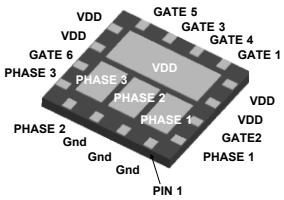
GOOD-ARK SEMICONDUCTOR

GSMP0342

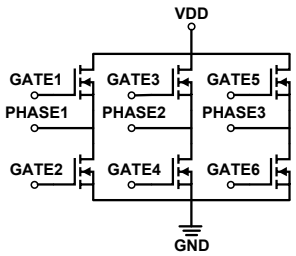
30V 6 IN 1 N-Channel MOSFETs

Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	8.5mΩ
I_D	42A



DFN6x6



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 GSMP0342 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_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	42	A
Drain Current-Continuous (T_C=100°C)		26.6	
Drain Current-Pulsed[1]	I_{DM}	168	A
Single Pulse Avalanche Energy[2]	E_{AS}	45	mJ
Single Pulse Avalanche Current[2]	I_{AS}	30	A
Power Dissipation (T_C=25°C)	P_D	24.7	W
Power Dissipation-Derate above 25°C		0.20	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.06	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
B_{VDSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.04	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V,T_J=25°C	-	-	1	μA
		V_{DS}=24V,V_{GS}=0V,T_J=125°C	-	-	10	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance [3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=16A	-	7.5	8.5	mΩ
		V_{GS}=4.5V, I_D=8A	-	10	13	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-4	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=8A	-	9.5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge [3,4]	Q_g	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	16.7	33	nC
Gate-Source Charge [3,4]	Q_{gs}		-	4.5	8	
Gate-Drain Charge [3,4]	Q_{gd}		-	1.3	2.6	
Turn-On Delay Time [3,4]	$t_{d(on)}$	V_{DD}=15V, R_G=3.3Ω, V_{GS}=10V, I_D=15A	-	4.8	9.0	nS
Rise Time [3,4]	t_r		-	12.5	24	
Turn-Off Delay Time [3,4]	$t_{d(off)}$		-	27.6	52	
Fall Time [3,4]	t_f		-	8.2	16	
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	850	1700	pF
Output Capacitance	C_{oss}		-	130	260	
Reverse Transfer Capacitance	C_{rss}		-	78	160	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	2.7	5.5	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	42	A
Pulsed Source Current [3]	I_{SM}		-	-	84	A
Diode Forward Voltage [3]	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V, I_S=10A, di/dt=100A/μs, T_J=25°C	-	8.1	-	nS
Reverse Recovery Charge	Q_{rr}		-	1.6	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A, R_G=25Ω, starting T_J=25°C.
3. Pulse test: pulse width≤300us,duty cycle ≤2%.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

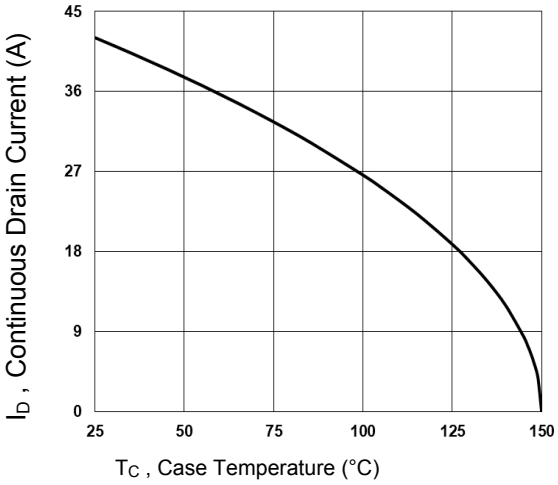


Fig.1 Continuous Drain Current vs. T_C

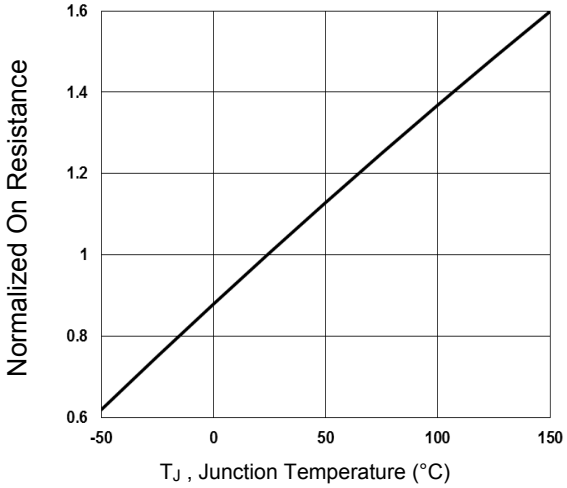


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

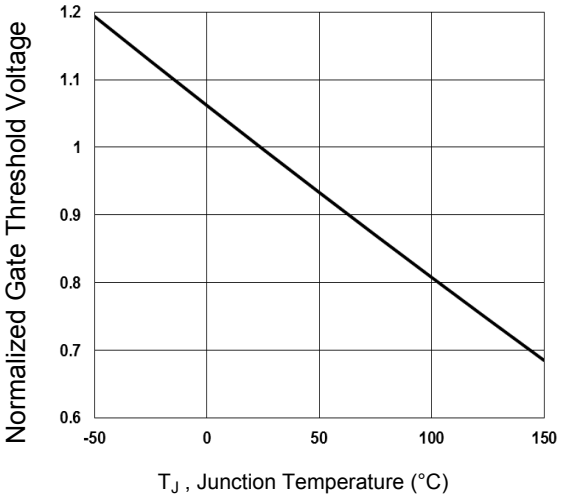


Fig.3 Normalized V_{th} vs. T_J

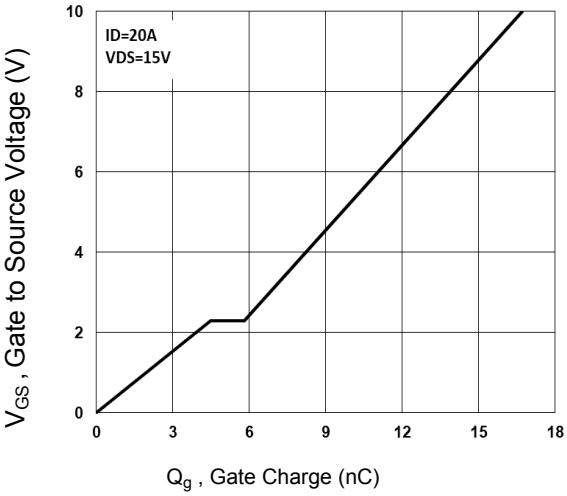


Fig.4 Gate Charge Waveform

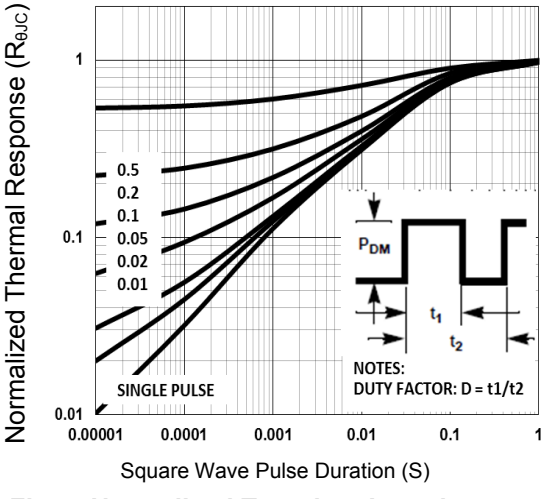


Fig.5 Normalized Transient Impedance

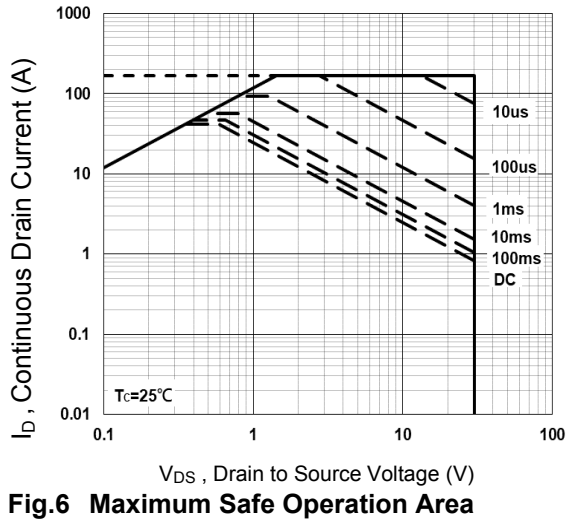


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

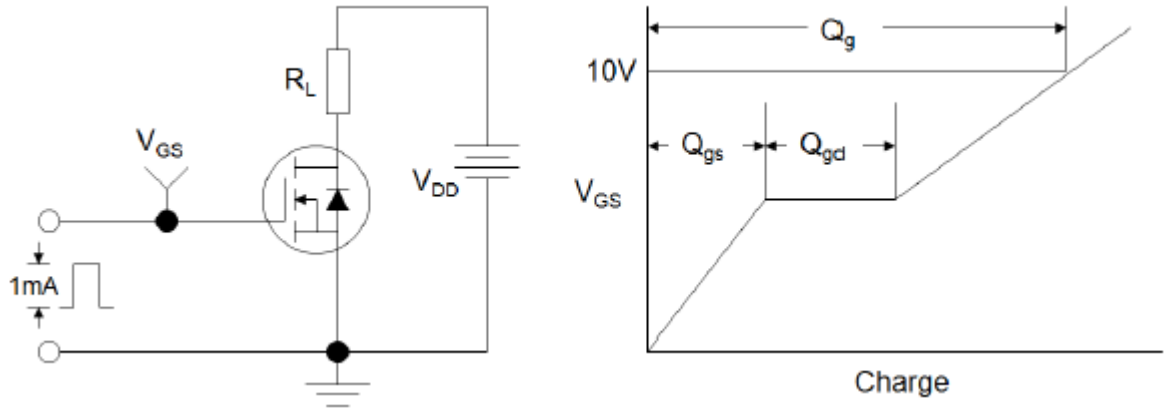


Figure 7. Gate Charge Test Circuit & Waveform

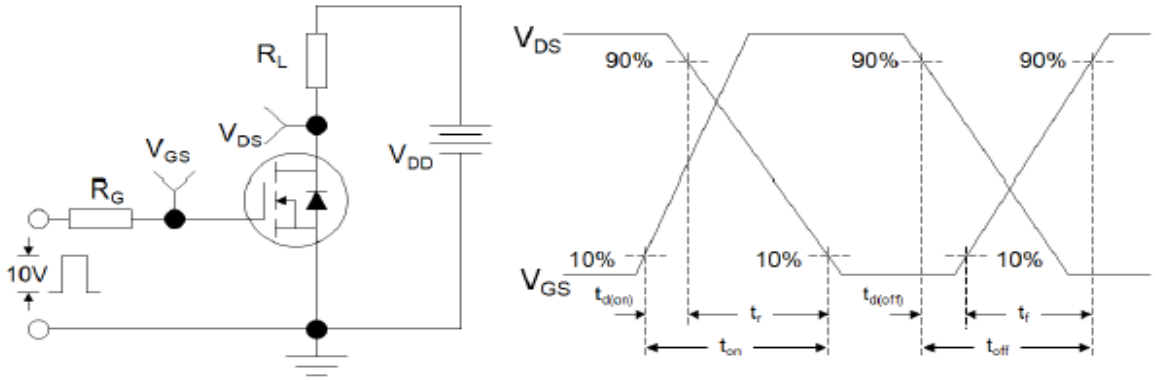


Figure 8. Resistive Switching Test Circuit & Waveforms

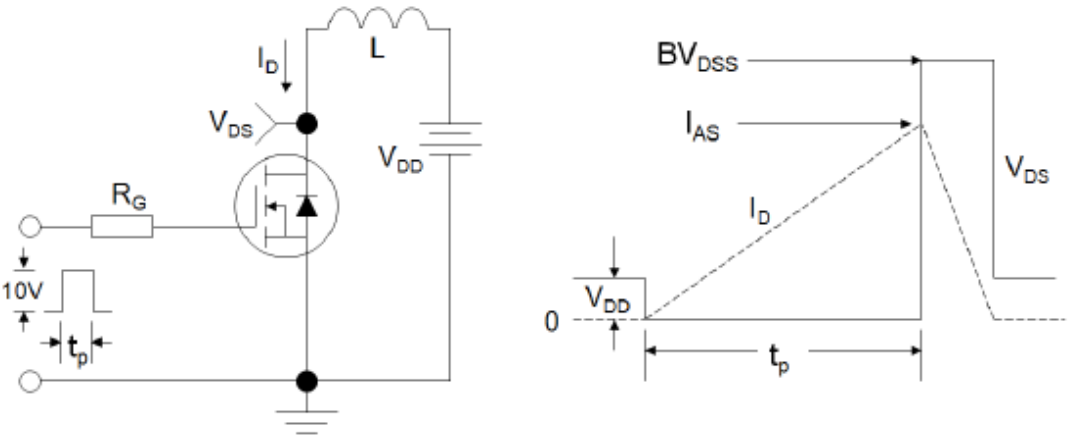
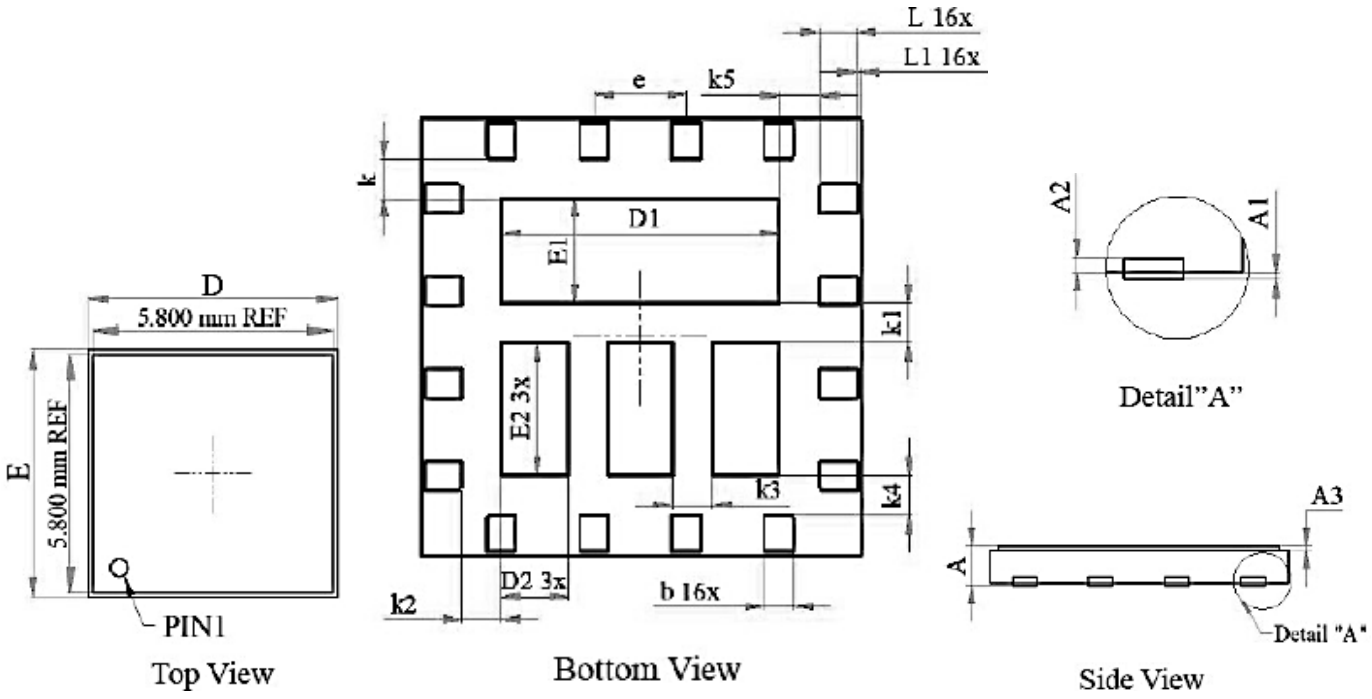


Figure 9. E_{AS} Circuit & Waveforms

Package Outline Dimensions DFN6x6



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	-	0.600	b	0.350	0.400	0.450
A1	-	-	0.005	L	0.450	0.500	0.550
A2	0.030	-	0.100	L1	0.010	0.050	0.090
A3	0.050	-	0.100	k	0.550 REF		
D	5.900	6.000	6.100	k1	0.550 REF		
E	5.900	6.000	6.100	k2	0.550 REF		
D1	3.700	3.800	3.900	k3	0.550 REF		
E1	1.325	1.425	1.525	k4	0.550 REF		
D2	0.800	0.900	1.000	k5	0.550 REF		
E2	1.725	1.825	1.925	e	1.27 BSC		

Recommended Pad Layout

(Unit in MM)