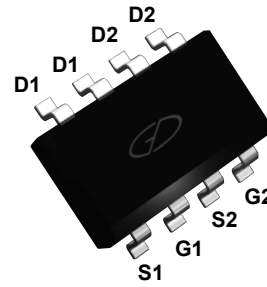
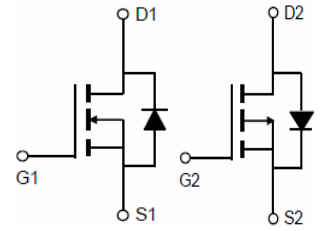


Main Product Characteristics

$V_{(BR)DSS}$	20V	-20V
$R_{DS(on)MAX}$	14mΩ@4.5V	45mΩ@-4.5V
	18mΩ@2.5V	60mΩ@-2.5V
I_D	10A	-6A



SOP-8



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 SSFQ1006S 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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	20	-20	V
Gate-Source Voltage		V_{GS}	± 12	± 12	V
Continuous Drain Current	$T_A=25^\circ\text{C}$	I_D	10	-6	A
	$T_A=70^\circ\text{C}$		8	-4.8	
Pulsed Drain Current ¹		I_{DM}	40	-30	A
Maximum Power Dissipation	$T_A=25^\circ\text{C}$	P_D	2.0	2.0	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To +150	-55 To +150	$^\circ\text{C}$

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient ²	$R_{\theta JA}$	N-Ch	62.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient ²	$R_{\theta JA}$	P-Ch	62.5	$^\circ\text{C/W}$

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	20	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
On Characteristics³						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.5	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =10A	-	12	14	mΩ
		V _{GS} =2.5V, I _D =5A	-	13.5	18	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =10A	10	-	-	S
Dynamic Characteristics⁴						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1.0MHz	-	691	-	PF
Output Capacitance	C _{oss}		-	128	-	PF
Reverse Transfer Capacitance	C _{rss}		-	115	-	PF
Switching Characteristics⁴						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, R _L =2Ω V _{GS} =4.5V, R _{GEN} =3Ω	-	9	-	nS
Turn-on Rise Time	t _r		-	13	-	nS
Turn-Off Delay Time	t _{d(off)}		-	14.5	-	nS
Turn-Off Fall Time	t _f		-	3.2	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =10A, V _{GS} =4.5V	-	10.2	-	nC
Gate-Source Charge	Q _{gs}		-	1.1	-	nC
Gate-Drain Charge	Q _{gd}		-	3.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} =0V, I _S =10A	-	0.8	1.2	V

P-Channel Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.7	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-6A$	-	34	45	m Ω
		$V_{GS}=-2.5V, I_D=-5A$	-	44	60	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-6A$	6	-	-	S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=-10V, V_{GS}=0V,$ $F=1.0MHz$	-	550	-	PF
Output Capacitance	C_{OSS}		-	93	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	64	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=5\Omega$ $V_{GS}=-4.5V, R_{GEN}=6\Omega$	-	7	-	nS
Turn-on Rise Time	t_r		-	13	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	12	-	nS
Turn-Off Fall Time	t_f		-	3	-	nS
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-6A$ $V_{GS}=-4.5V$	-	7	-	nC
Gate-Source Charge	Q_{gs}		-	1.1	-	nC
Gate-Drain Charge	Q_{gd}		-	1.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=-6A$	-	-	-1.2	V

Notes:

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

N-Channel Typical Electrical and Thermal Characteristic Curves

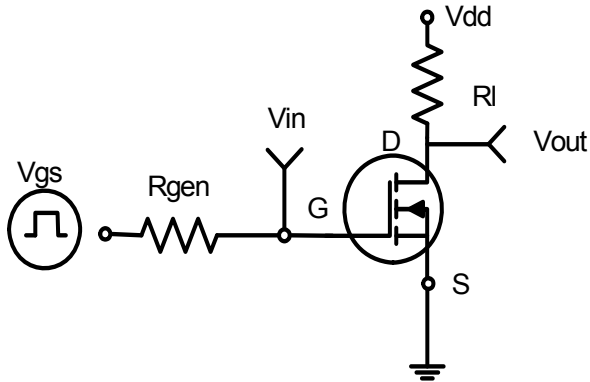


Figure 1. Switching Test Circuit

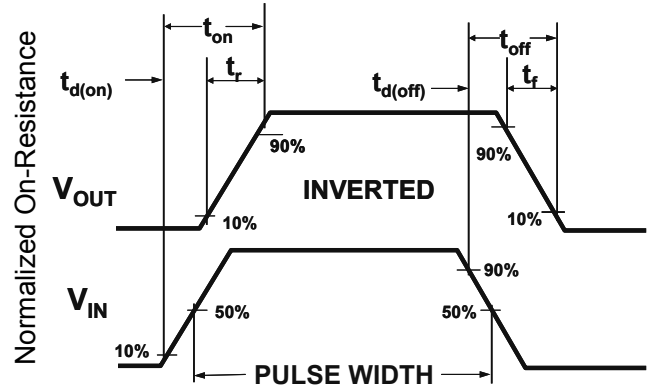


Figure 2. Switching Waveforms

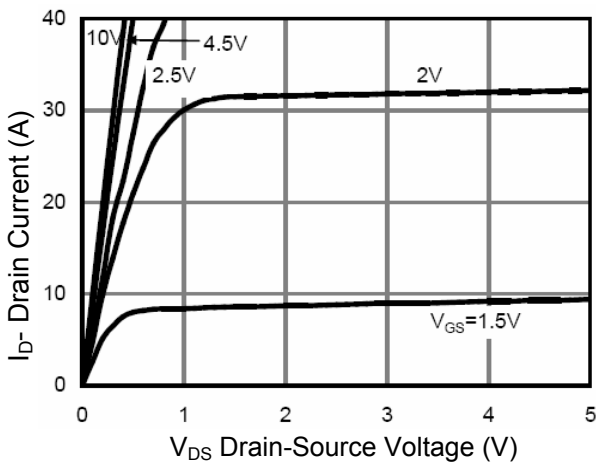


Figure 3. Output Characteristics

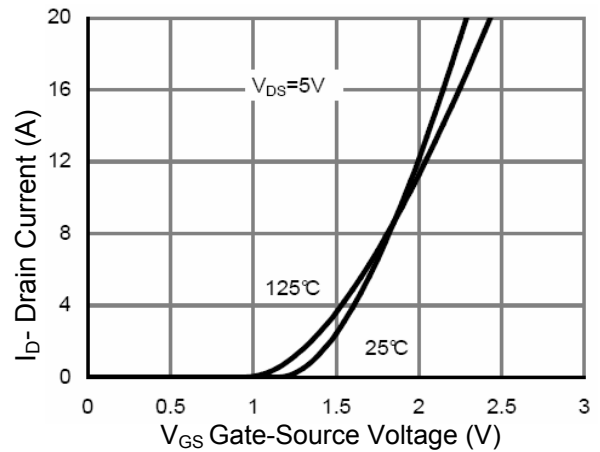


Figure 4. Transfer Characteristics

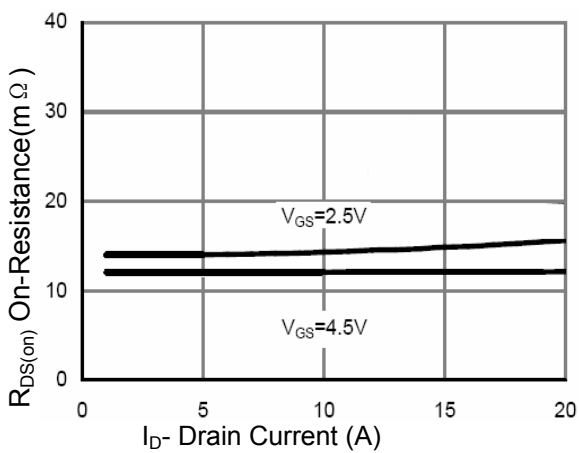


Figure 5. Drain-Source On-Resistance

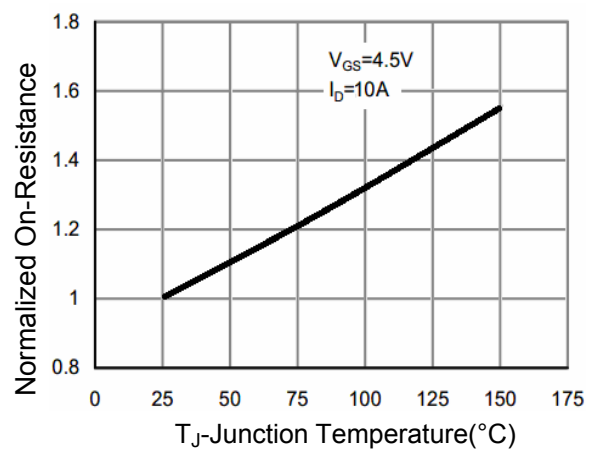


Figure 6. Drain-Source On-Resistance

N-Channel Typical Electrical and Thermal Characteristic Curves

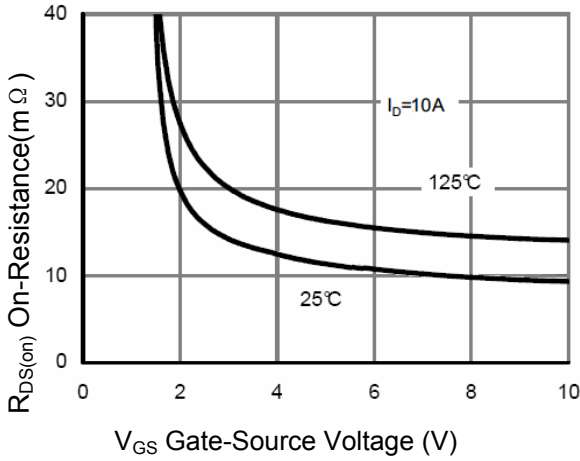


Figure 7. $R_{DS(on)}$ vs V_{GS}

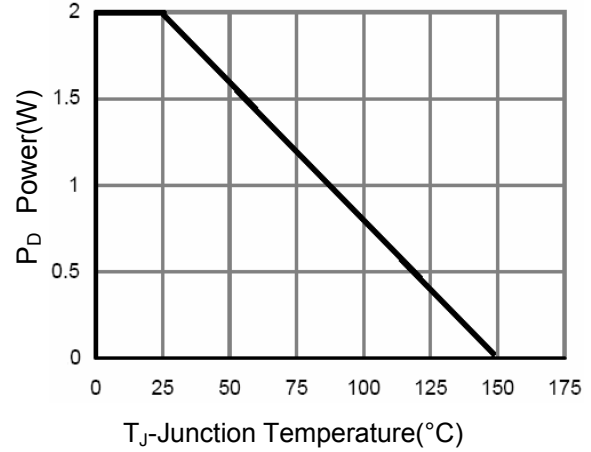


Figure 8. Power Dissipation

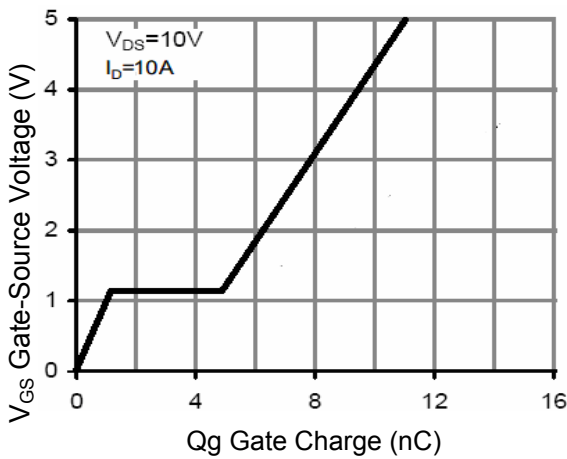


Figure 9. Gate Charge

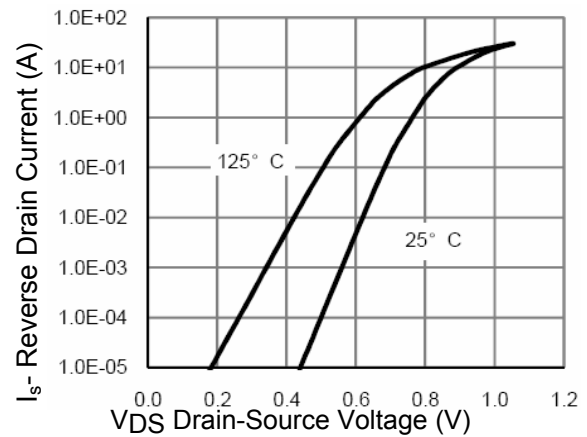


Figure 10. Source-Drain Diode Forward

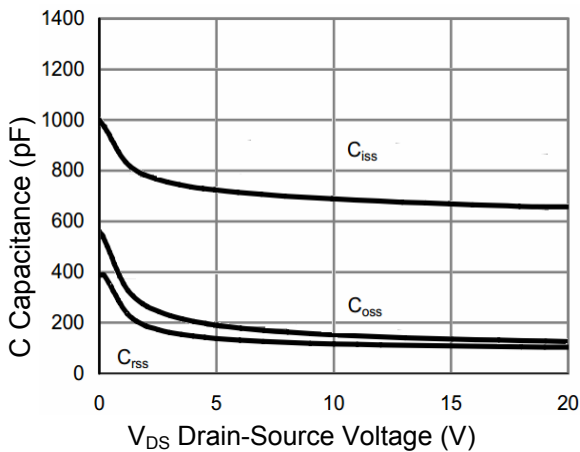


Figure 11. Capacitance vs V_{DS}

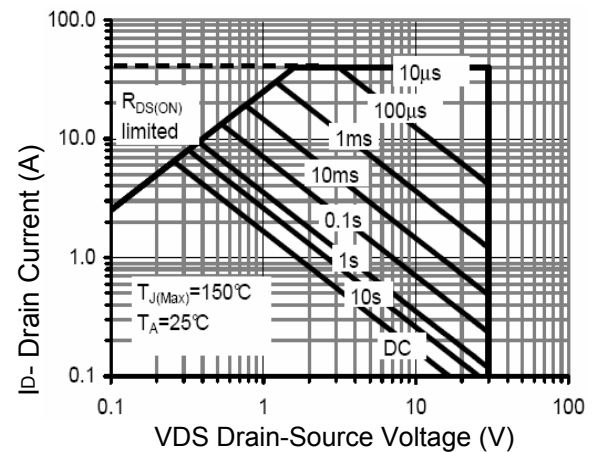


Figure 12. Safe Operation Area

N-Channel Typical Electrical and Thermal Characteristic Curves

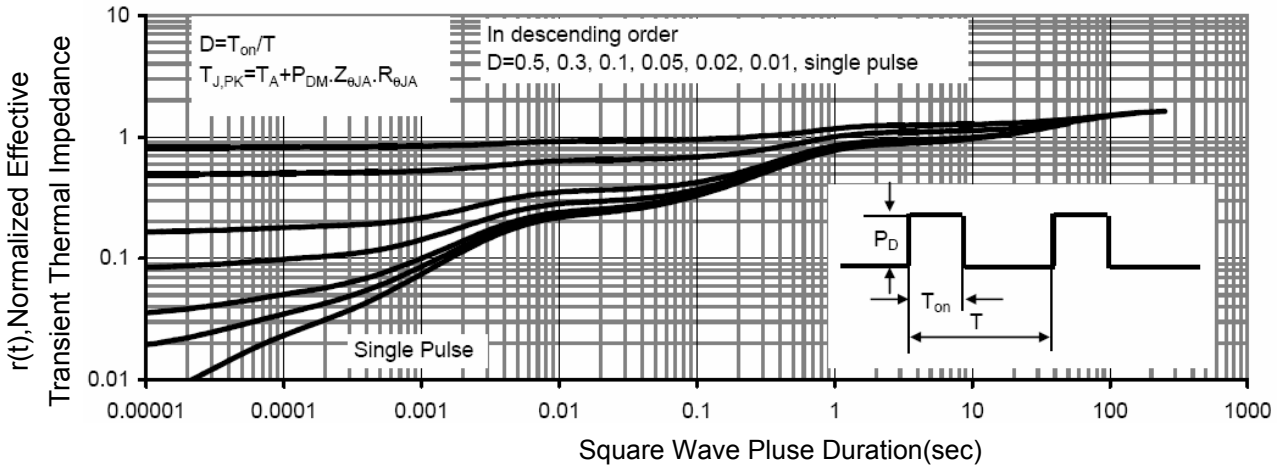


Figure 13. Normalized Maximum Transient Thermal Impedance

P-Channel Typical Electrical and Thermal Characteristic Curves

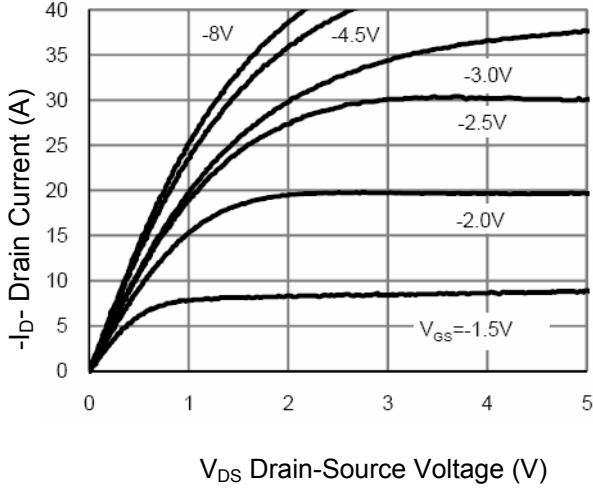


Figure 1. Output Characteristics

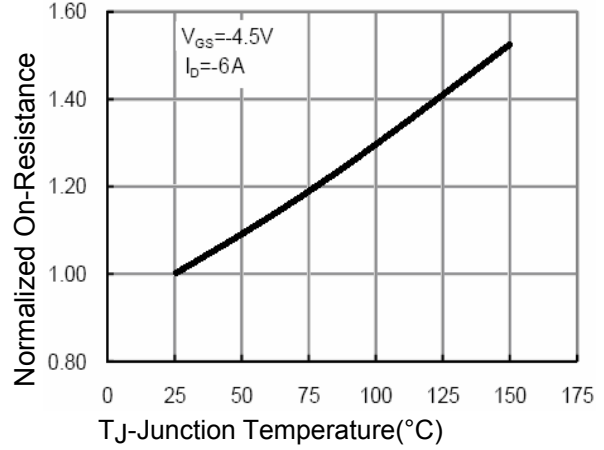


Figure 2. $R_{DS(on)}$ vs Junction Temperature

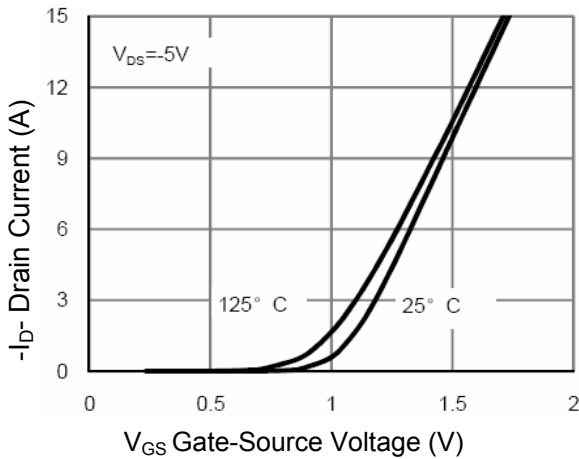


Figure 3. Transfer Characteristics

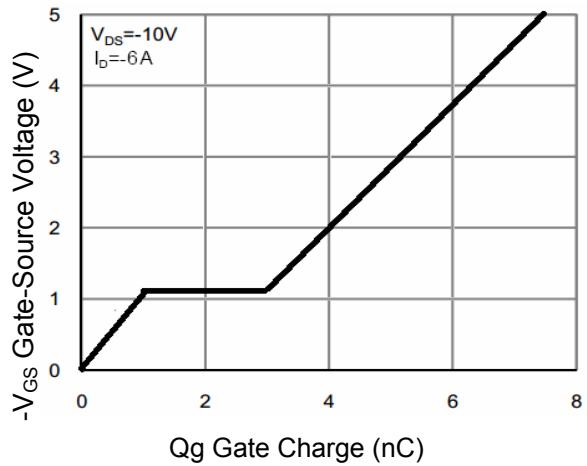


Figure 4. Gate Charge

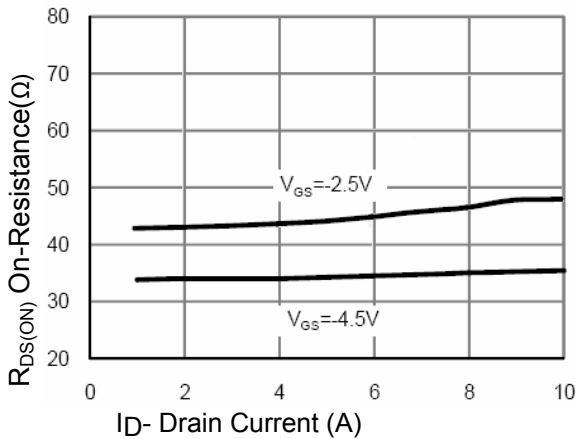


Figure 5. $R_{DS(on)}$ - Drain Current

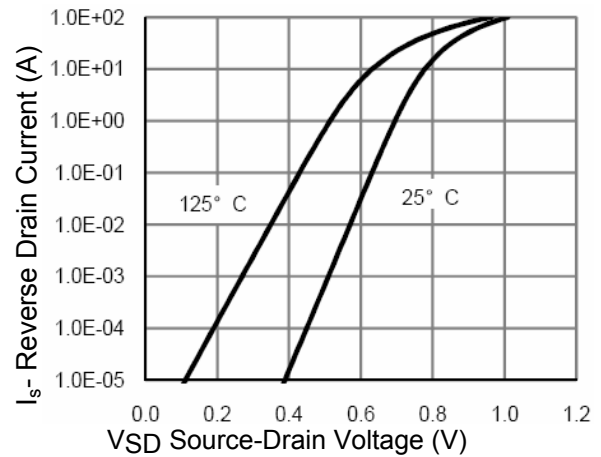


Figure 6. Source- Drain Diode Forward

P-Channel Typical Electrical and Thermal Characteristic Curves

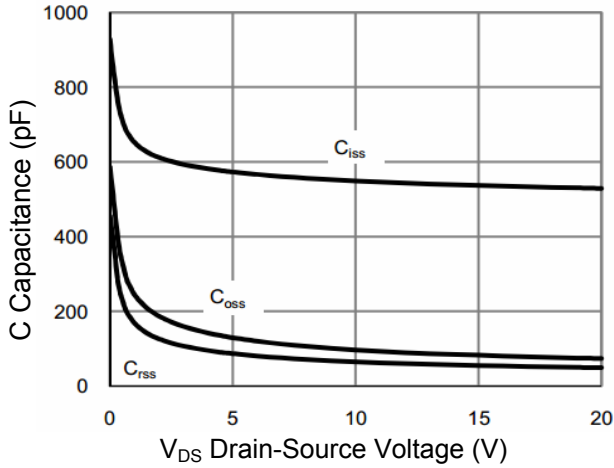


Figure 7. Capacitance vs VDS

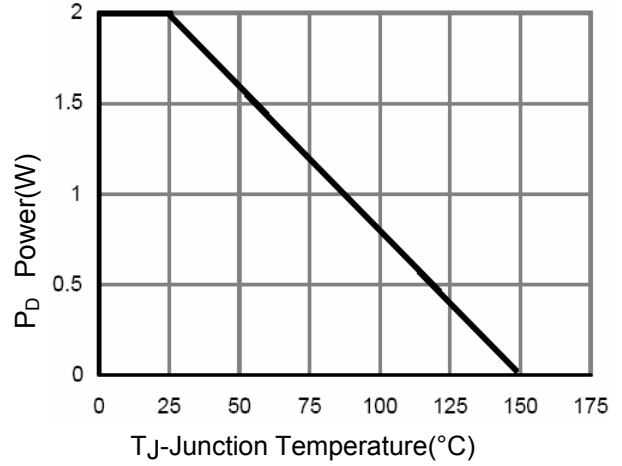


Figure 8. Power Dissipation

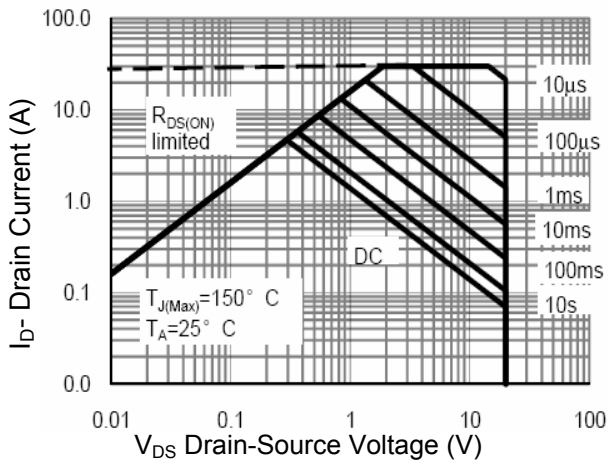


Figure 9. Safe Operation Area

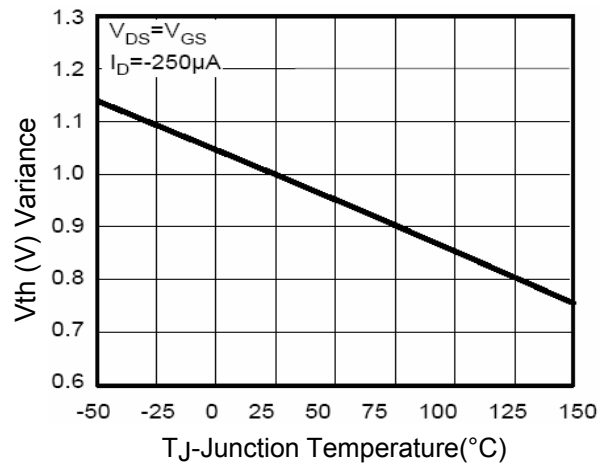


Figure 10. VGS(th) vs Junction Temperature

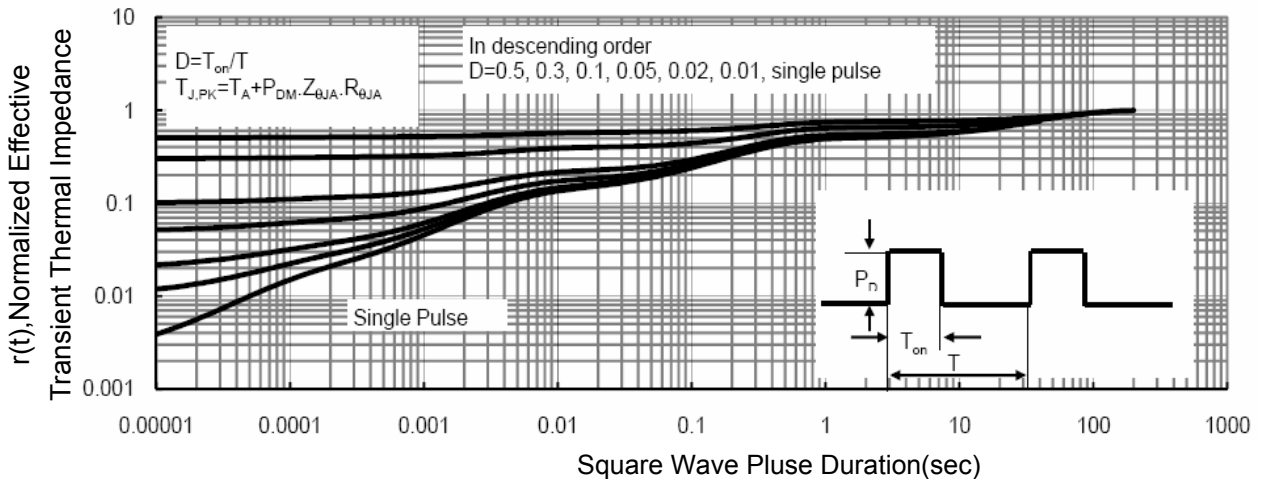
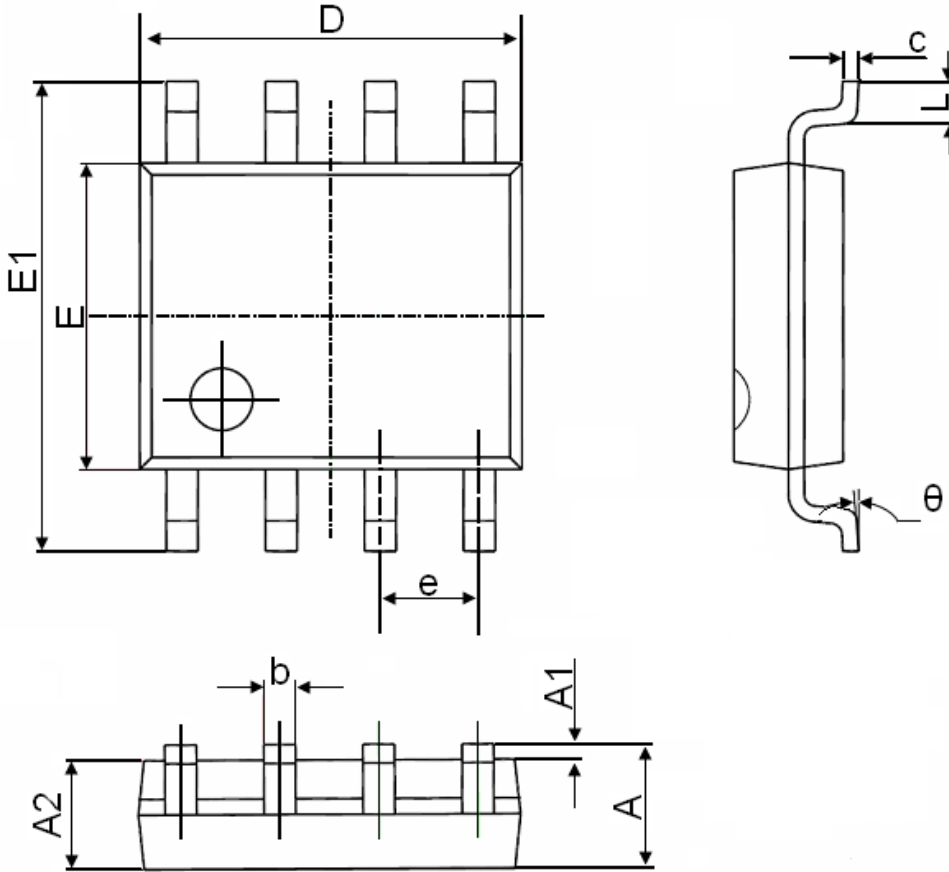


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°