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

企业微信二维码　　　　企业QQ二维码

Product Summary

Device	BV$_{DSS}$	R$_{DS(ON)}$	I$_D$ T$_A$ = +25°C
Q1	30V	460mΩ @ V$_{GS}$ = 4.5V	1.1A
		560mΩ @ V$_{GS}$ = 2.5V	1.0A
Q2	-30V	1000mΩ @ V$_{GS}$ = -4.5V	-0.7A
		1500mΩ @ V$_{GS}$ = -2.5V	-0.6A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

Description

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

Applications

- Backlighting
- DC-DC converters
- 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
- Terminals Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
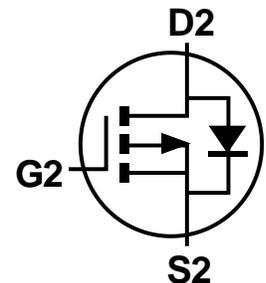- Weight: 0.013 grams (Approximate)

TSOT26

G1	1		6	D1
S2	2		5	S1
G2	3		4	D2
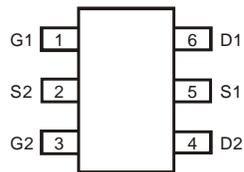
Top View

Top View
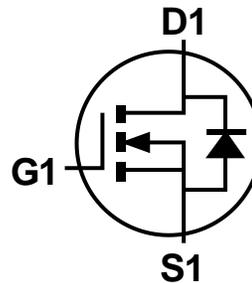
Q1 N-Channel

Q2 P-Channel

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

Characteristic			Symbol	Q1 Value	Q2 Value	Unit
Drain-Source Voltage			V_{DSS}	30	-30	V
Gate-Source Voltage			V_{GSS}	±8	±8	V
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C / T_A = +70°C	I_D	1.1 / 0.9	-0.7 / -0.6	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	0.73	-0.68	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	2.6	-1.9	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	0.54	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	230	°C/W
Power Dissipation (Note 6)	P_D	0.83	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	150	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics – Q1 N-Channel (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 10µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.45	—	0.95	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	290 / 340 / 400	460 / 560 / 730	mΩ	V_{GS} = 4.5V, I_D = 200mA / V_{GS} = 2.5V, I_D = 100mA / V_{GS} = 1.8V, I_D = 75mA
Diode Forward Voltage	V_{SD}	—	0.6	1.2	V	V_{DS} = V_{GS}, I_D = 300mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	40.8	—	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	7.6	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	4.6	—	pF	
Total Gate Charge	Q_g	—	0.9	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A
Gate-Source Charge	Q_{gs}	—	0.05	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.3	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	1.1	—	ns	V_{DS} = 10V, I_D = 1A, V_{GS} = 4.5V, R_G = 6Ω
Turn-On Rise Time	t_R	—	15.9	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	20.7	—	ns	
Turn-Off Fall Time	t_F	—	20.0	—	ns	

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. Repetitive rating, pulse width limited by junction temperature.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

Electrical Characteristics – Q2 P-Channel (@T$_A$ = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV$_{DSS}$	-30	—	—	V	V$_{GS}$ = 0V, I$_D$ = -250µA
Zero Gate Voltage Drain Current	I$_{DSS}$	—	—	-1	µA	V$_{DS}$ = -30V, V$_{GS}$ = 0V
Gate-Source Leakage	I$_{GSS}$	—	—	±10	µA	V$_{GS}$ = ±8V, V$_{DS}$ = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V$_{GS(TH)}$	-0.5	—	-1.1	V	V$_{DS}$ = V$_{GS}$, I$_D$ = -250µA
Static Drain-Source On-Resistance	R$_{DS(ON)}$	—	0.72	1	Ω	V$_{GS}$ = -4.5V, I$_D$ = -400mA
			0.86	1.5		V$_{GS}$ = -2.5V, I$_D$ = -200mA
			1.0	2		V$_{GS}$ = -1.8V, I$_D$ = -100mA
Diode Forward Voltage	V$_{SD}$	—	-0.9	-1.2	V	V$_{GS}$ = 0V, I$_S$ = -300mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C$_{iss}$	—	54	—	pF	V$_{DS}$ = -15V, V$_{GS}$ = 0V f = 1.0MHz
Output Capacitance	C$_{oss}$	—	10.9	—		
Reverse Transfer Capacitance	C$_{rss}$	—	5.8	—		
Total Gate Charge	Q$_g$	—	1.0	—	nC	V$_{GS}$ = -4.5V, V$_{DS}$ = -15V, I$_D$ = -1A
Total Gate Charge	Q$_g$	—	1.6	—		V$_{GS}$ = -8V, V$_{DS}$ = -15V I$_D$ = -1A
Gate-Source Charge	Q$_{gs}$	—	0.2	—		
Gate-Drain Charge	Q$_{gd}$	—	0.1	—		
Turn-On Delay Time	t$_{D(ON)}$	—	3.8	—	ns	V$_{DD}$ = -10V, R$_L$ = 10Ω V$_{GS}$ = -4.5V, R$_G$ = 6Ω
Turn-On Rise Time	t$_R$	—	11	—		
Turn-Off Delay Time	t$_{D(OFF)}$	—	45	—		
Turn-Off Fall Time	t$_F$	—	20	—		

Notes:　　7. Repetitive rating, pulse width limited by junction temperature.
　　　　　8. Short duration pulse test used to minimize self-heating effect.

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Q1 N-Channel
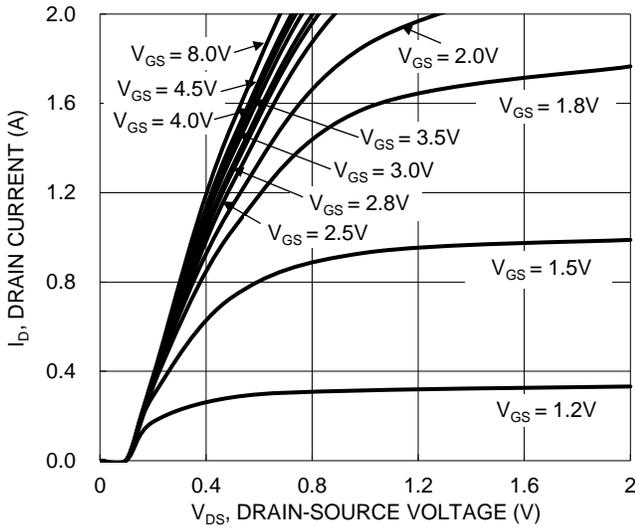
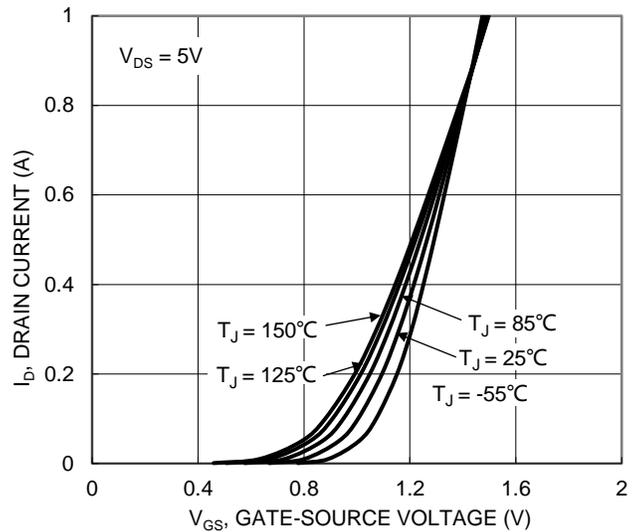Figure 1. Typical Output Characteristic

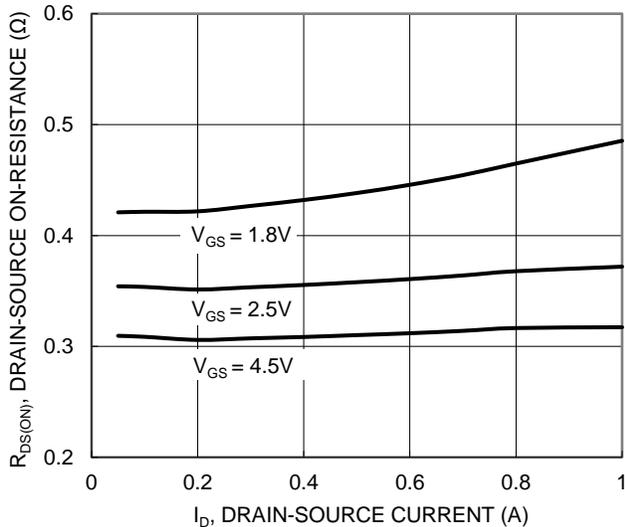Figure 2. Typical Transfer Characteristic

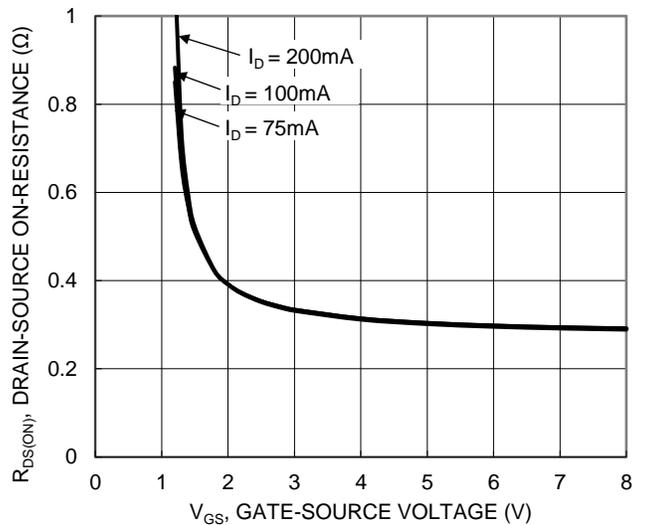Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

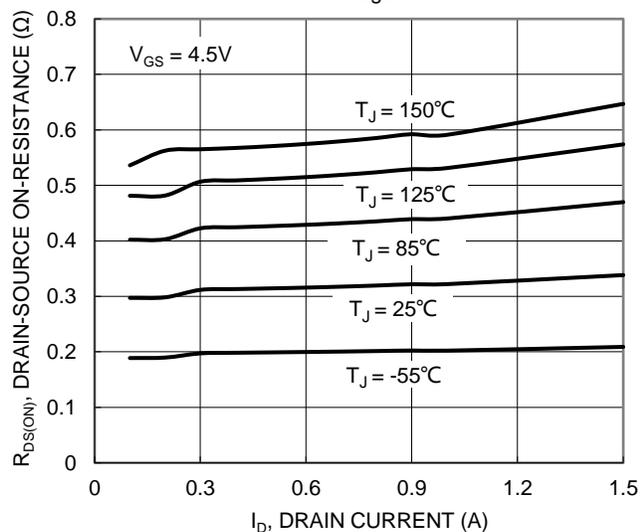Figure 4. Typical Transfer Characteristic

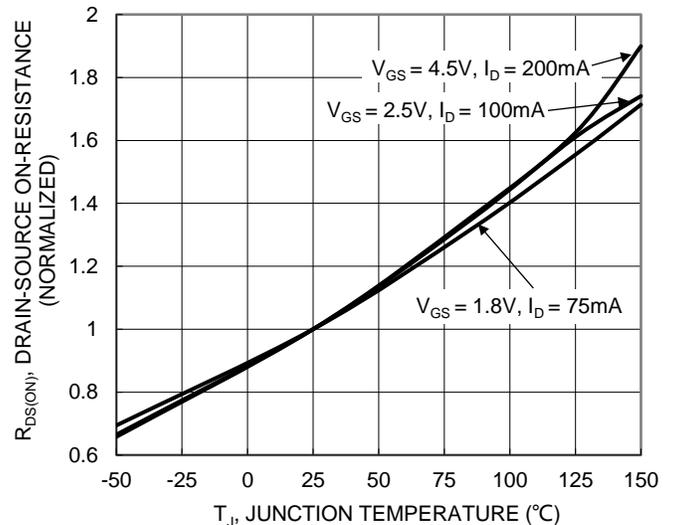Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

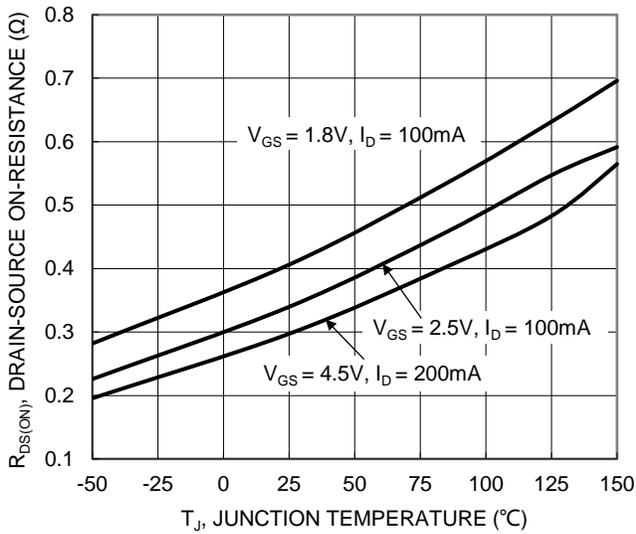Figure 6. On-Resistance Variation with Junction Temperature

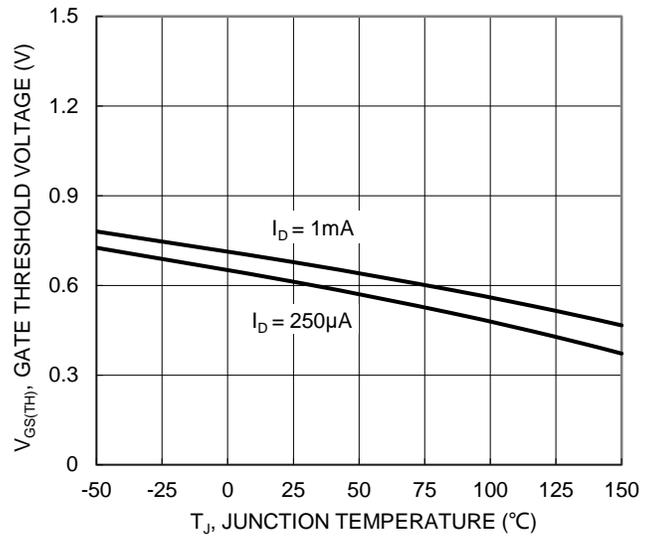Figure 7. On-Resistance Variation with Junction Temperature
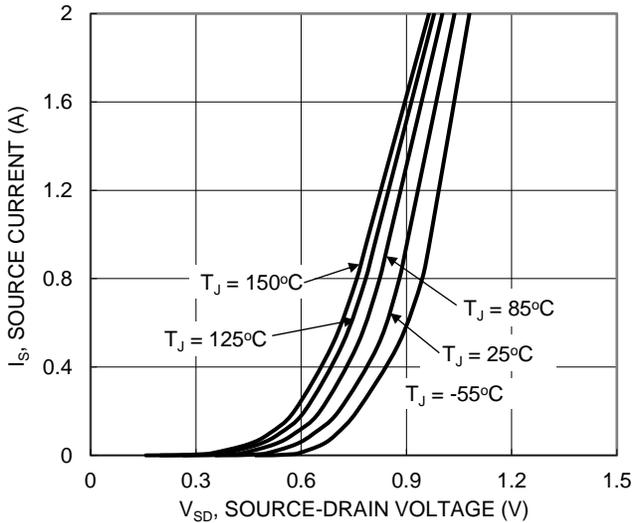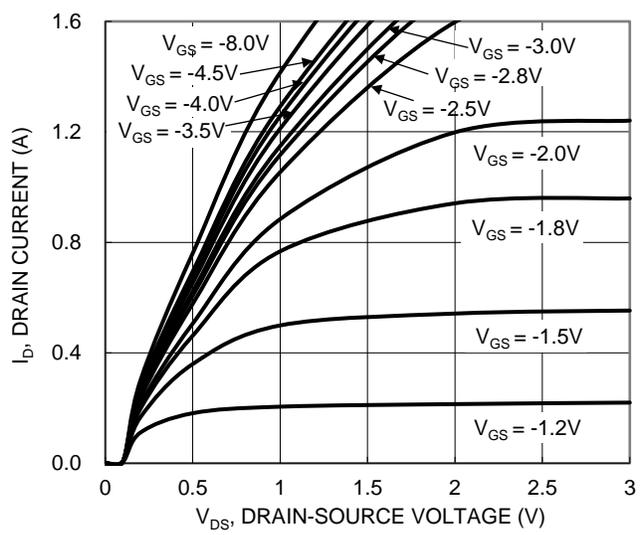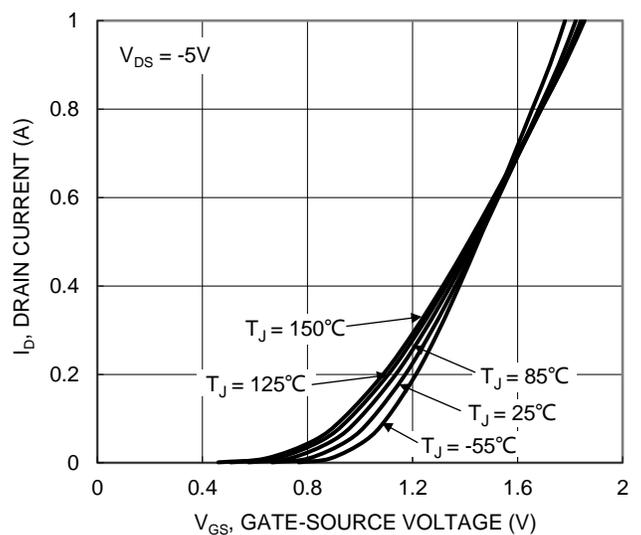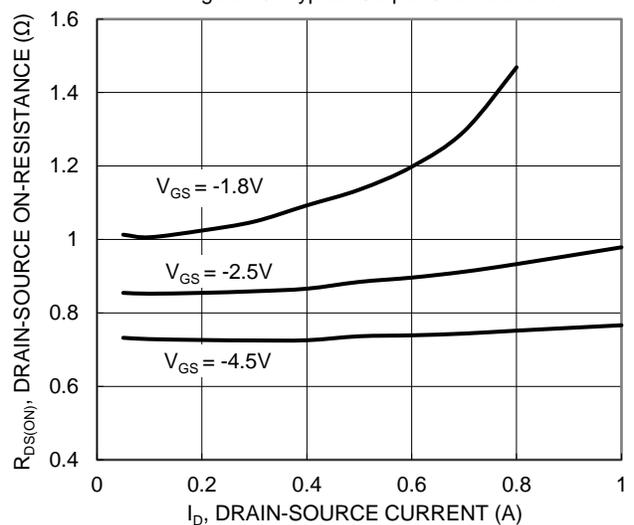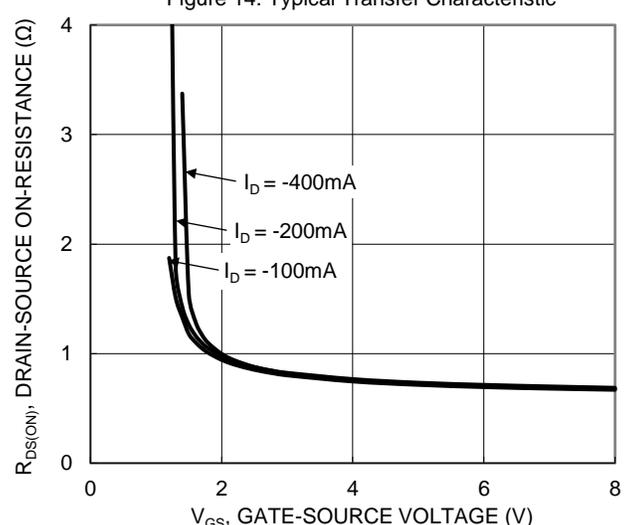

Figure 8. Gate Threshold Variation vs. Junction Temperature

Figure 9. Diode Forward Voltage vs. Current
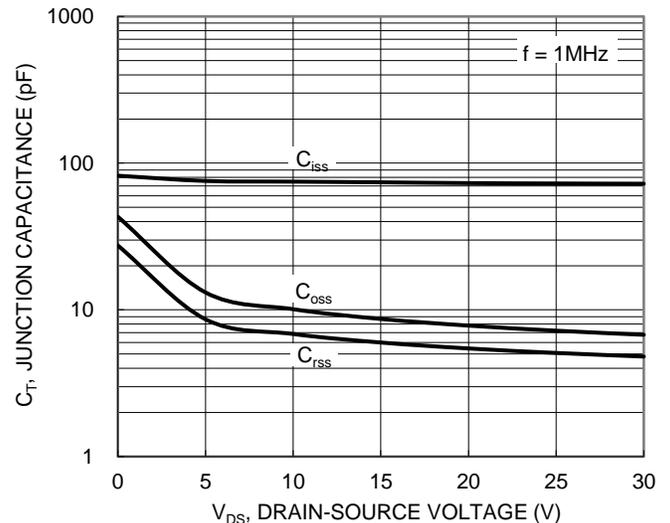
Figure 10. Typical Junction Capacitance
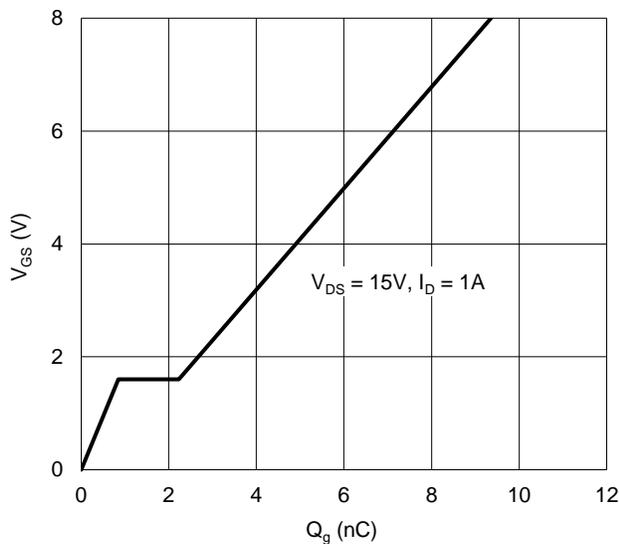
Figure 11. Gate Charge
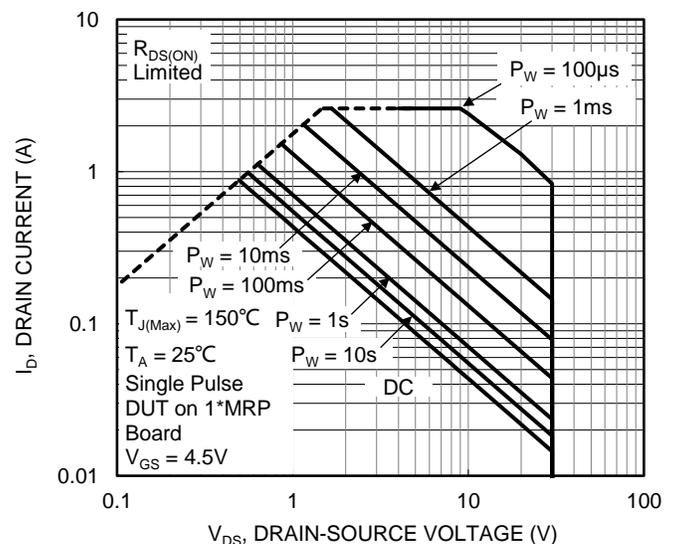
Figure 12. SOA, Safe Operation Area

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Q2 P-Channel

Figure 13. Typical Output Characteristic

Figure 14. Typical Transfer Characteristic

Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage
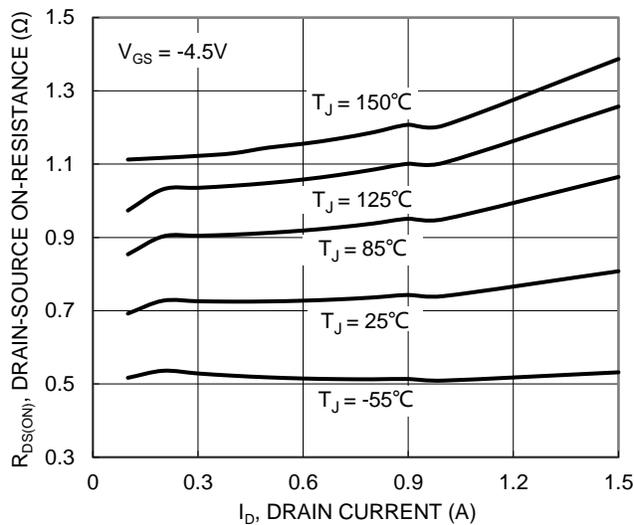

Figure 16. Typical Transfer Characteristic

Figure 17. Typical On-Resistance vs. Drain Current and Junction Temperature
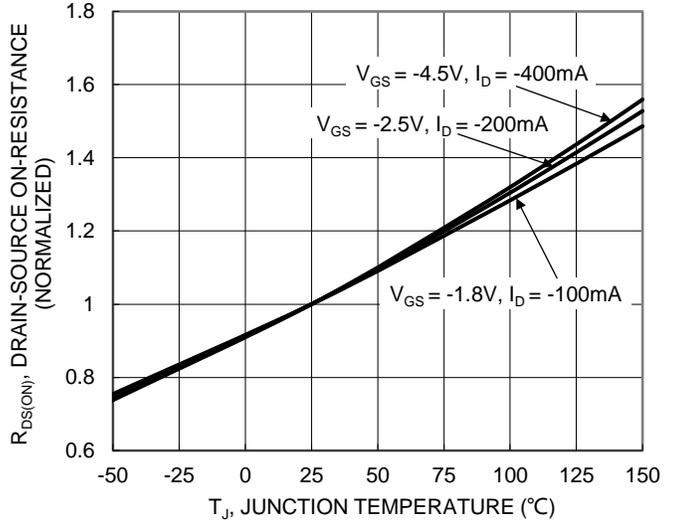

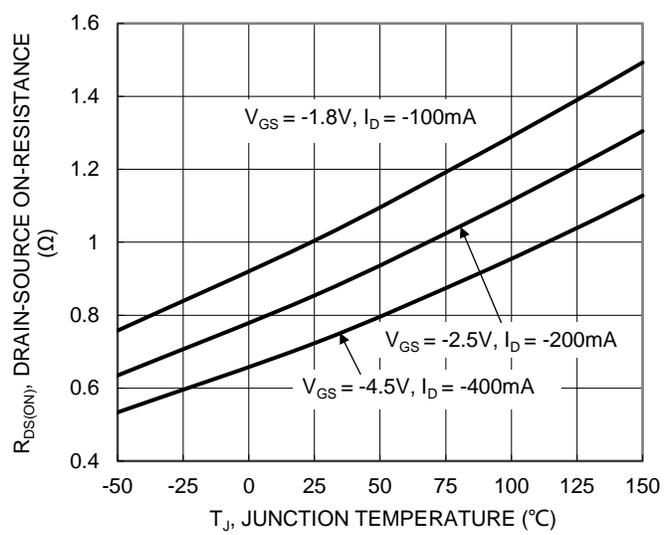Figure 18. On-Resistance Variation with Junction Temperature

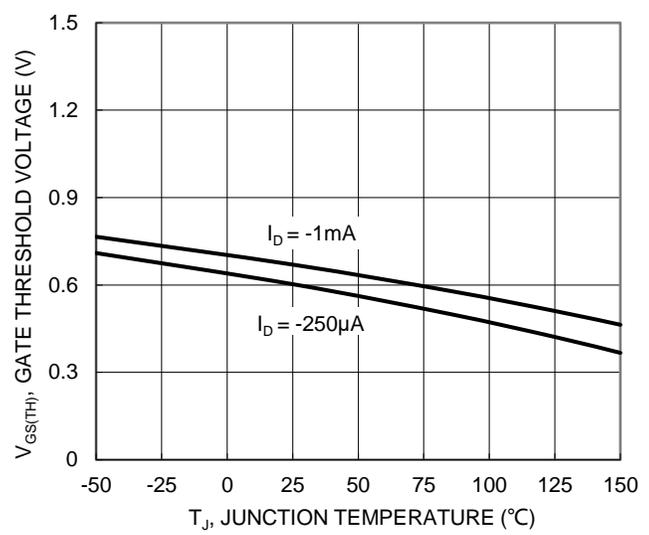Figure 19. On-Resistance Variation with Junction Temperature

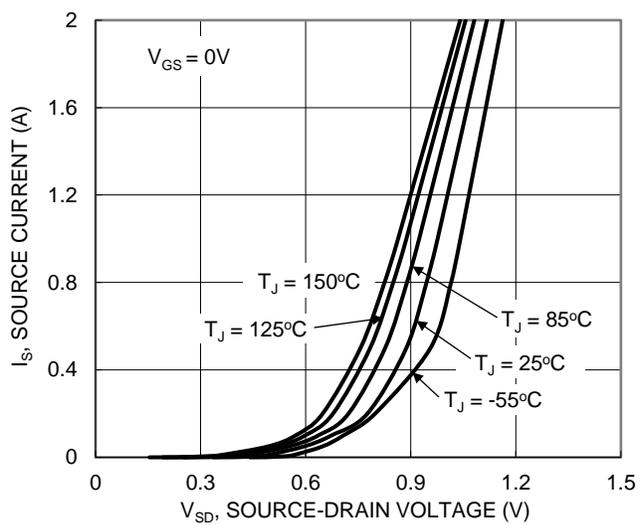Figure 20. Gate Threshold Variation vs. Junction Temperature

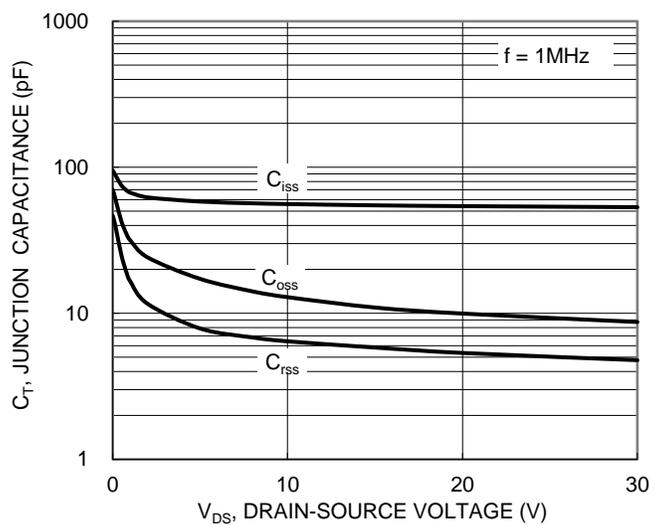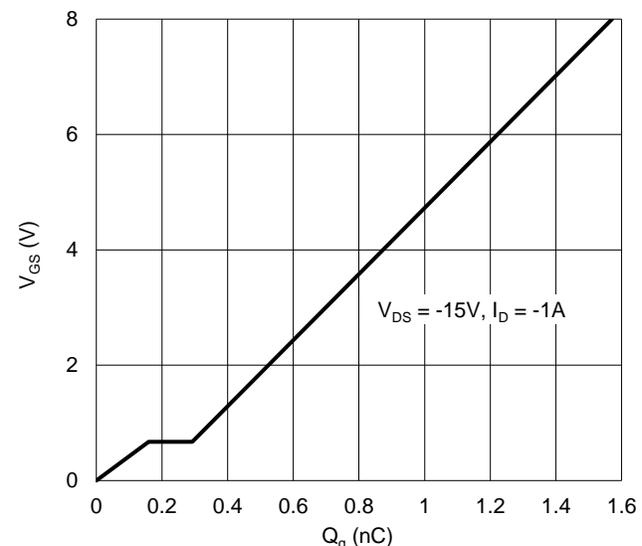Figure 21. Diode Forward Voltage vs. Current

Figure 22. Typical Junction Capacitance

Figure 23. Gate Charge
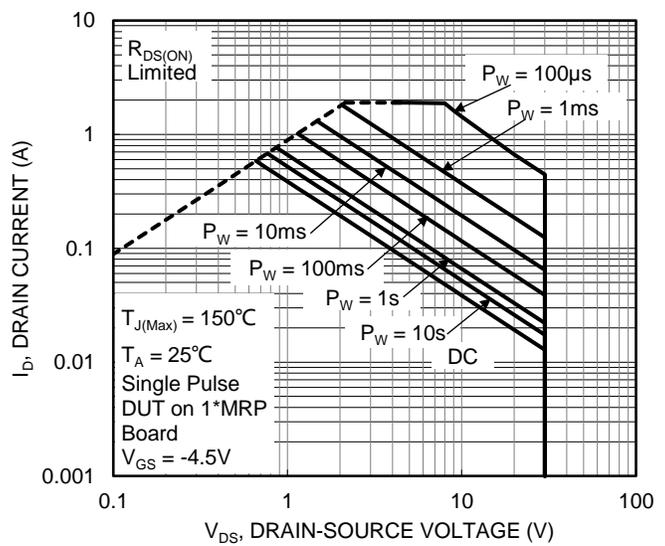
Figure 24. SOA, Safe Operation Area
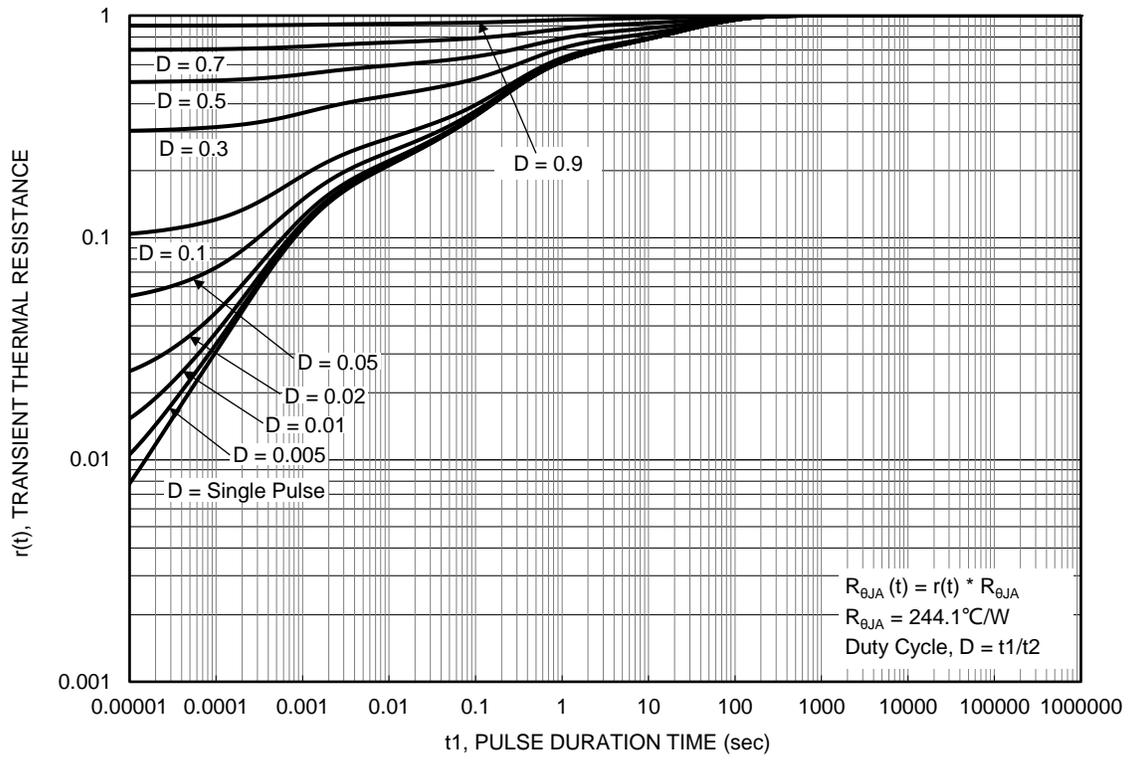
Figure 25. Transient Thermal Resistance

In the chart:

- D = 0.7
- D = 0.5
- D = 0.3
- D = 0.9
- D = 0.1
- D = 0.05
- D = 0.02
- D = 0.01
- D = 0.005
- D = Single Pulse

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
$R_{\theta JA} = 244.1°C/W$
Duty Cycle, D = t1/t2

Axis labels: r(t), TRANSIENT THERMAL RESISTANCE (vertical); t1, PULSE DURATION TIME (sec) (horizontal)

Package Outline Dimensions
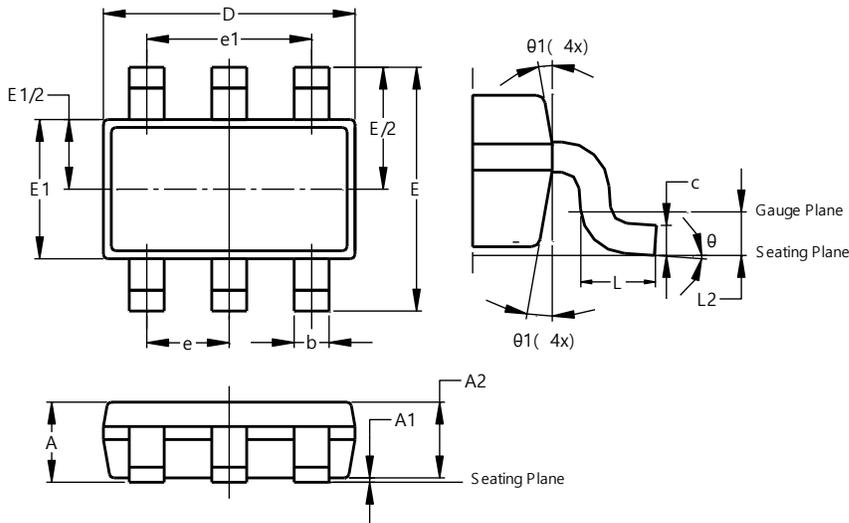
TSOT26

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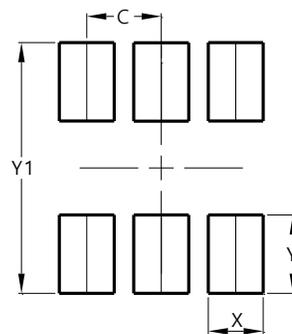
Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.200