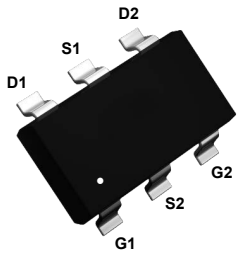
GOOD-ARK SEMICONDUCTOR

SSF6602

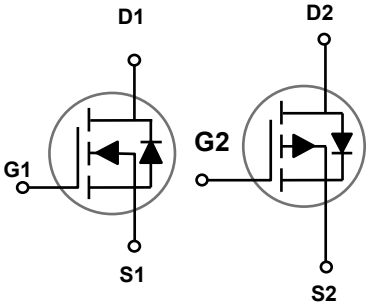
30V N-Channel + P-Channel Complementary MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	30V	-30V
$R_{DS(on)MAX}$	58mΩ@10V	100mΩ@-10V
	95mΩ@4.5V	150mΩ@-4.5V
I_D	3.5A	-2.7A



SOT-23-6L



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for battery operated systems, load switching, power converters and other general purpose applications
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The SSF6602 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A=25°C	I_D	3.5	-2.7	A
	T_A=70°C		3	-2.1	
Pulsed Drain Current [1]		I_{DM}	20	-15	A
Maximum Power Dissipation	T_A=25°C	P_D	1.2		W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To +150	-55 To +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient [2]	$R_{\theta JA}$	N-Ch	104	°C/W
Thermal Resistance, Junction-to-Ambient [2]	$R_{\theta JA}$	P-Ch	104	°C/W

N-Channel Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	1.5	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.5A	-	36	58	mΩ
		V_{GS}=4.5V, I_D=2A	-	60	95	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=3.1A	-	4	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	210	-	PF
Output Capacitance	C_{oss}		-	35	-	PF
Reverse Transfer Capacitance	C_{rss}		-	23	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=3Ω V_{GS}=10V,R_{GEN}=6Ω	-	4.5	-	nS
Turn-on Rise Time	t_r		-	1.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	18.5	-	nS
Turn-Off Fall Time	t_f		-	15.5	-	nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=3.5A, V_{GS}=10V	-	5	-	nC
Gate-Source Charge	Q_{gs}		-	0.55	-	nC
Gate-Drain Charge	Q_{gd}		-	1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V,I_S=3.5A	-	0.8	1.2	V
Diode Forward Current[2]	I_S		-	-	3.5	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

P-Channel Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.7A	-	69	100	mΩ
		V_{GS}=-4.5V, I_D=-2A	-	110	150	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-2.7A		2	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	199	-	PF
Output Capacitance	C_{oss}		-	47	-	PF
Reverse Transfer Capacitance	C_{rss}		-	28	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,R_L=15Ω V_{GS}=-10V,R_{GEN}=6Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	12	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-2.7A,V_{GS}=-10V	-	5	-	nC
Gate-Source Charge	Q_{gs}		-	0.7	-	nC
Gate-Drain Charge	Q_{gd}		-	1.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V,I_S=-2.7A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

N-Channel Typical Electrical and Thermal Characteristic Curves

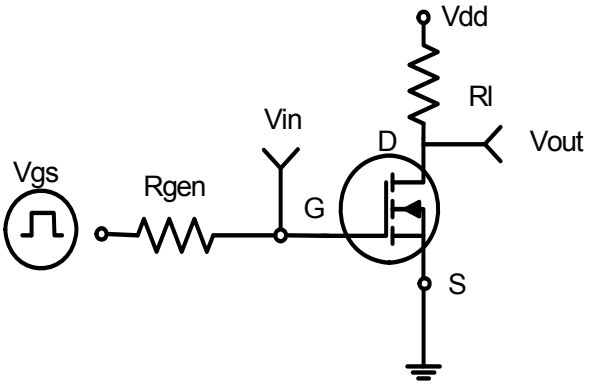


Figure 1 Switching Test Circuit

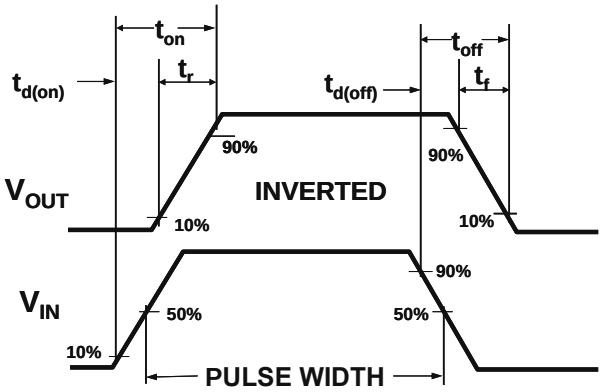


Figure 2 Switching Waveforms

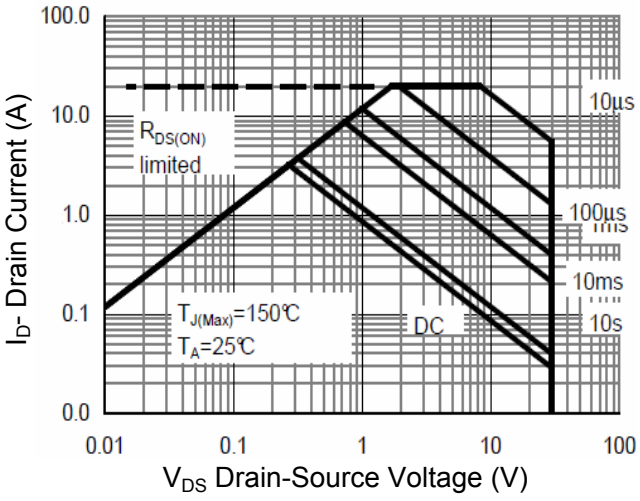


Figure 3 Safe Operation Area

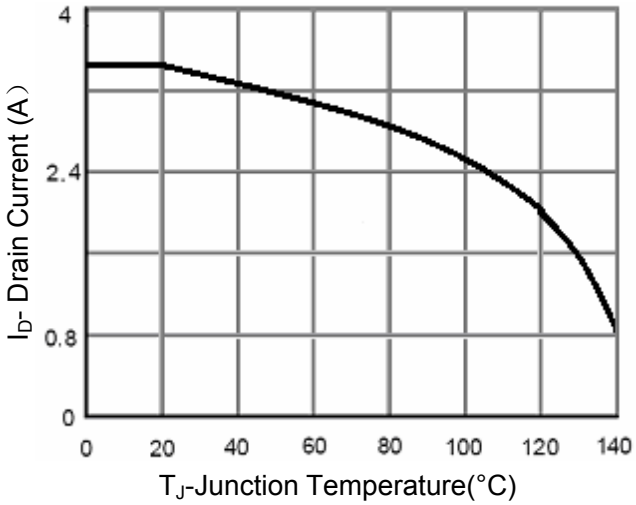


Figure 4 Drain Current

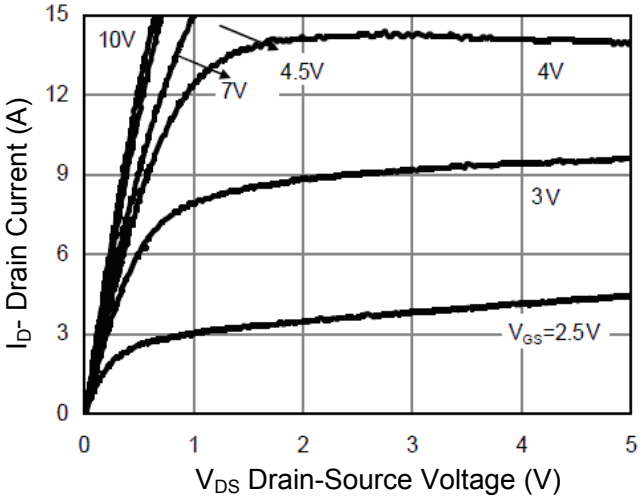


Figure 5 Output Characteristics

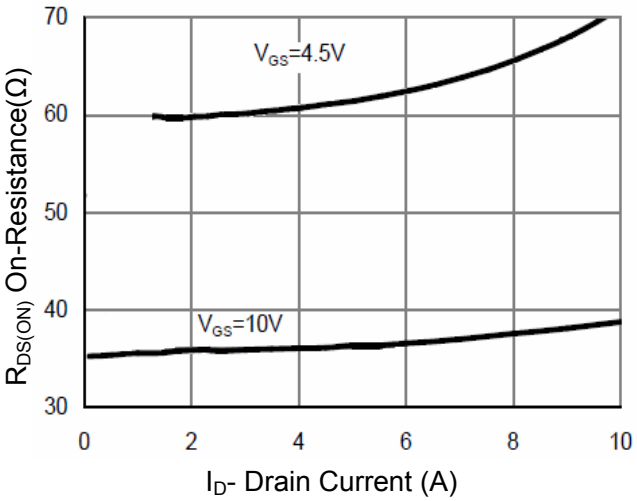


Figure 6 Drain-Source On-Resistance

N-Channel Typical Electrical and Thermal Characteristic Curves

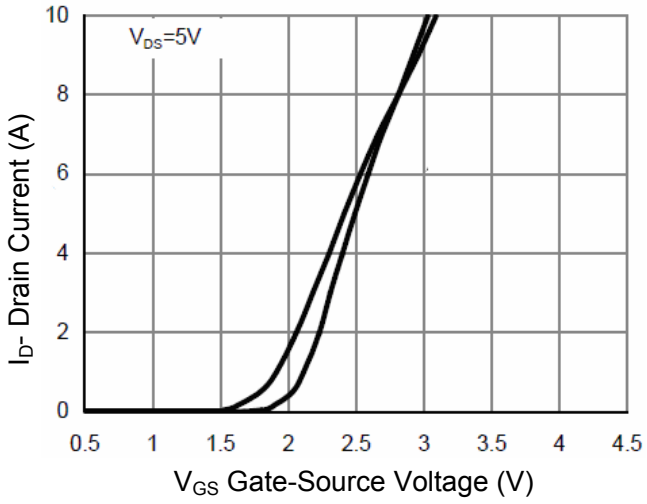


Figure 7 Transfer Characteristics

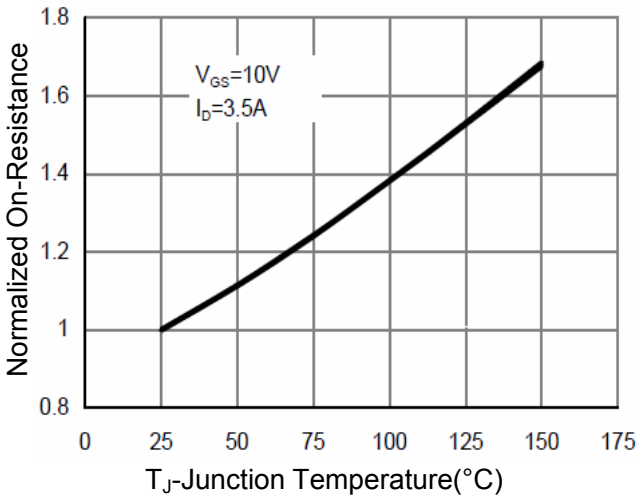


Figure 8 Drain-Source On-Resistance

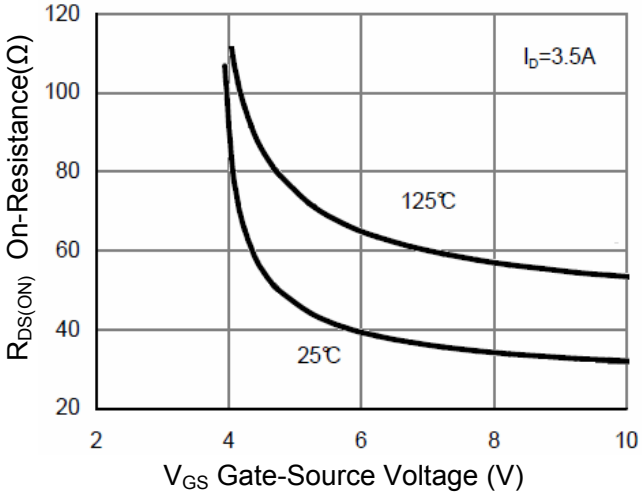


Figure 9 $R_{DS(ON)}$ vs V_{GS}

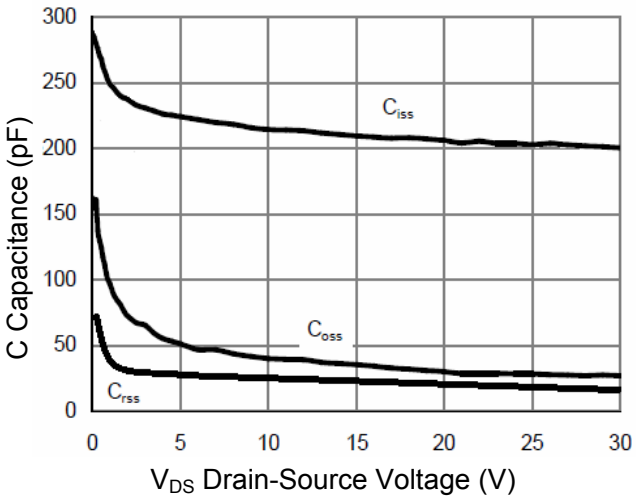


Figure 10 Capacitance vs V_{DS}

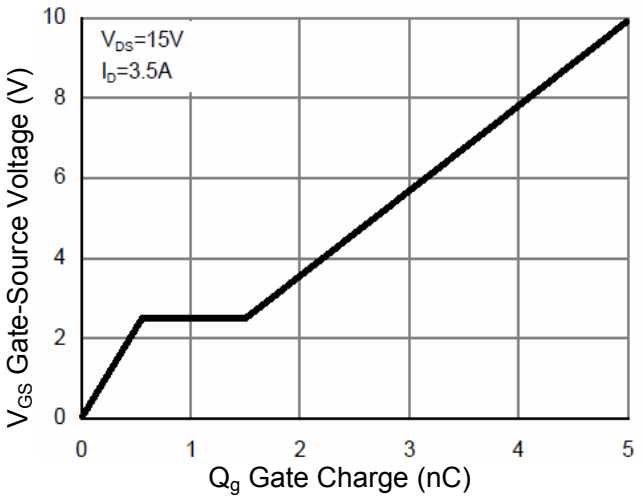


Figure 11 Gate Charge

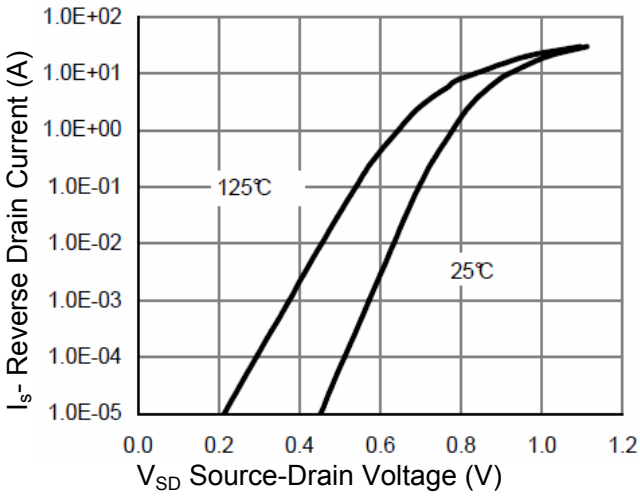


Figure 12 Source- Drain Diode Forward

N-Channel Typical Electrical and Thermal Characteristic Curves

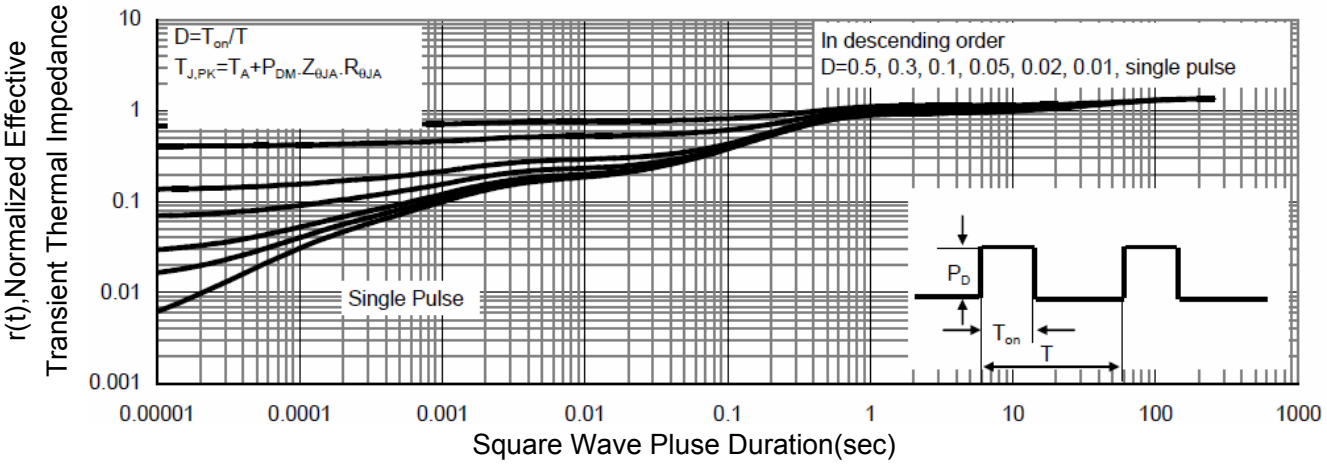


Figure 13 Normalized Maximum Transient Thermal Impedance

P-Channel Typical Electrical and Thermal Characteristic Curves

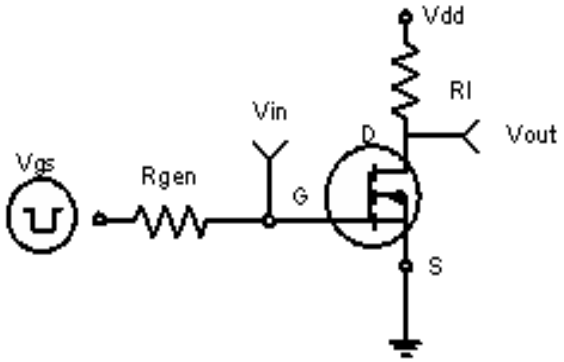


Figure 1 Switching Test Circuit

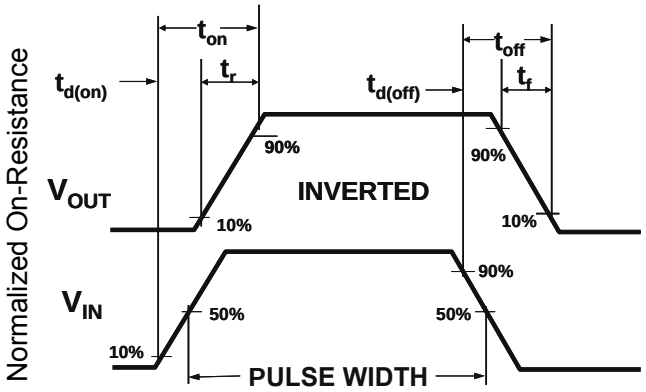


Figure 2 Switching Waveforms

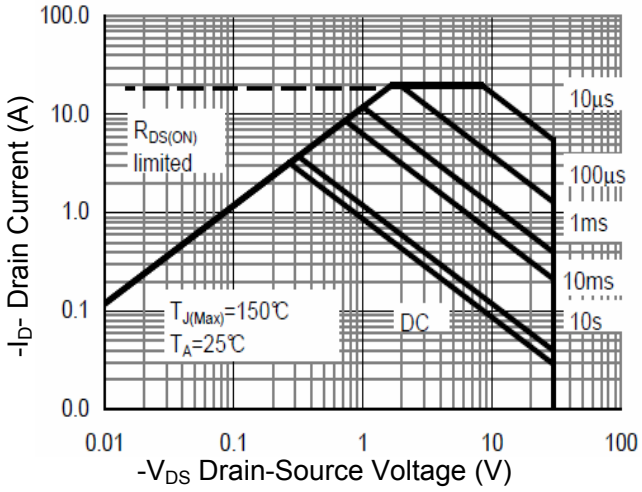


Figure 3 Safe Operation Area

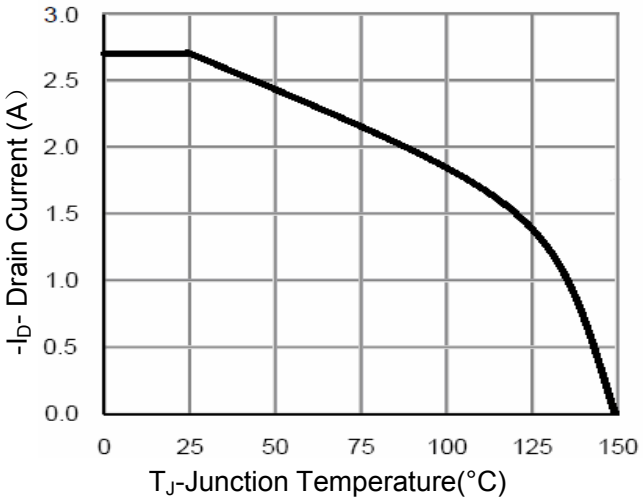


Figure 4 Drain Current

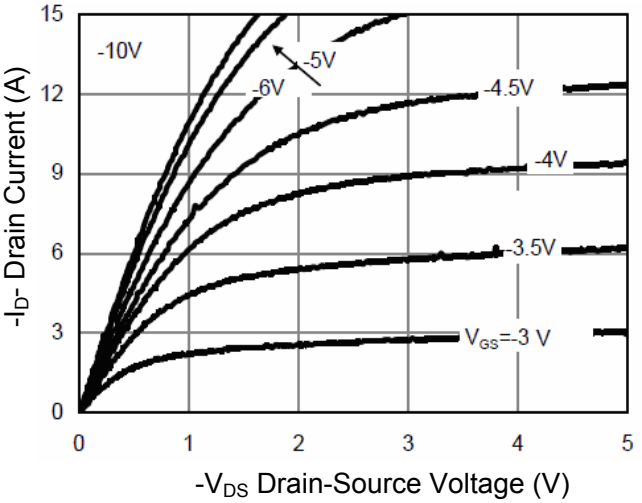


Figure 5 Output Characteristics

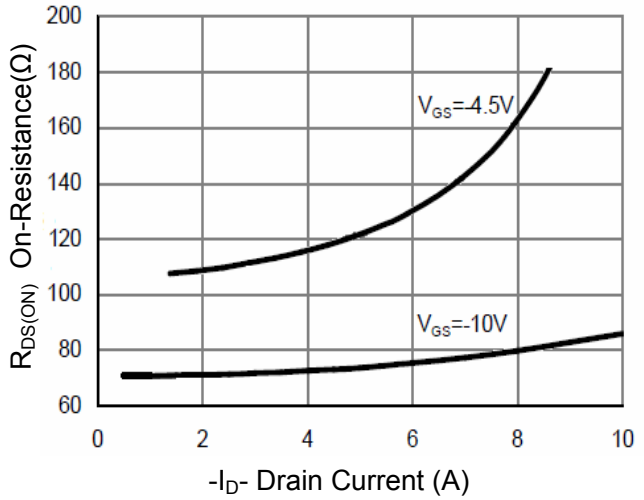


Figure 6 Drain-Source On-Resistance

P-Channel Typical Electrical and Thermal Characteristic Curves

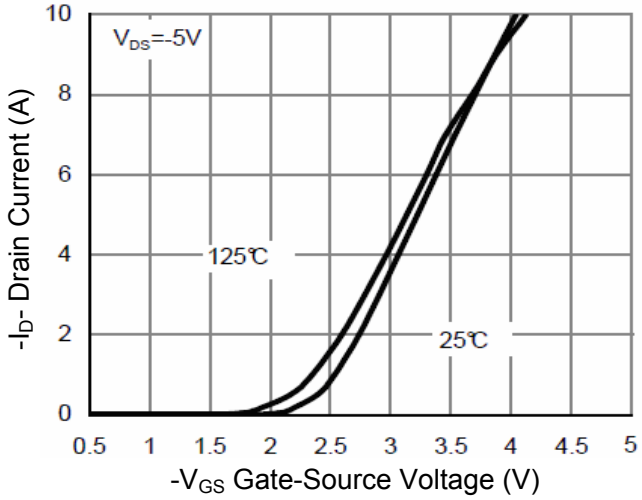


Figure 7 Transfer Characteristics

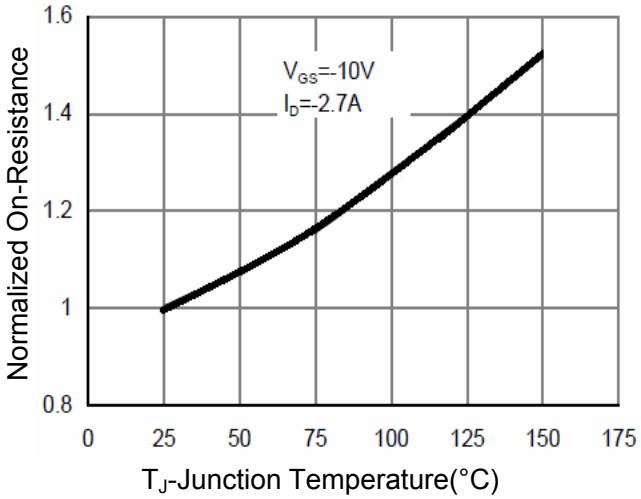


Figure 8 Drain-Source On-Resistance

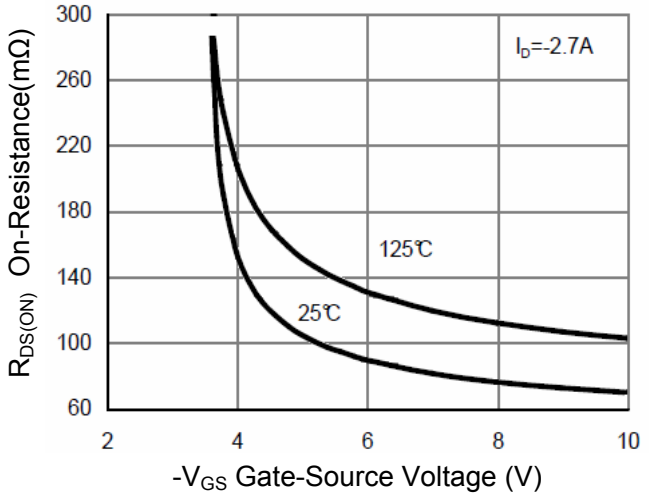


Figure 9 $R_{DS(ON)}$ vs V_{GS}

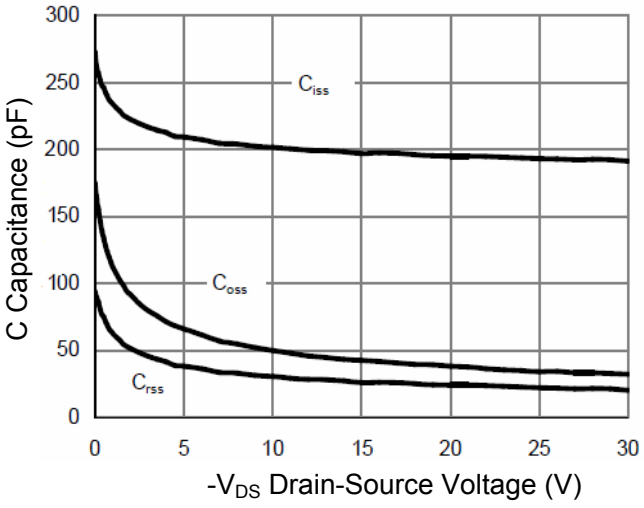


Figure 10 Capacitance vs V_{DS}

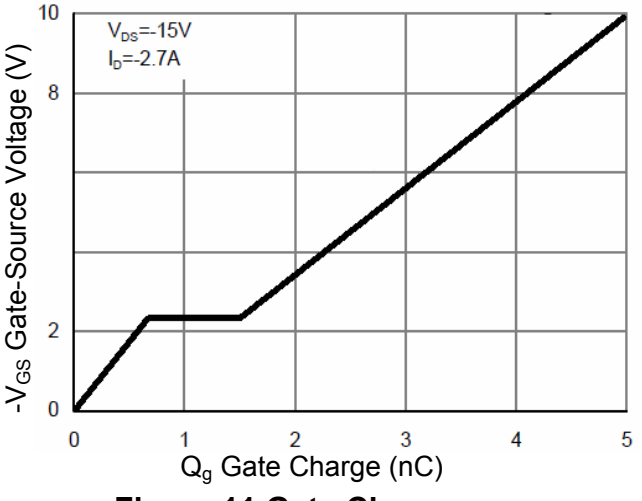


Figure 11 Gate Charge

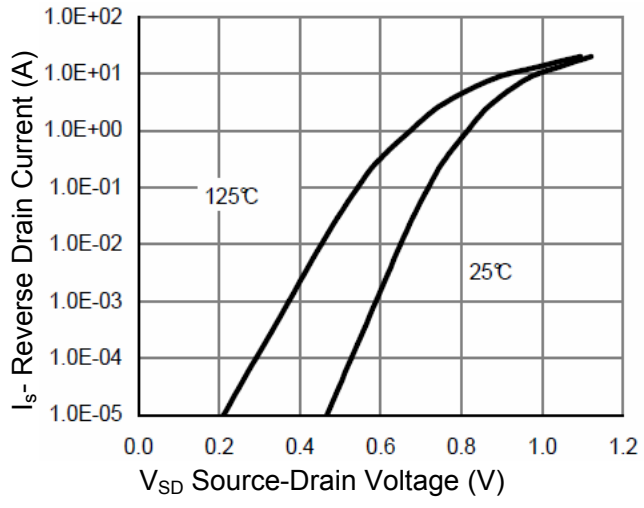


Figure 12 Source- Drain Diode Forward

P-Channel Typical Electrical and Thermal Characteristic Curves

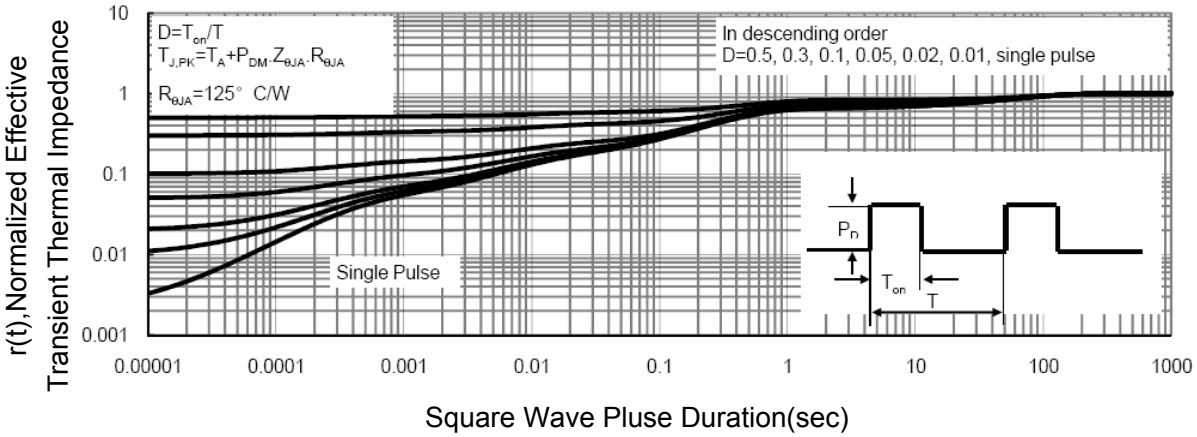
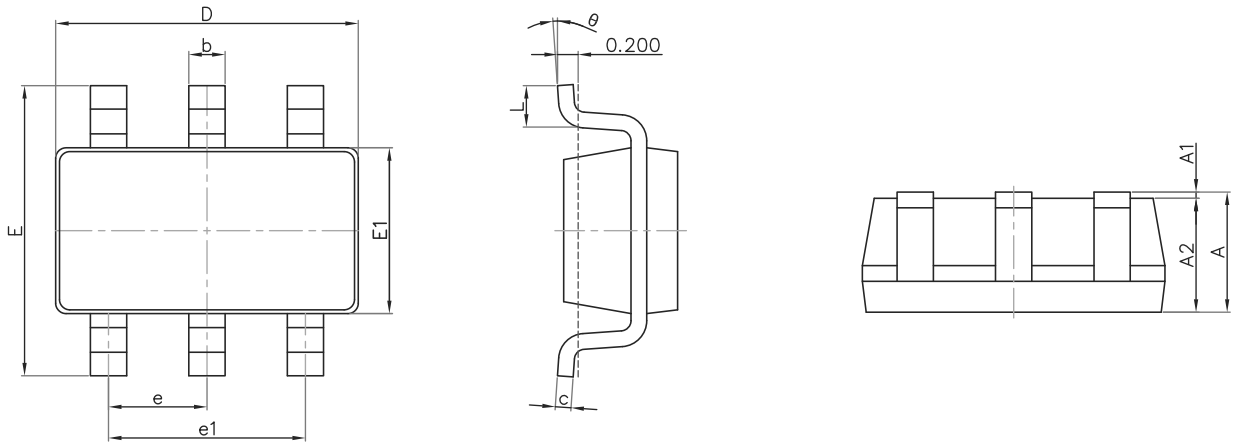


Figure 13 Normalized Maximum Transient Thermal Impedance

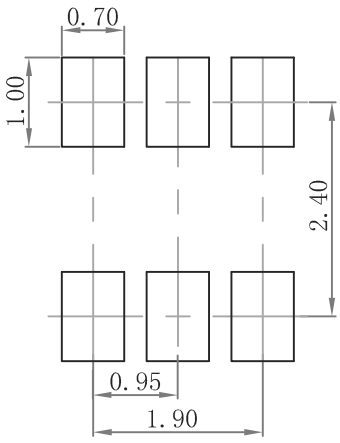
Package Outline Dimensions

SOT-23-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.