



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
40V	7.5mΩ @ V _{GS} = 10V	62A

Features

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

Description and Applications

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

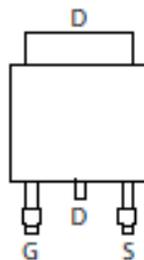
- Power management functions
- DC-DC converters
- Backlighting

Mechanical Data

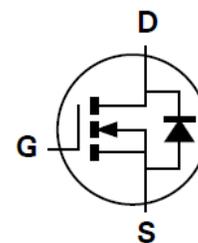
- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e3)
- Weight: 0.33 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}	40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	I _D	T _C = +25°C	62
		T _C = +70°C	44
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	240	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	60	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	240	A
Avalanche Current, L = 0.1mH	I _{AS}	24.7	A
Avalanche Energy, L = 0.1mH	E _{AS}	30.5	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	3.5	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	43	°C/W
Total Power Dissipation (Note 6)	P _D	50	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	3	°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}	40	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 32V, 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)}	—	6.2	7.5	mΩ	V _{GS} = 10V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.9	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	897	—	pF	V _{DS} = 20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	530	—		
Reverse Transfer Capacitance	C _{rss}	—	12.4	—		
Gate Resistance	R _g	—	2.07	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	12.1	—	nC	V _{DD} = 20V, I _D = 20A, V _{GS} = 10V
Gate-Source Charge	Q _{gs}	—	2.0	—		
Gate-Drain Charge	Q _{gd}	—	1.9	—		
Turn-On Delay Time	t _{D(ON)}	—	5.4	—	ns	V _{DD} = 20V, V _{GS} = 10V, I _D = 20A, R _g = 3Ω
Turn-On Rise Time	t _r	—	4.5	—		
Turn-Off Delay Time	t _{D(OFF)}	—	12.1	—		
Turn-Off Fall Time	t _f	—	5.6	—		
Reverse Recovery Time	t _{RR}	—	39.1	—	ns	I _F = 20A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	53.3	—	nC	

- Notes:
- Device mounted on FR-4 substrate PCB, 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.

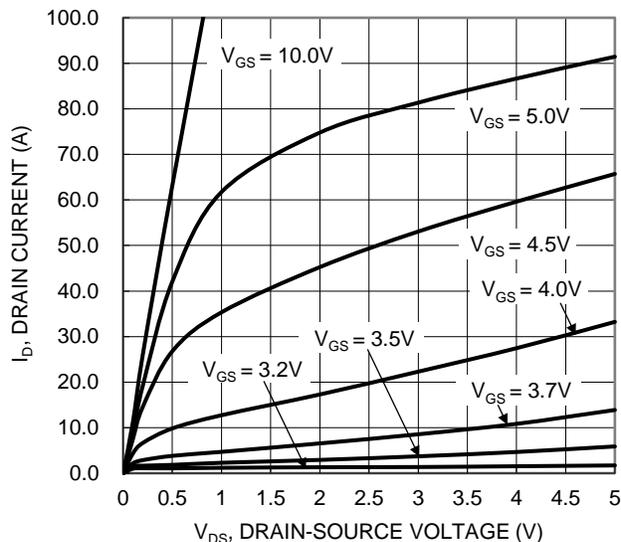


Figure 1. Typical Output Characteristic

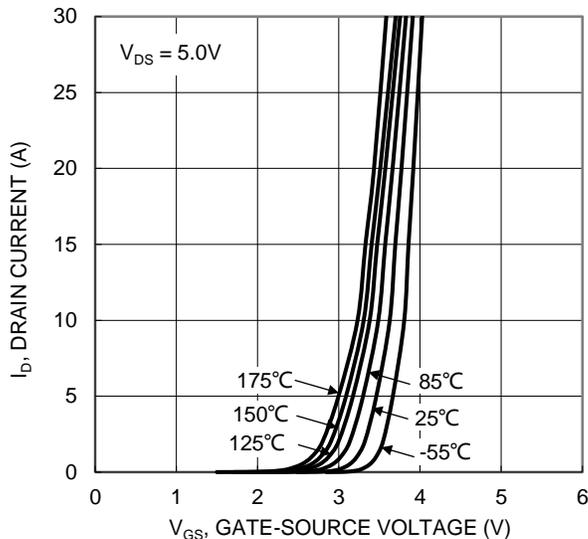


Figure 2. Typical Transfer Characteristic

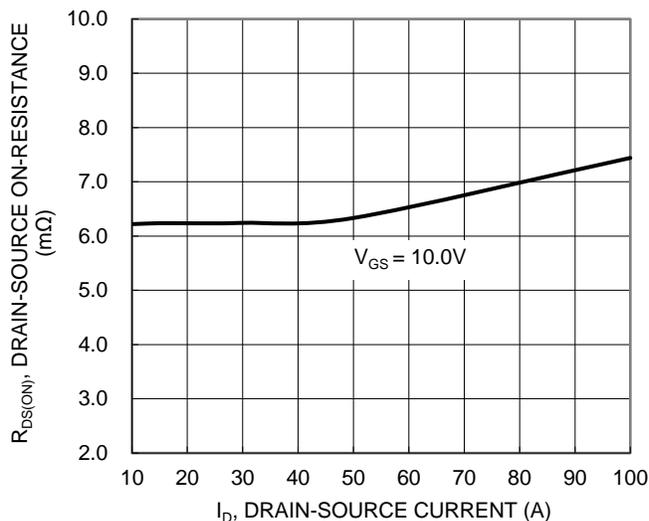


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

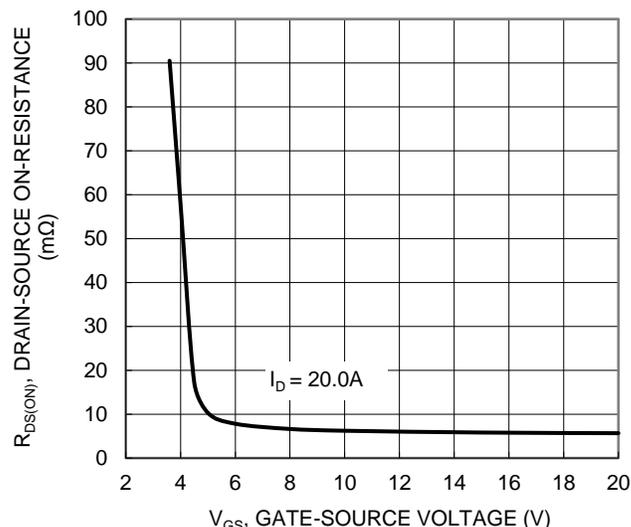


Figure 4. Typical Transfer Characteristic

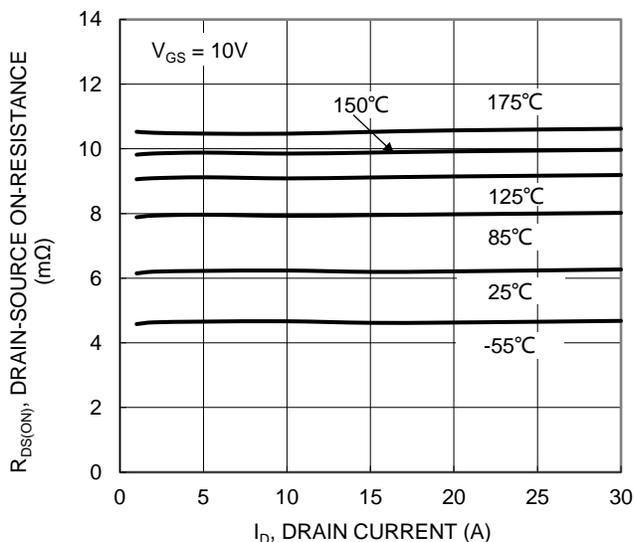


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

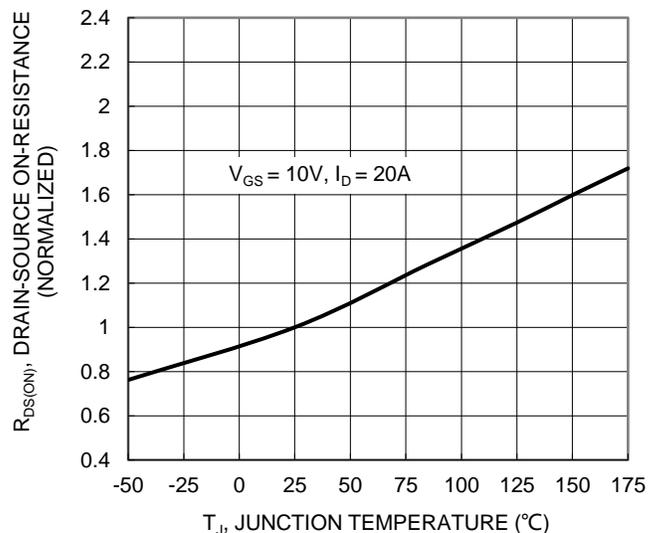


Figure 6. On-Resistance Variation with Temperature

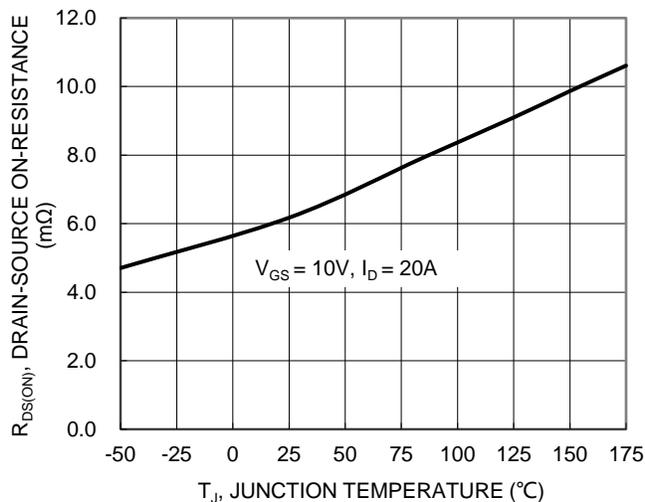


Figure 7. On-Resistance Variation with Temperature

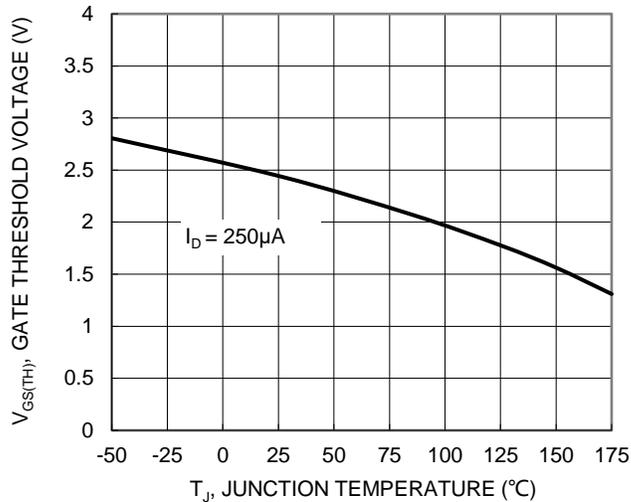


Figure 8. Gate Threshold Variation vs. Junction Temperature

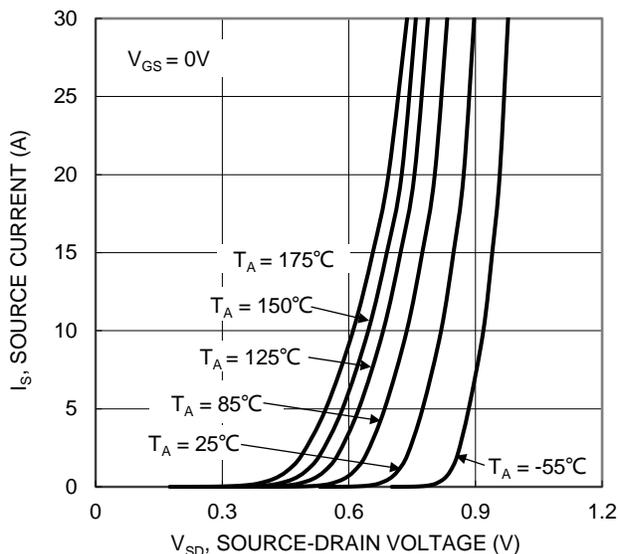


Figure 9. Diode Forward Voltage vs. Current

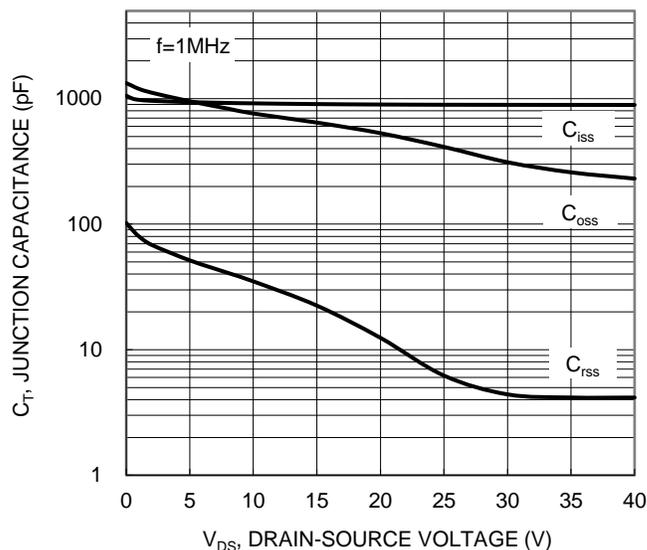


Figure 10. Typical Junction Capacitance

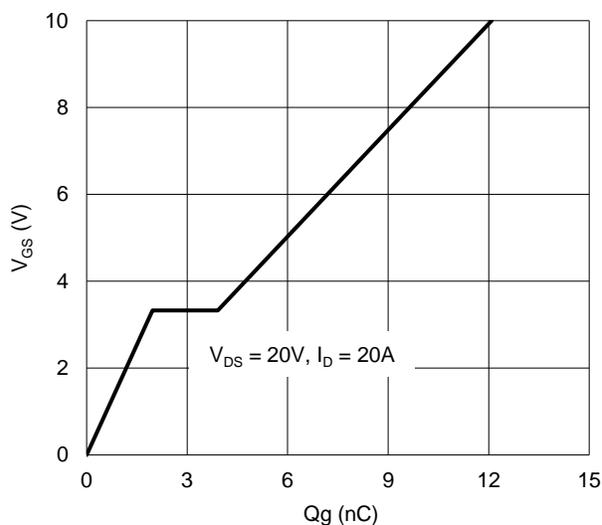


Figure 11. Gate Charge

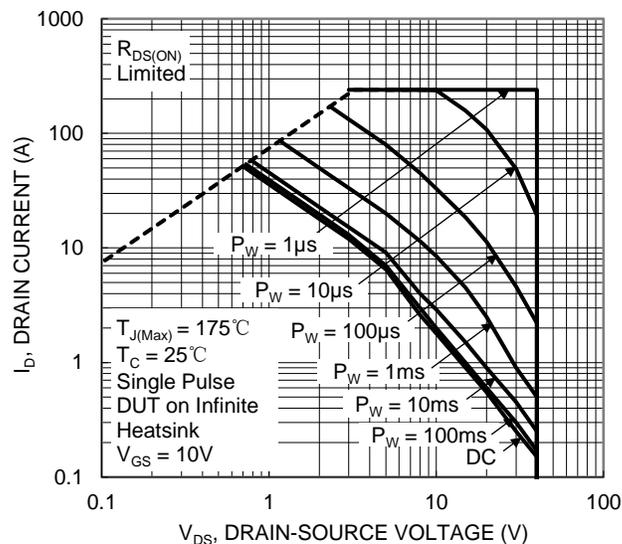


Figure 12. SOA, Safe Operation Area

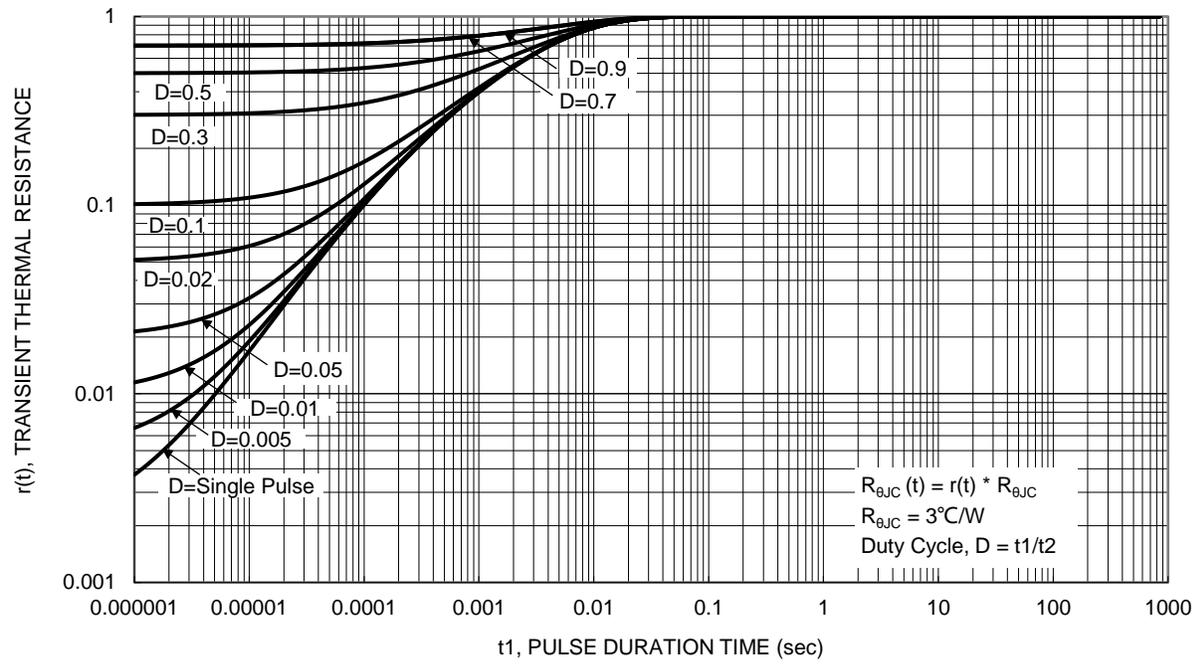
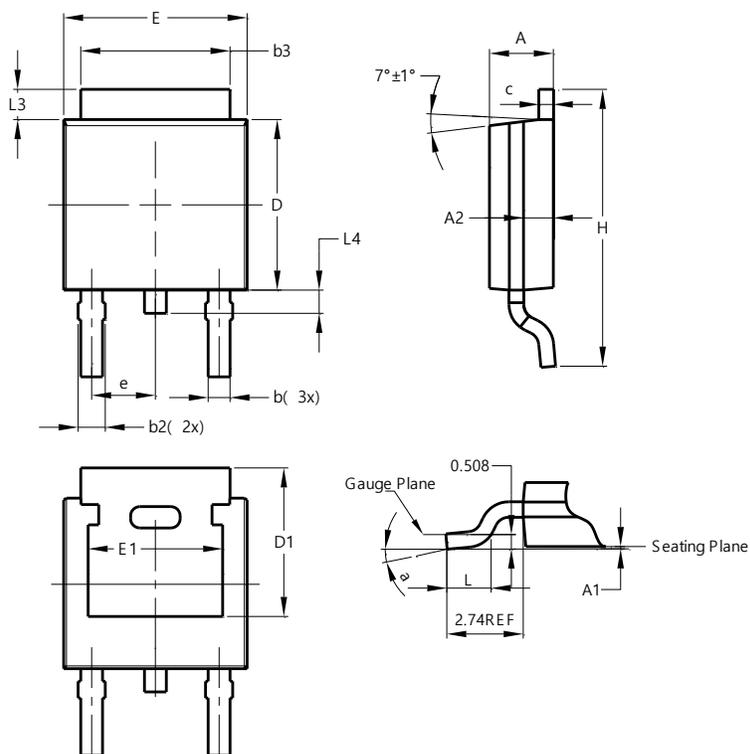


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

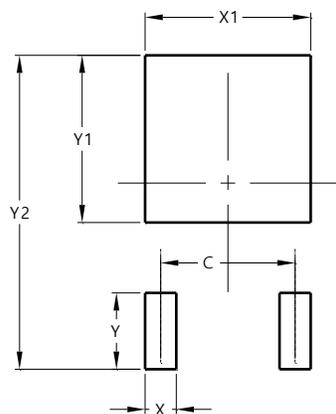
TO252 (DPAK)



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