GOOD-ARK
SEMICONDUCTOR

GSFP0380
30V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	5.5mΩ
I_D	80A

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 GSFP0380 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	80	A
Drain Current-Continuous $(T_C=100°C)$		51	
Drain Current-Pulsed[1]	I_{DM}	320	A
Single Pulse Avalanche Energy[2]	E_{AS}	88	mJ
Single Pulse Avalanche Current[2]	I_{AS}	42	A
Power Dissipation $(T_C=25°C)$	P_D	74	W
Power Dissipation-Derate above 25°C		0.59	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{θJA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{θJC}$	1.7	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

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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
BV_{DSS} 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	μA
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=20A	-	4.6	5.5	mΩ
		V_{GS}=4.5V, I_D=10A	-	6.5	8.5	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1	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=10A	-	18	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=15V, I_D=20A, V_{GS}=4.5V	-	11.1	-	nC
Gate-Source Charge[3,4]	Q_{gs}		-	1.85	-	
Gate-Drain Charge[3,4]	Q_{gd}		-	6.8	-	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=15V, R_G=3.3Ω, V_{GS}=10V, I_D=15A	-	7.5	-	nS
Rise Time[3,4]	t_r		-	14.5	-	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	35.2	-	
Fall Time[3,4]	t_f		-	9.6	-	
Input Capacitance	C_{Iss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	1210	-	pF
Output Capacitance	C_{oss}		-	190	-	
Reverse Transfer Capacitance	C_{rss}		-	100	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	2.5	-	Ω
Guaranteed Avalanche Engergy						
Single Pluse Avalanche Energy	E_{AS}	V_{DD}=25V, L=0.1mH, I_{AS}=20A	20	-	-	mJ
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_s	V_G=V_D=0V, Force Current	-	-	80	A
Pulsed Source Current[3]	I_{SM}		-	-	320	A
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_s=1A, T_J=25°C	-	-	1	V

Note:
1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=42A, R_G=25Ω, starting T_J=25°C.
3. Pulse test: pulse width ≤300us, duty cycle≤2%.
4. Essentially independent of operating temperature.

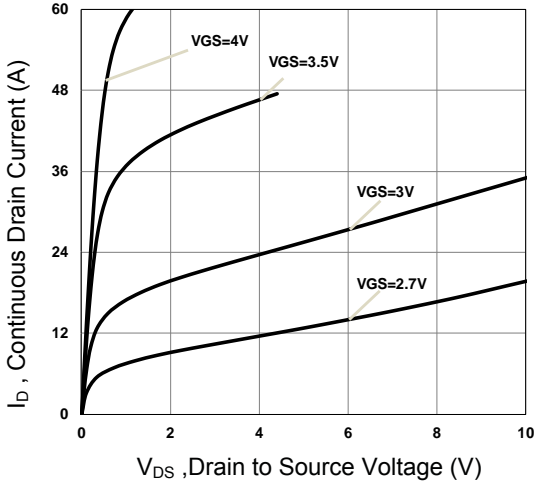# Typical Electrical and Thermal Characteristic Curves
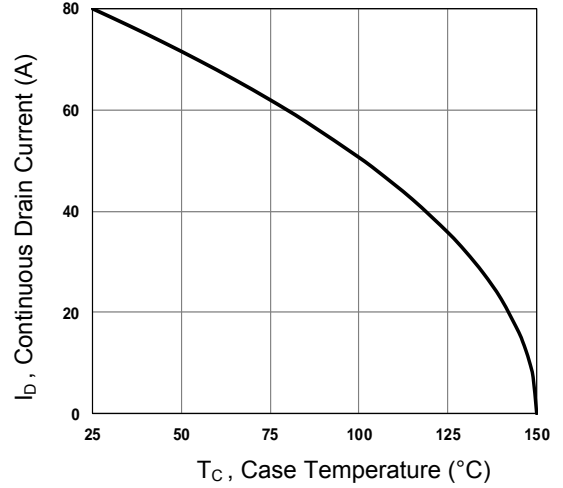

Figure 1. Typical Output Characteristics

Figure 2. Continuous Drain Current vs. T_C
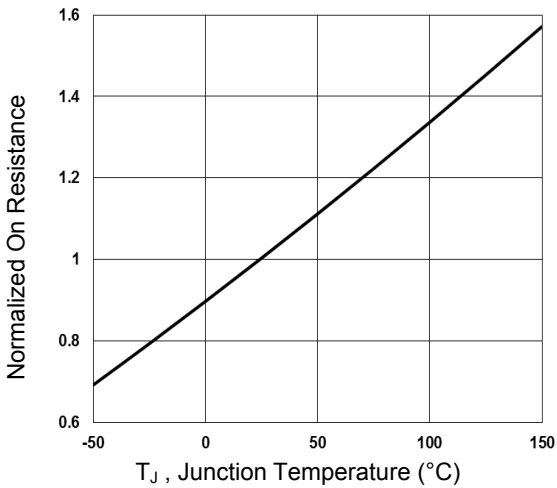

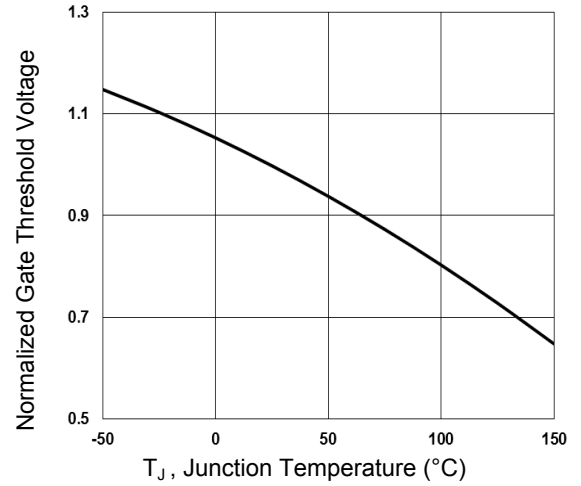Figure 3. Normalized R_{DSON} vs. T_J

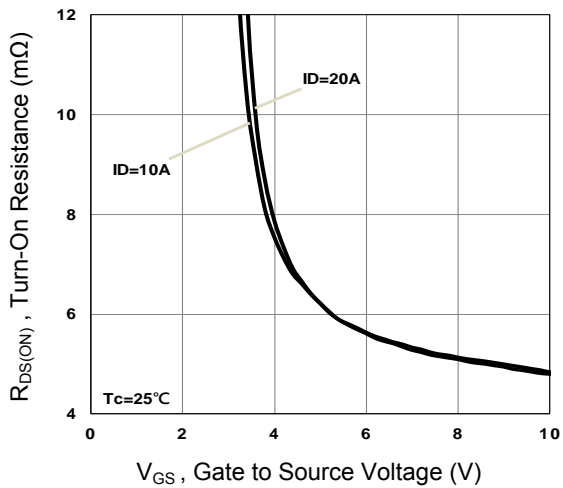Figure 4. Normalized V_{th} vs. T_J
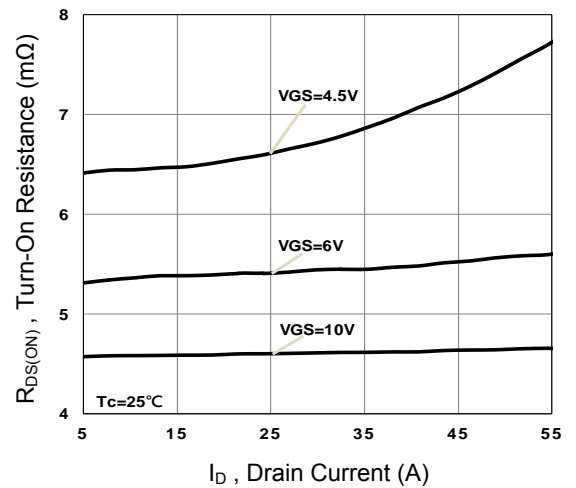

Figure 5. Turn-On Resistance vs. V_{GS}

Figure 6. Turn-On Resistance vs. I_D
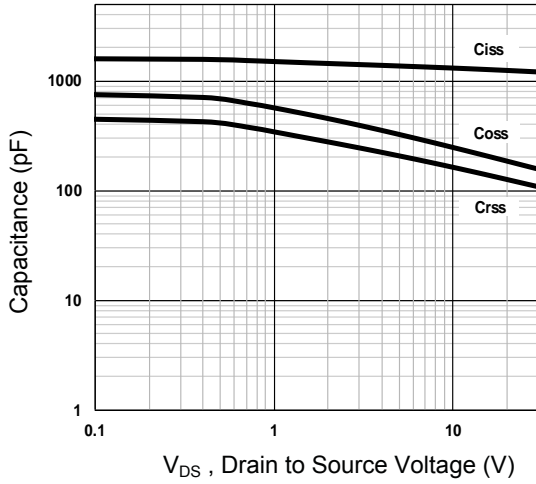
Typical Electrical and Thermal Characteristic Curves
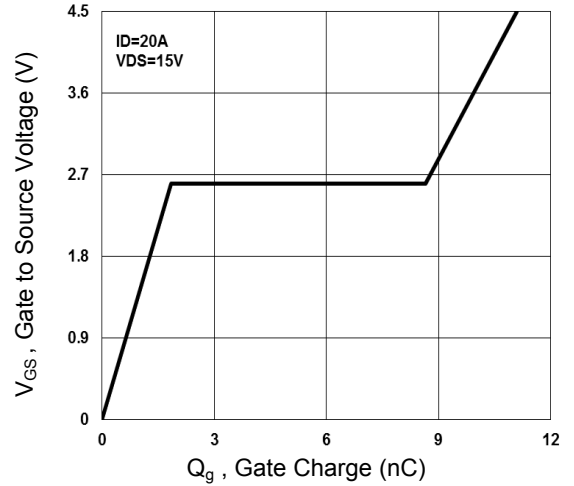

Figure 7. Capacitance Characteristics

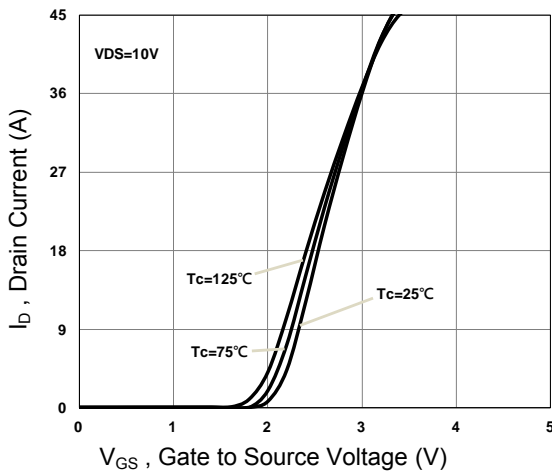**Figure 8. Gate Charge Waveform**

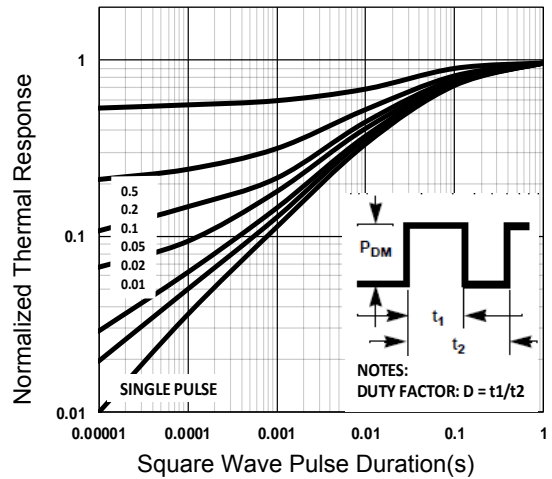**Figure 9. Transfer Characteristics**

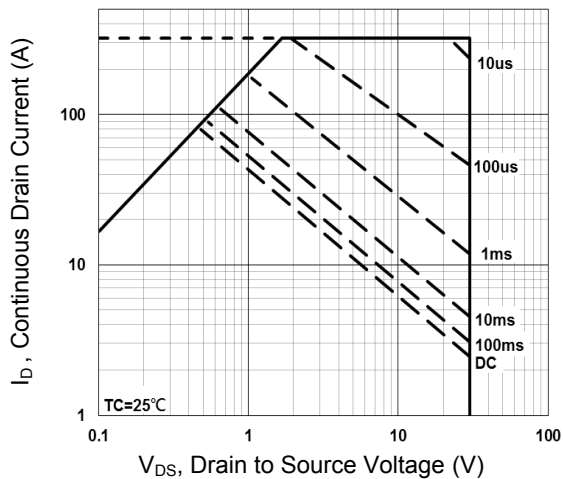**Figure 10. Normalized Transient Impedance**

Figure 11. Maximum Safe Operation Area

Figure 12. Switching Time Waveform

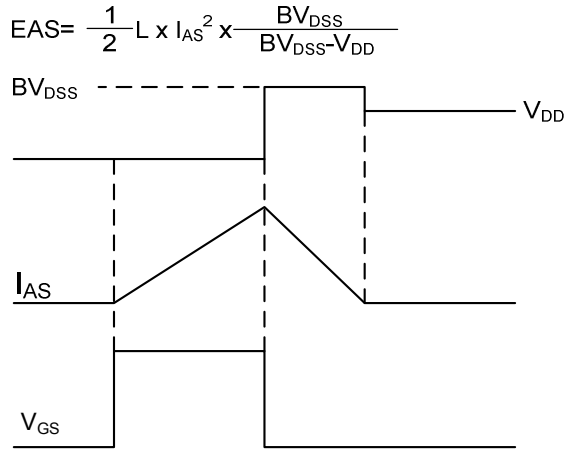## Typical Electrical and Thermal Characteristic Curves

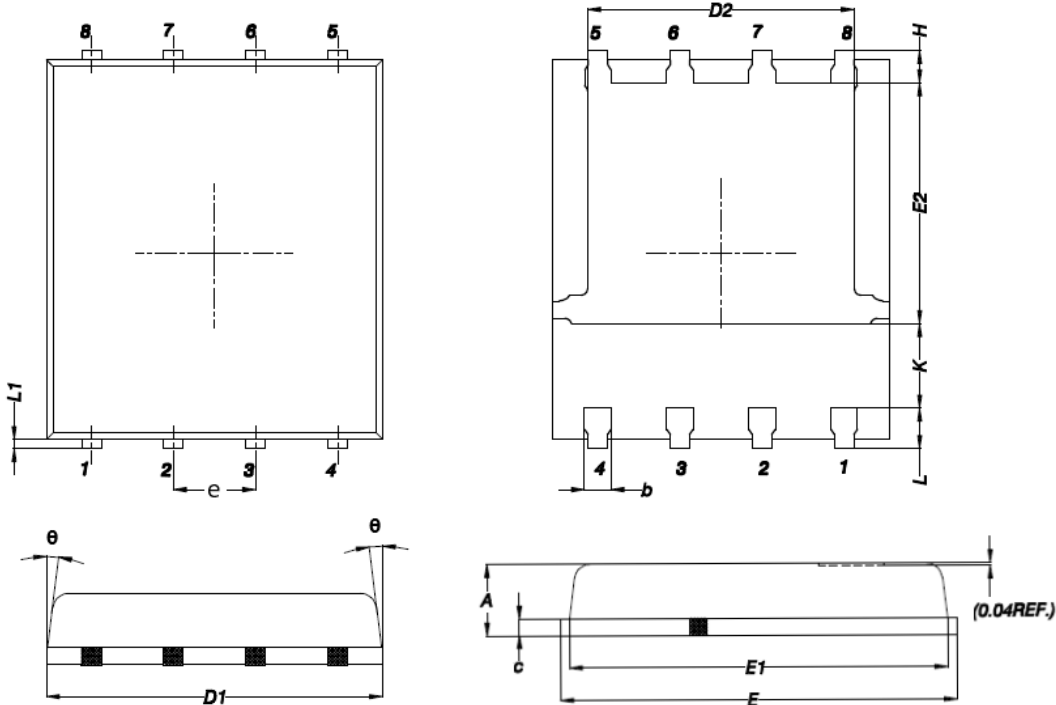$$EAS = \frac{1}{2} L \times I_{AS}{}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Figure 13. 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°