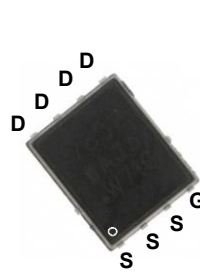
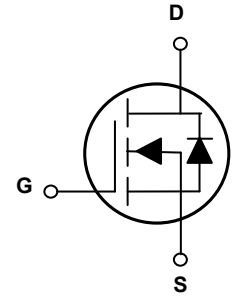


### Main Product Characteristics

$BV_{DSS}$	100V
$R_{DS(ON)}$	18m $\Omega$
$I_D$	40A



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 GSFP1040 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 ( $T_C=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_C=25^{\circ}C$ )	$I_D$	40	A
Drain Current-Continuous ( $T_C=100^{\circ}C$ )		26	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	160	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	76	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	39	A
Power Dissipation ( $T_C=25^{\circ}C$ )	$P_D$	83	W
Power Dissipation-Derate above 25 $^{\circ}C$		0.66	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^{\circ}C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.51	$^{\circ}C/W$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^{\circ}C$

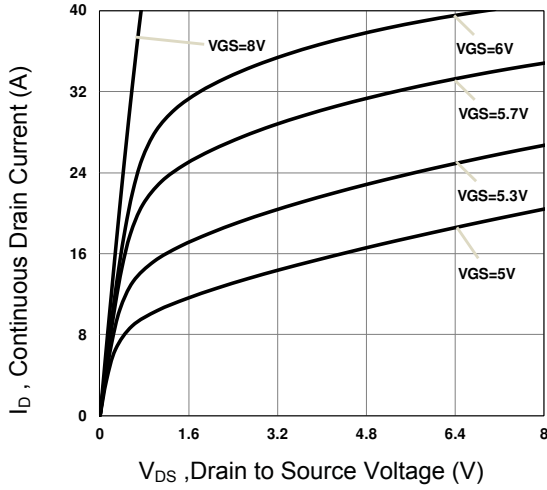
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=85^{\circ}\text{C}$	-	-	10	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	-	15	18	m $\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	-	6	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DS}=50V, I_D=20A, V_{GS}=10V$	-	11.4	18	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	2.6	4	
Gate-Drain Charge <sup>3,4</sup>	$Q_{gd}$		-	4	6	
Turn-On Delay Time <sup>3,4</sup>	$t_{d(on)}$	$V_{DD}=50V, R_G=6\Omega, V_{GS}=10V, I_D=20A$	-	4.8	7.2	nS
Rise Time <sup>3,4</sup>	$t_r$		-	12.5	19	
Turn-Off Delay Time <sup>3,4</sup>	$t_{d(off)}$		-	27.6	42	
Fall Time <sup>3,4</sup>	$t_f$		-	8.2	13	
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	-	865	1300	pF
Output Capacitance	$C_{oss}$		-	175	260	
Reverse Transfer Capacitance	$C_{rss}$		-	6	10	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	0.9	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	40	A
Pulsed Source Current	$I_{SM}$		-	-	80	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	-	-	1	V
Reverse Recovery Time	$t_{rr}$	$V_R=100V, I_S=10A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	-	130	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	180	-	nC

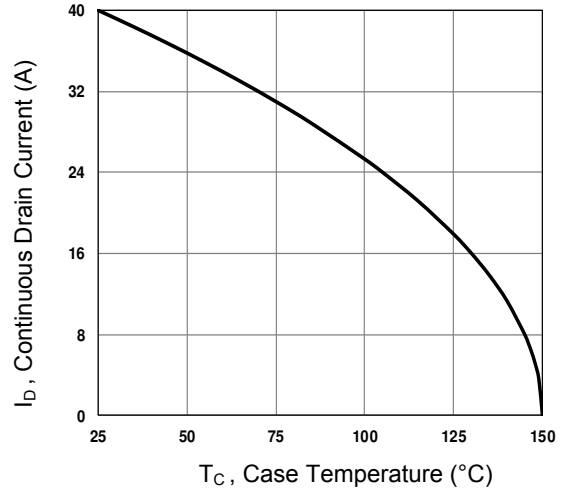
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=39A, R_G=25\Omega, \text{starting } T_J=25^{\circ}\text{C}$ .
3. Pulse test: pulse width  $\leq 300\mu s, \text{duty cycle} \leq 2\%$ .
4. Essentially independent of operation temperature.

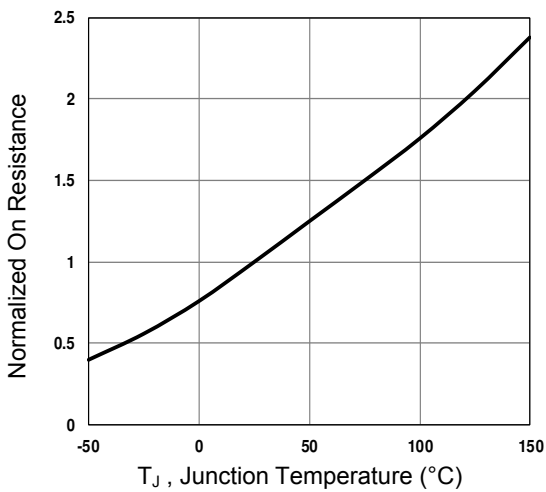
**Typical Electrical and Thermal Characteristic Curves**



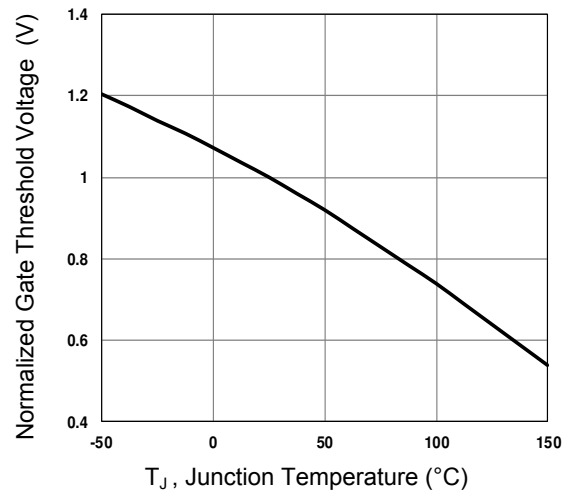
**Figure 1. Typical Output Characteristics**



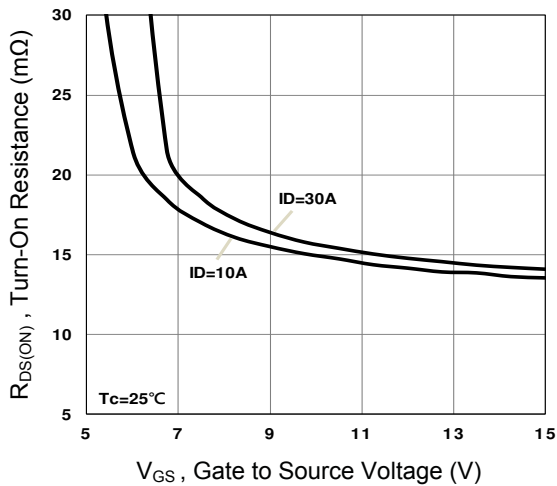
**Figure 2. Continuous Drain Current vs.  $T_C$**



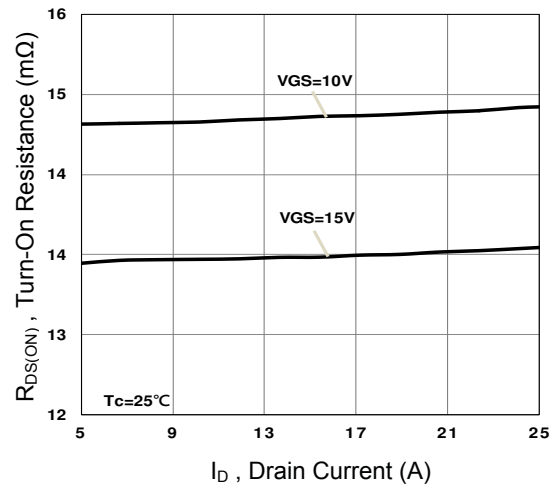
**Figure 3. Normalized  $R_{DS(on)}$  vs.  $T_J$**



**Figure 4. Normalized  $V_{th}$  vs.  $T_J$**

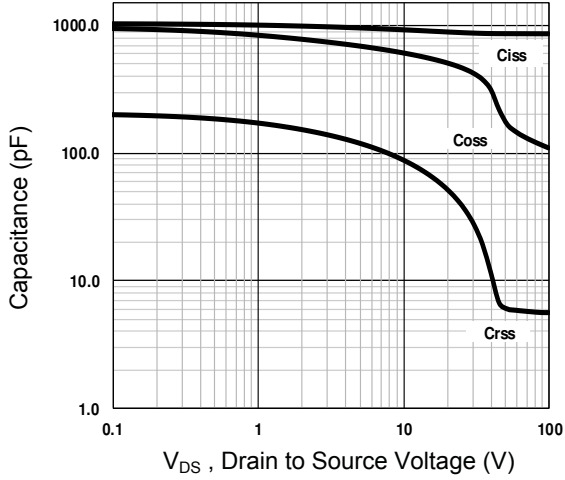


**Figure 5. Turn-On Resistance vs.  $V_{GS}$**

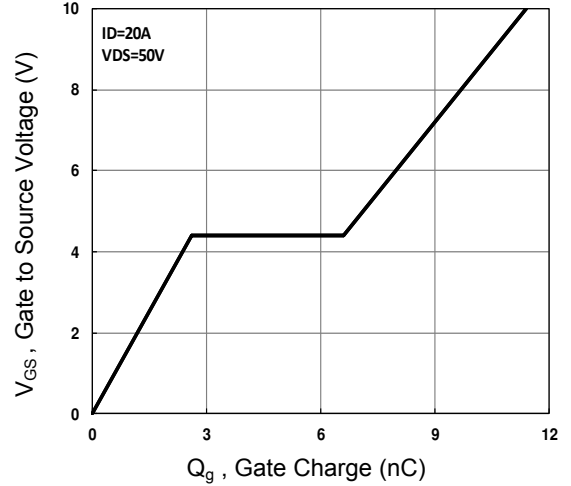


**Figure 6. Turn-On Resistance vs.  $I_D$**

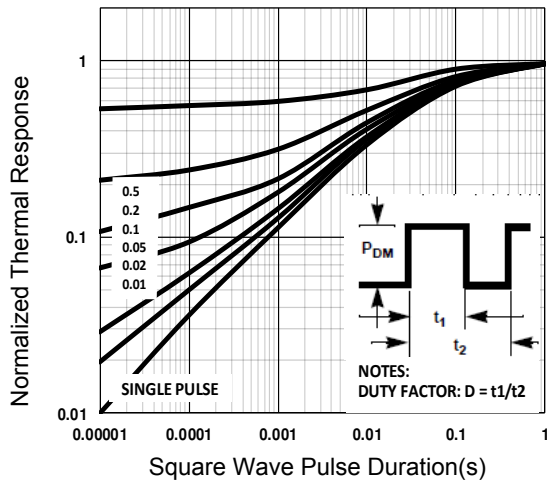
**Typical Electrical and Thermal Characteristic Curves**



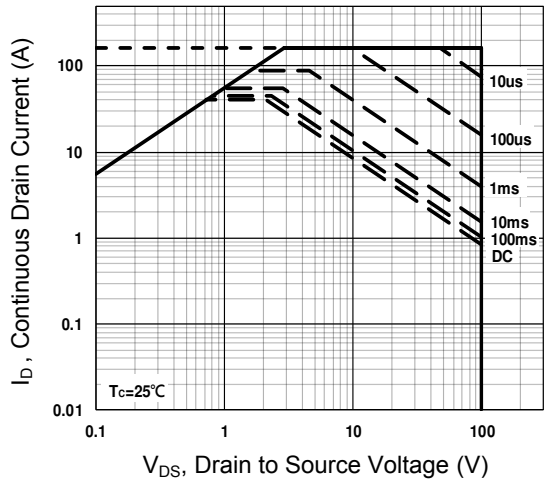
**Figure 7. Capacitance Characteristics**



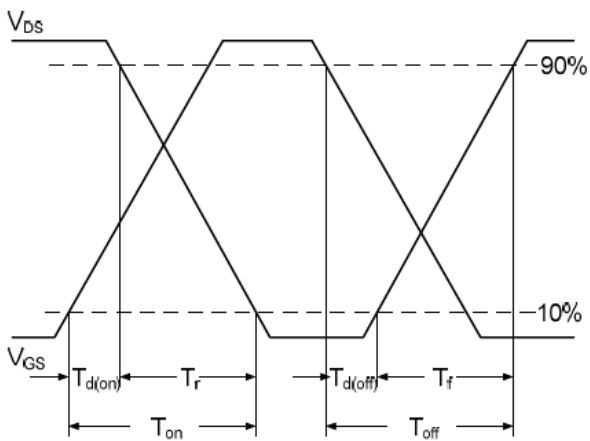
**Figure 8. Gate Charge Waveform**



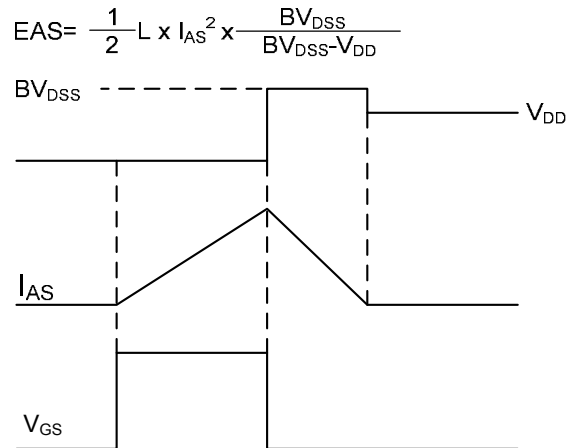
**Figure 9. Normalized Transient Impedance**



**Figure 10. Maximum Safe Operation Area**

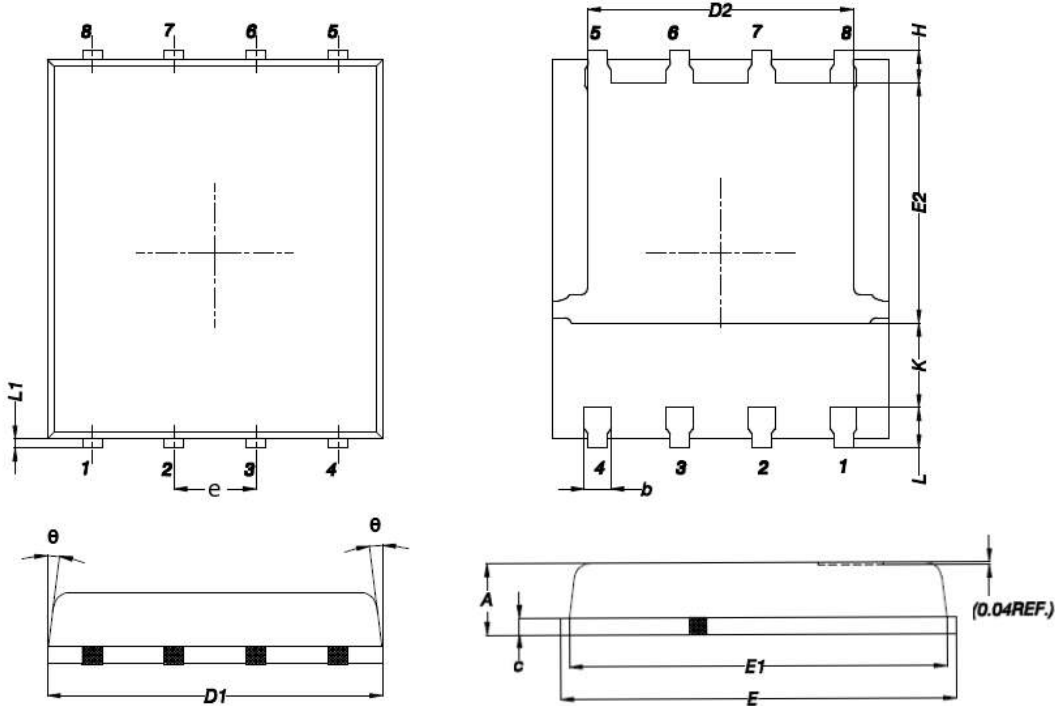


**Figure 11. Switching Time Waveform**



**Figure 12. EAS Waveform**

**Package Outline Dimensions (PPAK5x6)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.330	0.020	0.012
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
theta	12°	0°	12°	0°