优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
30V	2.45mΩ@V_{GS} = 10V	150 A
	3.5mΩ@V_{GS} = 4.5V	120 A

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

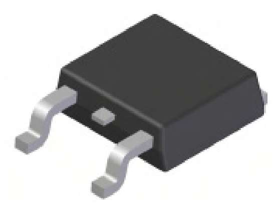
- Power Management Functions
- DC-DC Converters
- Backlighting

Features

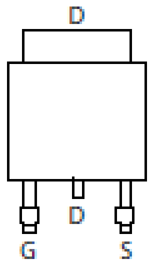
- Low On-Resistance
- Low Input Capacitance

Mechanical Data

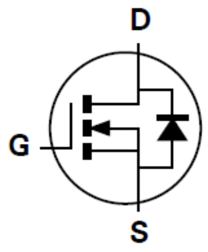
- Case:TO252 (DPAK)
- Case Material: Molded Plastic, “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.315 grams (Approximate)



Top View



Pin Out Top View



Equivalent Circuit

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±16	V
Continuous Drain Current, V_{GS} = 10V (Note 7)	Steady State	T_C = +25°C	I_D	150	A
		T_C = +100°C		100	
Pulsed Drain Current (380µs Pulse, Duty Cycle=1%)			I_{DM}	180	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	150	A
Avalanche Current (Note 8), L=1mH			I_{AS}	25	A
Avalanche Energy (Note 8), L=1mH			E_{AS}	312	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	78	°C/W
Total Power Dissipation (Note 6)		P_D	3.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	49	°C/W
Thermal Resistance, Junction to Case (Note 7)	Steady State	$R_{\theta JC}$	1.4	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	1.5	2	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	1.95	2.45	mΩ	V_{GS} = 10V, I_D = 25A
		-	2.65	3.5		V_{GS} = 4.5V, I_D = 25A
Diode Forward Voltage	V_{SD}	-	0.65	1.1	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	-	4336	-	pF	V_{DS} =15V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	-	3136	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	188	-	pF	
Gate Resistance	R_g	-	0.75	-	Ω	V_{DS} =0V, V_{GS} = 0V,f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	30	-	nC	V_{DS} = 15V, I_D =25A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	69	-	nC	
Gate-Source Charge	Q_{gs}	-	8	-	nC	
Gate-Drain Charge	Q_{gd}	-	9.8	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	18	-	ns	V_{DD} = 15V, V_{GS} = 4.5V, I_D = 25A, R_g = 4.7Ω
Turn-On Rise Time	t_R	-	33	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	35	-	ns	
Turn-Off Fall Time	t_F	-	30	-	ns	
Reverse Recovery Time	t_{RR}	-	48	-	ns	I_S = 15A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	-	55	-	nC	

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
8. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

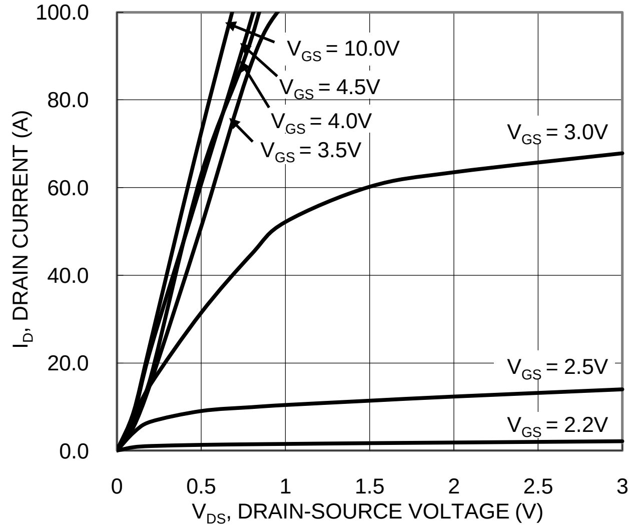


Figure 1. Typical Output Characteristic

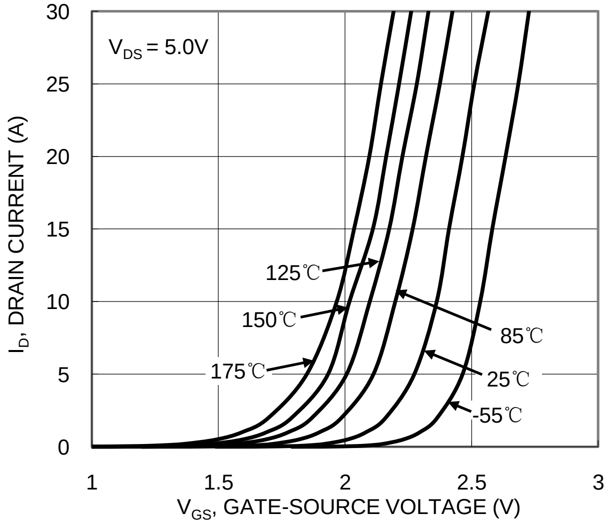


Figure 2. Typical Transfer Characteristic

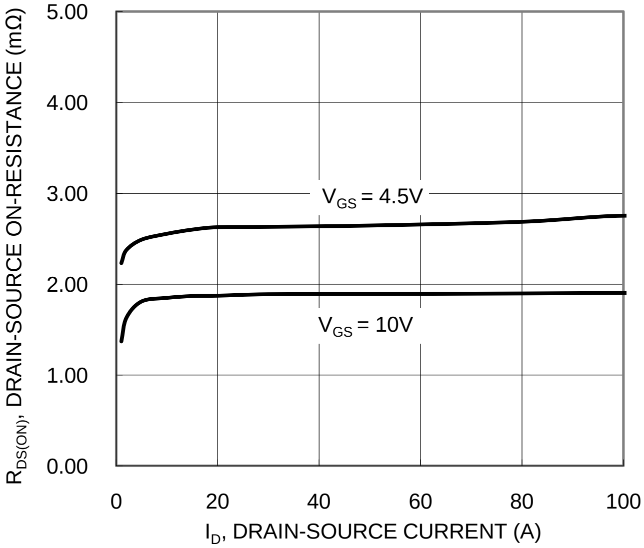


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

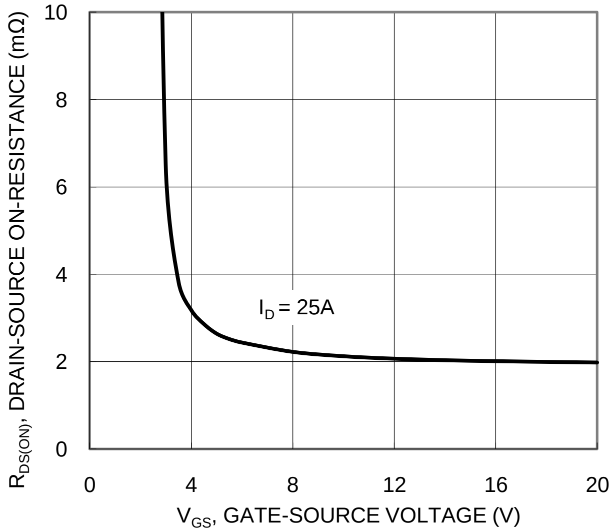


Figure 4. Typical Transfer Characteristic

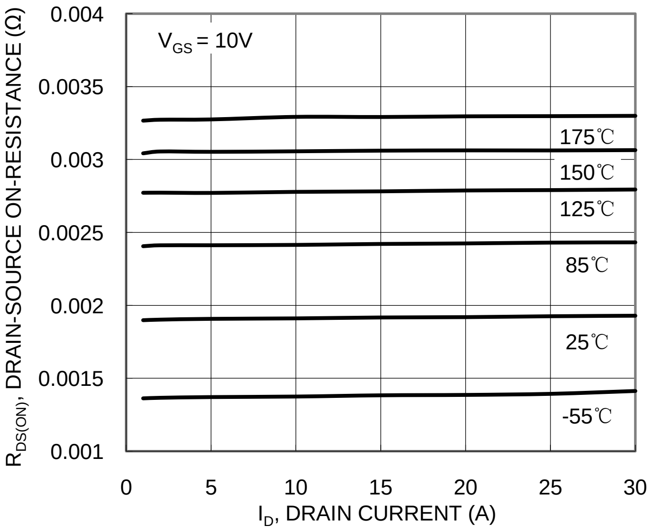


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

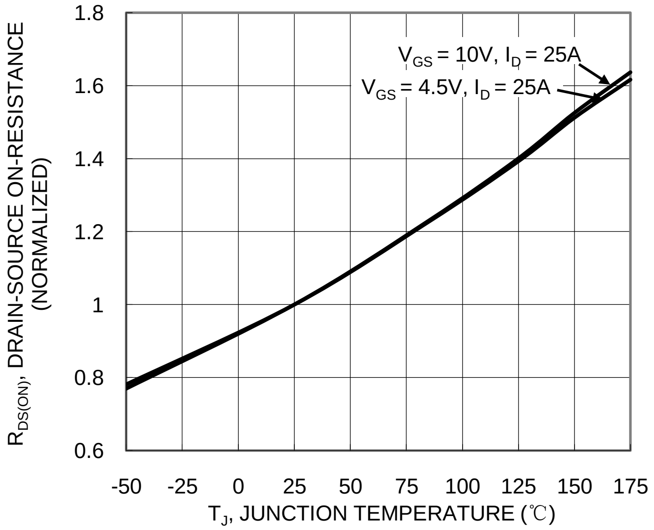


Figure 6. On-Resistance Variation with Temperature

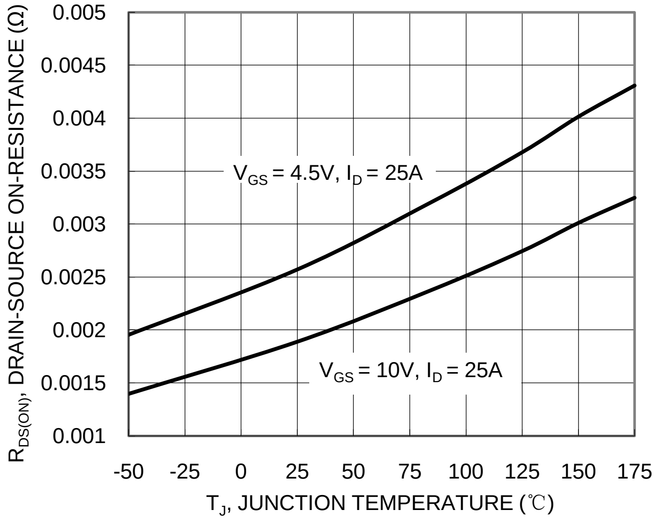


Figure 7. On-Resistance Variation with Temperature

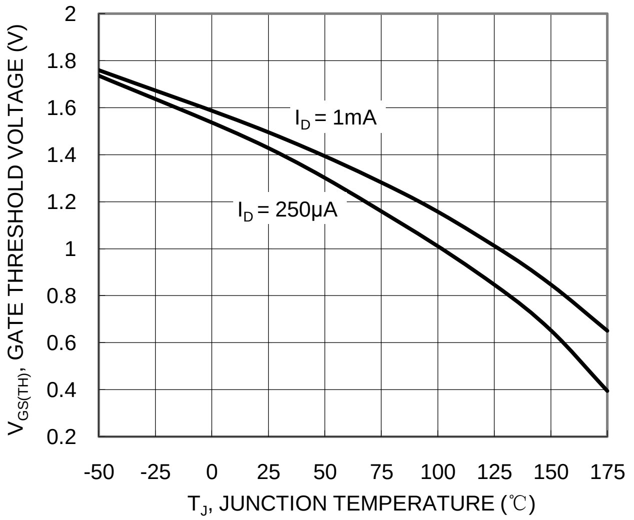


Figure 8. Gate Threshold Variation vs. Junction Temperature

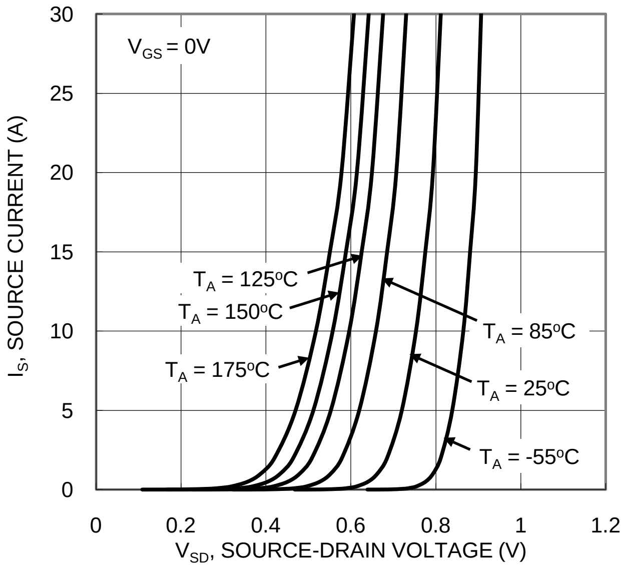


Figure 9. Diode Forward Voltage vs. Current

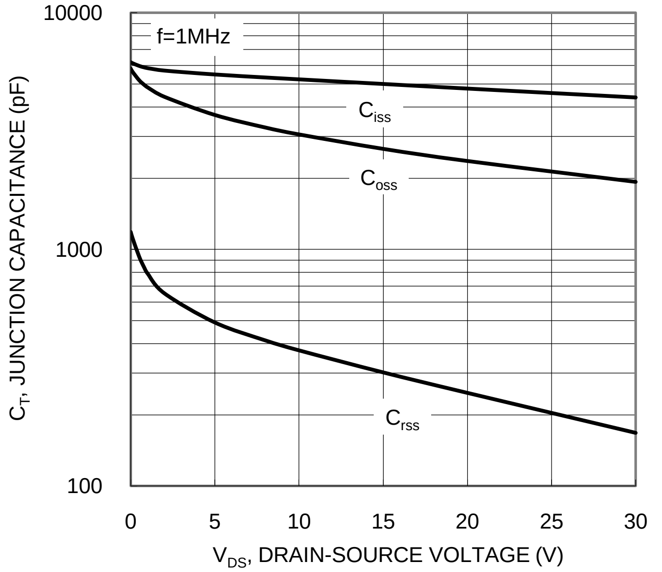


Figure 10. Typical Junction Capacitance

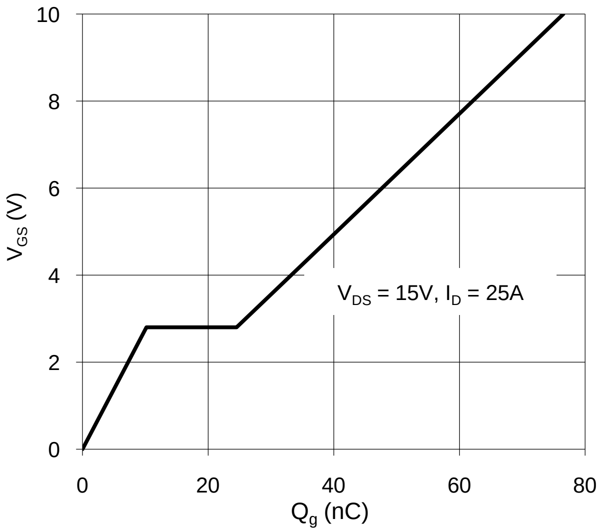


Figure 11. Gate Charge

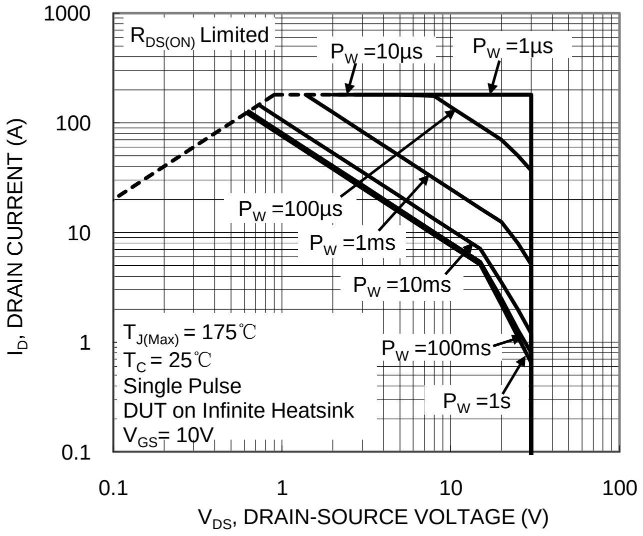


Figure 12. SOA, Safe Operation Area

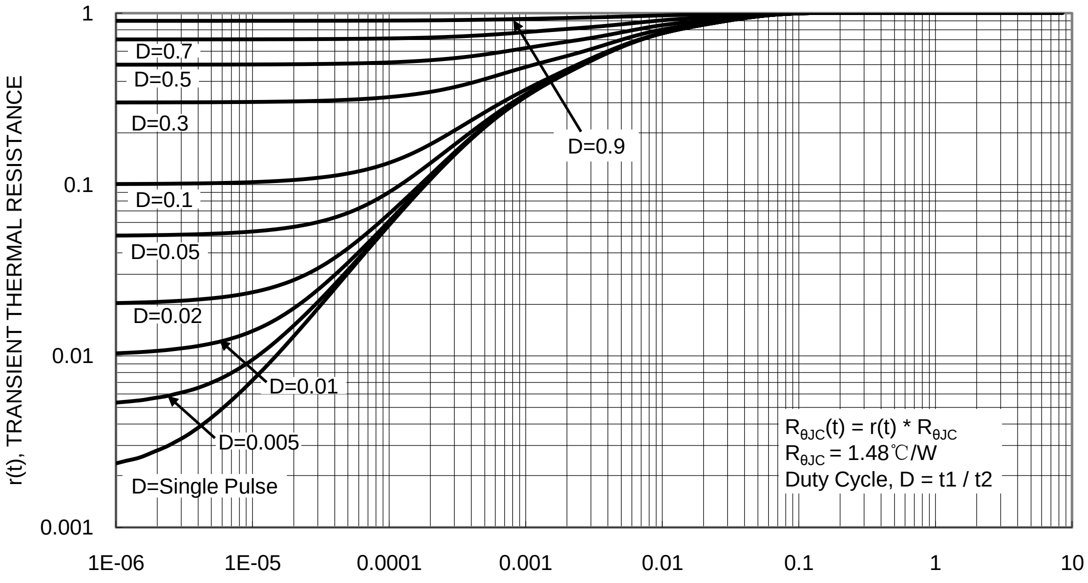
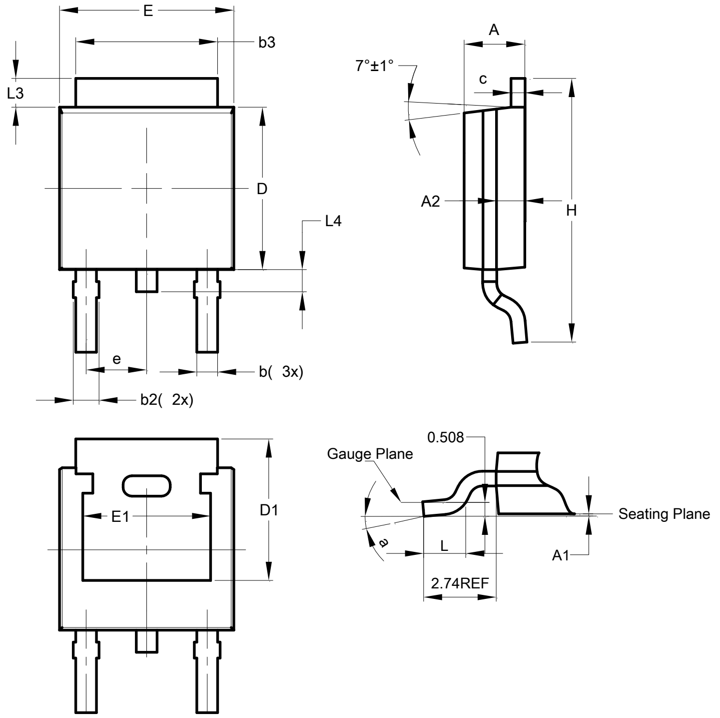


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

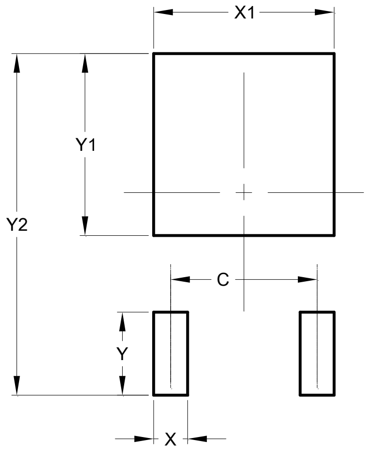
TO252 (DPAK)



TO252 (DPAK)			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

Suggested Pad Layout

TO252 (DPAK)



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700