



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 $T_C = +25^\circ C$
60V	10m $\Omega$ @ $V_{GS} = 10V$	128A

## Features and Benefits


- 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 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
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

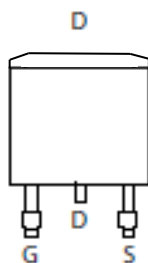
## Mechanical Data

- Package: TO263AB
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram Below
- Weight: 1.7 grams (Approximate)

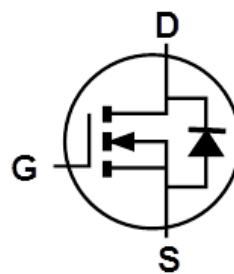
TO263AB (D2PAK)



Top View



Pin Out  
Top View



Internal Schematic

### Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$I_D$	$T_C = +25^\circ\text{C}$	128
		$T_C = +70^\circ\text{C}$	102
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	128	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	512	A
Avalanche Current, $L = 0.1\text{mH}$	$I_{AS}$	71	A
Avalanche Energy, $L = 0.1\text{mH}$	$E_{AS}$	252	mJ

### Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	30	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	312	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	0.4	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.  
 6. Thermal resistance from junction to soldering point (on the exposed drain pad).

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	10	$\mu A$	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 1mA$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	7.7	10	m $\Omega$	$V_{GS} = 10V, I_D = 25A$
Diode Forward Voltage	$V_{SD}$	—	0.8	1.2	V	$V_{GS} = 0V, I_S = 25A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	2692	—	pF	$V_{DS} = 25V, V_{GS} = 0V$ $f = 1MHz$
Output Capacitance	$C_{oss}$	—	909	—		
Reverse Transfer Capacitance	$C_{rss}$	—	65	—		
Gate Resistance	$R_g$	—	3.6	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	$Q_g$	—	46	—	nC	$V_{DS} = 44V, I_D = 25A,$ $V_{GS} = 10V$
Gate-Source Charge	$Q_{gs}$	—	12	—		
Gate-Drain Charge	$Q_{gd}$	—	13	—		
Turn-On Delay Time	$t_{D(on)}$	—	13.5	—	ns	$V_{DS} = 30V, V_{GEN} = 10V,$ $R_L = 1.2\Omega$
Turn-On Rise Time	$t_R$	—	44	—		
Turn-Off Delay Time	$t_{D(off)}$	—	45	—		
Turn-Off Fall Time	$t_F$	—	29	—		
Reverse Recovery Time	$t_{RR}$	—	51.5	—	ns	$I_F = 20A, di/dt = 100A/\mu s,$
Reverse Recovery Charge	$Q_{RR}$	—	92	—	nC	$V_R = 30V$

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
 8. Guaranteed by design. Not subject to product testing.

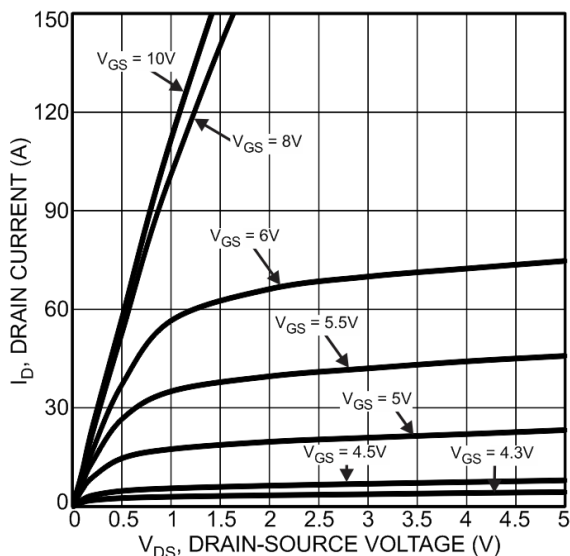


Fig. 1 Typical Output Characteristic

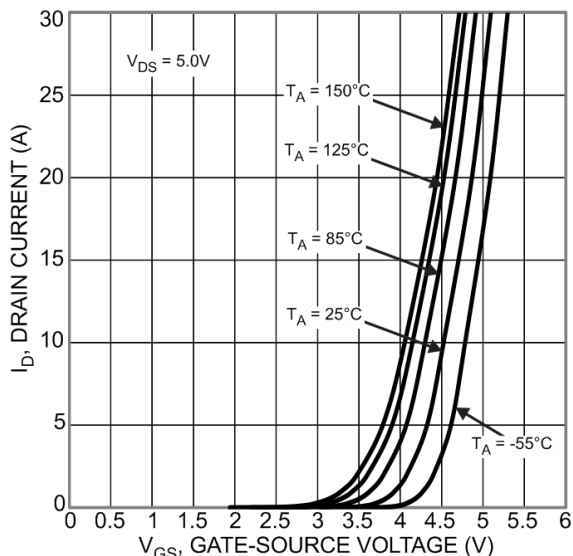


Fig. 2 Typical Transfer Characteristics

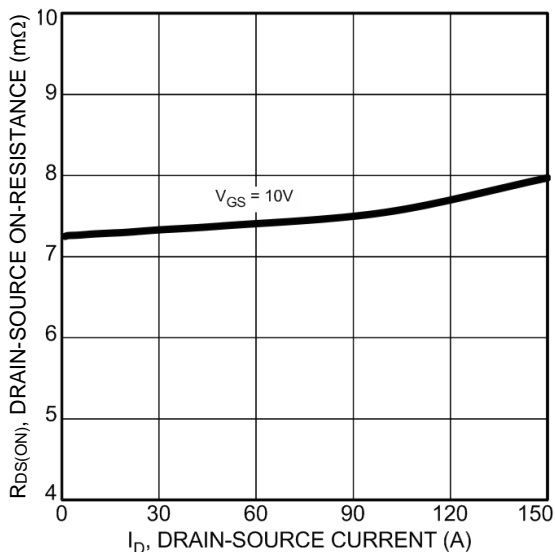


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

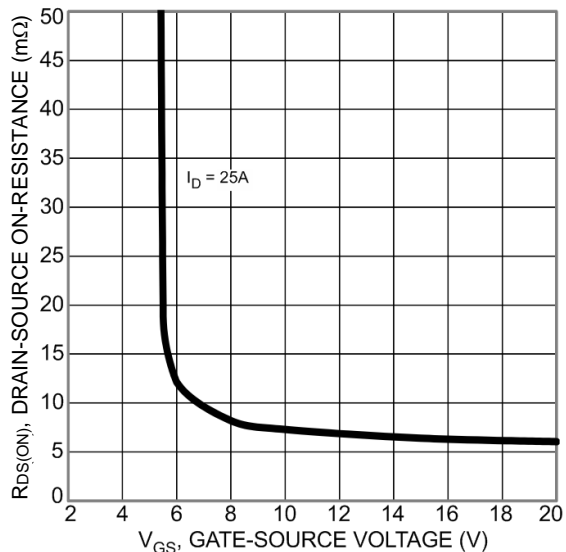


Fig. 4 Typical Transfer Characteristic

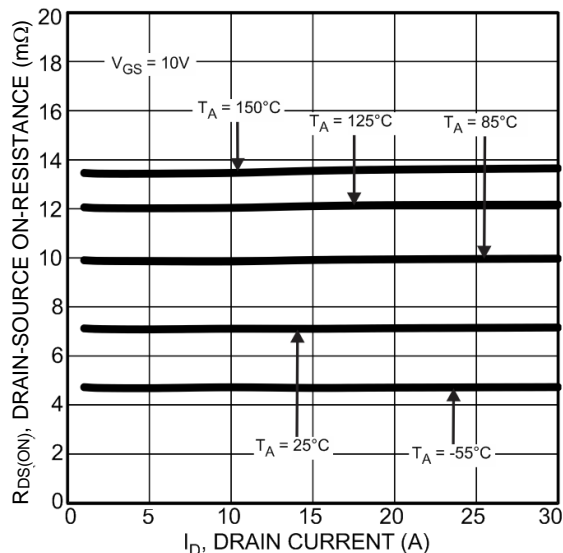


Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

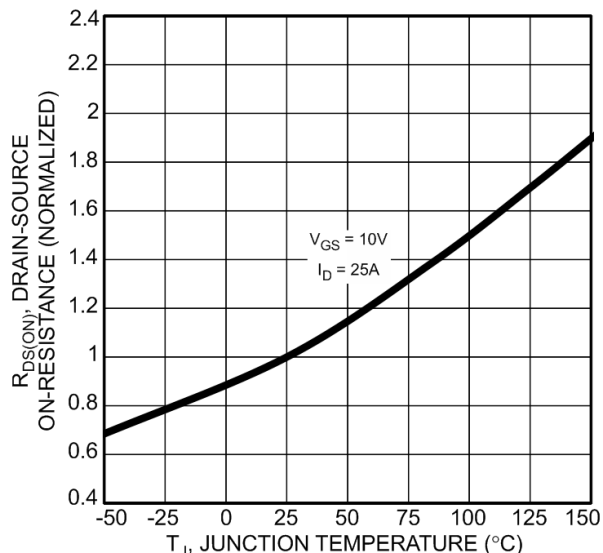


Fig. 6 On-Resistance Variation with Temperature

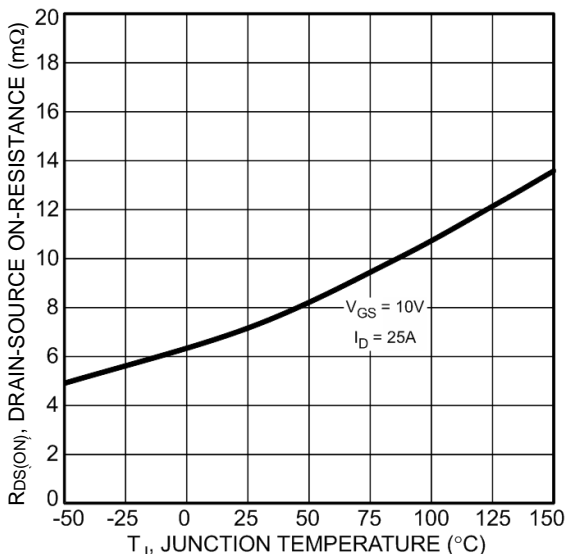


Fig. 7 On-Resistance Variation with Temperature

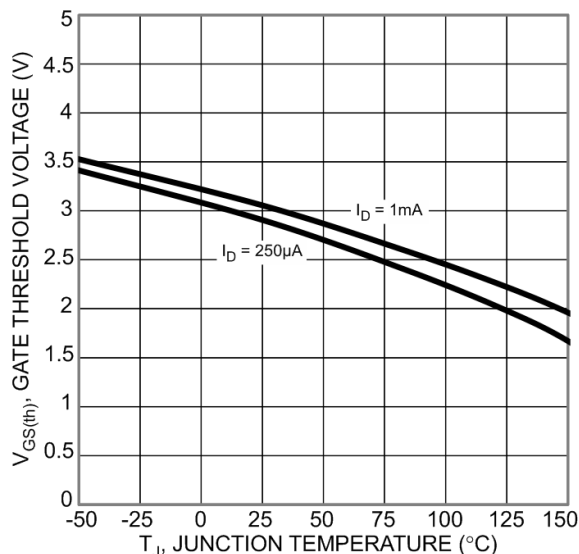


Fig. 8 Gate Threshold Variation vs. Junction Temperature

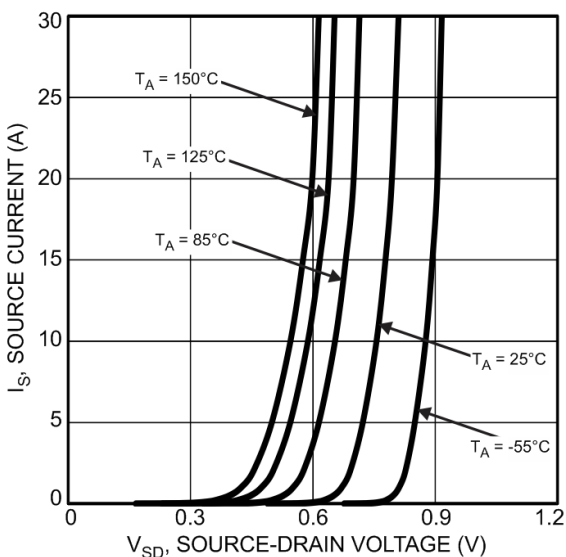


Fig. 9 Diode Forward Voltage vs. Current

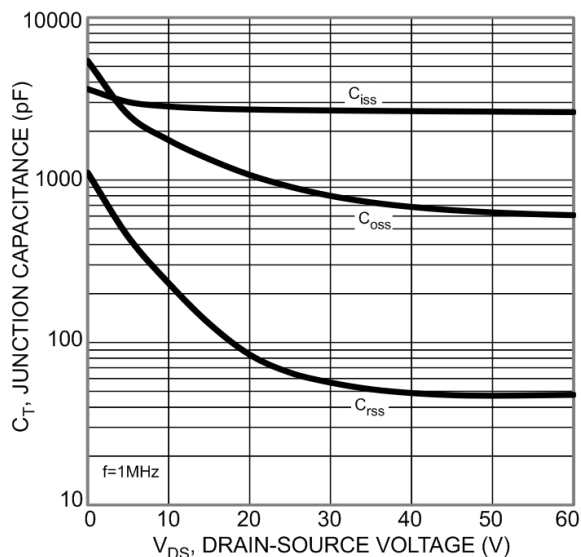


Fig. 10 Typical Junction Capacitance

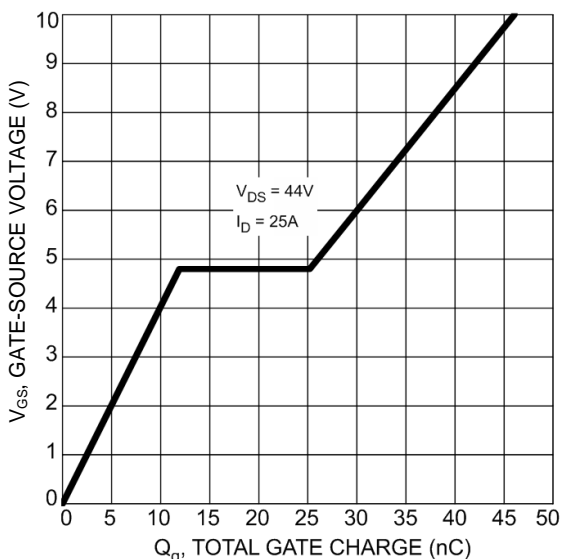


Fig. 11 Gate Charge

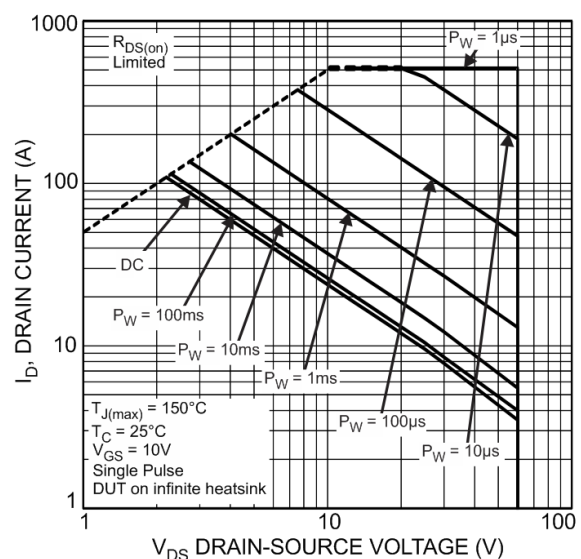
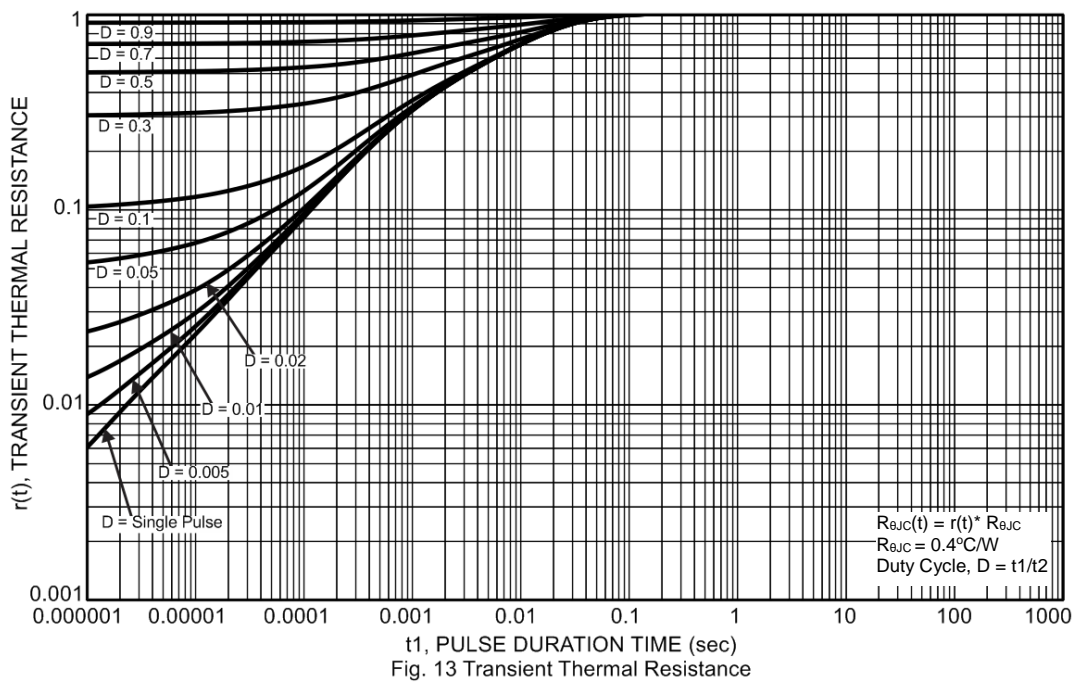
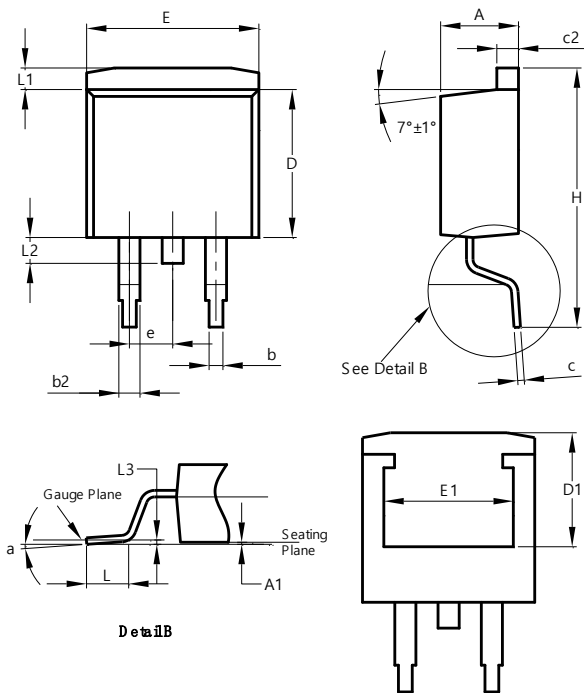


Fig. 12 SOA, Safe Operation Area



**Package Outline Dimensions**

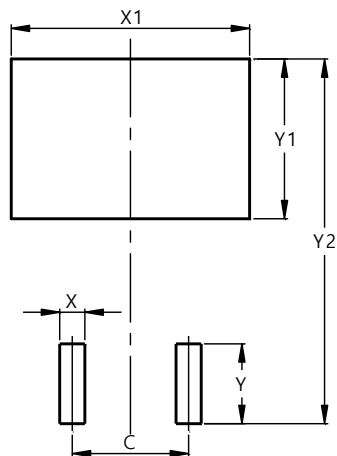
**TO263AB (D2PAK)**



TO263AB (D2PAK)			
Dim	Min	Max	Typ
A	4.07	4.82	-
A1	0.00	0.25	-
b	0.51	0.99	-
b2	1.15	1.77	-
c	0.356	0.73	-
c2	1.143	1.65	-
D	8.39	9.65	-
D1	6.55	6.95	-
e	2.54 TYP		
E	9.66	10.66	-
E1	6.23	8.23	-
H	14.61	15.87	-
L	1.78	2.79	-
L1	-	1.67	-
L2	-	1.77	-
L3	-	-	0.254
a	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**

**TO263AB (D2PAK)**



Dimensions	Value (in mm)
C	5.08
X	1.10
X1	10.41
Y	3.50
Y1	7.01
Y2	15.99