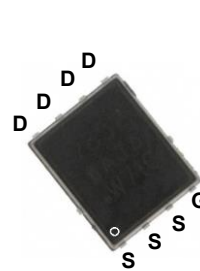
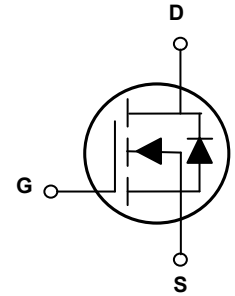


### Main Product Characteristics

$BV_{DSS}$	60V
$R_{DS(ON)}$	21m $\Omega$
$I_D$	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 GSFP0640 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	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	40	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		25	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	160	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	42	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	29	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	83	W
Power Dissipation-Derate above 25 $^\circ\text{C}$		0.66	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-50 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-50 To +150	$^\circ\text{C}$

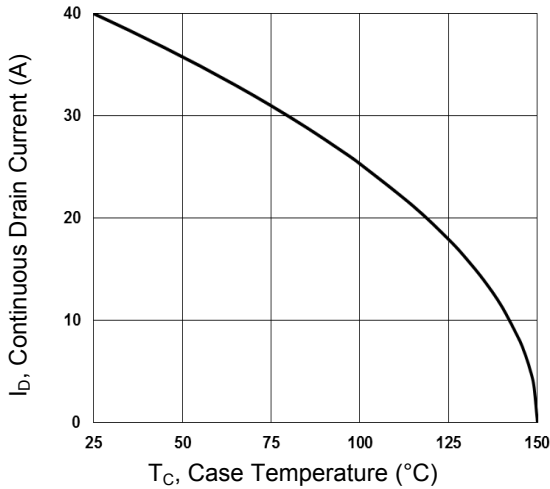

**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1mA$	-	0.07	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V,$ $T_J=25^\circ\text{C}$	-	-	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V,$ $T_J=125^\circ\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	-	17	21	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	-	20	24	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.2	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	5	-	$mV/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=10A$	-	9	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=30V, I_D=15A,$ $V_{GS}=10V$	-	16.5	25	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	2.5	3.8	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	4	6	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=30V, R_G=6\Omega,$ $V_{GS}=10V, I_D=1A$	-	7.2	14	nS
Rise Time <sup>2,3</sup>	$t_r$		-	38	72	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	34	65	
Fall Time <sup>2,3</sup>	$t_f$		-	8.2	16	
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V,$ $F=1MHz$	-	1180	1750	pF
Output Capacitance	$C_{oss}$		-	90	135	
Reverse Transfer Capacitance	$C_{rss}$		-	50	75	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V,$ $F=1MHz$	-	2.6	4.4	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	40	A
Pulsed Source Current	$I_{SM}$		-	-	160	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A,$ $T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time <sup>2</sup>	$t_{rr}$	$V_R=50V, I_S=10A,$ $di/dt=100A/\mu s,$ $T_J=25^\circ\text{C}$	-	30	-	nS
Reverse Recovery Charge <sup>2</sup>	$Q_{rr}$		-	16	-	nC

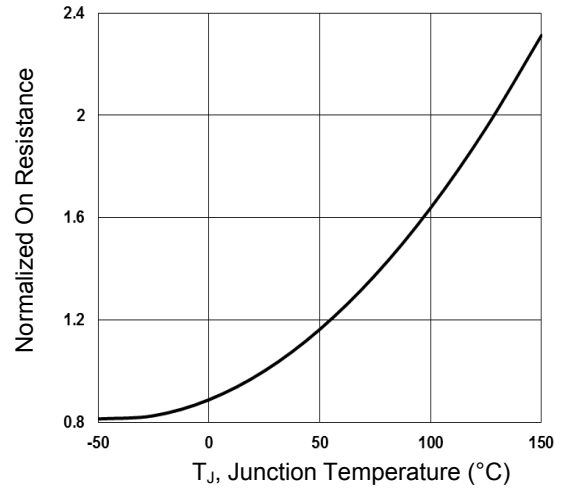
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=29A, R_G=25\Omega,$  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.

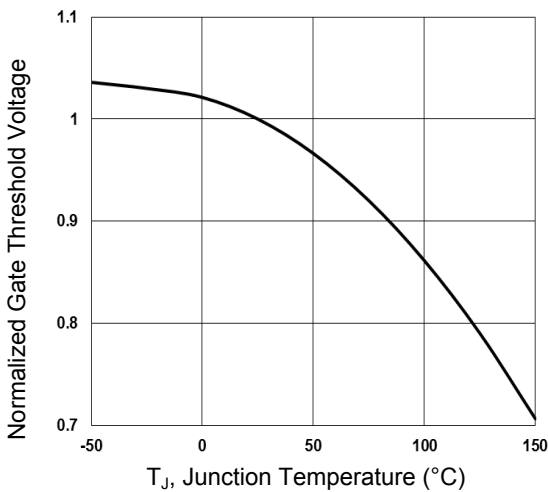
**Typical Electrical and Thermal Characteristic Curves**



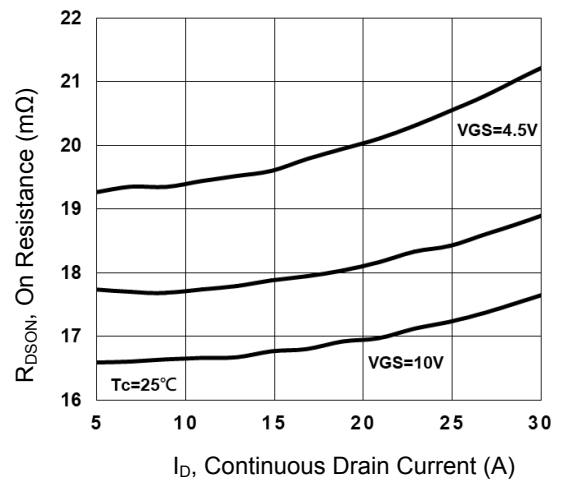
**Figure 1. Continuous Drain Current vs. T<sub>C</sub>**



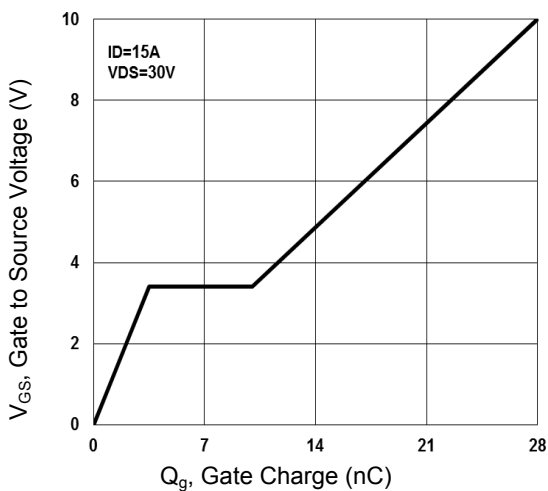
**Figure 2. Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**



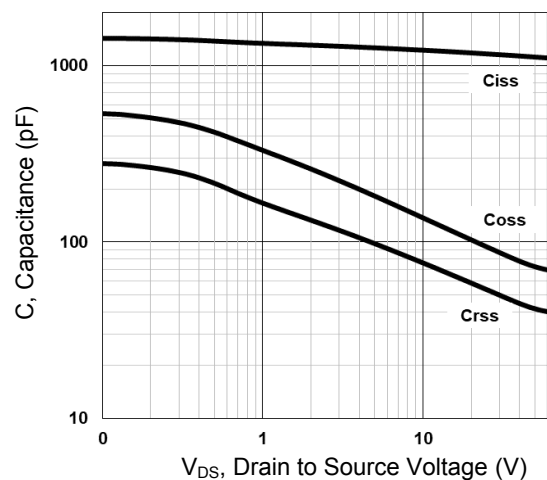
**Figure 3. Normalized V<sub>th</sub> vs. T<sub>J</sub>**



**Figure 4. R<sub>DS(on)</sub> vs. Continuous Drain Current**

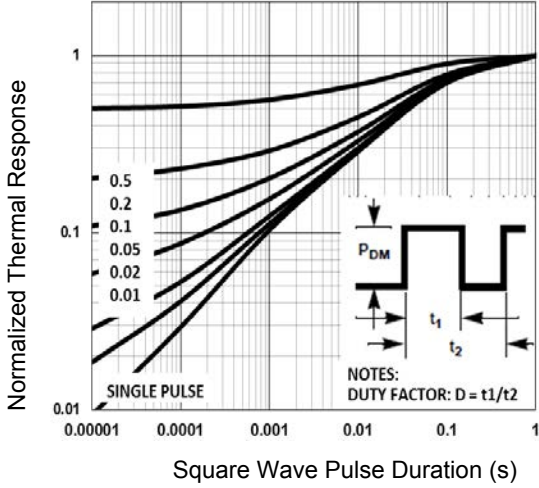


**Figure 5. Gate Charge Waveform**

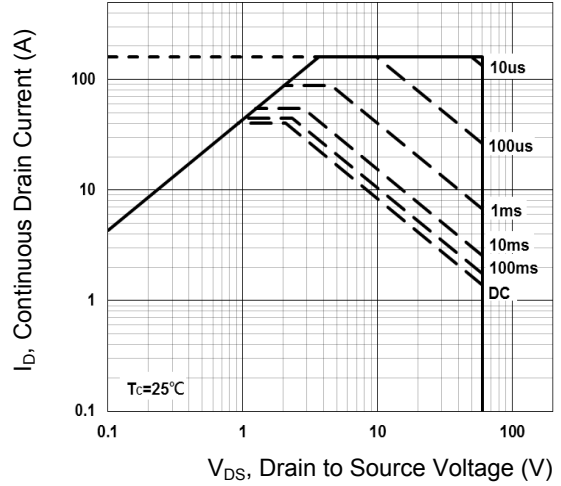


**Figure 6. Capacitance Characteristics**

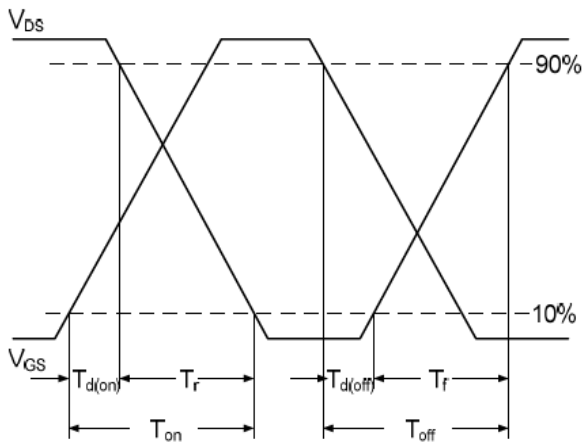
**Typical Electrical and Thermal Characteristic Curves**



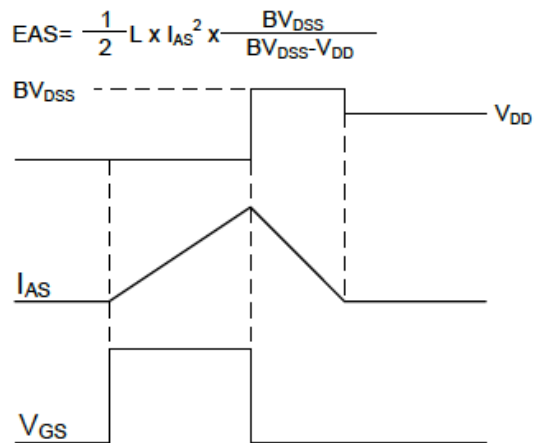
**Figure 7. Normalized Transient Impedance**



**Figure 8. Maximum Safe Operation Area**

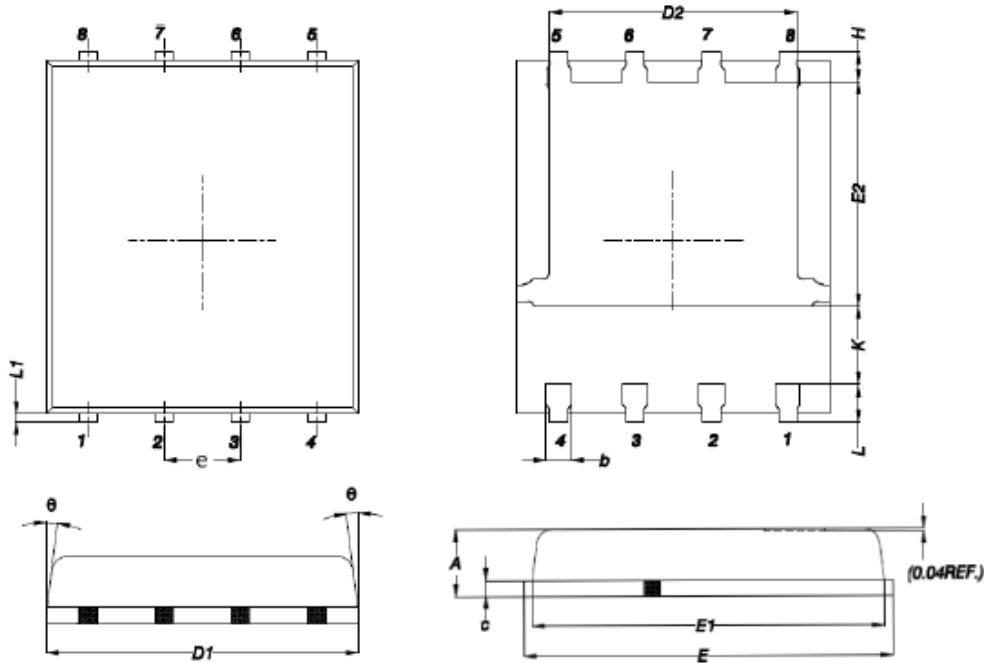


**Figure 9. Switching Time Waveform**



**Figure 10. 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	0.300	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°