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$_A$ = +25°C
-20V	80mΩ @ V$_{GS}$ = -4.5V	-3.7A
	110mΩ @ V$_{GS}$ = -2.5V	-3.1A

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- General purpose interfacing switches
- Power management functions

Mechanical Data

- Package: TSOT26
- 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—Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ⓔ3
- Weight: 0.013 grams (Approximate)

TSOT26

Top View

Top View
Pin Configuration

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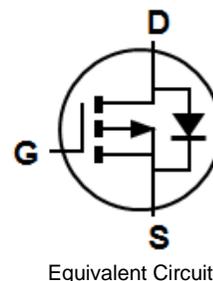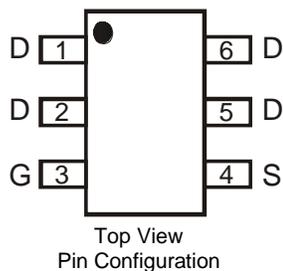
Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±10	V
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.7 -2.9	A
Continuous Drain Current (Note 6) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.1 -2.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-1.2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-20	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\Theta JA}$	105	°C/W
Total Power Dissipation (Note 6)		P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\Theta JA}$	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}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.45	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	54	80	mΩ	V_{GS} = -4.5V, I_D = -2.8A
		—	70	110		V_{GS} = -2.5V, I_D = -2.0A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.0	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	443	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	59	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	47	—	pF	
Gate Resistance	R_G	—	8.5	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz
Total Gate Charge	Q_g	—	6.0	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -3A
Gate-Source Charge	Q_{gs}	—	0.6	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.8	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.0	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 10Ω, R_G = 1.0Ω, I_D = -1A
Turn-On Rise Time	t_R	—	3.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	24.5	—	ns	
Turn-Off Fall Time	t_F	—	9.5	—	ns	
Reverse Recovery Time	t_{RR}	—	8.3	—	ns	I_F = -1.0A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	2.0	—	nC	I_F = -1.0A, di/dt = 100A/µs

Notes: 5. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.
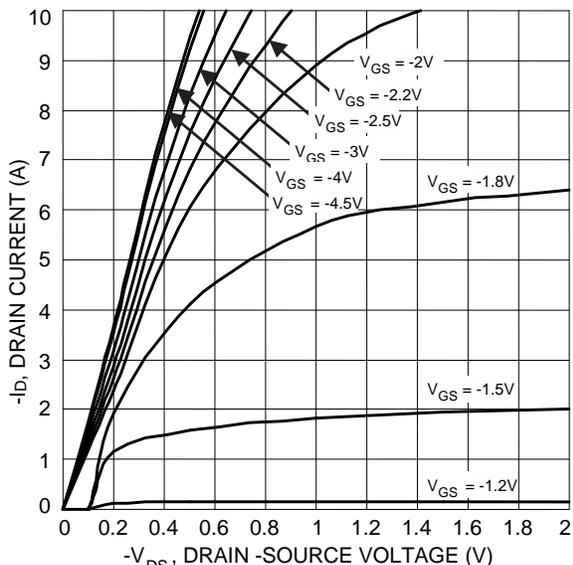
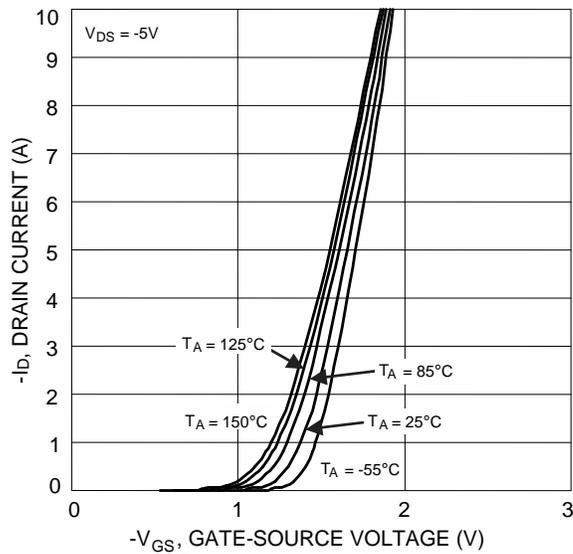Figure 1 Typical Output Characteristics

Figure 2 Typical Transfer Characteristics
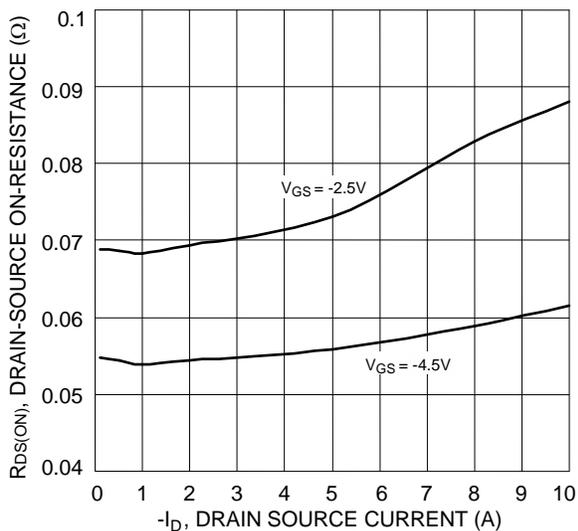

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage
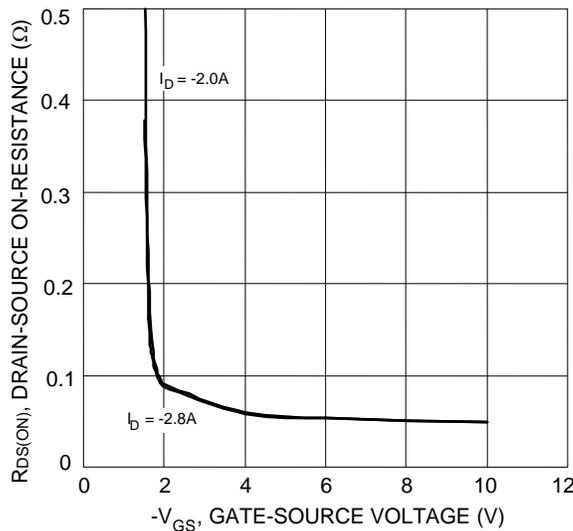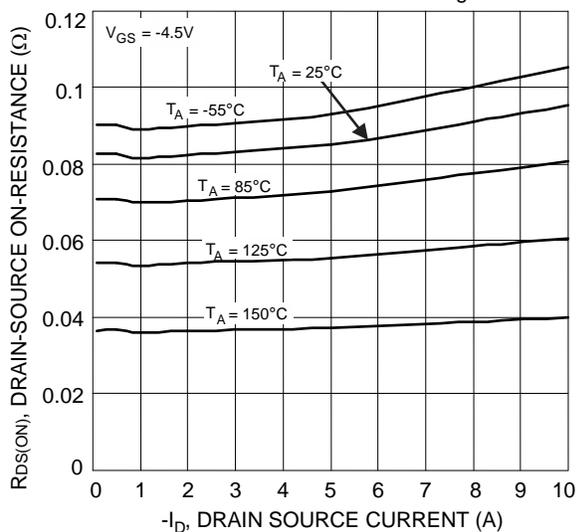

Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

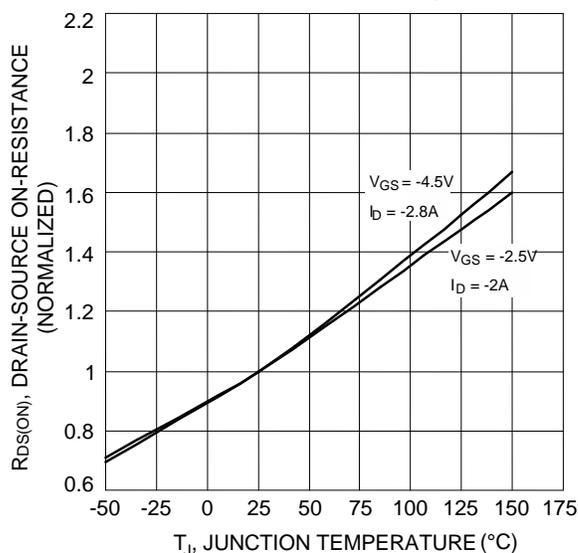Figure 5 Typical On-Resistance vs. Drain Current and Temperature

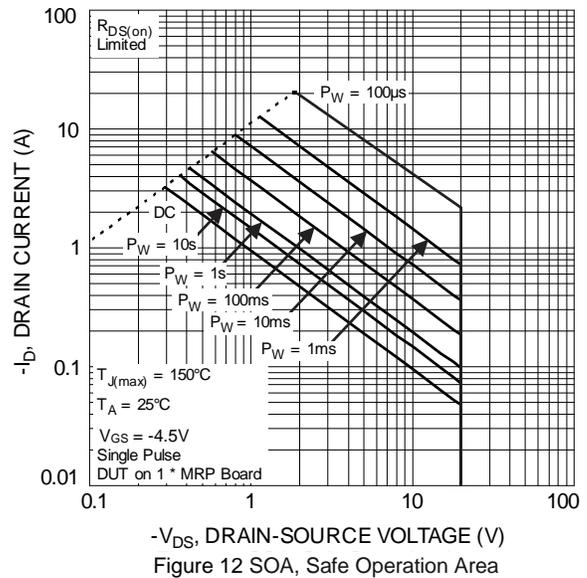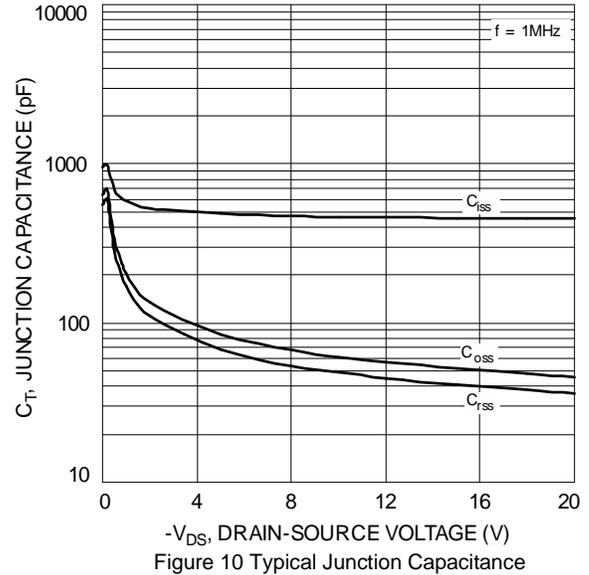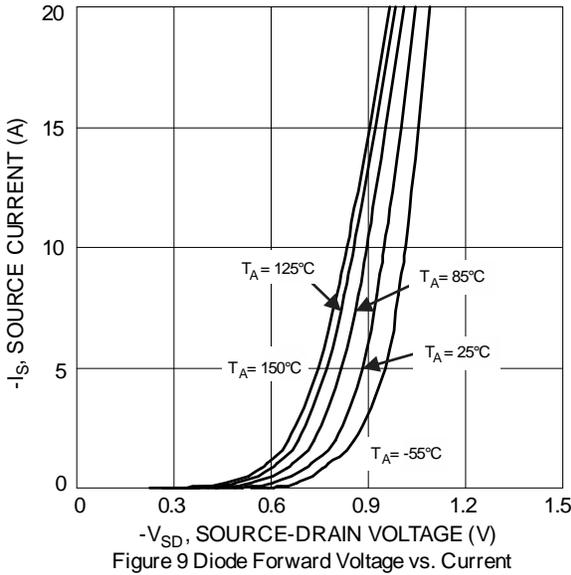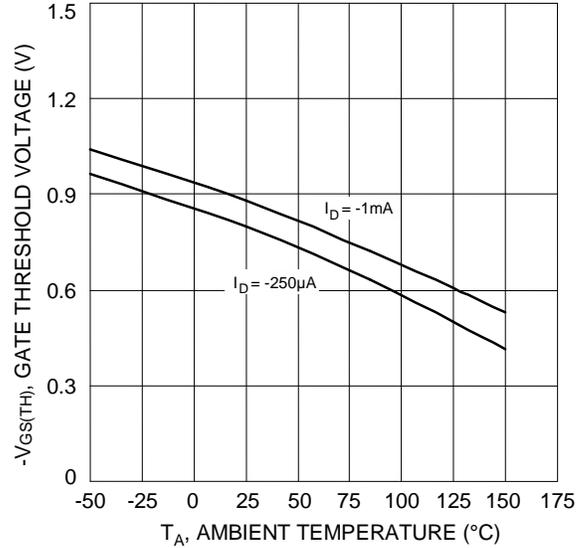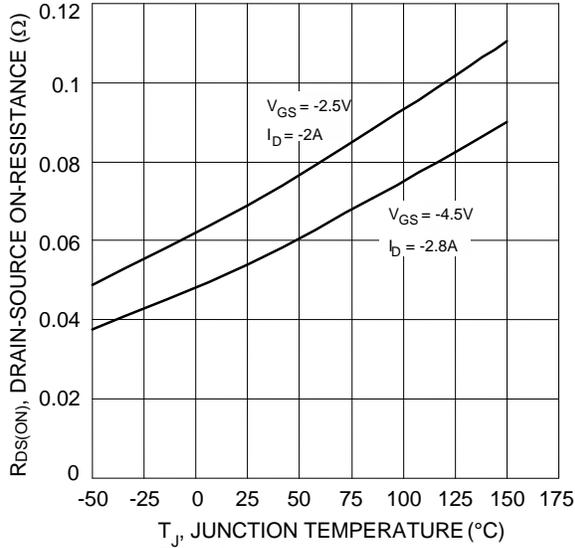Figure 6 On-Resistance Variation with Temperature

Figure 7 On-Resistance Variation with Temperature

Figure 8 Gate Threshold Variation vs. Ambient Temperature

Figure 9 Diode Forward Voltage vs. Current

Figure 10 Typical Junction Capacitance

Figure 11 Gate Charge

Figure 12 SOA, Safe Operation Area
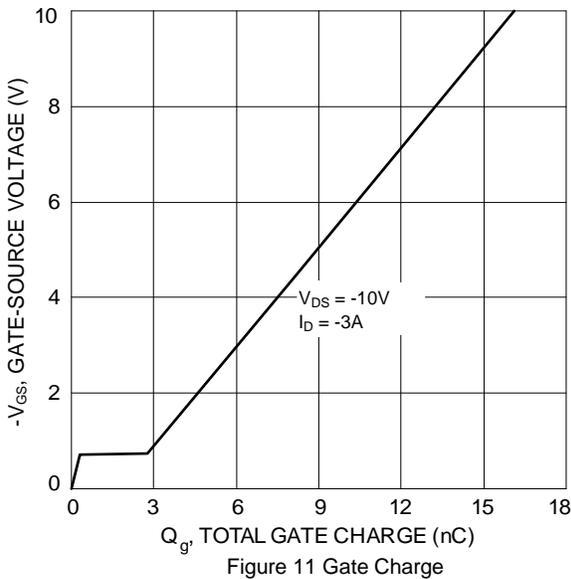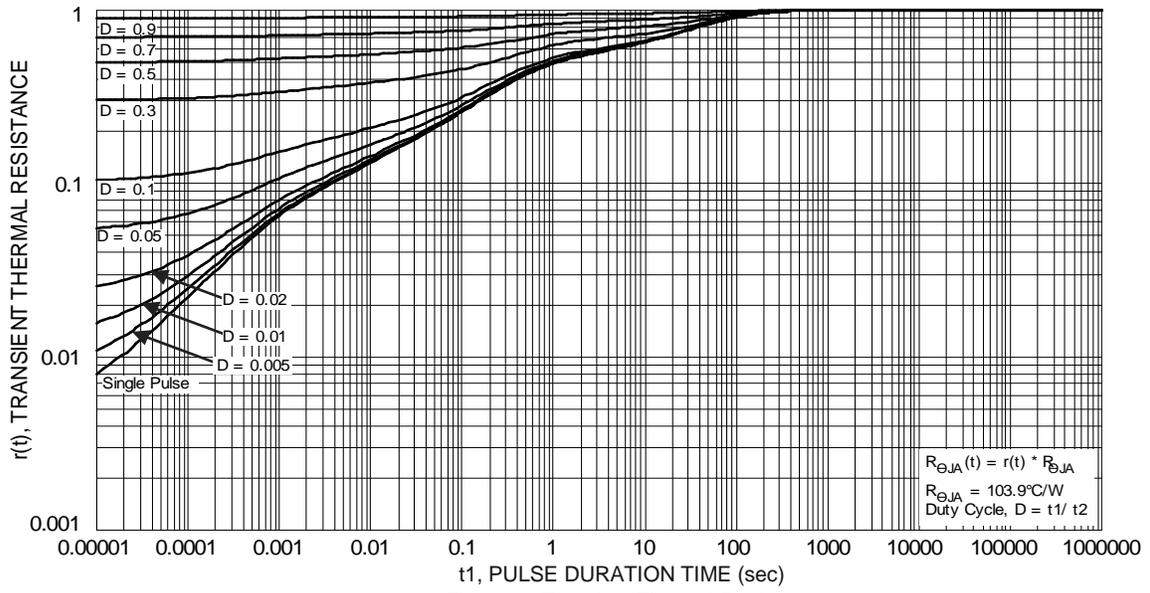
Figure 13 Transient Thermal Resistance

$R_{\Theta JA}(t) = r(t) * R_{\Theta JA}$

$R_{\Theta JA} = 103.9°C/W$

Duty Cycle, D = t1/ t2

Package Outline Dimensions
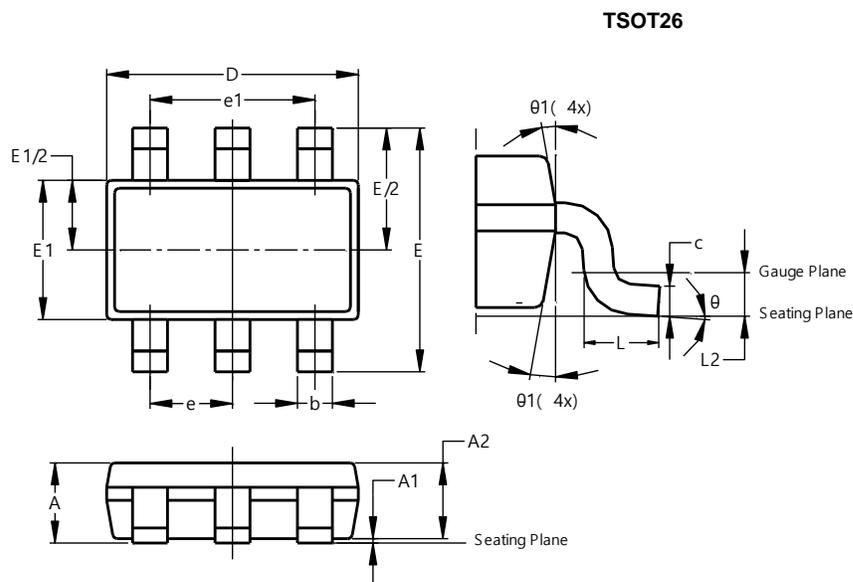
TSOT26

TSOT26			
Dim	**Min**	**Max**	**Typ**
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
θ	0°	8°	4°
θ1	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout

TSOT26
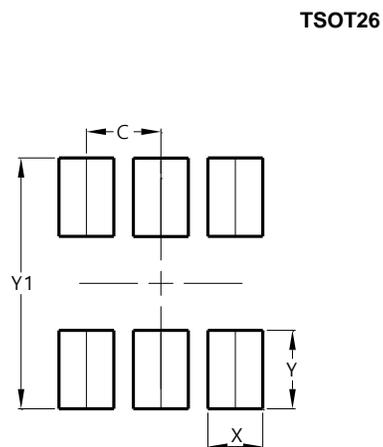
Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.200