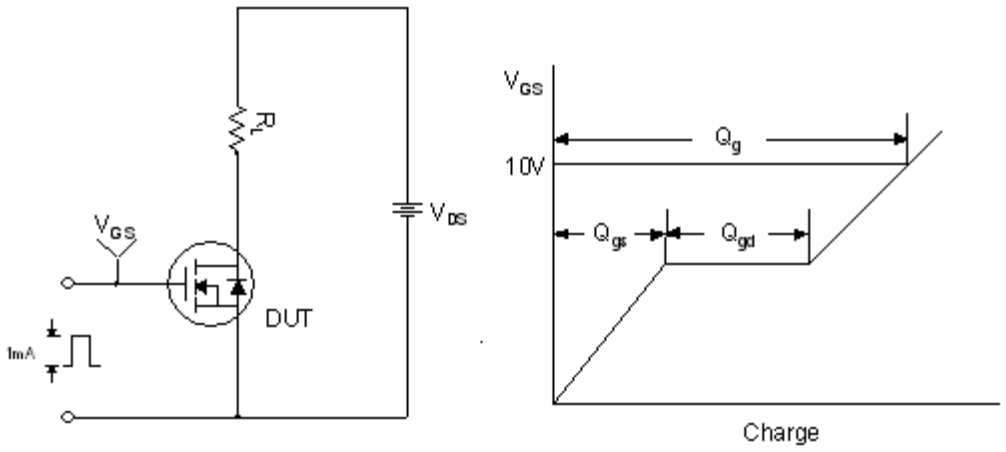


Figure 13. Gate Charge Test Circuit & Waveform

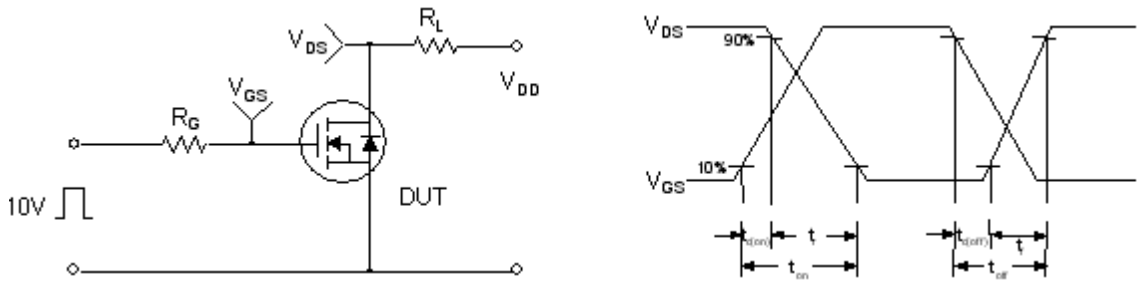


Figure 14. Resistive Switching Test Circuit & Waveforms

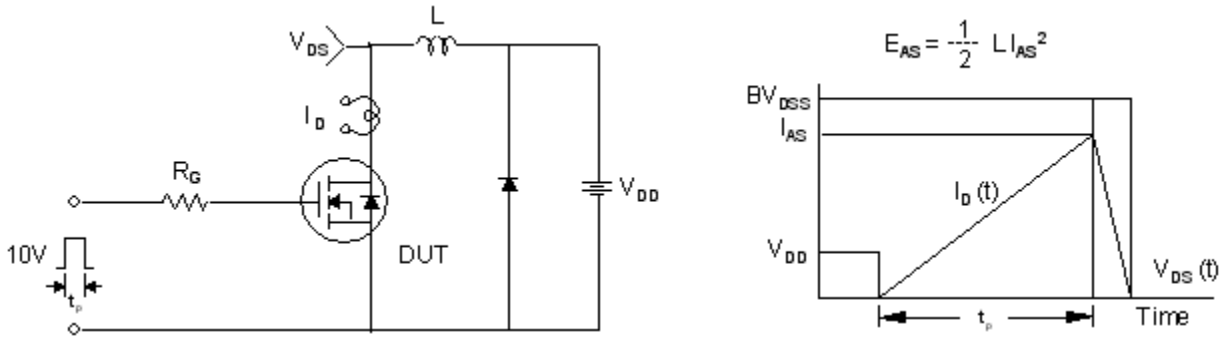


Figure 15. Unclamped Inductive Switching Test Circuit & Waveforms

Ratings and Characteristic Curves

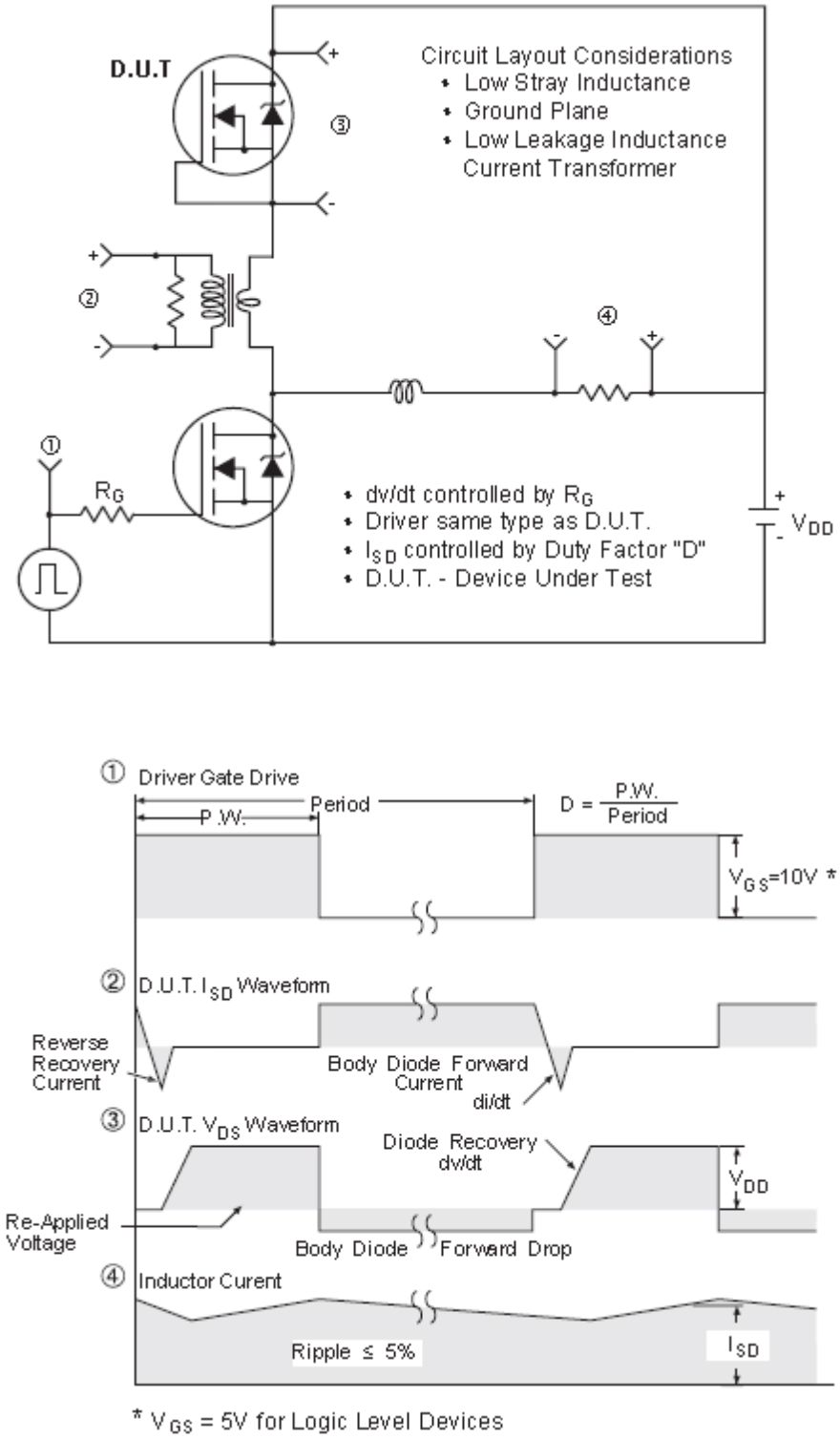
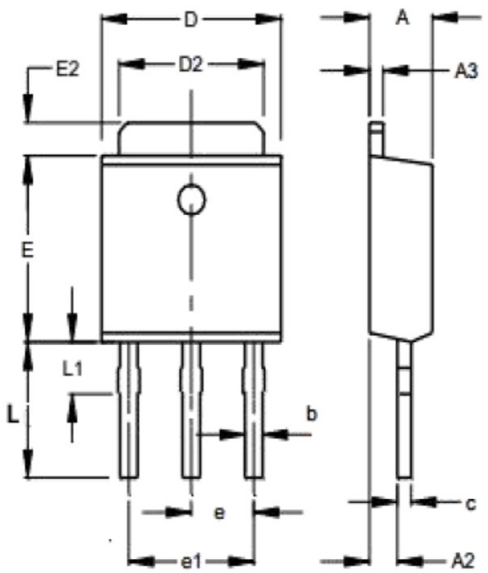


Figure 16. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package Outline Dimensions Millimeters

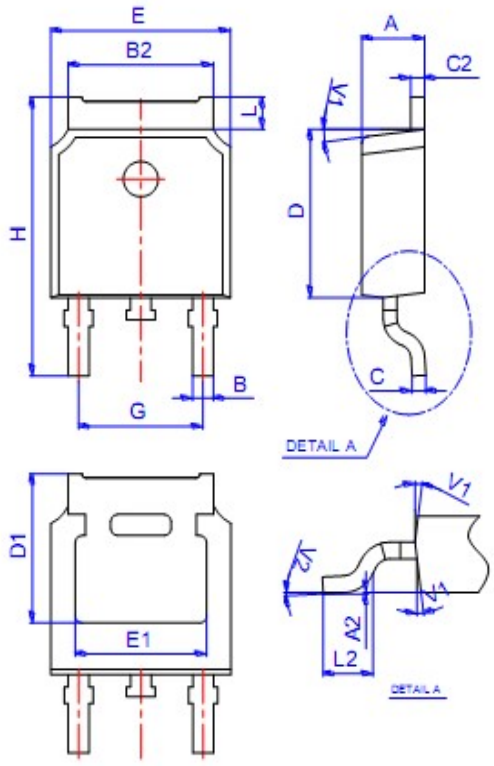
TO-251



Dim.	Min.	Max.
A	2.2	2.4
A2	0.95	1.15
A3	0.45	0.65
b	0.65	0.85
c	0.45	0.55
D	6.45	6.75
D2	5.2	5.4
E	5.8	6
E2	0.95	1.25
e	Typ 2.3	
e1	Typ 4.6	
L	4	4.2
L1	1.2	1.5

All Dimensions in millimeter

TO-252



Dim.	Min.	Typ.	Max.
A	2.10	-	2.50
A2	0	-	0.10
B	0.66	-	0.86
B2	5.18	-	5.48
C	0.40	-	0.60
C2	0.44	-	0.58
D	5.90	-	6.30
D1	5.30REF		
E	6.40	-	6.80
E1	4.63	-	-
G	4.47	-	4.67
H	9.50	-	10.70
L	1.09	-	1.21
L2	1.35	-	1.65
V1	-	7°	-
V2	0°	-	6°

All Dimensions in millimeter