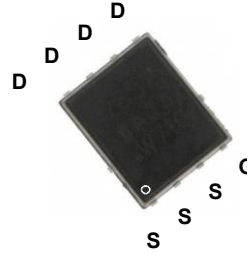
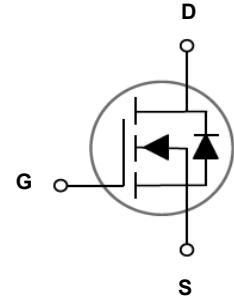


**Main Product Characteristics**

$BV_{DSS}$	40V
$R_{DS(ON)}$	2.2m $\Omega$
$I_D$	140A



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 GSFP04140 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** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	140	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		88	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	560	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	360	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	85	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	142	W
Power Dissipation-Derate above $25^\circ\text{C}$		1.14	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.88	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-50 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-50 To +150	$^\circ\text{C}$

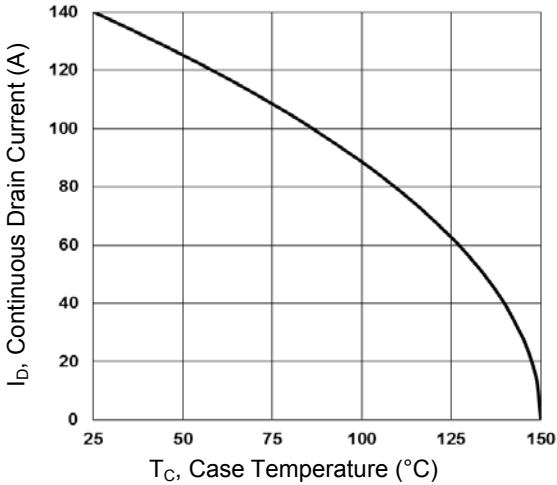
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{DS}=32V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	1.7	2.2	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	2.1	3	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=10A$	-	45	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DS}=20V, I_D=10A, V_{GS}=4.5V$	-	70	140	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	15	32	
Gate-Drain Charge <sup>3,4</sup>	$Q_{gd}$		-	40	80	
Turn-On Delay Time <sup>3,4</sup>	$t_{d(on)}$	$V_{DD}=20V, R_G=10\Omega, V_{GS}=10V, I_D=10A$	-	24.6	48	nS
Rise Time <sup>3,4</sup>	$t_r$		-	62.8	120	
Turn-Off Delay Time <sup>3,4</sup>	$t_{d(off)}$		-	224	440	
Fall Time <sup>3,4</sup>	$t_f$		-	162	320	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	-	8000	12000	pF
Output Capacitance	$C_{oss}$		-	550	1000	
Reverse Transfer Capacitance	$C_{rss}$		-	420	800	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1.2	2.4	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	140	A
Pulsed Source Current	$I_{SM}$		-	-	280	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=20A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	-	32	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	19	-	nC

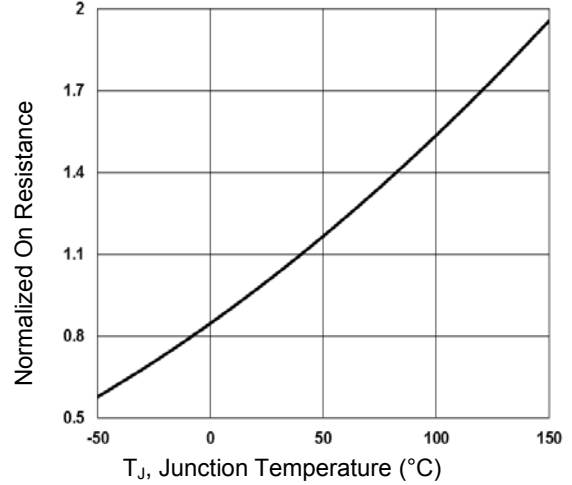
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=85A$ , starting  $T_J=25^\circ\text{C}$ .
3. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

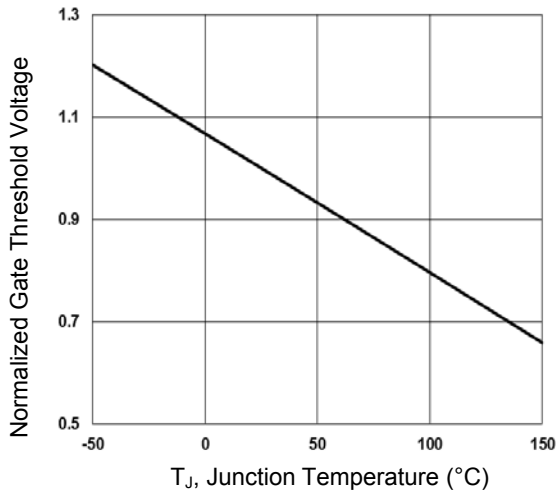
**Typical Electrical and Thermal Characteristic Curves**



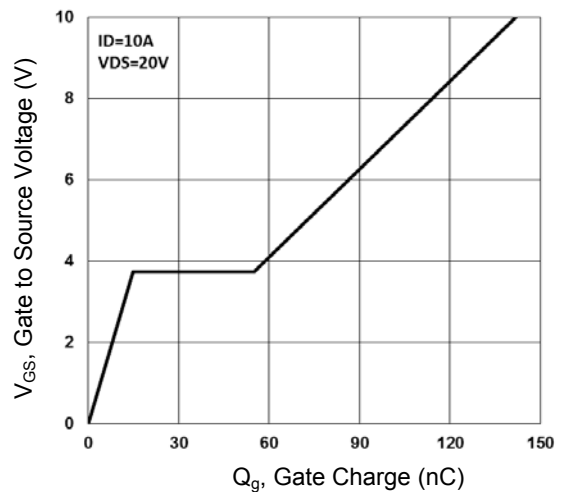
**Figure 1. Continuous Drain Current vs.  $T_c$**



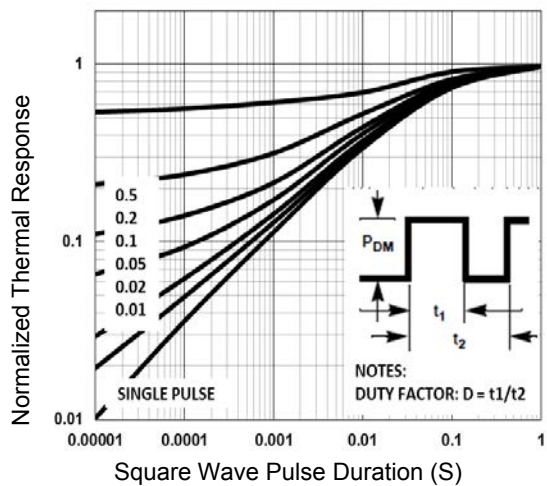
**Figure 2. Normalized  $R_{DS(ON)}$  vs.  $T_j$**



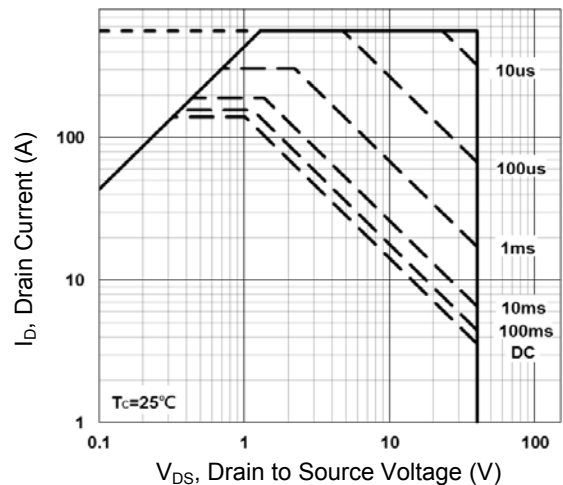
**Figure 3. Normalized  $V_{th}$  vs.  $T_j$**



**Figure 4. Gate Charge Characteristics**

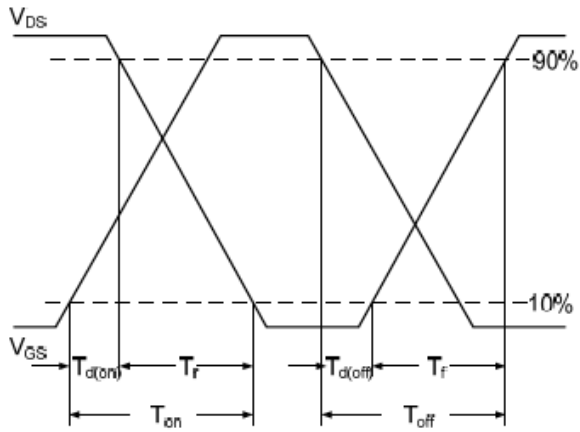


**Figure 5. Normalized Transient Impedance**

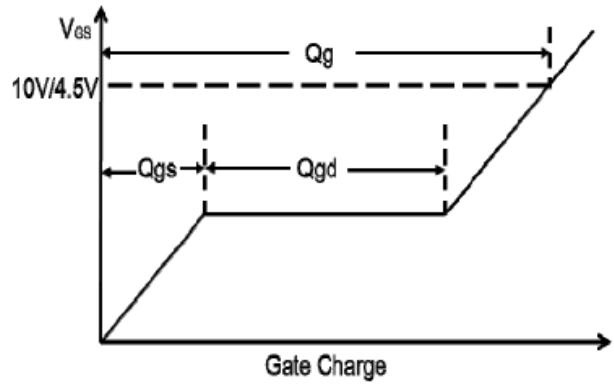


**Figure 6. Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**

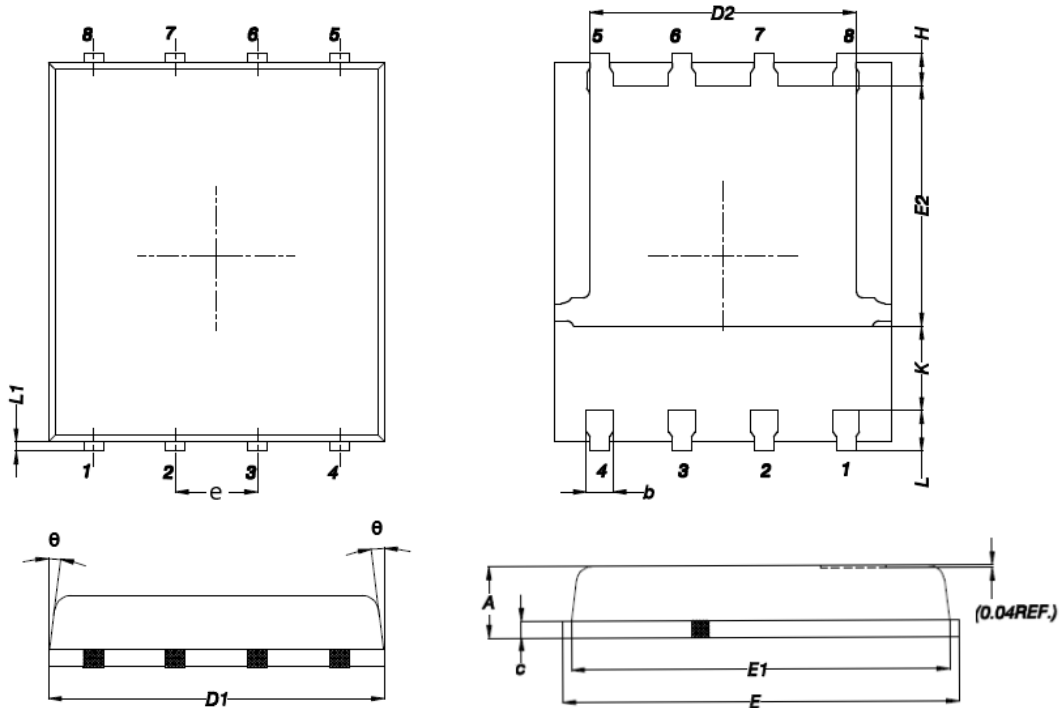


**Figure 7. Switching Time Waveform**



**Figure 8. Gate Charge 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	0.300	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
θ	12°	0°	12°	0°