



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

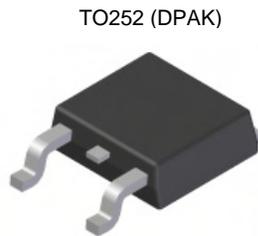
BV _{DSS}	R _{DS(ON)} Max	I _D Max T _c = +25°C
100V	14mΩ @ V _{GS} = 10V	59A
	20mΩ @ V _{GS} = 6V	50A

Description

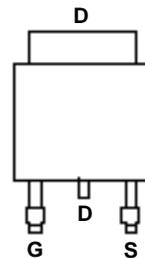
This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power-management applications.

Applications

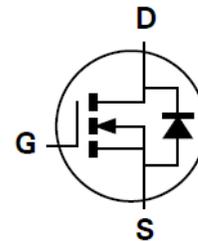
- Power-management functions
- DC-DC converters
- Backlightings



Top View



Pin Out Top View



Equivalent Circuit

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Minimizes Power Losses
- Low Q_g – Minimizes Switching Losses

Mechanical Data

- Package: TO252
- Package 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 
- Weight: 0.33 grams (Approximate)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	100	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 9)	I _D	T _C = +25°C	59
		T _C = +100°C	42
Pulsed Drain Current (10μs Pulse, T _C = +25°C, Package Limited)	I _{DM}	235	A
Maximum Continuous Body Diode Forward Current (Note 9)	I _S	59	A
Pulsed Body Diode Forward Current (10μs Pulse, T _C = +25°C, Package Limited)	I _{SM}	235	A
Avalanche Current, L = 0.1mH	I _{AS}	15.8	A
Avalanche Energy, L = 0.1mH	E _{AS}	12.5	mJ
Avalanche Current, L = 3mH (Note 8)	I _{AS}	7.5	A
Avalanche Energy, L = 3mH (Note 8)	E _{AS}	85	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	2	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	75	°C/W
Total Power Dissipation (Note 6)	P _D	3.7	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	40	°C/W
Total Power Dissipation (Note 9)	P _D	75	W
Thermal Resistance, Junction to Case (Note 9)	R _{θJC}	2	°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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 80V, 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)}	2	—	4	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	11.1	14	mΩ	V _{GS} = 10V, I _D = 20A
		—	14.7	20		V _{GS} = 6V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.86	1.3	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2343	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	487	—		
Reverse Transfer Capacitance	C _{rss}	—	26	—		
Gate Resistance	R _g	—	0.69	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	30.1	—	nC	V _{DD} = 50V, I _D = 10A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	7.5	—		
Gate-Drain Charge	Q _{gd}	—	6.5	—		
Turn-On Delay Time	t _{d(ON)}	—	9.8	—	ns	V _{DD} = 50V, V _{GS} = 10V, I _D = 10A, R _g = 6Ω
Turn-On Rise Time	t _r	—	7.8	—		
Turn-Off Delay Time	t _{d(OFF)}	—	22.5	—		
Turn-Off Fall Time	t _f	—	9.6	—		
Reverse Recovery Time	t _{RR}	—	43	—	ns	I _F = 10A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	65.1	—	nC	

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

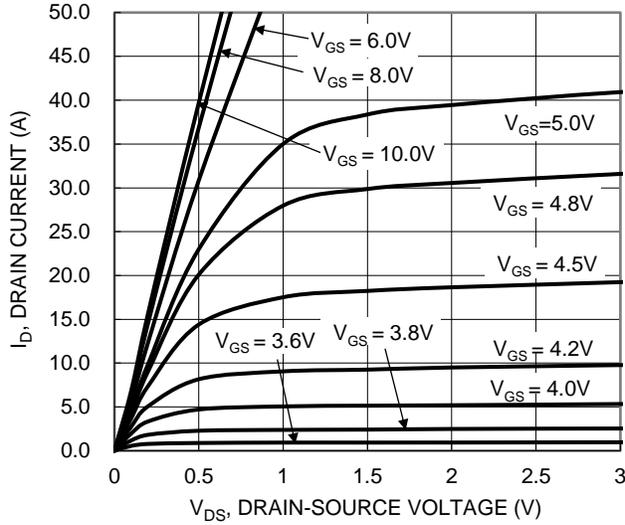


Figure 1. Typical Output Characteristic

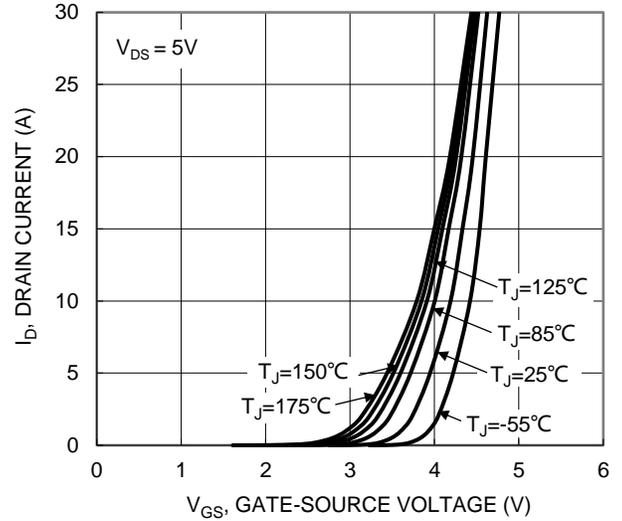


Figure 2. Typical Transfer Characteristic

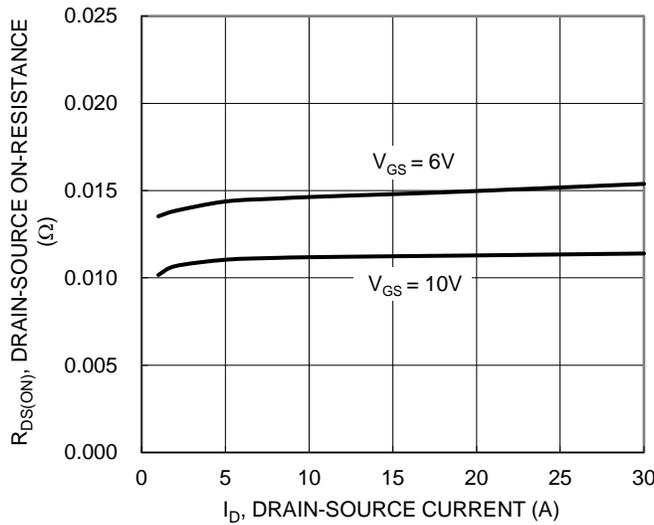


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

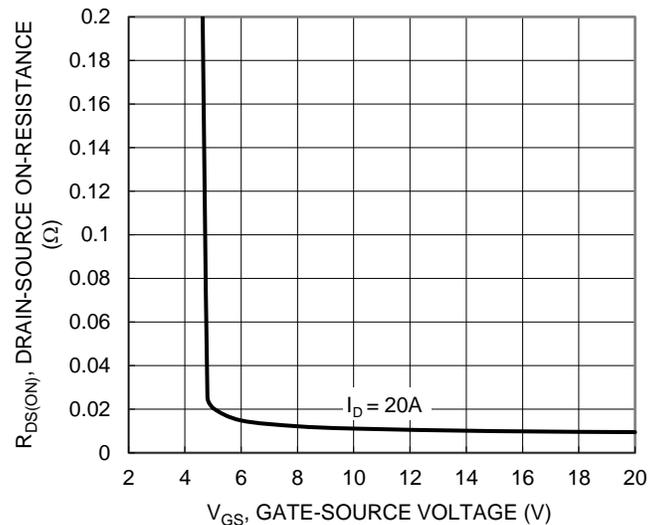


Figure 4. Typical Transfer Characteristic

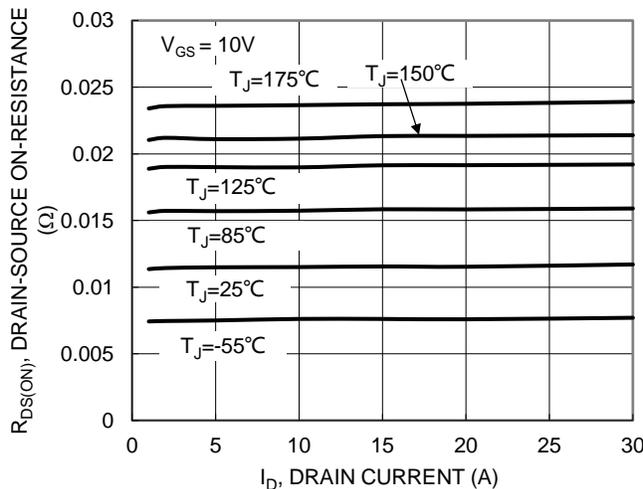


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

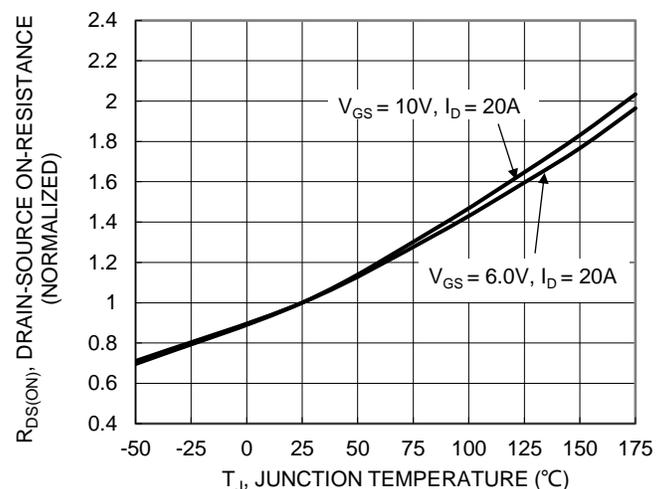


Figure 6. On-Resistance Variation with Temperature

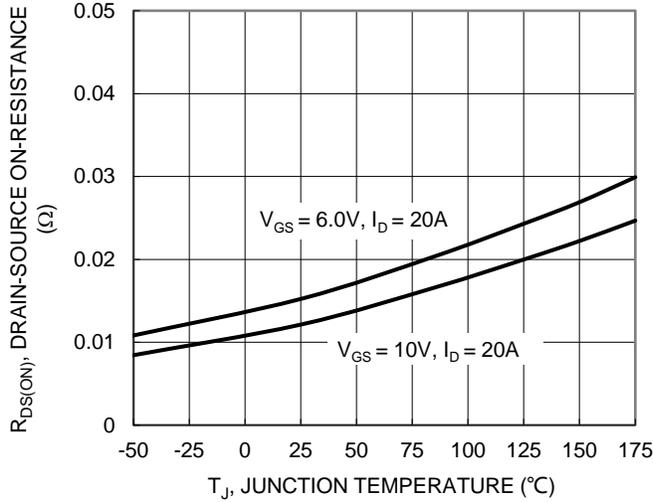


Figure 7. On-Resistance Variation with Temperature

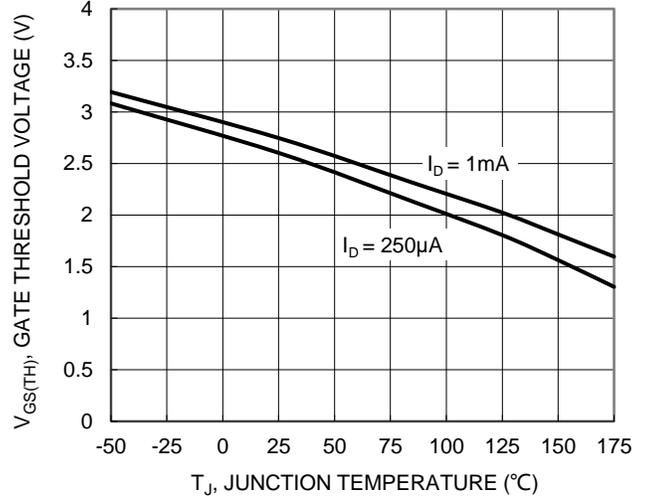


Figure 8. Gate Threshold Variation vs. Junction Temperature

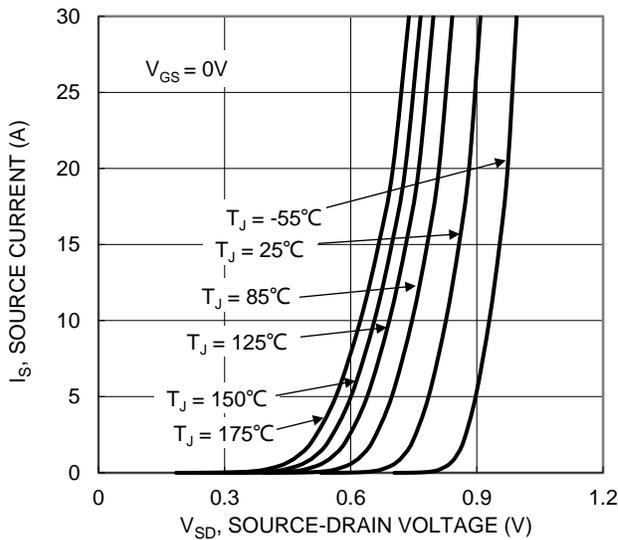


Figure 9. Diode Forward Voltage vs. Current

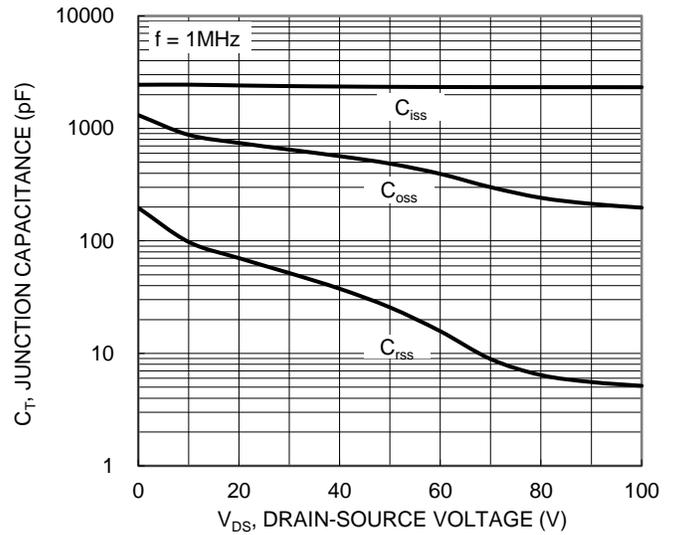


Figure 10. Typical Junction Capacitance

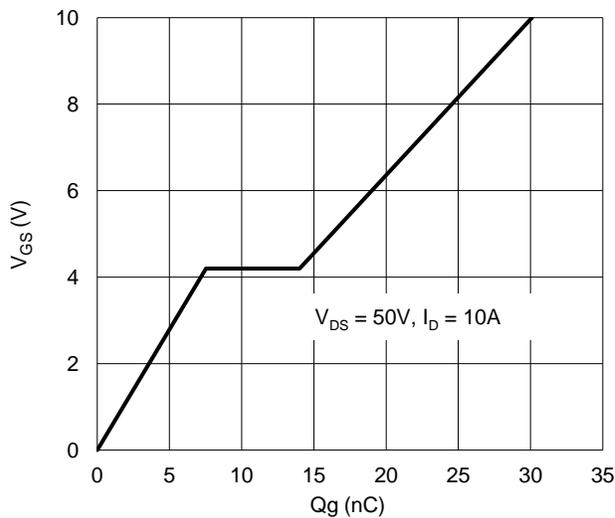


Figure 11. Gate Charge

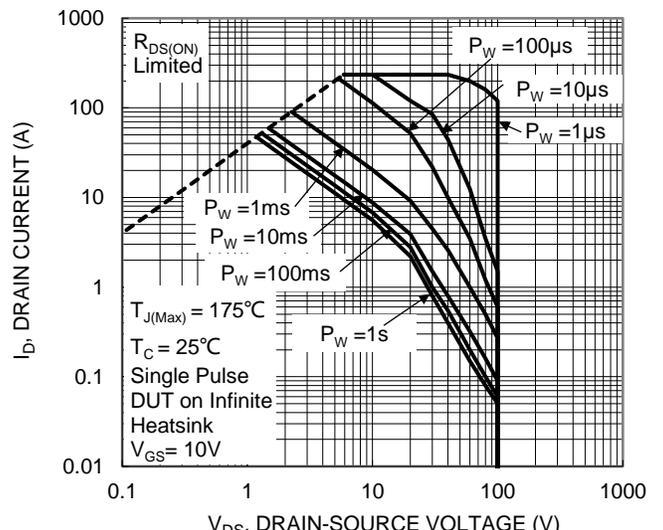


Figure 12. SOA, Safe Operation Area

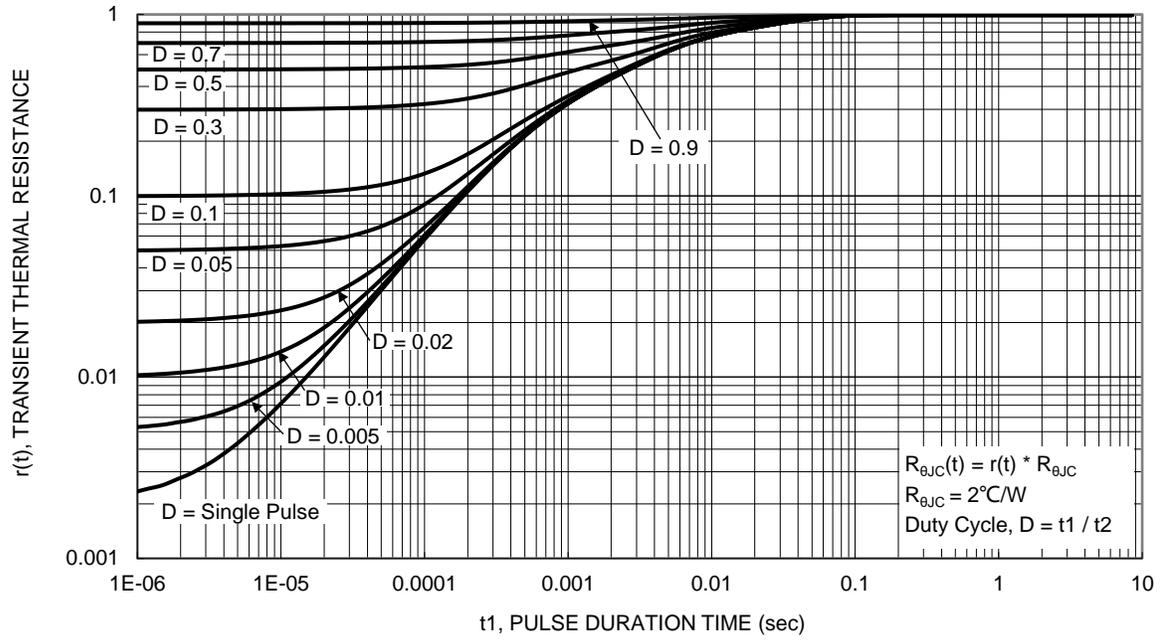
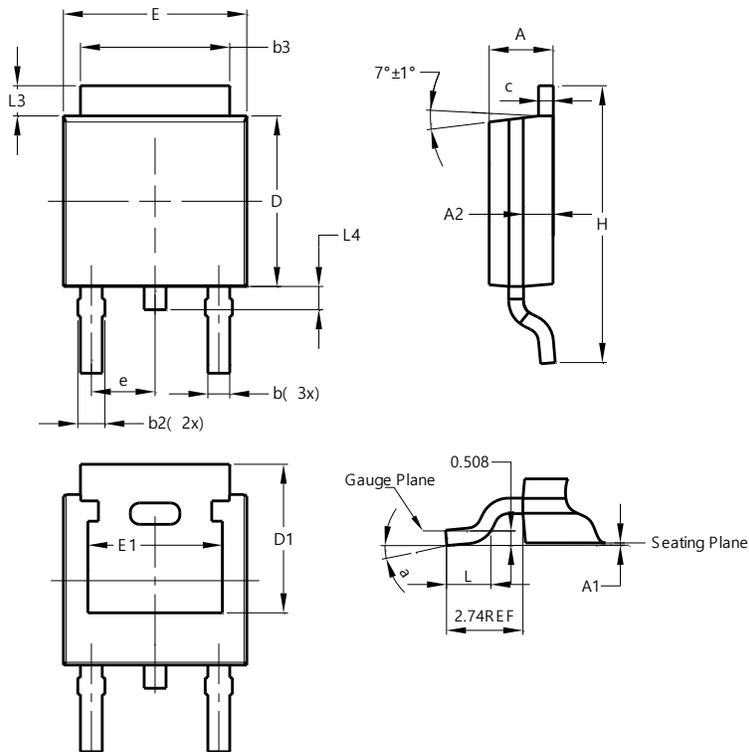


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

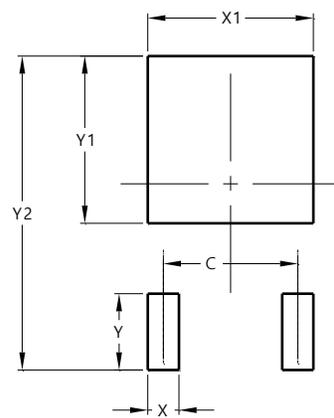
TO252 (DPAK)



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	5.50	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