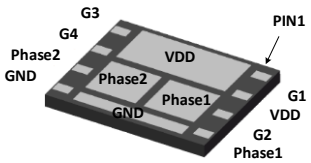
GOOD-ARK SEMICONDUCTOR

GSMP0336

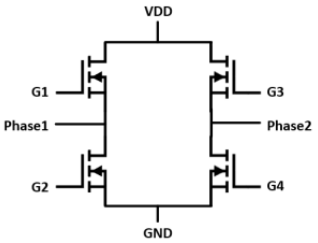
30V 4 IN 1 N-Channel MOSFETs

Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	10.2mΩ
I_D	35A



DFN5x6



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 GSMP0336 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	35	A
Drain Current-Continuous (T_C=100°C)		22	
Drain Current-Pulsed[1]	I_{DM}	140	A
Single Pulse Avalanche Energy[2]	E_{AS}	13	mJ
Single Pulse Avalanche Current[2]	I_{AS}	16	A
Power Dissipation (T_C=25°C)	P_D	21.5	W
Power Dissipation-Derate above 25°C		0.17	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.8	°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=10A	-	8.4	10.2	mΩ
		V_{GS}=4.5V, I_D=5A	-	11.6	15	
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=3A	-	6.4	-	S
Dynamic and Switching Characteristics						
Total Gate Charge [3,4]	Q_g	V_{DS}=15V, I_D=5A, V_{GS}=10V	-	16.5	33	nC
Gate-Source Charge [3,4]	Q_{gs}		-	2.3	5.0	
Gate-Drain Charge [3,4]	Q_{gd}		-	3.0	6.0	
Turn-On Delay Time [3,4]	$t_{d(on)}$	V_{DD}=15V, R_G=6Ω, V_{GS}=10V, I_D=1A	-	3.8	7.0	nS
Rise Time [3,4]	t_r		-	10.0	19	
Turn-Off Delay Time [3,4]	$t_{d(off)}$		-	22.0	42	
Fall Time [3,4]	t_f		-	6.6	13	
Input Capacitance	C_{lss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	620	900	pF
Output Capacitance	C_{oss}		-	85	125	
Reverse Transfer Capacitance	C_{rss}		-	60	90	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	2.8	5.6	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	35	A
Pulsed Source Current [3]	I_{SM}		-	-	70	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	-	-	-	nS
Reverse Recovery Charge	Q_{rr}		-	-	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, 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

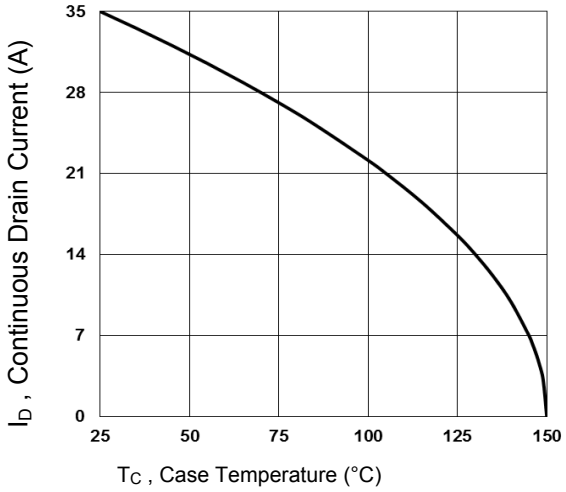


Fig.1 Continuous Drain Current vs. T_C

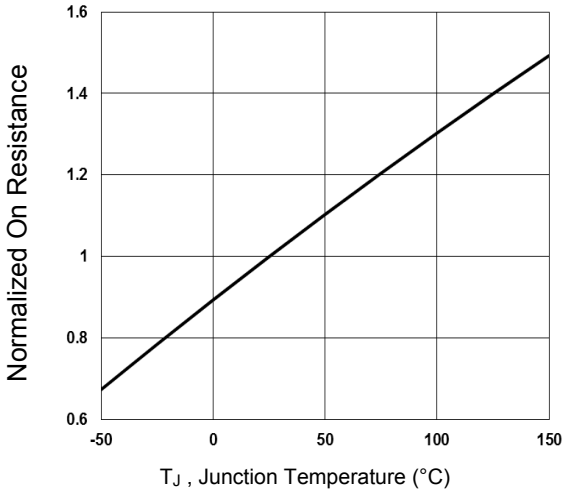


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

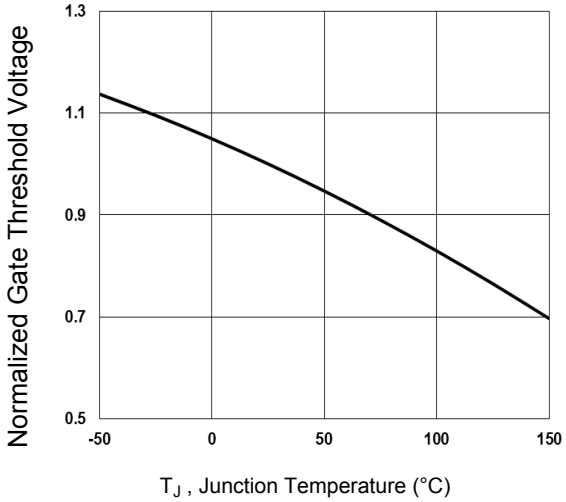


Fig.3 Normalized V_{th} vs. T_J

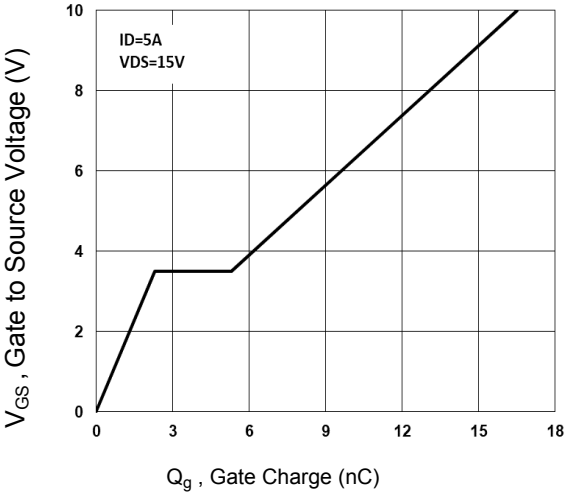


Fig.4 Gate Charge Waveform

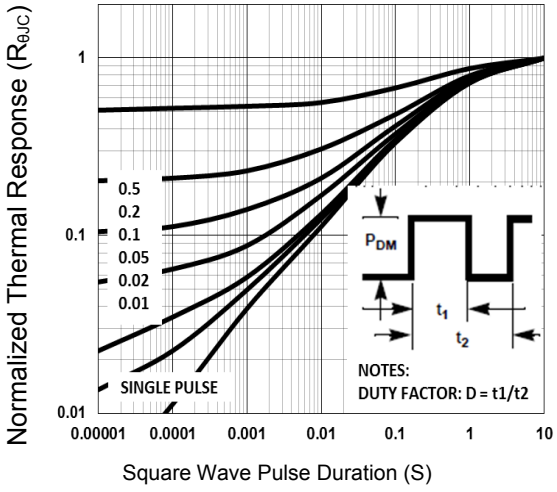


Fig.5 Normalized Transient Impedance

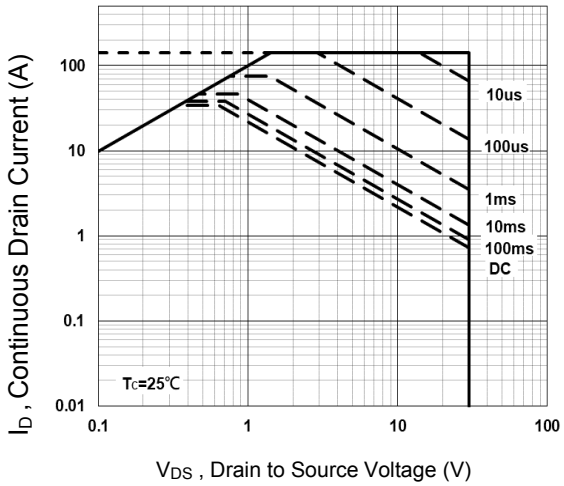


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

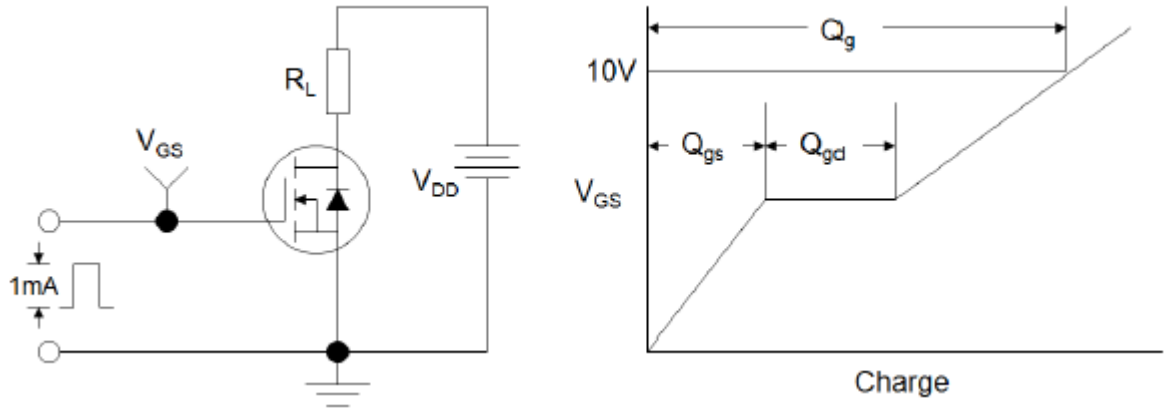


Figure 7. Gate Charge Test Circuit & Waveform

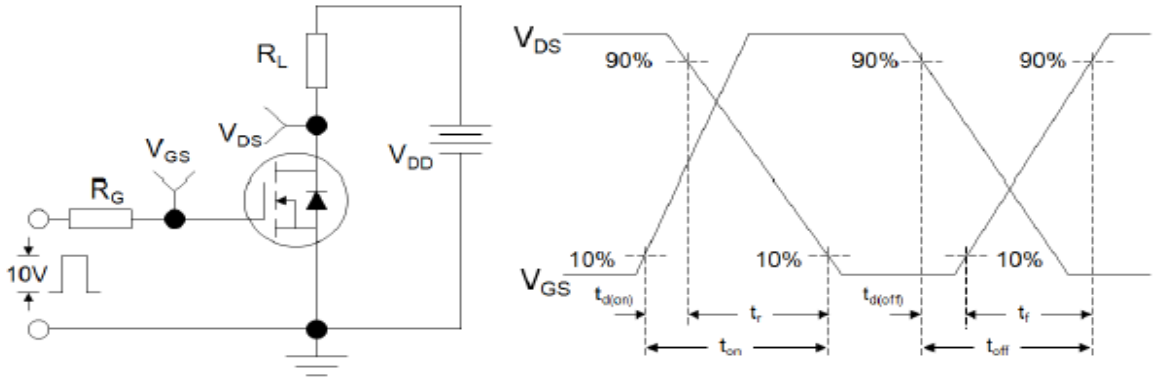


Figure 8. Resistive Switching Test Circuit & Waveforms

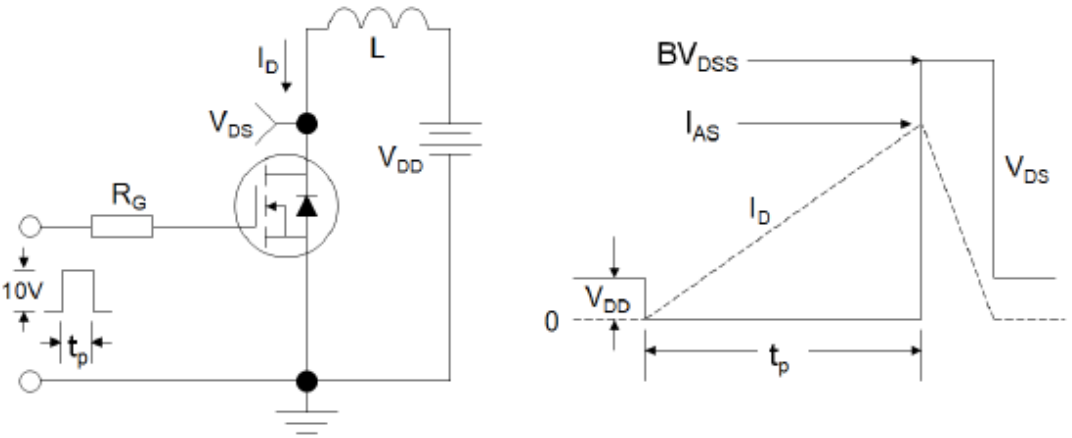
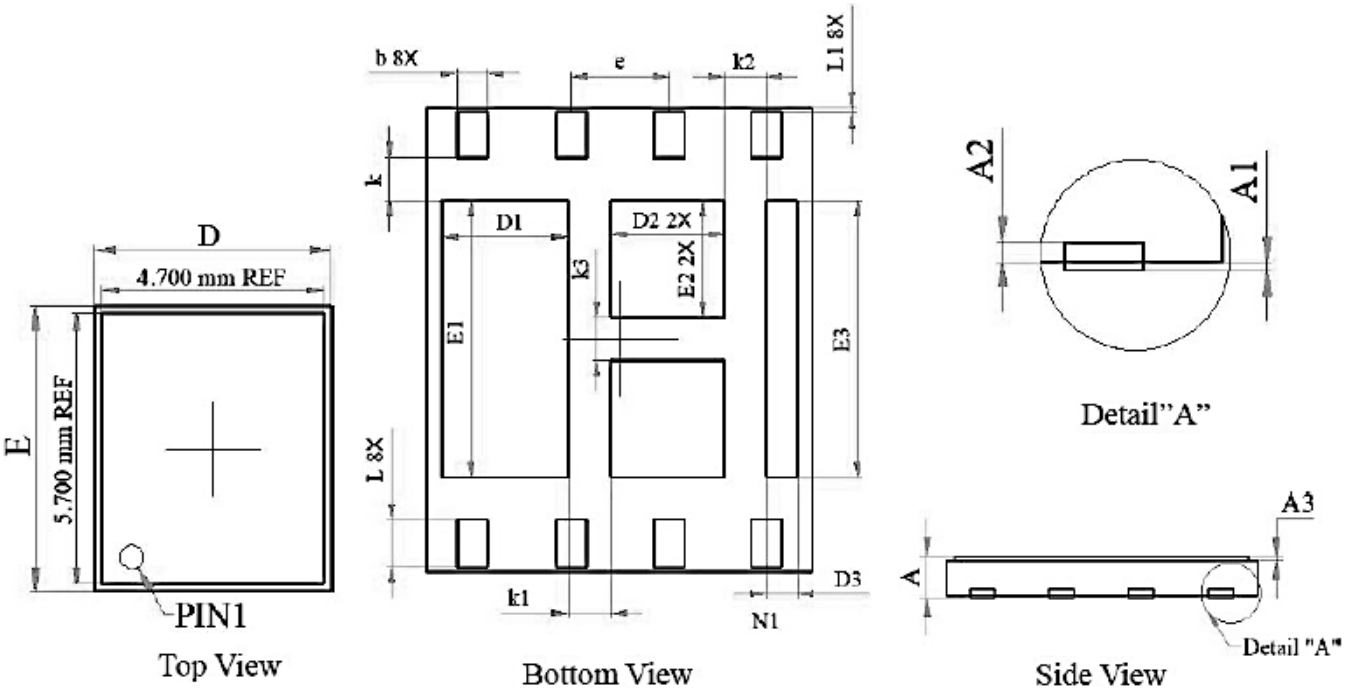


Figure 9. E_{AS} Circuit & Waveforms

Package Outline Dimensions DFN5x6



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	---	0.600	D3	0.300	0.400	0.500
A1	---	---	0.005	E3	3.500	3.600	3.700
A2	0.030	---	0.100	b	0.350	0.400	0.450
A3	0.050	---	0.100	L	0.550	0.600	0.650
D	4.900	5.000	5.100	L1	0.010	0.050	0.090
E	5.900	6.000	6.100	k	0.550 REF		
D1	1.525	1.625	1.725	k1	0.550 REF		
E1	3.500	3.600	3.700	k2	0.550 REF		
D2	1.375	1.475	1.575	k3	0.550 REF		
E2	1.425	1.525	1.625	e	1.27 BSC		

Recommended Pad Layout

(Unit in MM)