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

Device	$V_{(BR)DSS}$	$R_{DS(ON)}$ max	Package	I_D max T_A = +25°C
Q1	30V	55mΩ @ V_{GS} = 10V	TSOT26	3.8A
		65mΩ @ V_{GS} = 4.5V	TSOT26	3.6A
Q2	-30V	110mΩ @ V_{GS} = -10V	TSOT26	-2.5A
		142mΩ @ V_{GS} = -4.5V	TSOT26	-2.1A

Features

- Complementary MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

Description

This MOSFET has been 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.

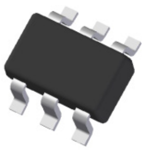
Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

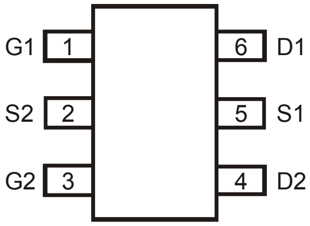
Mechanical Data

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.008 grams (approximate)

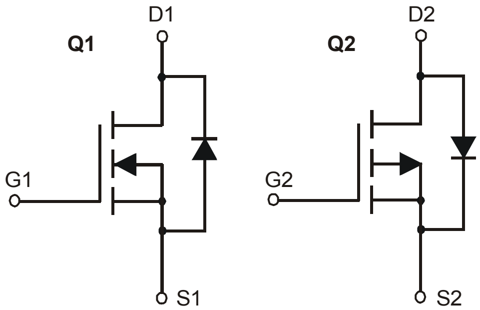
TSOT26



Top View



Top View



N-Channel P-Channel

Device Schematic

Maximum Ratings - Q1 and Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Q1	Q2	Units
Drain-Source Voltage			V_{DSS}	30	-30	V
Gate-Source Voltage			V_{GSS}	±12	±12	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	3.8 3.0	-2.5 -2	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	4.5 3.4	-3 -2.3	A
Maximum Body Diode Forward Current (Note 6)			I_S	1.5	-1.5	A
Pulsed Drain Current (Note 6)			I_{DM}	20	-15	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.85	W
	T_A = +70°C		0.54	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	147	°C/W
	t<10s		103	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.3	W
	T_A = +70°C		0.83	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	96	°C/W
	t<10s		67	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	36	
Operating and Storage Temperature Range		T_{J}, T_{STG}	-55 to +150	°C

Electrical Characteristics - Q1 (@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 @T_J = +25°C	I_{DSS}	-	-	1	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	1	1.5	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	34	55	mΩ	V_{GS} = 10V, I_D = 3.4A
		-	38	65		V_{GS} = 4.5V, I_D = 3A
			49	85		V_{GS} = 2.5V, I_D = 2A
Forward Transfer Admittance	$\lvert Y_{fs}\rvert$	-	6	-	S	V_{DS} = 5V, I_D = 3.4A
Diode Forward Voltage (Note 7)	V_{SD}	-	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	422	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	41	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	39	-	pF	
Gate resistance	R_g		1.26	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	5.4	-	nC	V_{GS} = 10V, V_{DS} = 15V, I_D = 3.1A
Total Gate Charge (V_{GS} = 10V)	Q_g		12.3	-	nC	
Gate-Source Charge	Q_{gs}	-	0.8	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.2	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	1.6	-	ns	V_{DS} = 15V, V_{GS} = 10V, R_L = 4.7Ω, R_G =3Ω,
Turn-On Rise Time	t_r	-	7.4	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	31.2	-	ns	
Turn-Off Fall Time	t_f	-	15.6	-	ns	

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 thermal vias to bottom layer 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 (@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 @T_J = +25°C	I_{DSS}	-	-	-1	μA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	-0.8	-1.2	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	70	110	mΩ	V_{GS} = -10V, I_D = -2.3A
		-	81	142		V_{GS} = -4.5V, I_D = -2A
			105	190		V_{GS} = -2.5V, I_D = -1A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	5.3	-	S	V_{DS} = -5V, I_D = -2.3A
Diode Forward Voltage (Note 7)	V_{SD}	-	-0.8	-1.0	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	541	-	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	46	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	43	-	pF	
Gate resistance	R_g	-	16.9	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	-	6.5	-	nC	V_{GS} = -10V, V_{DS} = -15V, I_D = -2.3A
Total Gate Charge (V_{GS} = -10V)	Q_g		13.8	-	nC	
Gate-Source Charge	Q_{gs}	-	1.0	-	nC	
Gate-Drain Charge	Q_{gd}	-	1.6	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	1.7	-	ns	V_{DS} = -15V, V_{GS} = -10V, R_L = 6Ω, R_G = 3Ω,
Turn-On Rise Time	t_r	-	4.6	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	18.3	-	ns	
Turn-Off Fall Time	t_f	-	2.2	-	ns	

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

N Channel - Q1

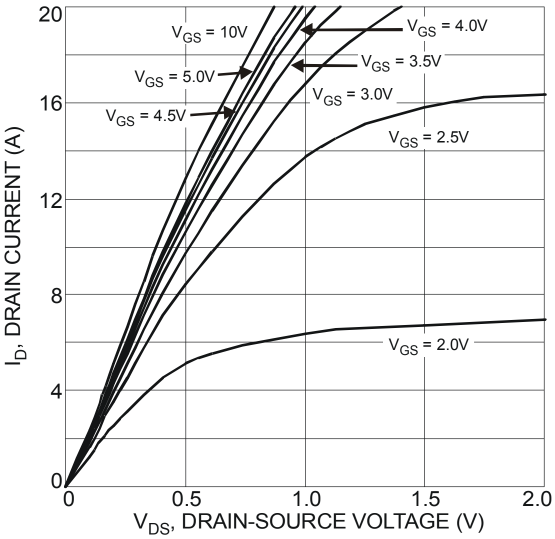


Fig. 1 Typical Output Characteristic

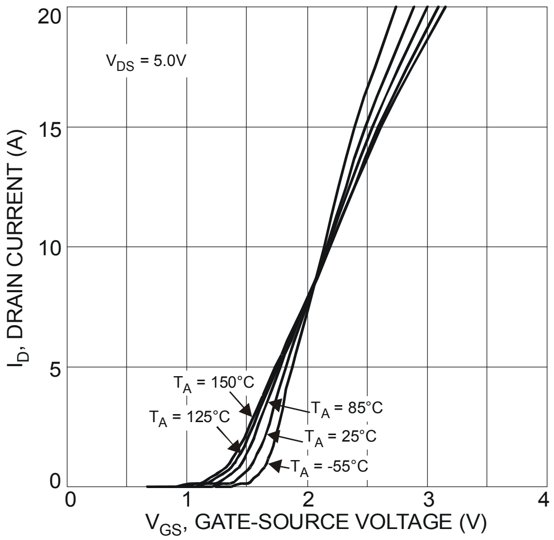


Fig. 2 Typical Transfer Characteristics

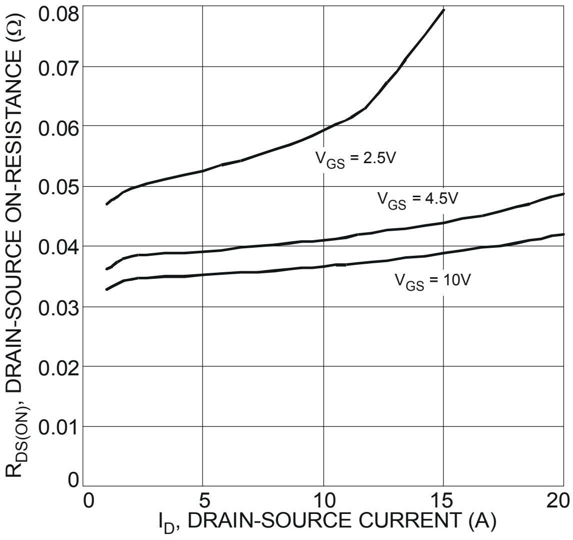


Fig. 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

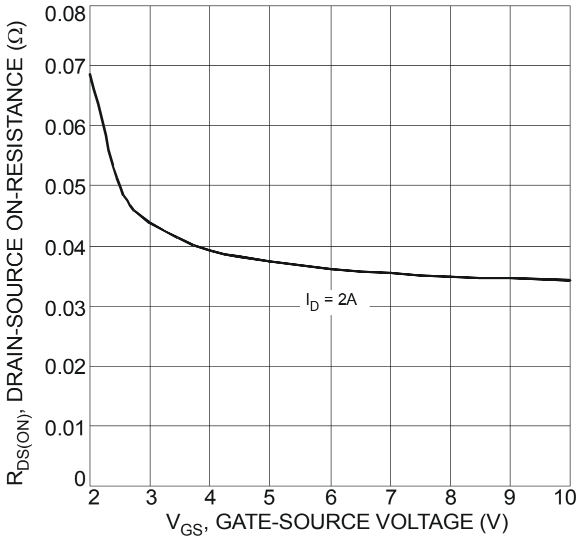


Fig. 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

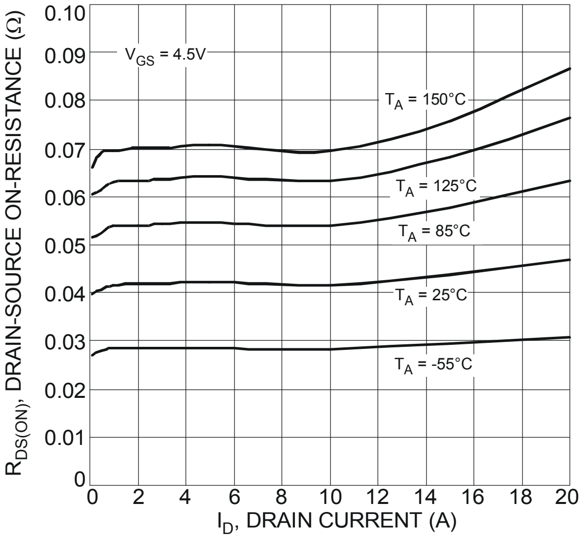


Fig. 5 Typical On-Resistance vs.
Drain Current and Temperature

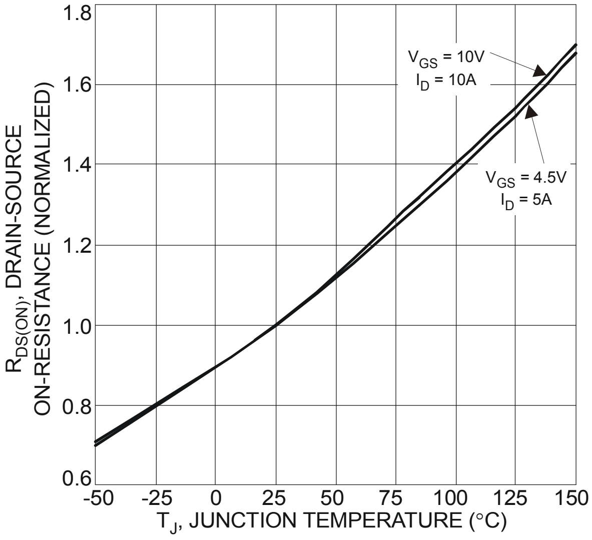


Fig. 6 On-Resistance Variation with Temperature

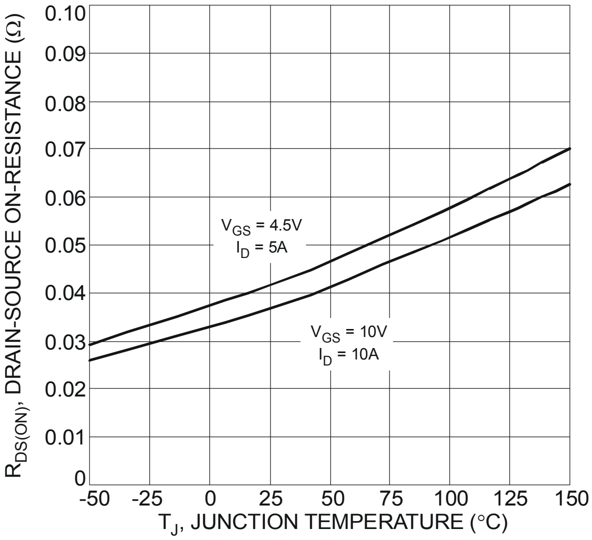


Fig. 7 On-Resistance Variation with Temperature

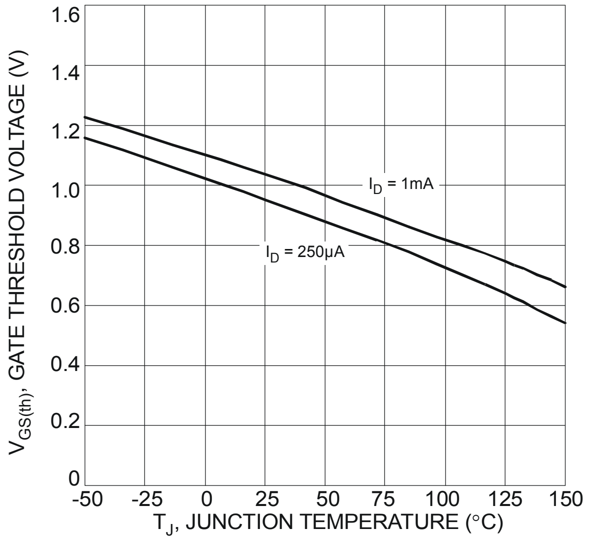


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

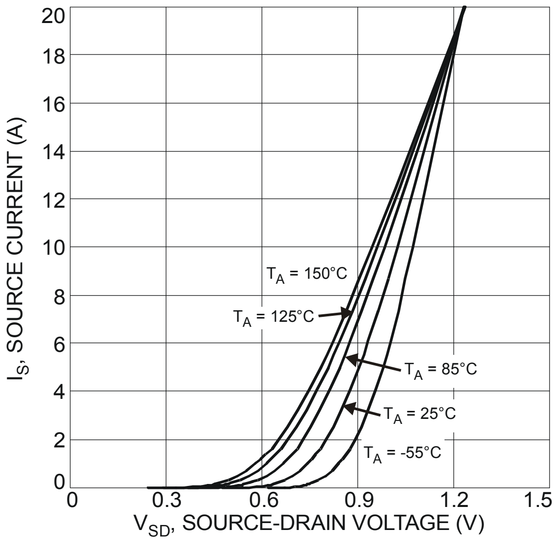


Fig. 9 Diode Forward Voltage vs. Current

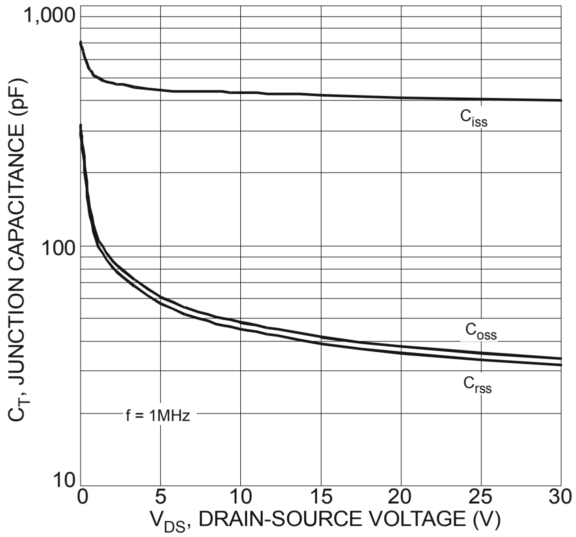


Fig. 10 Typical Junction Capacitance

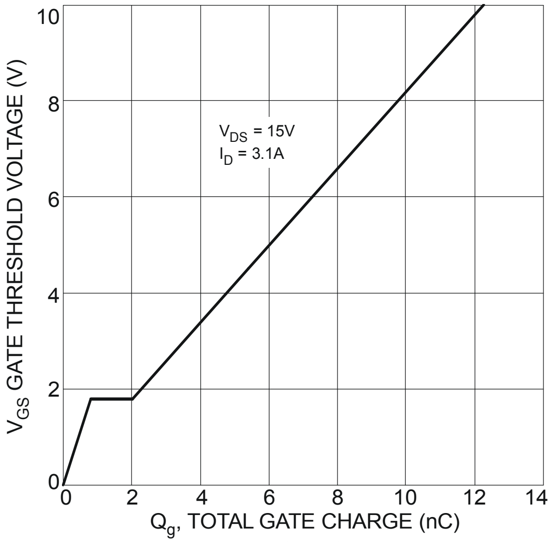


Fig. 11 Gate Charge

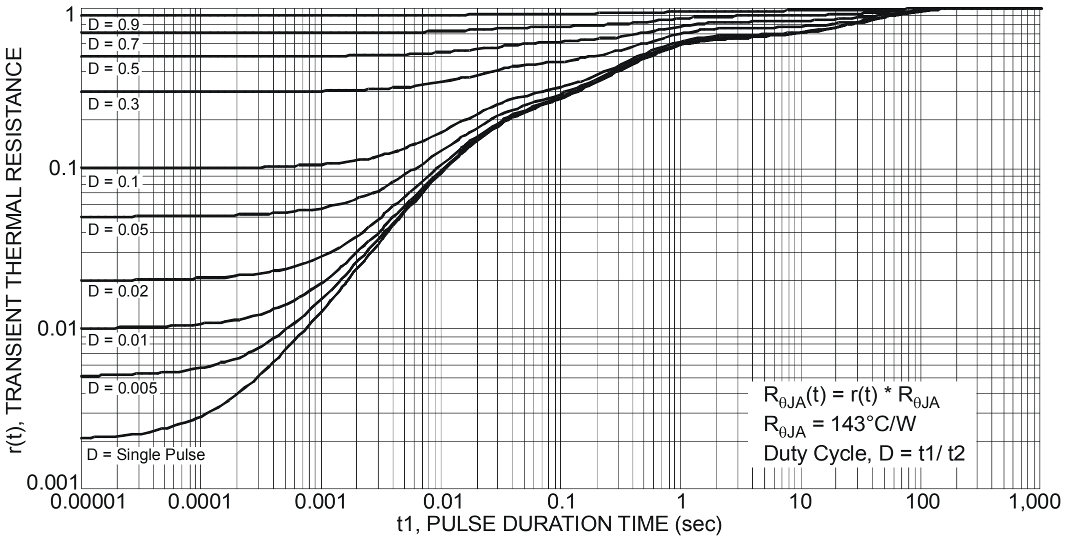


Fig. 12 Transient Thermal Resistance

P Channel - Q2

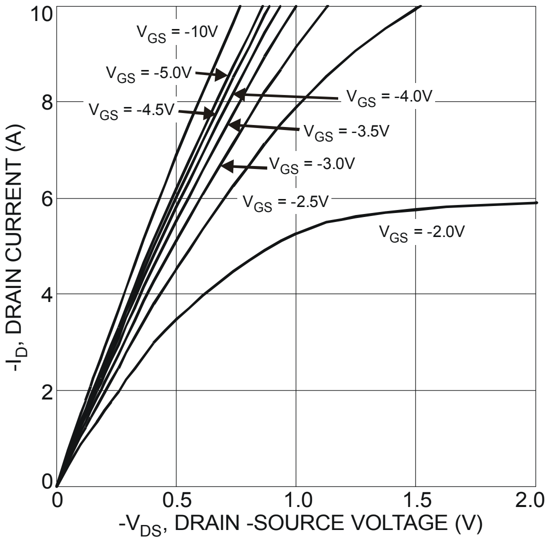


Fig. 13 Typical Output Characteristics

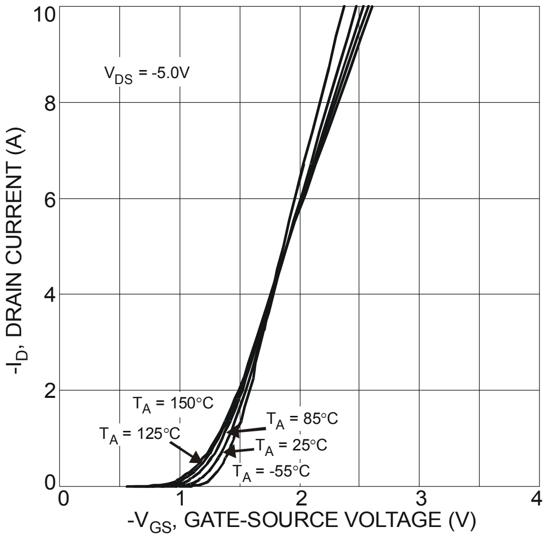


Fig. 14 Typical Transfer Characteristics

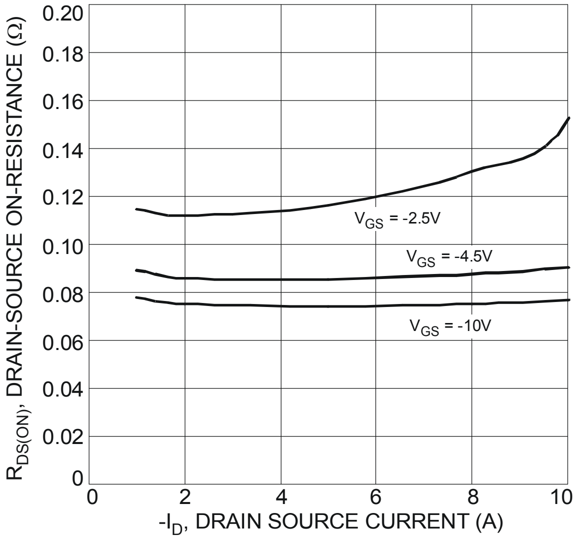


Fig. 15 Typical On-Resistance vs.
Drain Current and Gate Voltage

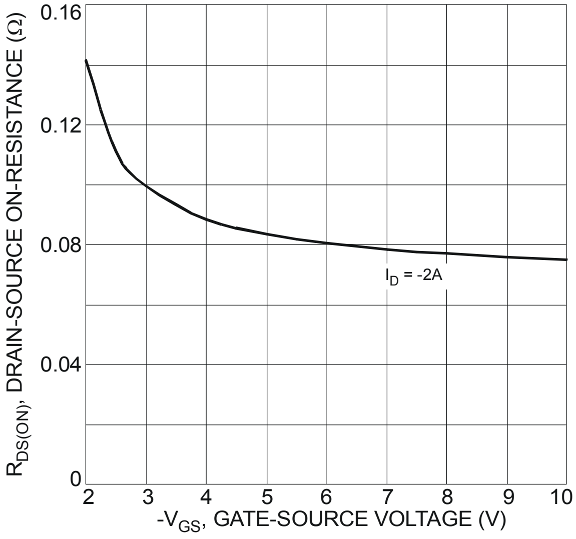


Fig. 16 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

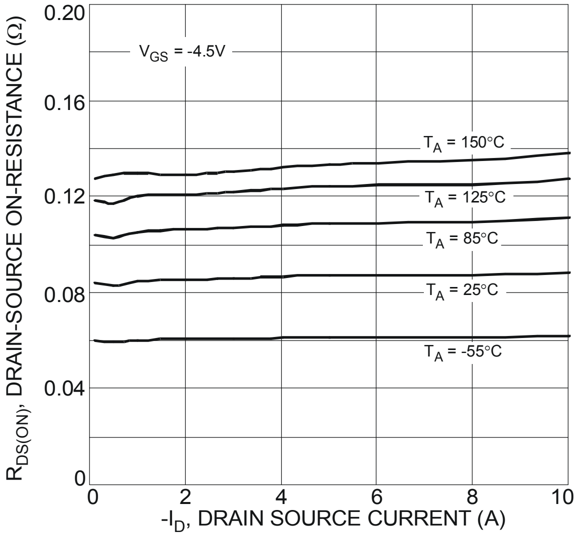


Fig. 17 Typical On-Resistance vs.
Drain Current and Temperature

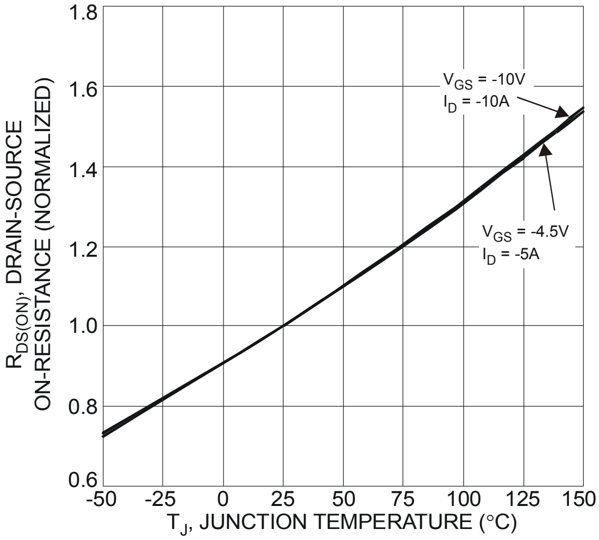


Fig. 18 On-Resistance Variation with Temperature

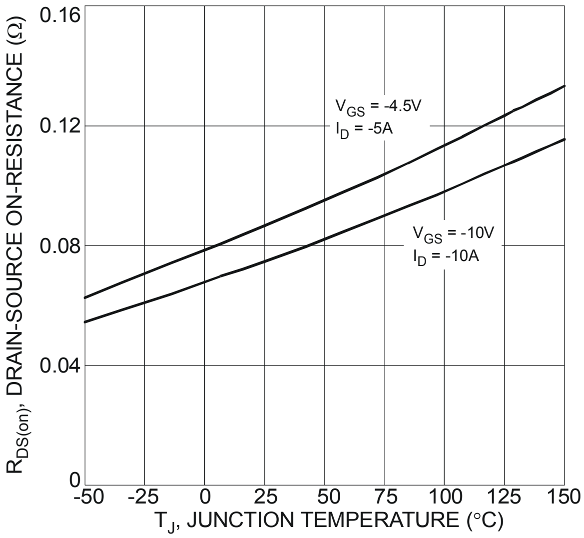


Fig. 19 On-Resistance Variation with Temperature

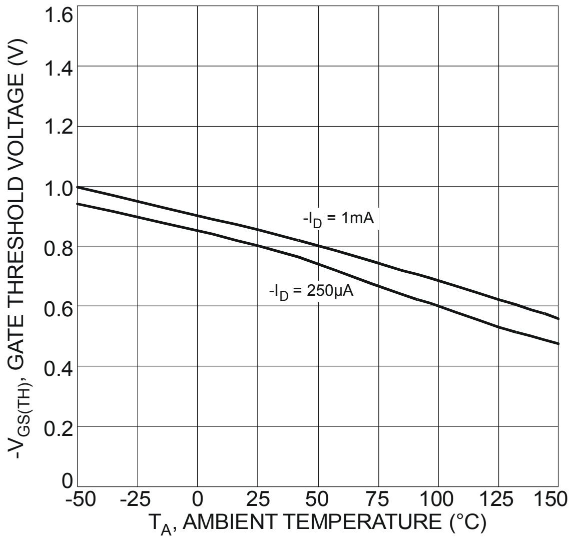


Fig. 20 Gate Threshold Variation vs. Ambient Temperature

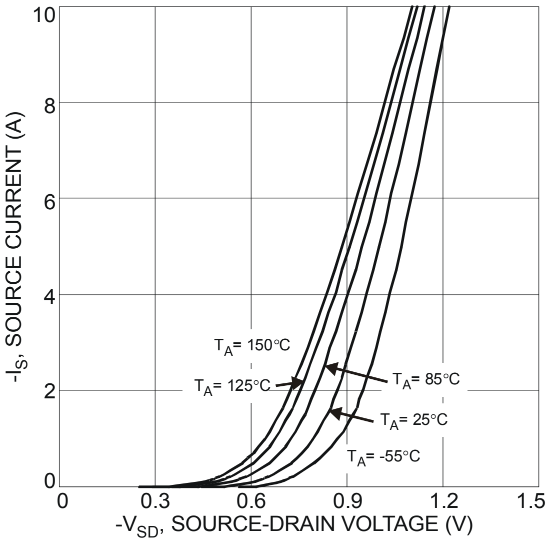


Fig. 21 Diode Forward Voltage vs. Current

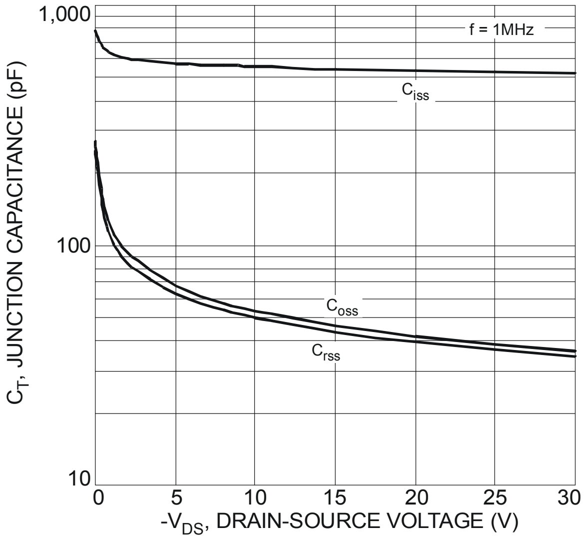


Fig. 22 Typical Junction Capacitance

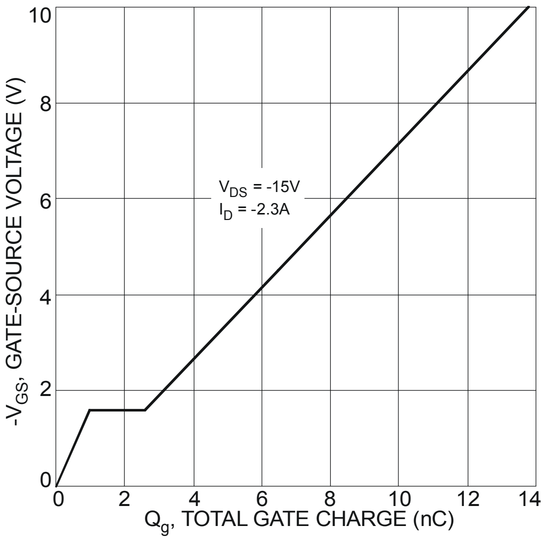


Fig. 23 Gate-Charge Characteristics

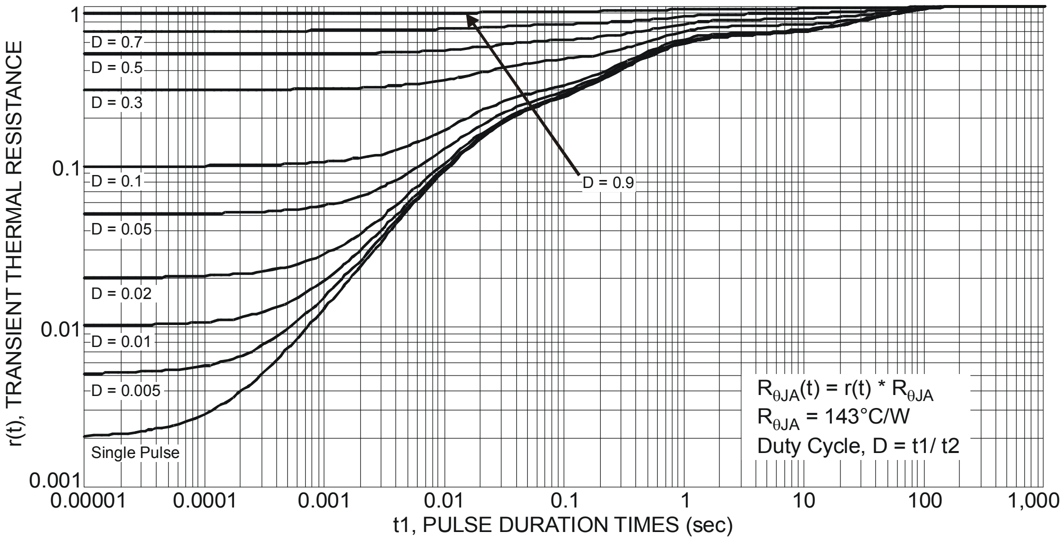
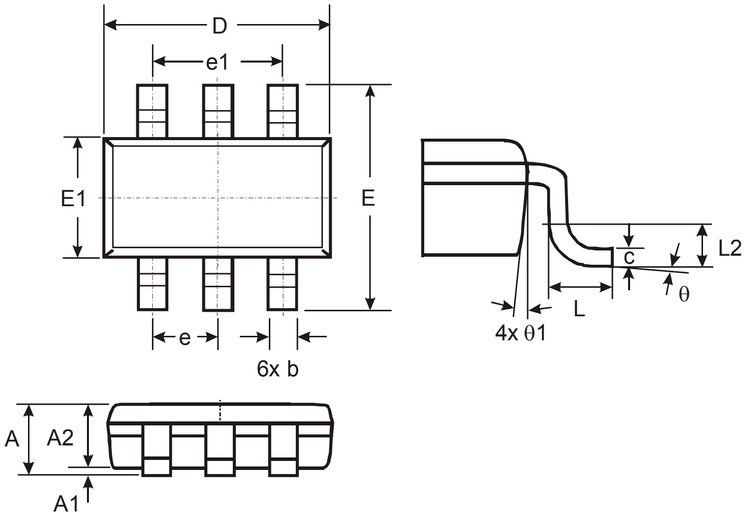


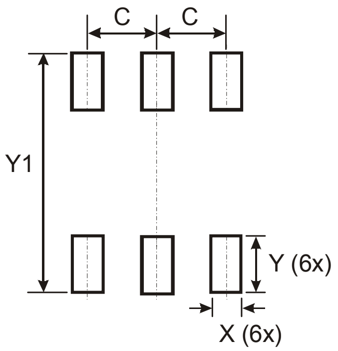
Fig. 24 Transient Thermal Resistance

Package Outline Dimensions



TSOT26			
Dim	**Min**	**Max**	**Typ**
A	–	1.00	–
A1	0.01	0.10	–
A2	0.84	0.90	–
D	–	–	2.90
E	–	–	2.80
E1	–	–	1.60
b	0.30	0.45	–
c	0.12	0.20	–
e	–	–	0.95
e1	–	–	1.90
L	0.30	0.50	
L2	–	–	0.25
θ	0°	8°	4°
θ1	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout



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