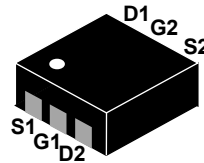
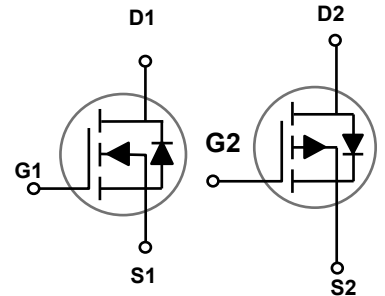


Main Product Characteristics

Polarity	N-Ch	P-Ch
V_{DSS}	12V	-12V
$R_{DS(ON)(Max.)}$	32mΩ@ $V_{GS}=4.5V$	74mΩ@ $V_{GS}=-4.5V$
I_D	5.0A	-5.0A



DFN2X2-6L



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The SSFB12N05 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 ($T_A=25^{\circ}C$ unless otherwise specified)

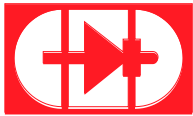
Parameter	Symbol	N-Channel	P-Channel	Unit	
Drain-Source Voltage	V_{DS}	12	-12	V	
Gate-Source Voltage	V_{GS}	± 12	± 12	V	
Continuous Drain Current	I_D	$T_A=25^{\circ}C$	5	-5	A
		$T_A=70^{\circ}C$	4.5	-3.8	
Pulsed Drain Current ¹	I_{DM}	20	-15	A	
Maximum Power Dissipation	P_D	1.9	1.9	W	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	-55 to +150	$^{\circ}C$	

Thermal Characteristics

Parameter	Symbol	N-Channel	P-Channel	Unit
Thermal Resistance, Junction-to-Ambient ²	$R_{\theta JA}$	65	65	$^{\circ}C/W$

N-CH 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	12	20	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =12V, 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	0.4	0.6	1	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =5A	-	28	32	mΩ
		V _{GS} =2.5V, I _D =4.6A	-	36	42	mΩ
		V _{GS} =1.8V, I _D =4.1A	-	55	80	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =5A	-	20	-	S
Dynamic Characteristics⁴						
Input Capacitance	C _{iss}	V _{DS} =6V, V _{GS} =0V, F=1.0MHz	-	495	-	PF
Output Capacitance	C _{oss}		-	155	-	PF
Reverse Transfer Capacitance	C _{rss}		-	95	-	PF
Switching Characteristics⁴						
Turn-on Delay Time	t _{d(on)}	V _{DD} =6V, R _L =1.2Ω, V _{GS} =10V, R _{GEN} =4.5Ω	-	7	-	nS
Turn-on Rise Time	t _r		-	5	-	
Turn-Off Delay Time	t _{d(off)}		-	18	-	
Turn-Off Fall Time	t _f		-	6	-	
Total Gate Charge	Q _g	V _{DS} =6V, I _D =5A, V _{GS} =4.5V	-	6.6	-	nC
Gate-Source Charge	Q _{gs}		-	1	-	
Gate-Drain Charge	Q _{gd}		-	1.2	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} =0V, I _S =5A	-	-	1.2	V


P-CH 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}	$V_{GS}=0V, I_D=-250\mu A$	-12	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-12V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4.5A$	-	60	74	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3.2A$	-	84	110	$m\Omega$
		$V_{GS}=-1.8V, I_D=-1A$	-	130	220	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-5A$	-	10	-	S
Dynamic Characteristics⁴						
Input Capacitance	C_{iss}	$V_{DS}=-6V, V_{GS}=0V, F=1.0MHz$	-	520	-	PF
Output Capacitance	C_{oss}		-	100	-	PF
Reverse Transfer Capacitance	C_{rss}		-	65	-	PF
Switching Characteristics⁴						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-6V, R_L=2.3\Omega, V_{GS}=-10V, R_{GEN}=6\Omega$	-	7.5	-	nS
Turn-on Rise Time	t_r		-	5.5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	19	-	
Turn-Off Fall Time	t_f		-	7	-	
Total Gate Charge	Q_g	$V_{DS}=-6V, I_D=-4.5A, V_{GS}=-4.5V$	-	9.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.6	-	
Gate-Drain Charge	Q_{gd}		-	2.2	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=-5A$	-	-	-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 $\leq 2\%$.
4. Essentially independent of operating temperature.

N-CH Typical Electrical and Thermal Characteristic Curves

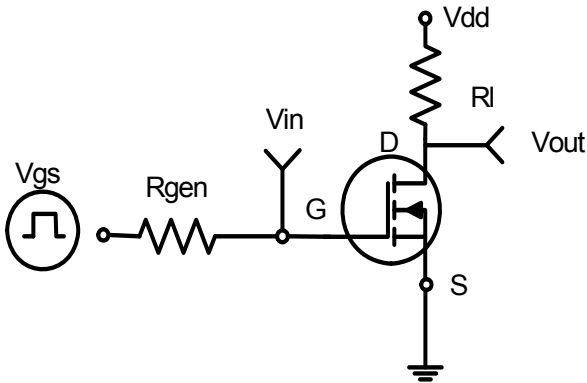


Fig.1 Switching Test Circuit

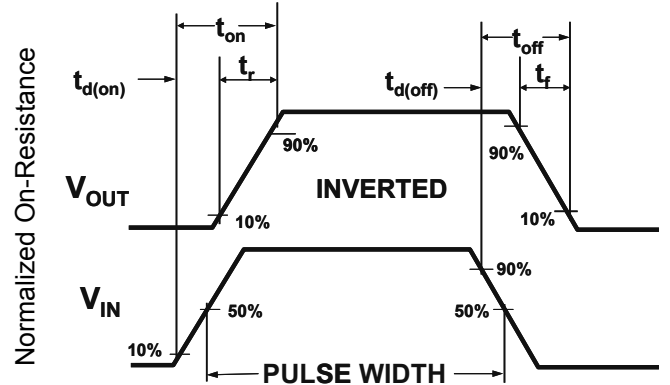


Fig.2 Switching Waveforms

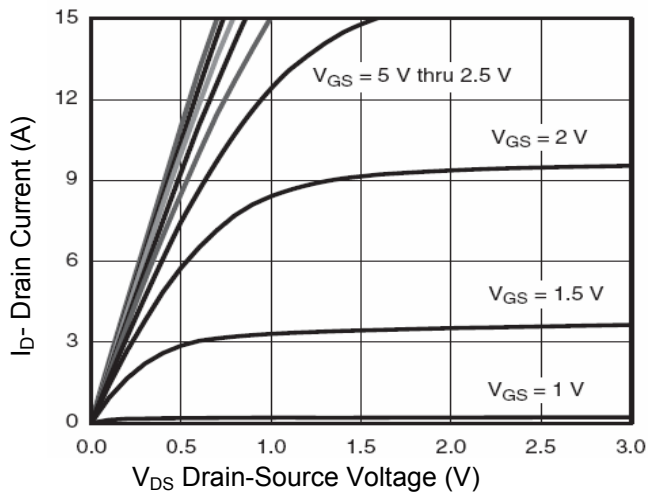


Fig.3 Output Characteristics

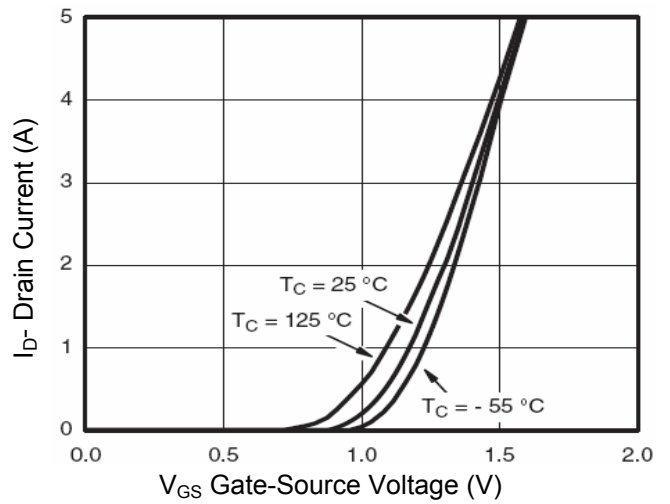


Fig.4 Transfer Characteristics

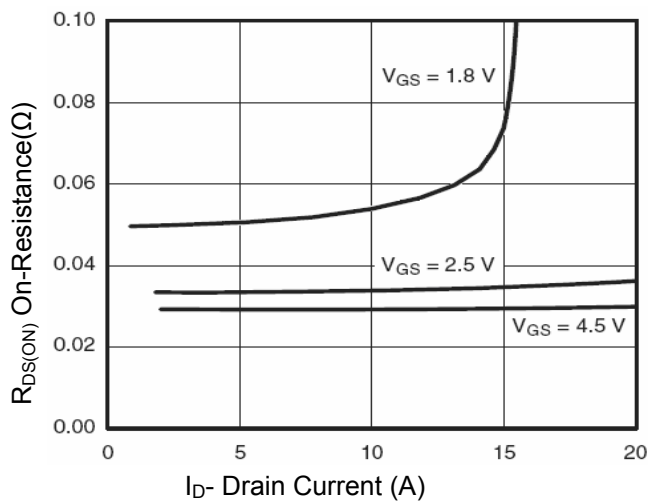


Fig.5 Drain-Source On-Resistance

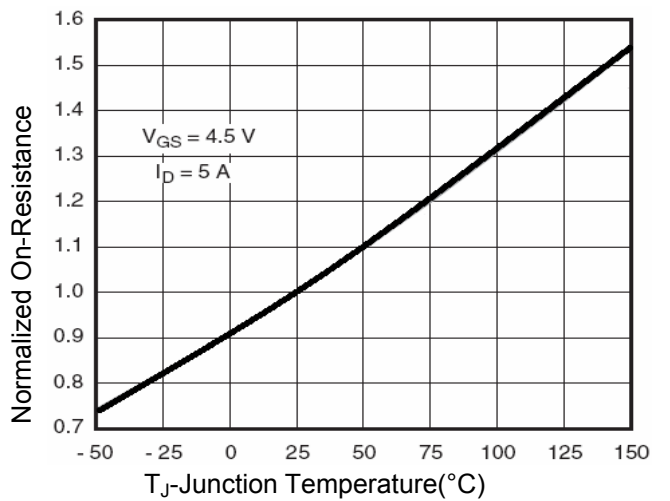


Fig.6 Drain-Source On-Resistance

N-CH Typical Electrical and Thermal Characteristic Curves

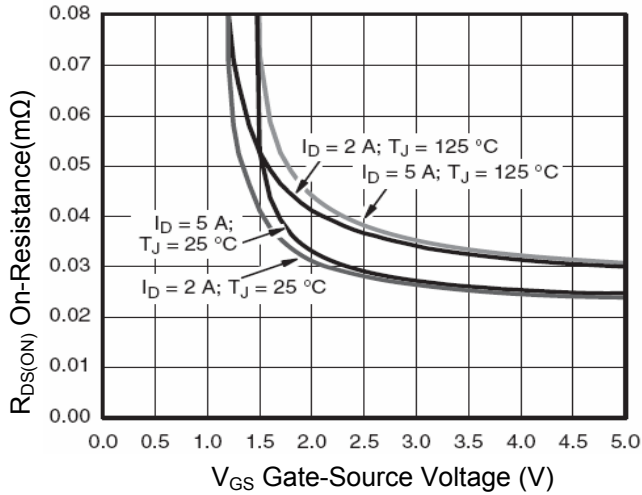


Fig.7 $R_{DS(on)}$ vs V_{GS}

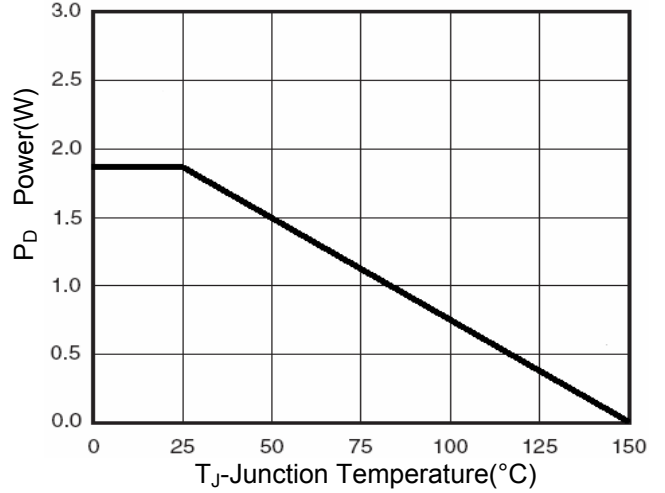


Fig.8 Power Dissipation

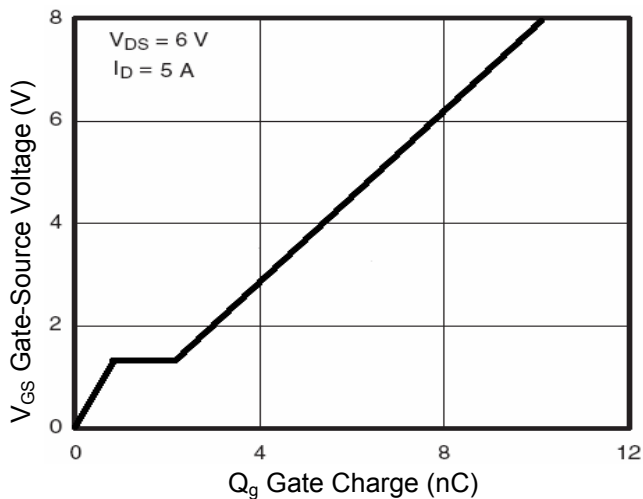


Fig.9 Gate Charge

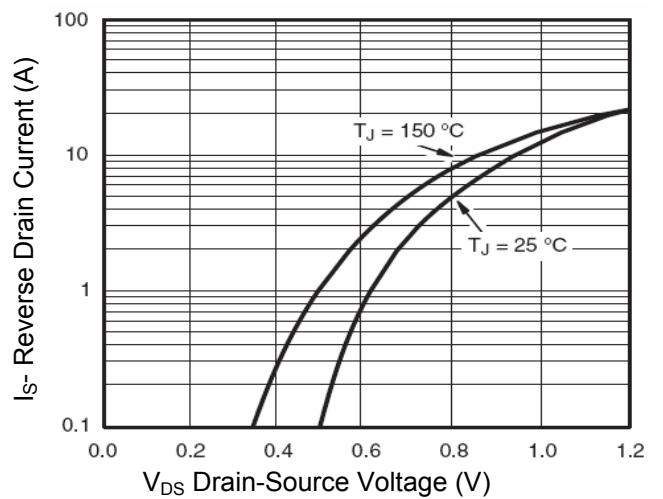


Fig.10 Source- Drain Diode Forward

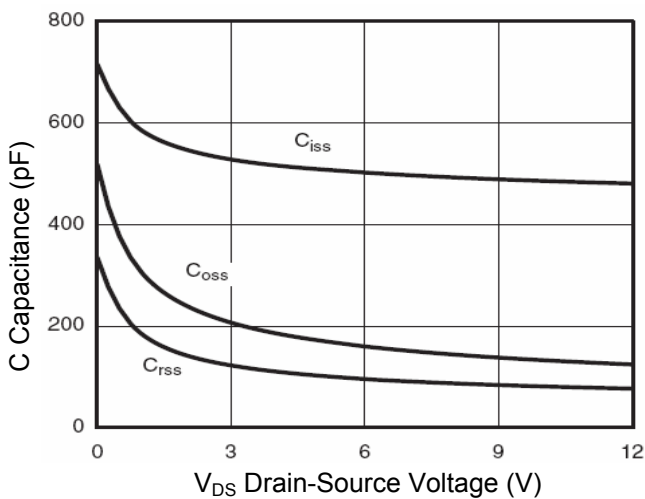


Fig.11 Capacitance vs V_{DS}

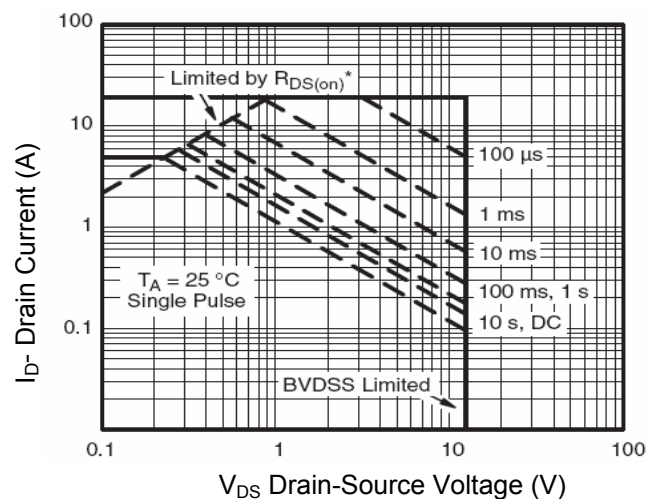


Fig.12 Safe Operation Area

N-CH Typical Electrical and Thermal Characteristic Curves

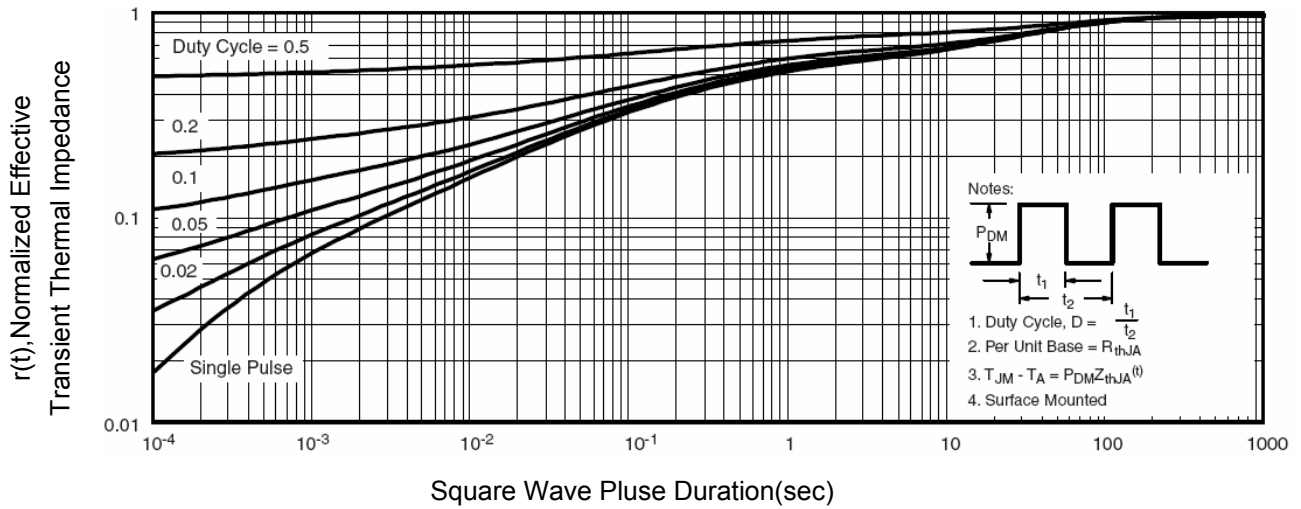


Fig.13 Normalized Maximum Transient Thermal Impedance

P-CH Typical Electrical and Thermal Characteristic Curves

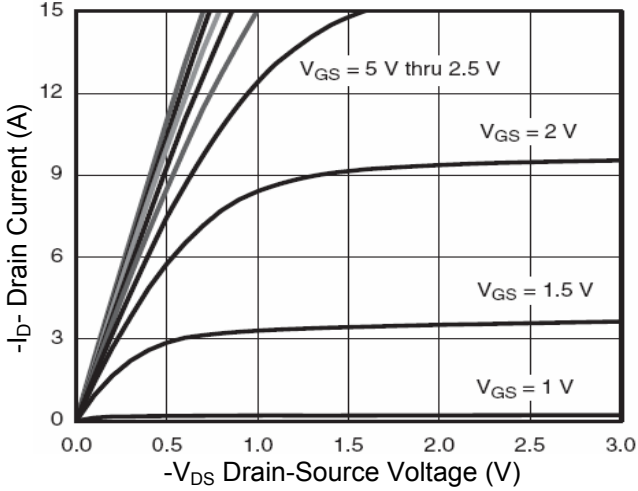


Fig.14 Output Characteristics

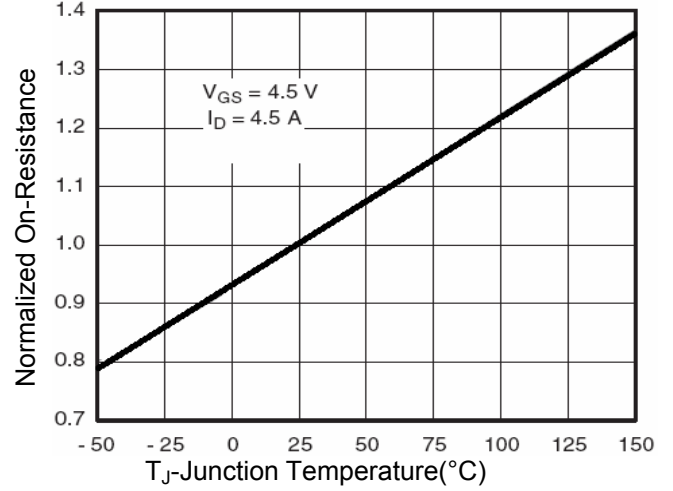


Fig.15 $R_{DS(ON)}$ -Junction Temperature

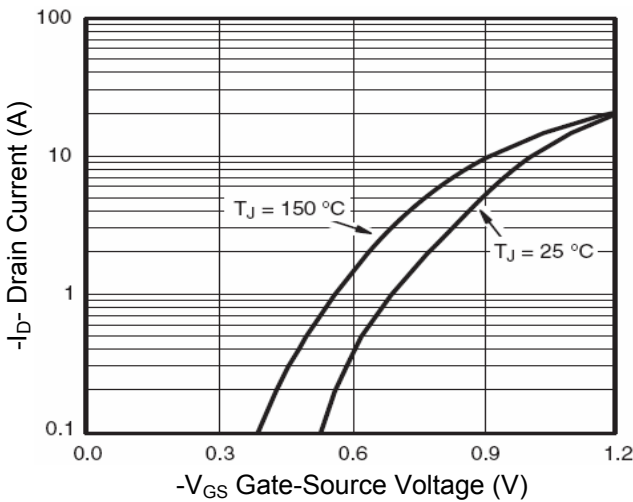


Fig.16 Transfer Characteristics

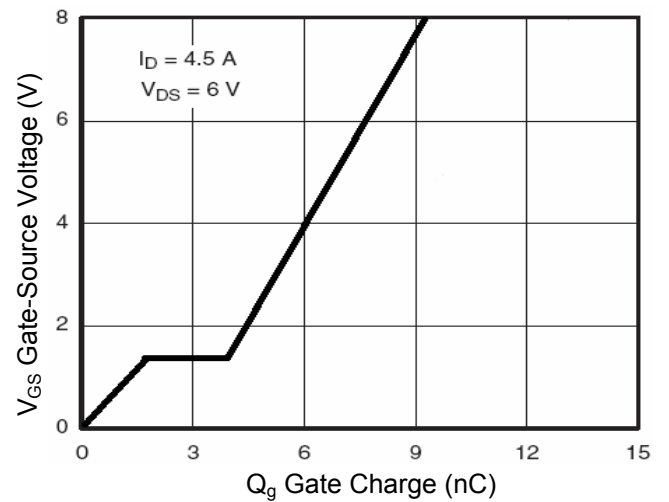


Fig.17 Gate Charge

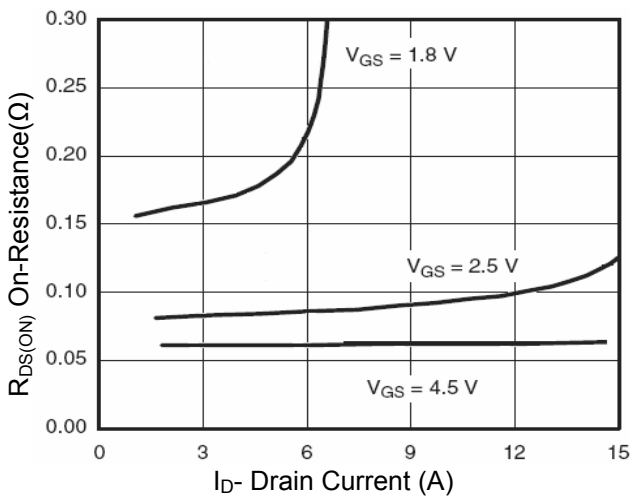


Fig.18 $R_{DS(ON)}$ - Drain Current

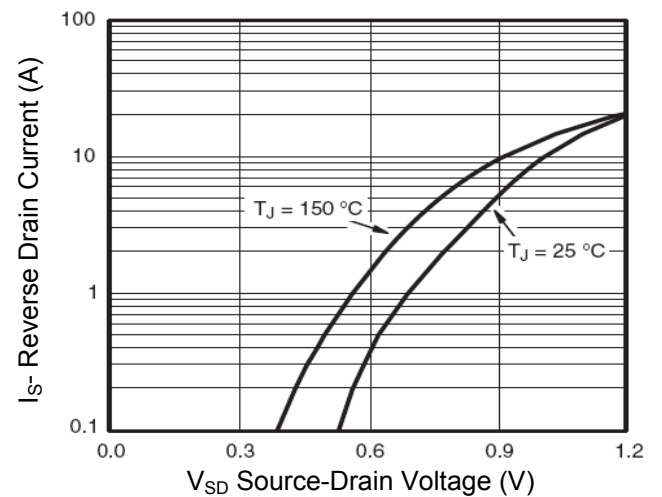


Fig.19 Source- Drain Diode Forward

P-CH Typical Electrical and Thermal Characteristic Curves

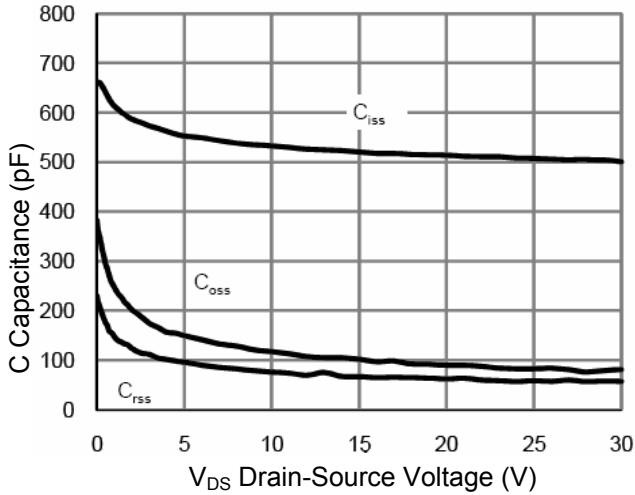


Fig.20 Capacitance vs V_{DS}

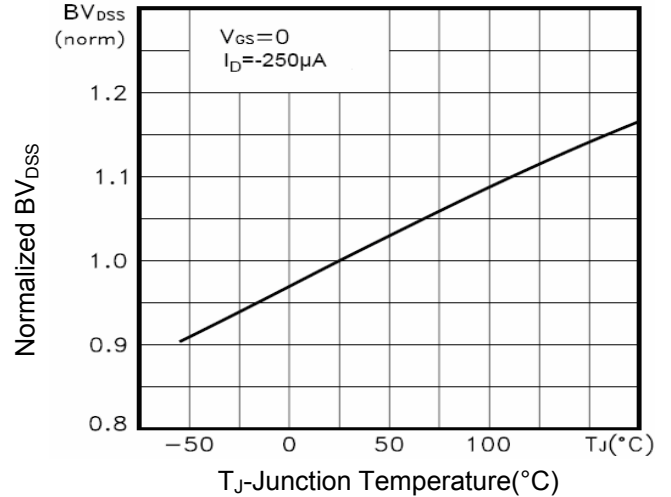


Fig.21 BV_{DSS} vs Junction Temperature

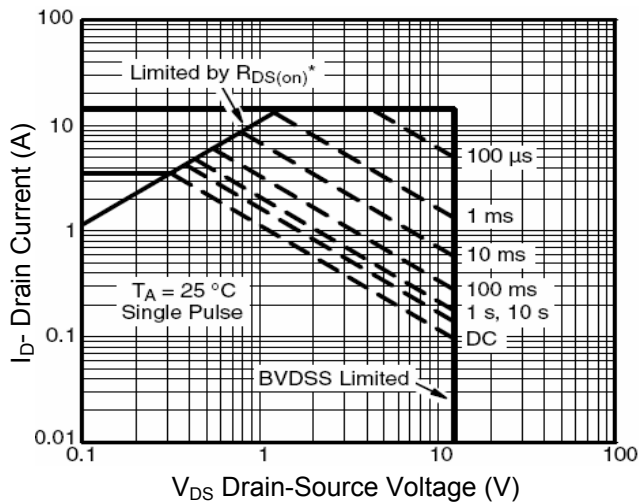


Fig.22 Safe Operation Area

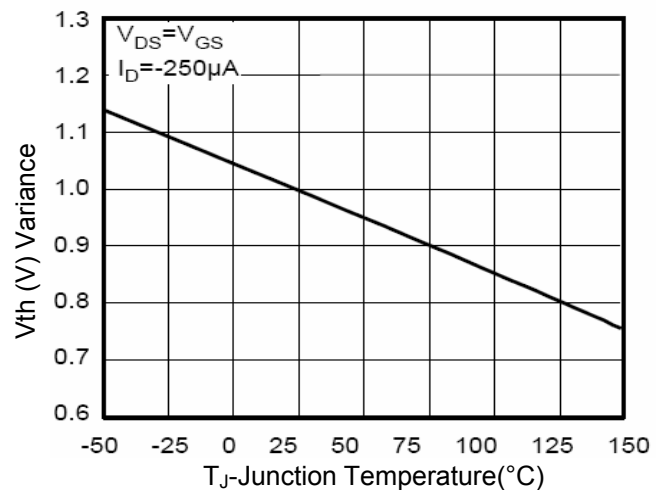


Fig.23 $V_{GS(th)}$ vs Junction Temperature

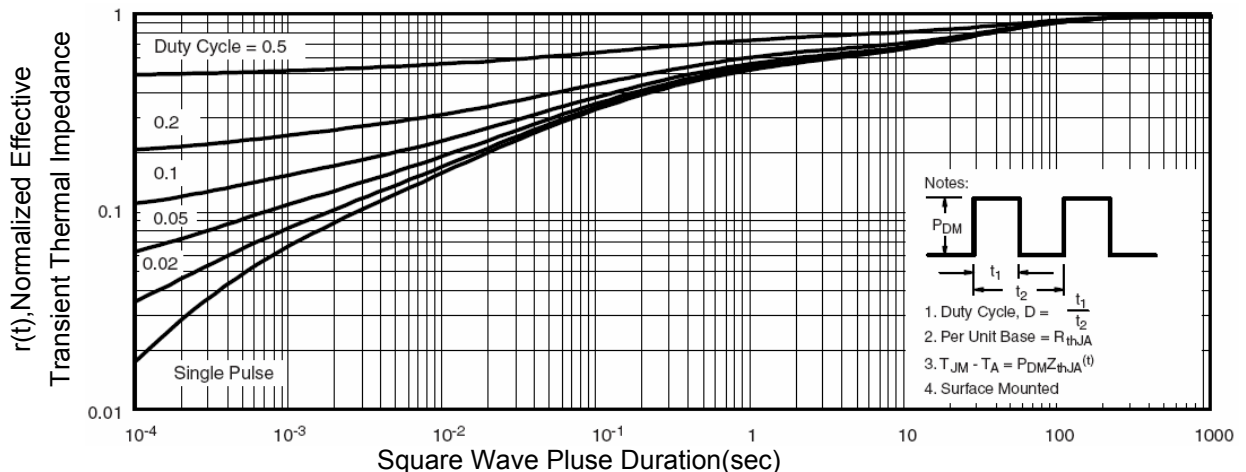
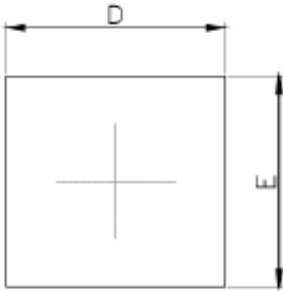


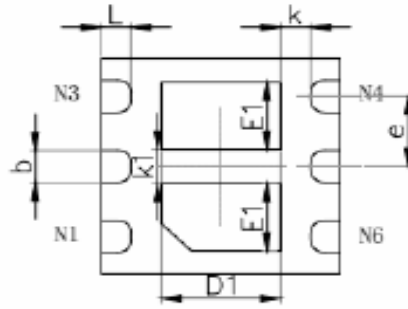
Fig.24 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions

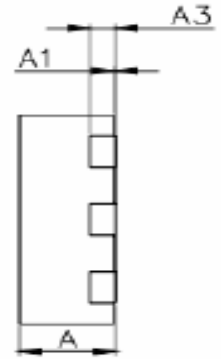
DFN2X2-6L



Top View



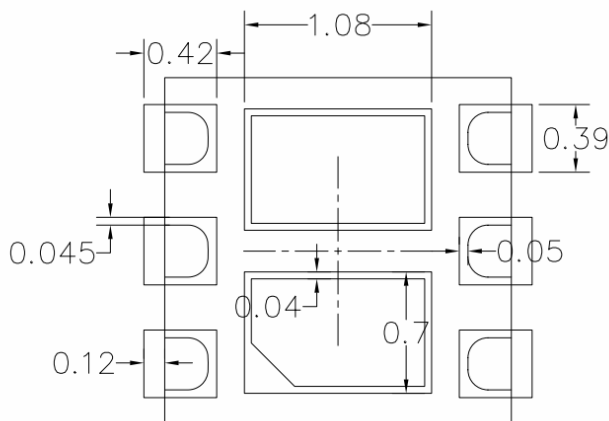
Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.900	2.100	0.075	0.083
E	1.900	2.100	0.075	0.083
D1	0.900	1.100	0.035	0.043
E1	0.520	0.720	0.020	0.028
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
k	0.200MIN.		0.008MIN.	
k1	0.320REF.		0.013REF.	
L	0.200	0.300	0.008	0.012

Recommended Pad Layout



Note:
 1. Controlling dimensions in mm.
 2. Tolerance ± 0.050 mm.