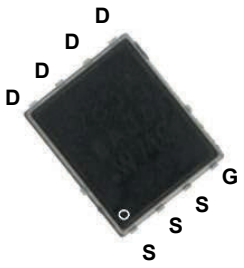
GOOD-ARK SEMICONDUCTOR

GSGP1R306E

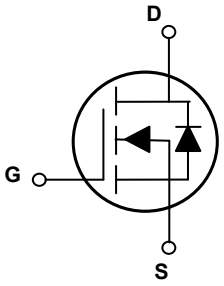
60V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	1.3mΩ (Max.)
I_D	276A



PPAK5x6



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 GSGP1R306E 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 supplies and a wide variety of other applications.

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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)	I_D	276	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		191	A
Pulsed Drain Current[2]	I_{DM}	1120	A
Power Dissipation (T_C=25°C)[3]	P_D	198	W
		1.32	W/°C
Single Pulse Avalanche Energy[1]	E_{AS}	506	mJ
Single Pulse Avalanche Current	I_{AS}	45	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.76	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +175	°C
Soldering Temperature	T_{sold}	260	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	60	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=60V, V_{GS}=0V, T_J=125°C	-	15	-	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A	-	1.1	1.3	mΩ
		V_{GS}=4.5V, I_D=20A	-	1.4	1.7	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	-	2.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=30V, f=1MHz	-	7213	-	pF
Output Capacitance	C_{oss}		-	1483	-	
Reverse Transfer Capacitance	C_{rss}		-	30	-	
Total Gate Charge[4,5]	Q_g	I_D=50A, V_{DD}=30V, V_{GS}=4.5V	-	50	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	23	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	15	-	
Gate Plateau[4,5]	$V_{plateau}$		-	3.2	-	V
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=30V, V_{GS}=4.5V, R_G=2.5Ω, I_D=50A	-	39	-	nS
Rise Time[4,5]	t_r		-	34	-	
Turn-Off Delay Time Time[4,5]	$t_{d(off)}$		-	52	-	
Fall Time[4,5]	t_f		-	27	-	
Gate Resistance	R_g	f=1MHz	-	1.5	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	276	A
Diode Pulse Current	$I_{S.pulse}$		-	-	1120	A
Diode Forward Voltage	V_{SD}	I_S=50A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time[4]	T_{rr}	I_S=50A, V_{GS}=0V, V_R=50V, dI_F/dt=100A/us	-	69	-	nS
Reverse Recovery Charge[4]	Q_{rr}		-	126	-	nC

Notes:

1. L=0.5mH, V_{DD}=50V, R_G=25Ω, starting temperature T_J=25°C.
2. Pulse time of 5μs.
3. The dissipated power value will change with the temperature.
4. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

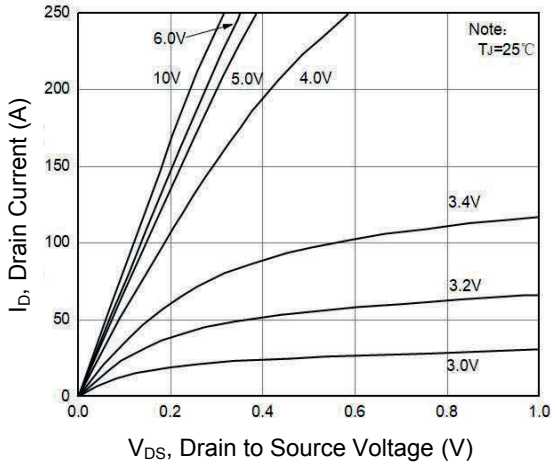


Figure 1. Typical Output Characteristics

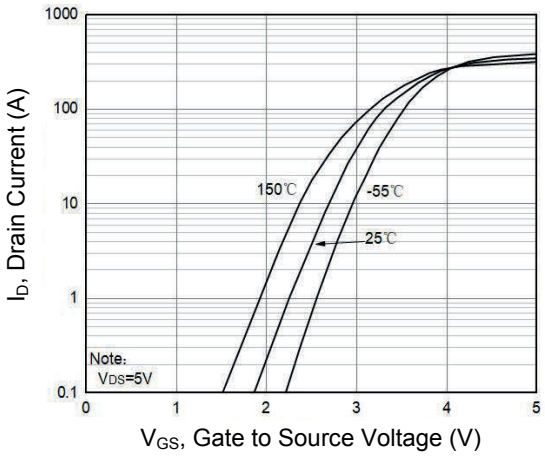


Figure 2. Transfer Characteristics

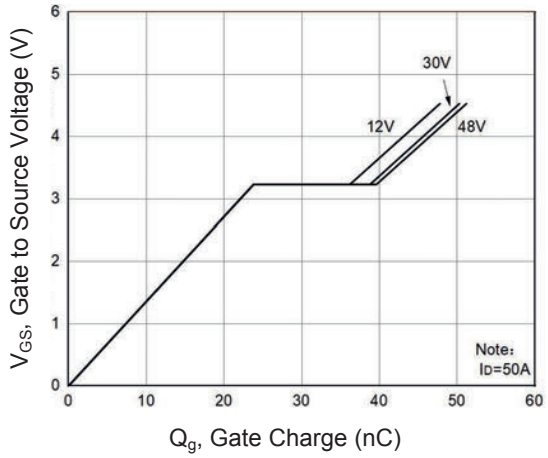


Figure 3. Gate Charge Characteristics

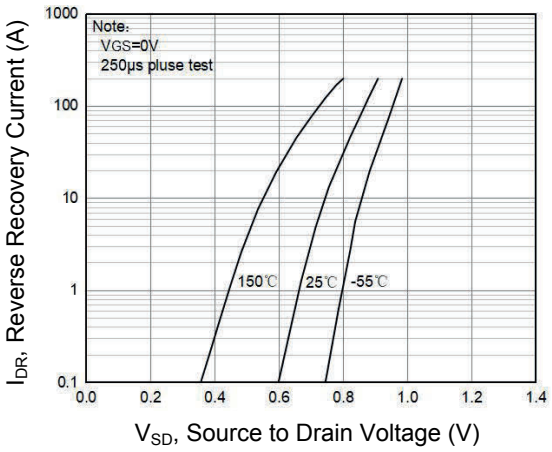


Figure 4. Body Diode Characteristics

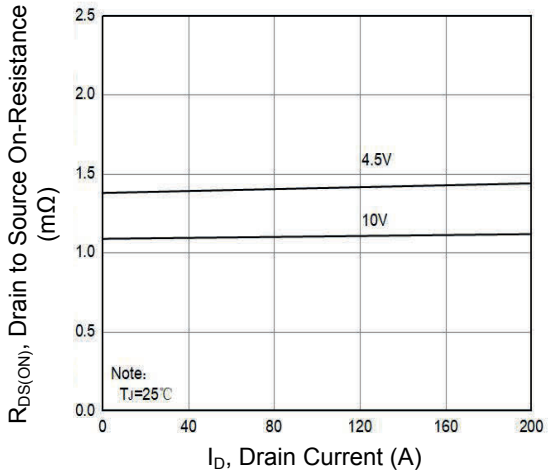


Figure 5. $R_{DS(ON)}$ vs. Drain Current

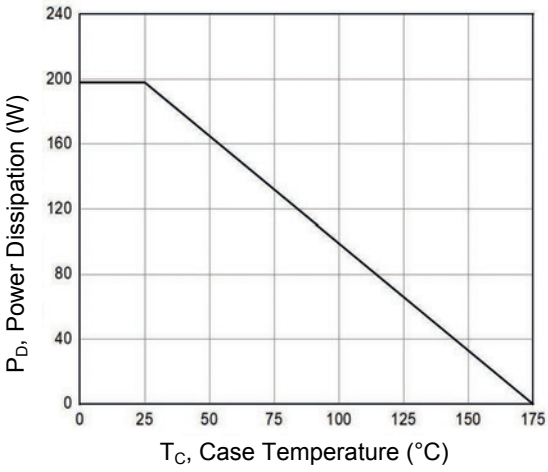


Figure 6. Power Dissipation vs. T_C

Typical Electrical and Thermal Characteristic Curves

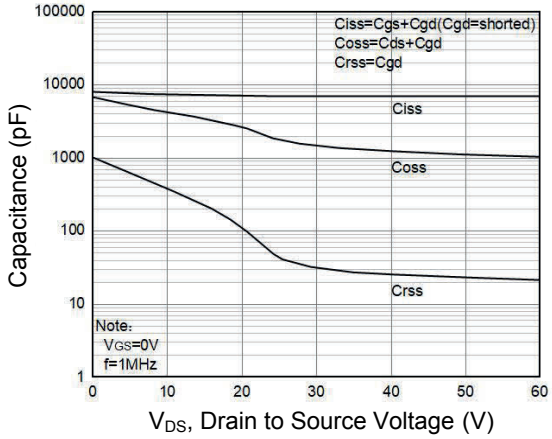


Figure 7. Capacitance Characteristics

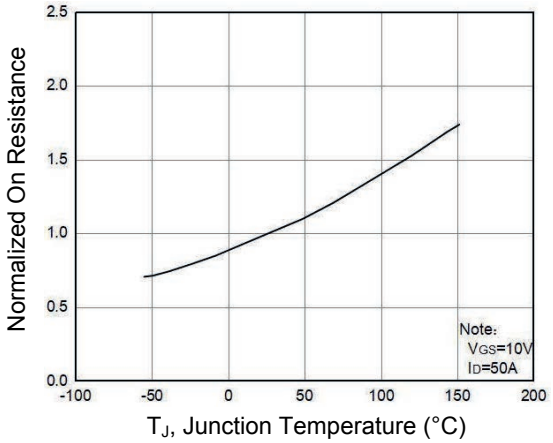


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

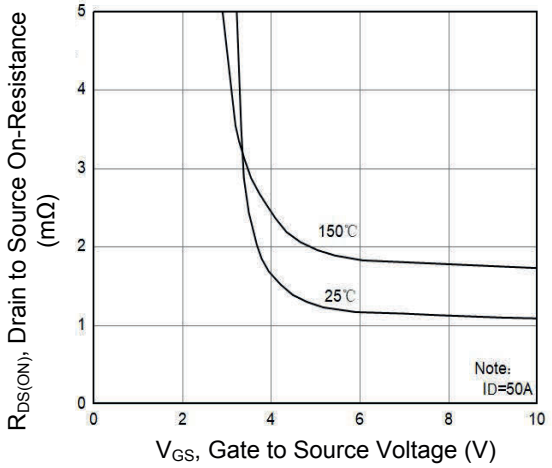


Figure 9. R_{DSon} vs. V_{GS}

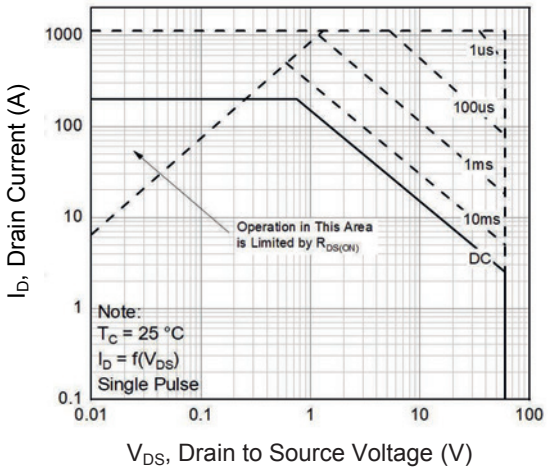


Figure 10. Safe Operation Area

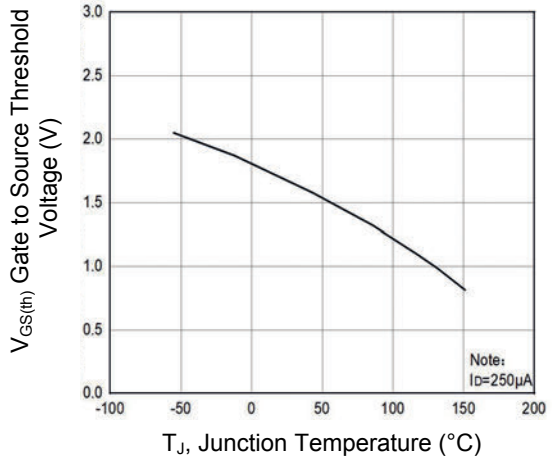


Figure 11. Gate Threshold Voltage vs. T_J

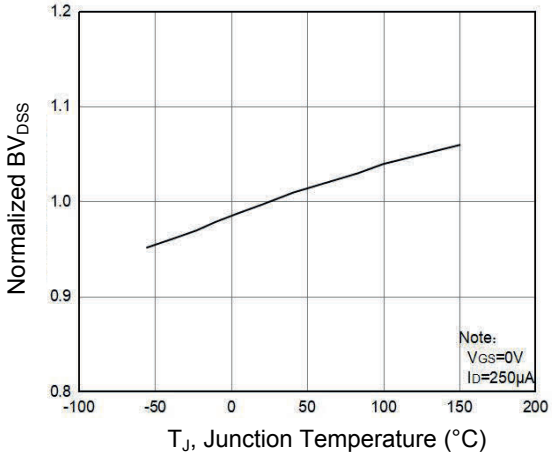
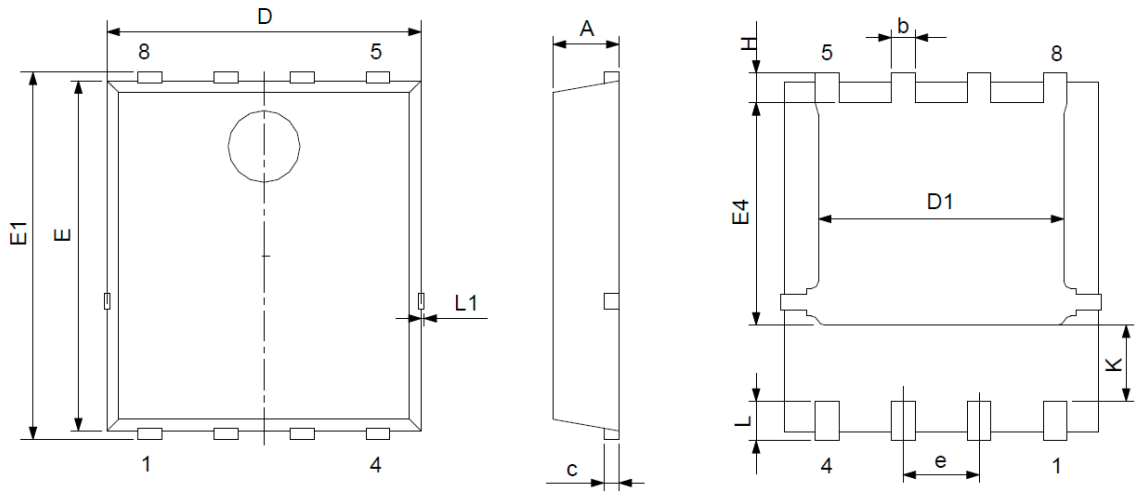


Figure 12. Normalized BV_{DSS} vs. T_J

Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.047
c	0.154	0.354	0.006	0.014
D	4.800	5.400	0.190	0.213
E	5.660	6.060	0.223	0.240
D1	3.760	4.300	0.148	0.169
E1	5.900	6.350	0.232	0.250
b	0.300	0.550	0.012	0.022
k	1.100	1.500	0.043	0.059
e	1.070	1.370	0.042	0.054
E4	3.340	3.920	0.131	0.154
L	0.300	0.710	0.012	0.028
L1	-	0.120	-	0.005
H	0.400	0.710	0.016	0.028

Order Information

Device	Package	Marking	Carrier	Quantity
GSGP1R306E	PPAK5x6	P1R306	Tape & Reel	5,000 Pcs / Reel