



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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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 N-Channel	12V	25mΩ @ V _{GS} = 4.5V	6.1A
		32mΩ @ V _{GS} = 2.5V	5.4A
		40mΩ @ V _{GS} = 1.8V	4.9A
Q2 P-Channel	-20V	80mΩ @ V _{GS} = -4.5V	-3.5A
		100mΩ @ V _{GS} = -2.5V	-3.1A
		140mΩ @ V _{GS} = -1.8V	-2.6A
		210mΩ @ V _{GS} = -1.5V	-2.1A

Description

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

Applications

- Backlighting
- DC-DC Converters
- Power Management Functions

Features and Benefits

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

Mechanical Data

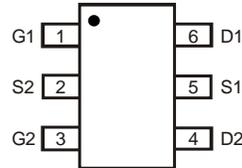
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe.
Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.013 grams (Approximate)



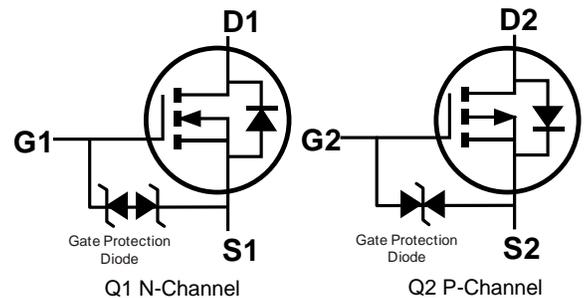
TSOT26



Top View



Top View



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

Characteristic			Symbol	Q1 N-Channel	Q2 P-Channel	Unit
Drain-Source Voltage			V_{DSS}	12	-20	V
Gate-Source Voltage			V_{GSS}	± 8	± 8	V
Continuous Drain Current (Note 6)	Steady State	$T_A = +25^\circ\text{C}$	I_D	6.1	-3.5	A
N-Channel: $V_{GS} = 4.5\text{V}$ P-Channel: $V_{GS} = -4.5\text{V}$		$T_A = +70^\circ\text{C}$		4.7	-2.7	
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	1.4	-1.4	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	35	-20	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	157	$^\circ\text{C/W}$
	$t < 5\text{s}$		102	
Total Power Dissipation (Note 6)		P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	108	$^\circ\text{C/W}$
	$t < 5\text{s}$		64	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	18	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics – Q1 N-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	12	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	1.0	μA	$V_{DS} = 12\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	17	25	m Ω	$V_{GS} = 4.5\text{V}, I_D = 5.2\text{A}$
		—	21	32		$V_{GS} = 2.5\text{V}, I_D = 4.8\text{A}$
		—	30	40		$V_{GS} = 1.8\text{V}, I_D = 2.5\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	787	—	pF	$V_{DS} = 6\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	203	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	177	—	pF	
Gate Resistance	R_G	—	4.8	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	10.5	—	nC	$V_{DS} = 6\text{V}, I_D = 6.8\text{A}$
Total Gate Charge ($V_{GS} = 8\text{V}$)		—	18.5	—	nC	
Gate-Source Charge	Q_{GS}	—	1.2	—	nC	
Gate-Drain Charge	Q_{GD}	—	2.9	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.6	—	ns	
Turn-On Rise Time	t_R	—	9.4	—	ns	$V_{DD} = 6\text{V}, V_{GS} = 4.5\text{V},$ $R_L = 1.1\Omega, R_G = 1\Omega$
Turn-Off Delay Time	$t_{D(OFF)}$	—	15.7	—	ns	
Turn-Off Fall Time	t_F	—	3.7	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	12.0	—	ns	$I_S = 5.4\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	1.8	—	nC	$I_S = 5.4\text{A}, di/dt = 100\text{A}/\mu\text{s}$

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 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.

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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1.0	μA	V _{DS} = -20V, 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)}	-0.4	—	-1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	55	80	mΩ	V _{GS} = -4.5V, I _D = -3.8A
		—	70	100		V _{GS} = -2.5V, I _D = -3.3A
		—	88	140		V _{GS} = -1.8V, I _D = -1.0A
		—	110	210		V _{GS} = -1.5V, I _D = -0.5A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{ISS}	—	576	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	87	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	71	—	pF	
Gate Resistance	R _G	—	15	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _G	—	6.7	—	nC	V _{DS} = -10V, I _D = -4.9A
Total Gate Charge (V _{GS} = -8V)		—	11.5	—	nC	
Gate-Source Charge	Q _{GS}	—	1.0	—	nC	
Gate-Drain Charge	Q _{GD}	—	2.0	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.5	—	ns	V _{DD} = -10V, V _{GS} = -4.5V, R _L = 2.6Ω, R _G = 1Ω
Turn-On Rise Time	t _R	—	3.6	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	20.8	—	ns	
Turn-Off Fall Time	t _F	—	12.7	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	13.1	—	ns	I _S = -3.9A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	3.9	—	nC	I _S = -3.9A, di/dt = 100A/μs

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

Typical Characteristics – Q1 N-CHANNEL

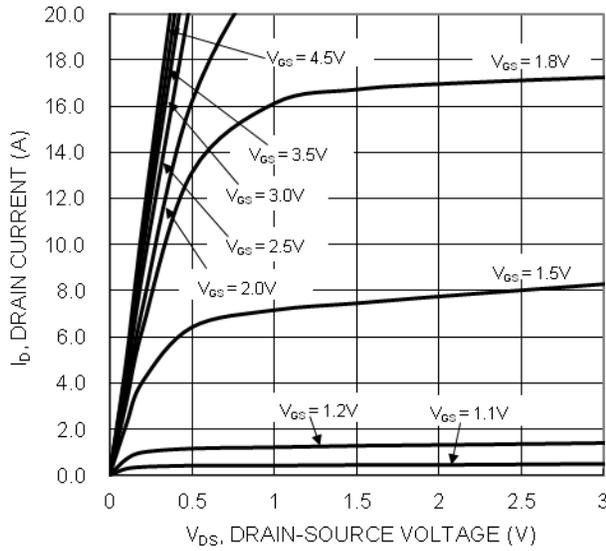


Figure 1 Typical Output Characteristic

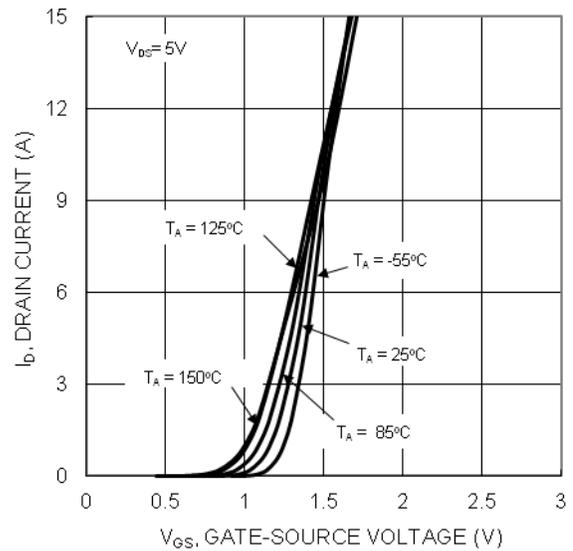


Figure 2 Typical Transfer Characteristic

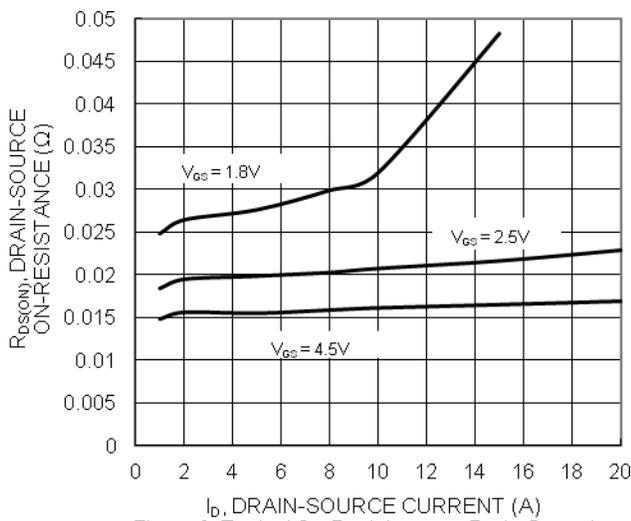


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

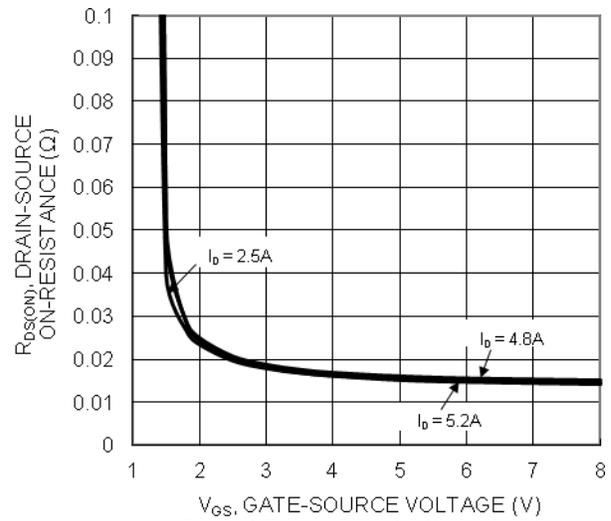


Figure 4 Typical Transfer Characteristic

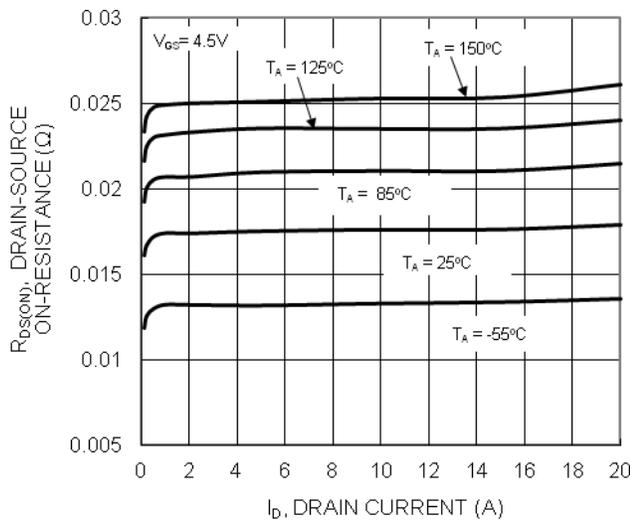


Figure 5 Typical On-Resistance vs Drain Current and Temperature

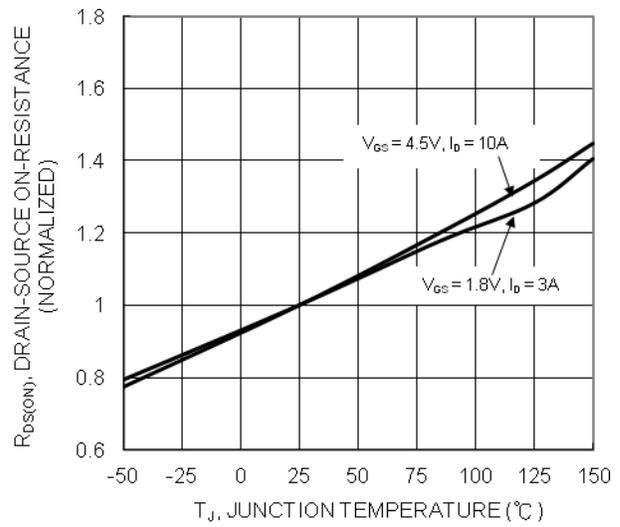


Figure 6 On-Resistance Variation with Temperature

Typical Characteristics – Q1 N-CHANNEL (continued)

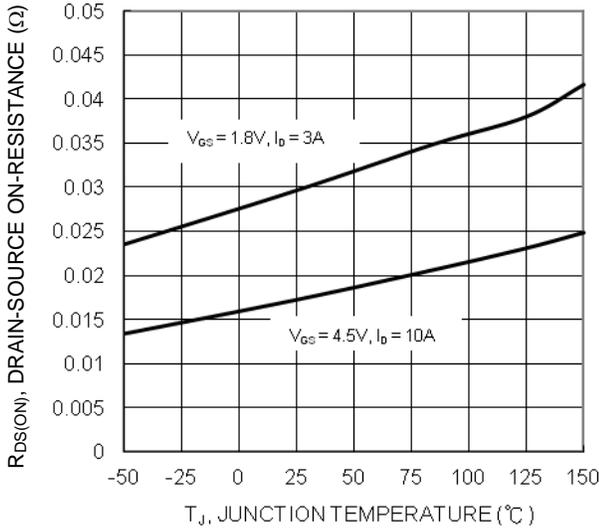


Figure 7 On-Resistance Variation with Temperature

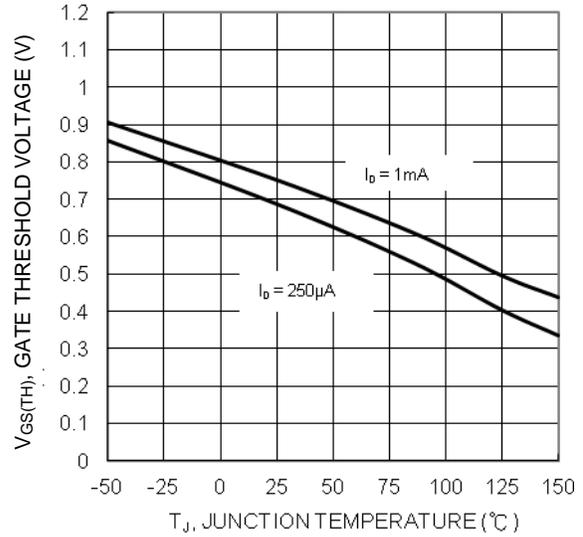


Figure 8 Gate Threshold Variation vs Junction Temperature

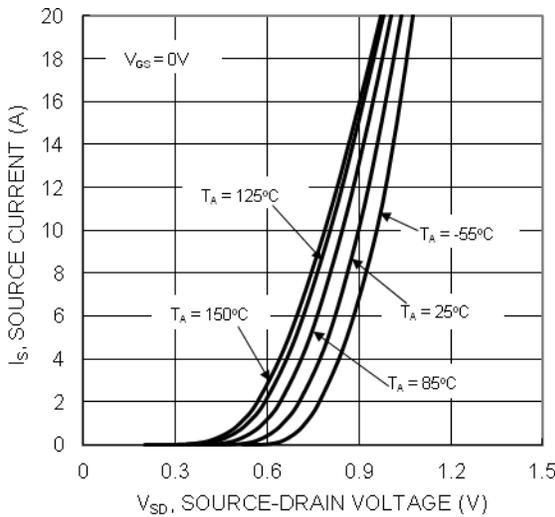


Figure 9 Diode Forward Voltage vs. Current

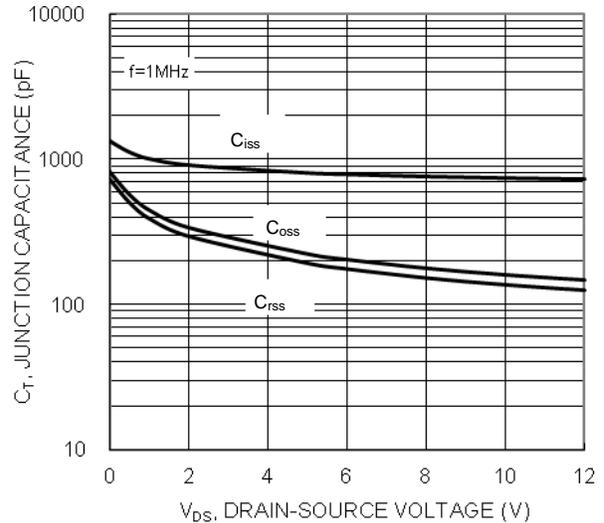


Figure 10 Typical Junction Capacitance

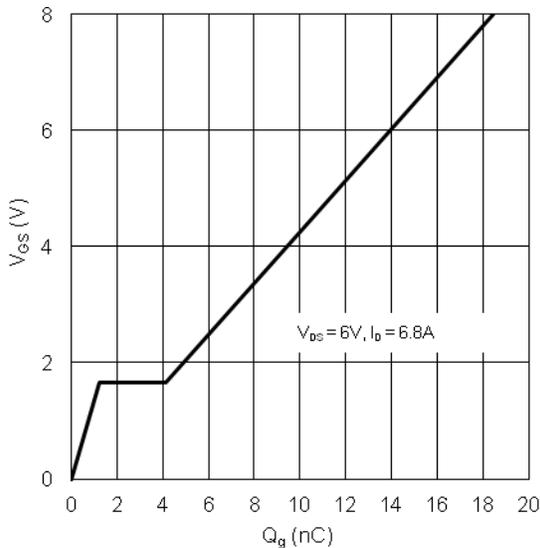


Figure 11 Gate Charge

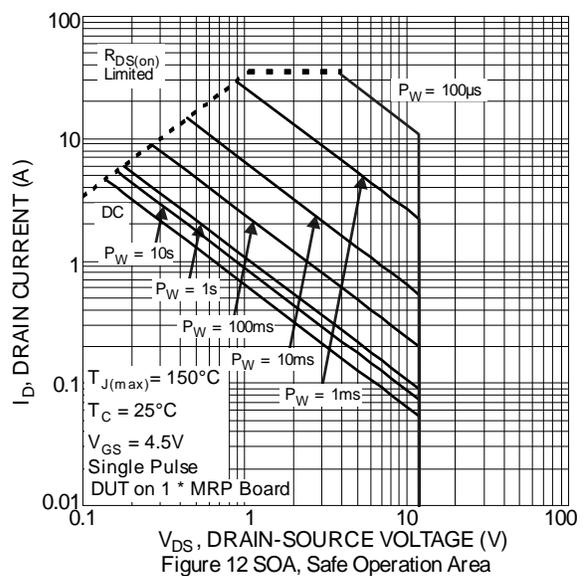


Figure 12 SOA, Safe Operation Area

Typical Characteristics – Q2 P-CHANNEL

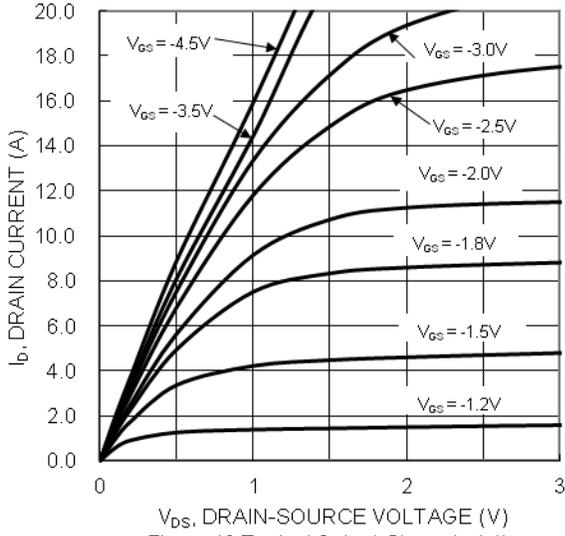


Figure 13 Typical Output Characteristic

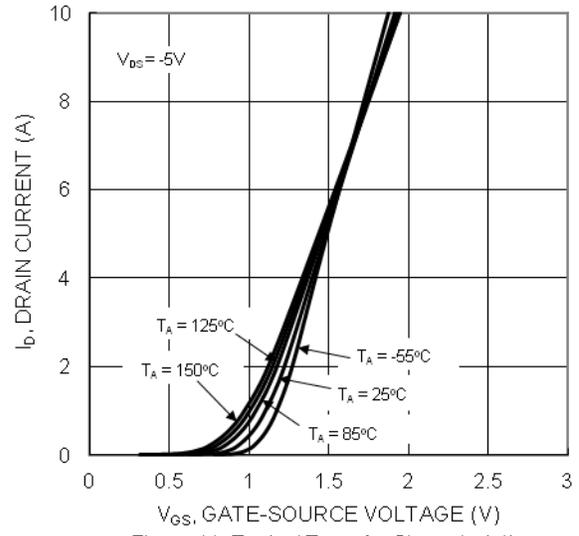


Figure 14 Typical Transfer Characteristic

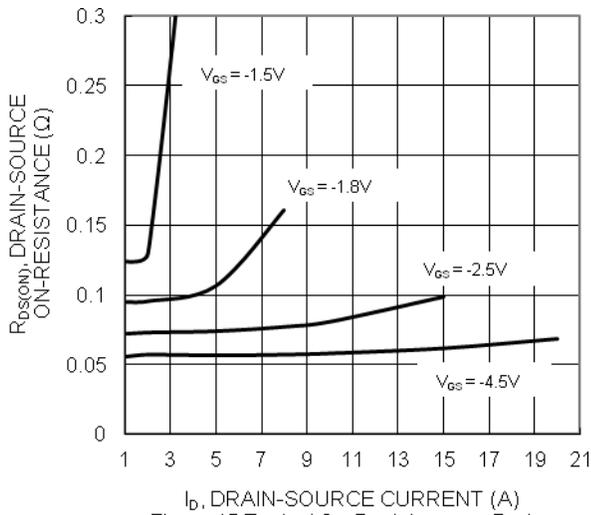


Figure 15 Typical On-Resistance vs Drain Current and Gate Voltage

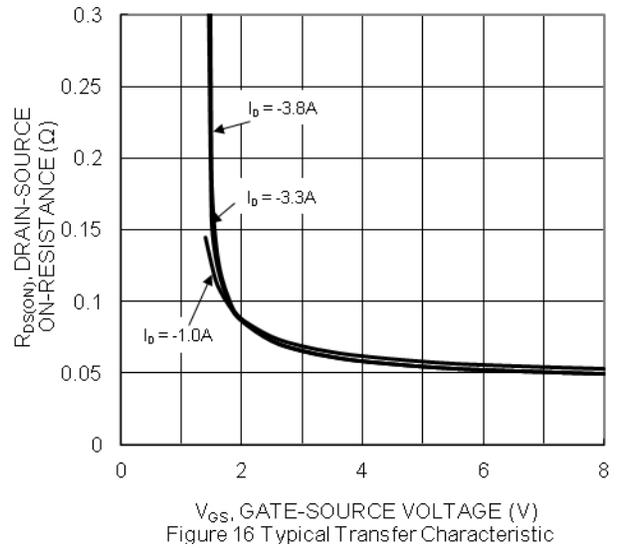


Figure 16 Typical Transfer Characteristic

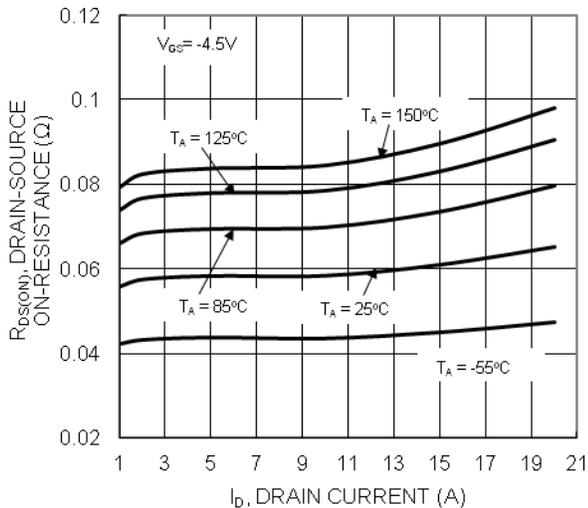


Figure 17 Typical On-Resistance vs Drain Current and Temperature

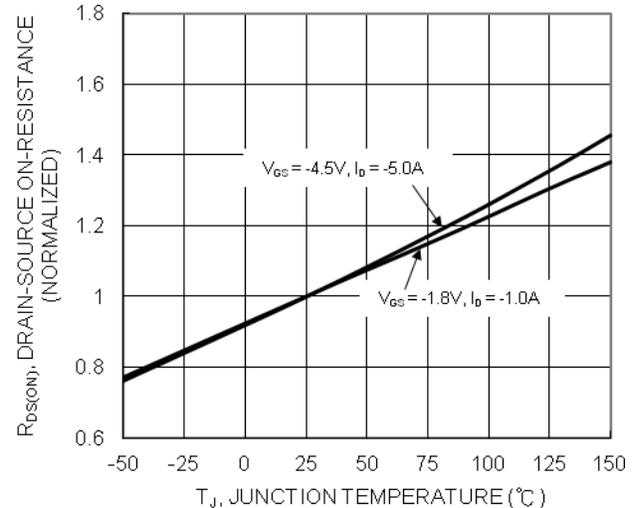
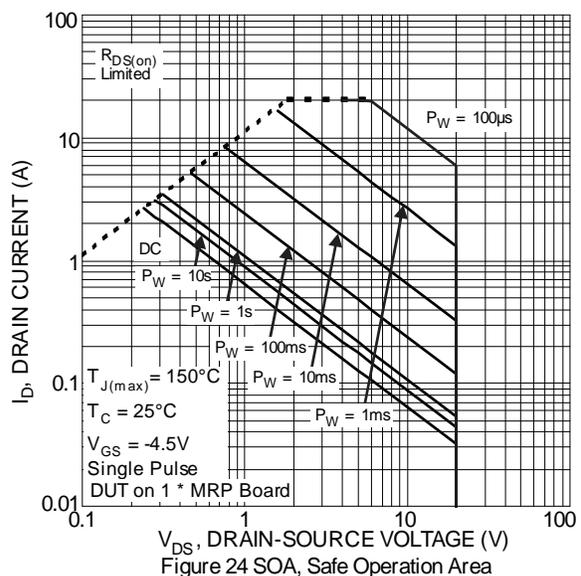
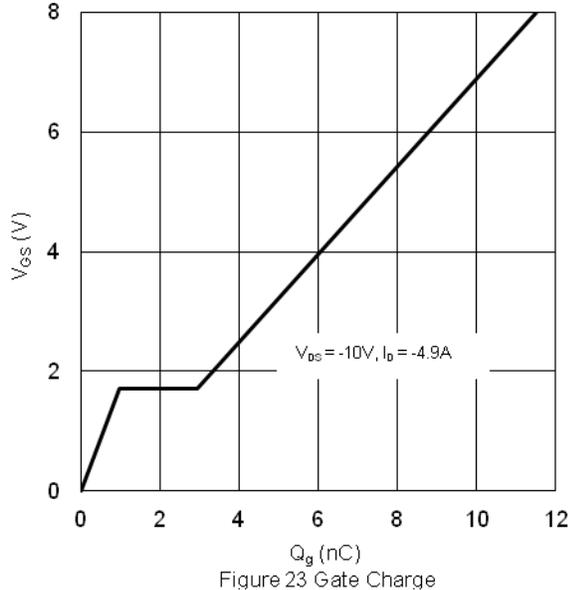
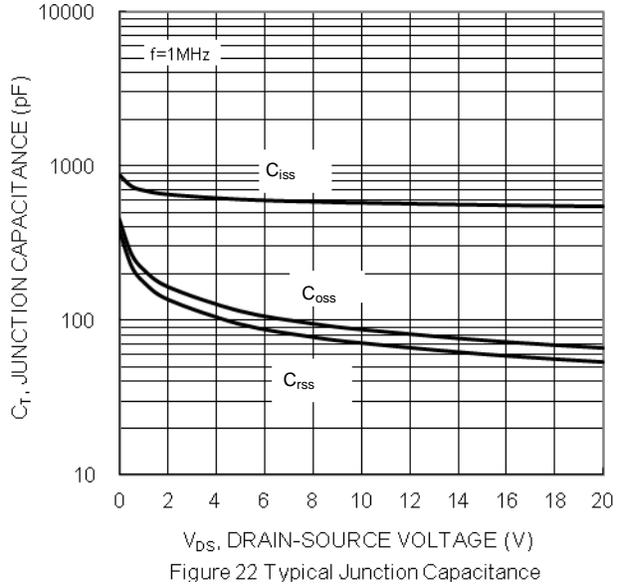
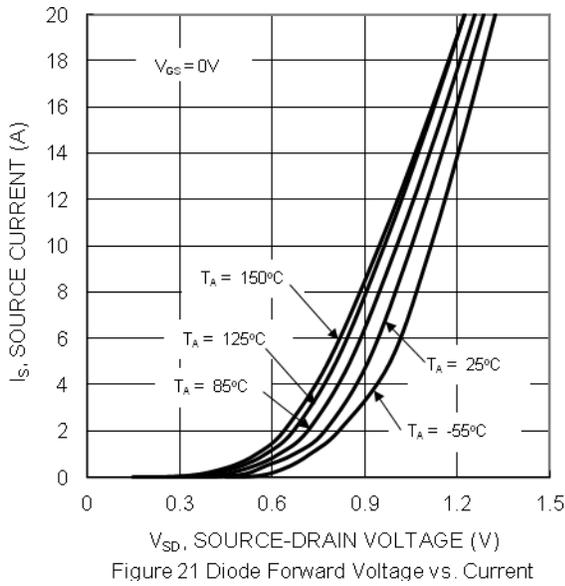
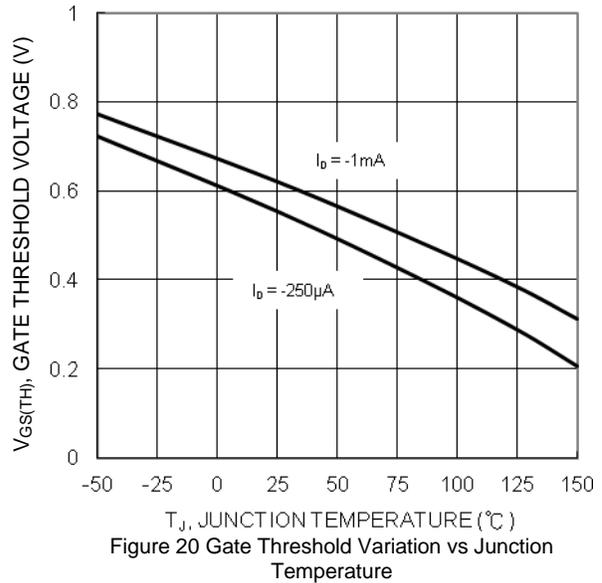
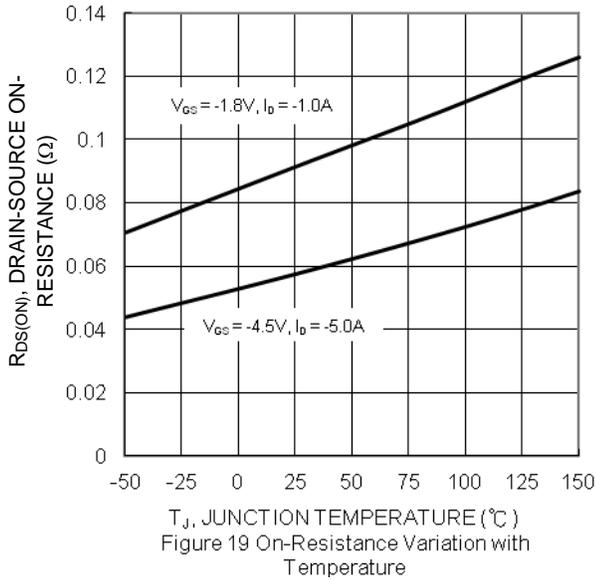
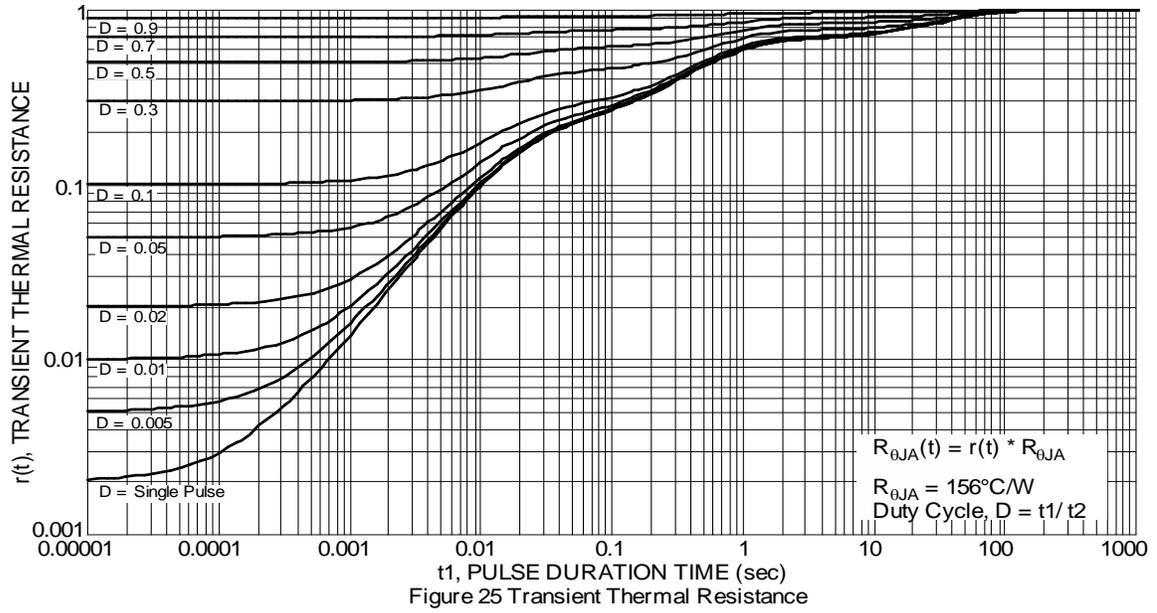


Figure 18 On-Resistance Variation with Temperature

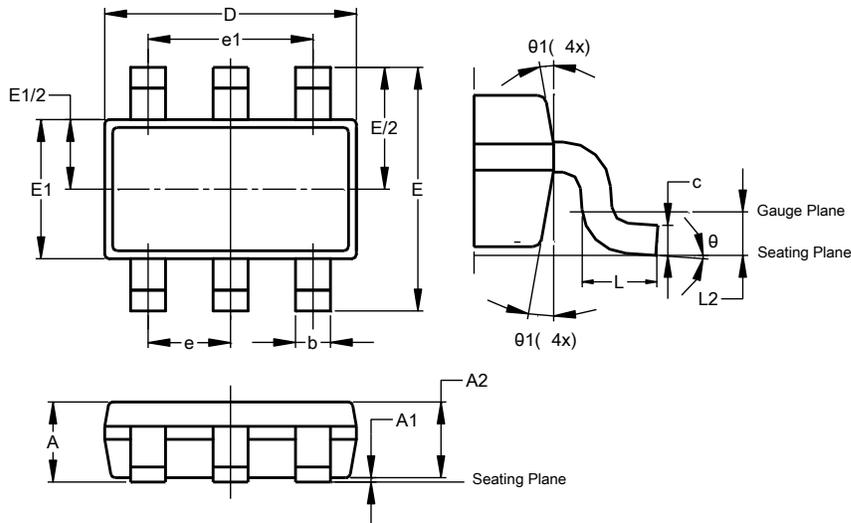
Typical Characteristics – Q2 P-CHANNEL (continued)





Package Outline Dimensions

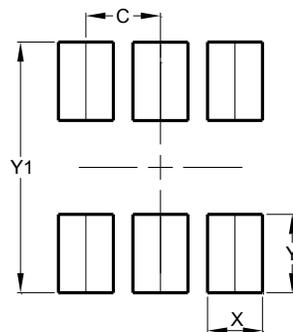
TSOT26



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°
θ_1	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout

TSOT26



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199