



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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企业微信二维码



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Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C (Note 6)
-40V	25mΩ @ V _{GS} = -10V	-40A
	45mΩ @ V _{GS} = -4.5V	-33A

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Input/Output Leakage
- 100% Unclamped Inductive Switch (UIS) Test in Production

Description and Applications

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

- Motor controls
- Backlighting
- DC-DC converters
- Printer equipment

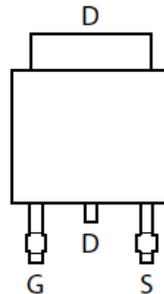
Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.315 grams (Approximate)

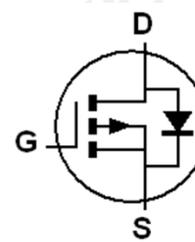
TO252 (DPAK)



Top View



Top View
Pin Out



Device Symbol

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _C = +25°C	I _D	-40	A
		T _C = +70°C		-32	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-160	A
Maximum Body Diode Forward Current (Note 6)			I _S	-40	A
Avalanche Current, L = 0.3mH			I _{AS}	-22.9	A
Avalanche Energy, L = 0.3mH			E _{AS}	78.7	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	3.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	35	°C/W
Total Power Dissipation (Note 6)	T _C = +25°C	P _D	70	W
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	1.77	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.8	—	-1.8	V	I _D = -250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance	R _{DS(ON)}	—	13	25	mΩ	V _{GS} = -10V, I _D = -3A
			17	45		V _{GS} = -4.5V, I _D = -3A
Diode Forward Voltage	V _{SD}	—	-0.7	-1	V	I _S = -1A, V _{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2064	—	pF	V _{DS} = -20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	212	—		
Reverse Transfer Capacitance	C _{rss}	—	183	—		
Gate Resistance	R _g	—	2.5	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -10V)	Q _g	—	45.8	—	nC	V _{DS} = -20V, I _D = -3A
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	23.5	—		
Gate-Source Charge	Q _{gs}	—	5	—		
Gate-Drain Charge	Q _{gd}	—	6.7	—		
Turn-On Delay Time	t _{D(ON)}	—	4.3	—	ns	V _{GS} = -10V, V _{DD} = -20V, I _D = -3A, R _g = 6Ω
Turn-On Rise Time	t _r	—	4.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	71.8	—		
Turn-Off Fall Time	t _f	—	23.9	—		

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

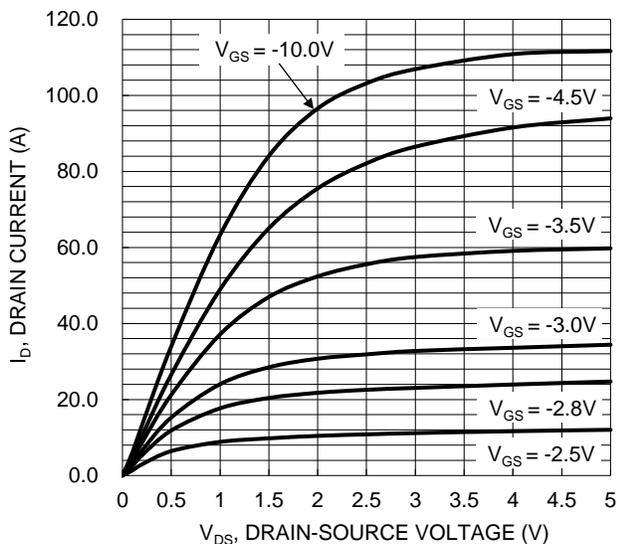


Figure 1. Typical Output Characteristic

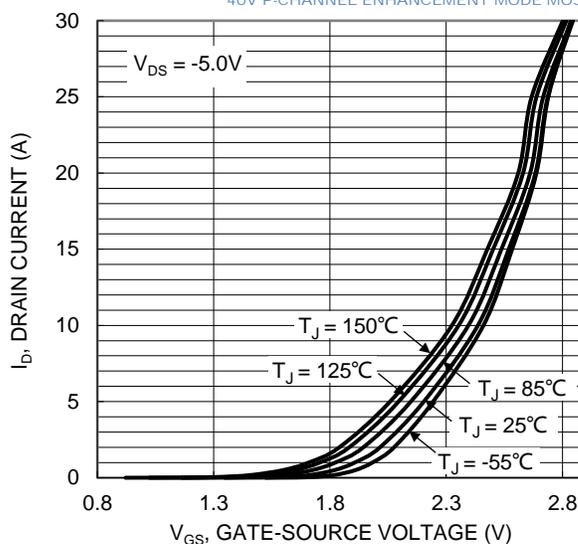


Figure 2. Typical Transfer Characteristic

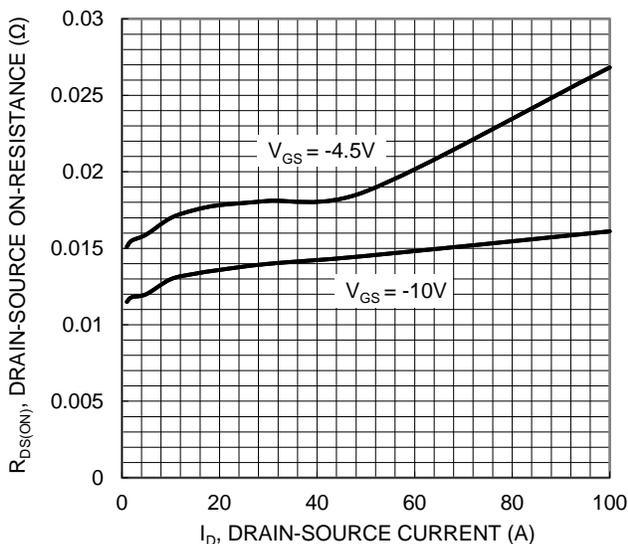


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

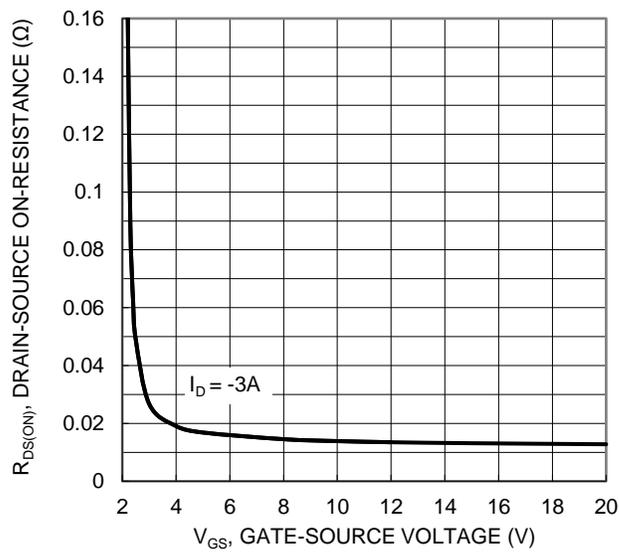


Figure 4. Typical Transfer Characteristic

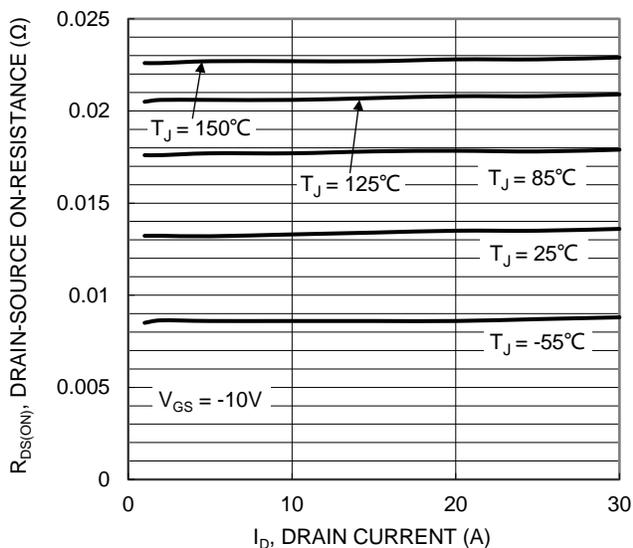


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

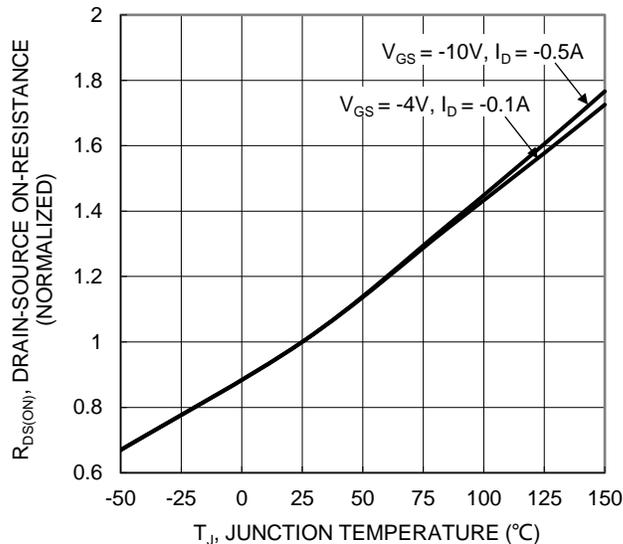


Figure 6. On-Resistance Variation with Junction Temperature

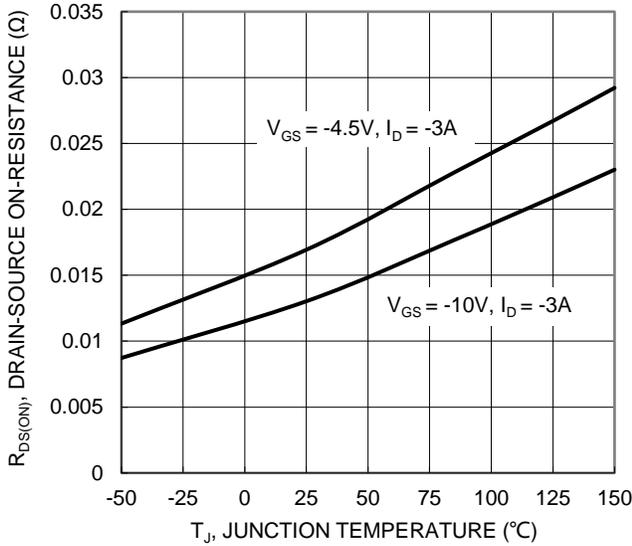


Figure 7. On-Resistance Variation with Junction Temperature

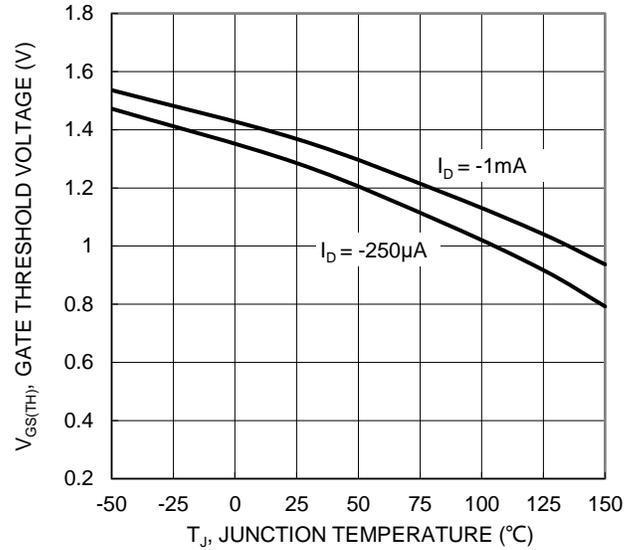


Figure 8. Gate Threshold Variation vs. Junction Temperature

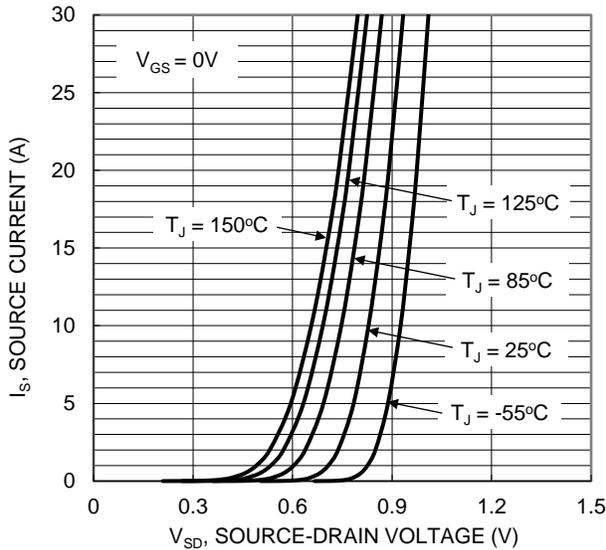


Figure 9. Diode Forward Voltage vs. Current

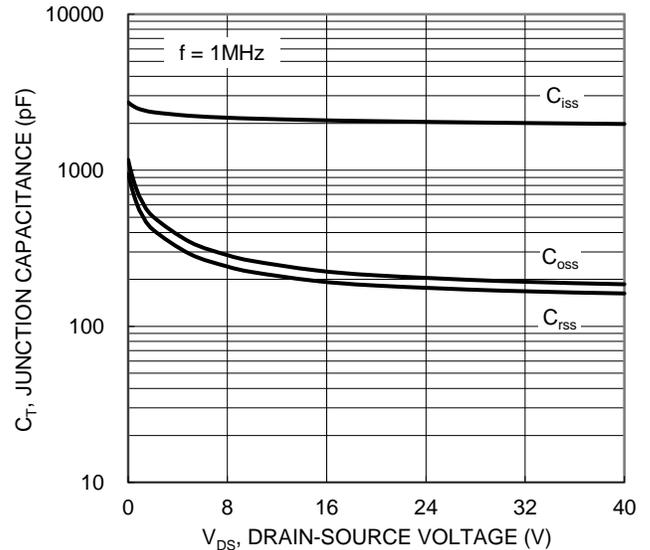


Figure 10. Typical Junction Capacitance

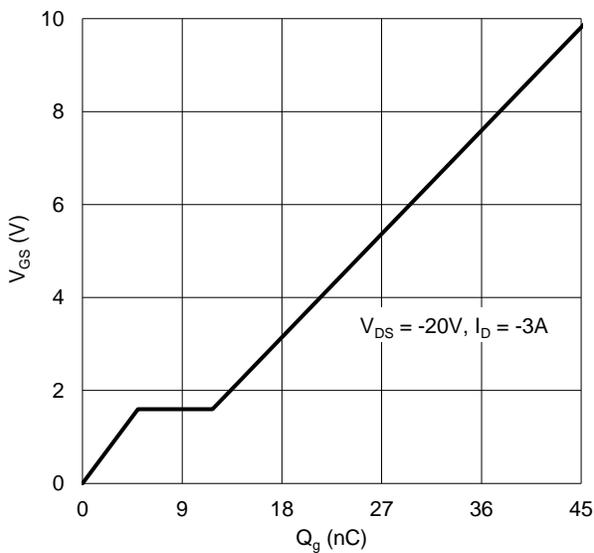


Figure 11. Gate Charge

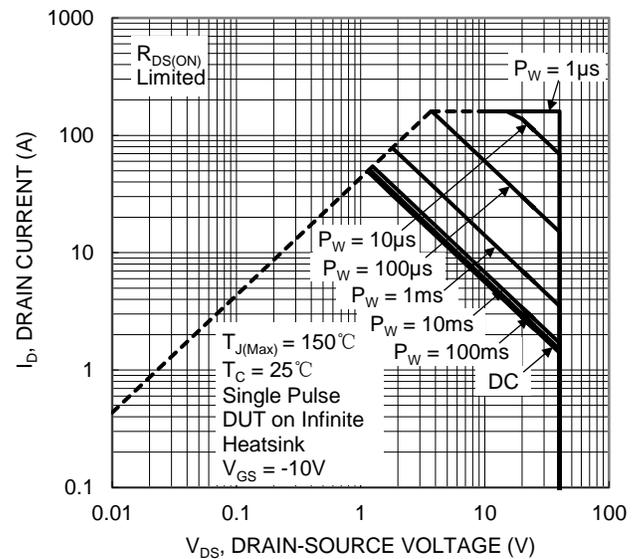


Figure 12. SOA, Safe Operation Area

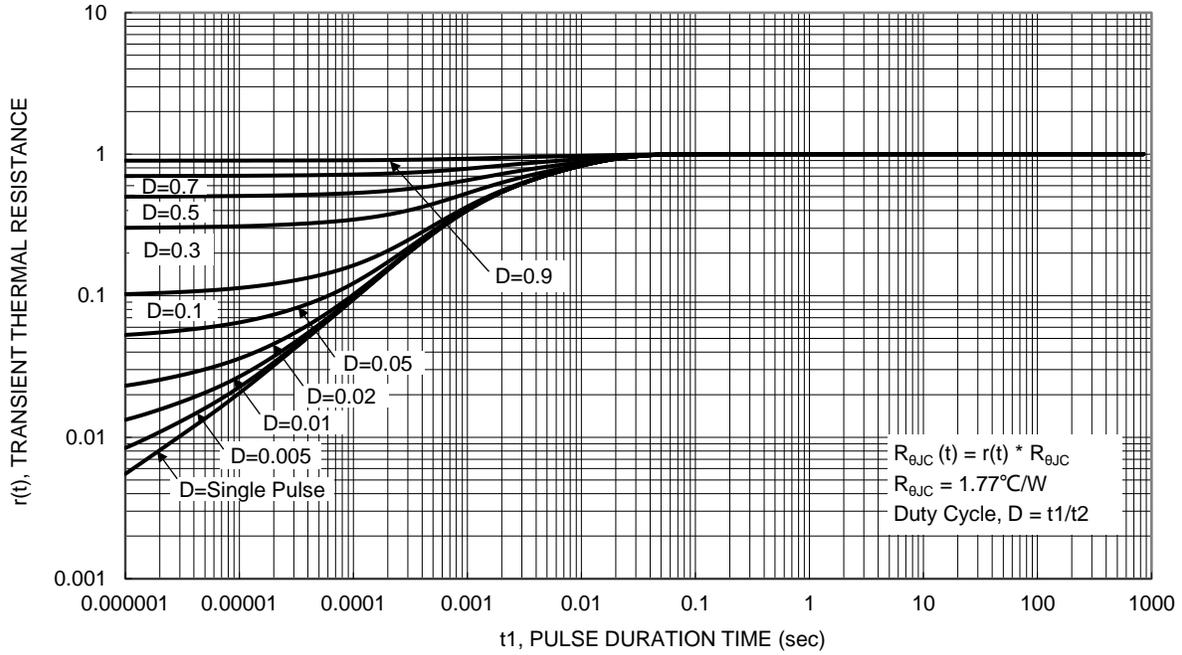
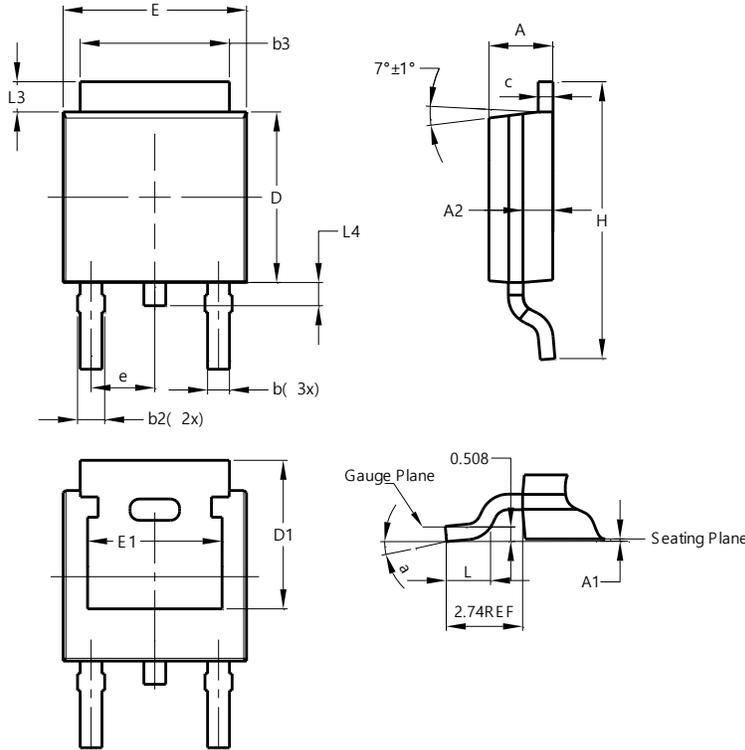


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

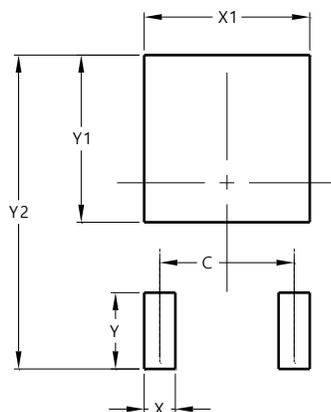
TO252 (DPAK)



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	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
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