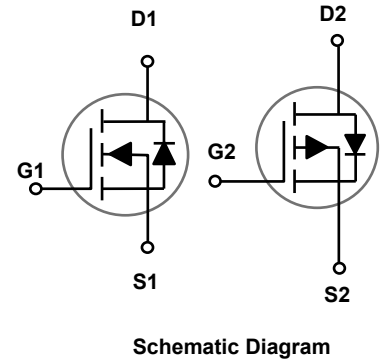
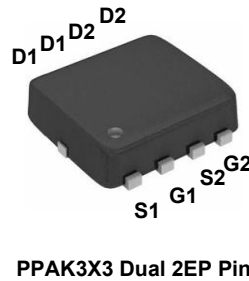


Main Product Characteristics

Polarity	N-Ch	P-Ch
V_{DSS}	30V	-30V
$R_{DS(ON)(Max.)}$	20m Ω	18m Ω
I_D	12A	-16A



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 GSFN3703 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	Rating		Unit
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current – Continuous ($T_C=25^\circ\text{C}$)	I_D	12	-16	A
Drain Current – Continuous ($T_C=100^\circ\text{C}$)		7.6	-10.1	A
Drain Current – Pulsed ¹	I_{DM}	48	-64	A
Single Pulse Avalanche Energy ^{2,6}	E_{AS}	32	63	mJ
Single Pulse Avalanche Current ²	I_{AS}	8	35	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	20		W
Power Dissipation – Derate above 25°C		0.16		W/ $^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150		$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150		$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	6.4	$^\circ\text{C}/\text{W}$

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

Parameter	Symbol	Test Conditions	Typical	Min	Max	Unit
DC Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	---	---	V
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 Characteristics						
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =8A	---	15	20	mΩ
		V _{GS} =4.5V, I _D =5A	---	21	30	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250μA	1.2	1.5	2.5	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	-4	---	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =6A	---	13	---	S
Dynamic Characteristics						
Total Gate Charge ^{3,4}	Q _g	V _{DS} =15V, V _{GS} =10V, I _D =6A	---	9.1	18	nC
Gate-Source Charge ^{3,4}	Q _{gs}		---	1	2	
Gate-Drain Charge ^{3,4}	Q _{gd}		---	2.1	4	
Turn-On Delay Time ^{3,4}	T _{d(on)}	V _{DD} =15V, V _{GS} =10V, R _G =6Ω, I _D =1A	---	2.8	5	nS
Rise Time ^{3,4}	T _r		---	7.2	14	
Turn-Off Delay Time ^{3,4}	T _{d(off)}		---	15.8	30	
Fall Time ^{3,4}	T _f		---	4.6	9	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	345	500	pF
Output Capacitance	C _{oss}		---	55	80	
Reverse Transfer Capacitance	C _{rss}		---	32	55	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	3.2	6.4	Ω
Thermal Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	---	---	12	A
Pulsed Source Current	I _{SM}		---	---	24	A
Diode Forward Voltage	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=1mH, I_{AS}=8A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
BV_{DSS} Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Reference to $25^\circ\text{C}, I_D=-1\text{mA}$	---	-0.03	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}\leq 20V, V_{DS}=0V$	---	---	± 100	nA
Dynamic Characteristics						
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-8A$	---	14.5	18	$\text{m}\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	---	23	30	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$		---	4	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=-10V, I_D=-3A$	---	6.8	---	S
Switching Characteristics						
Total Gate Charge ^{7,8}	Q_g		---	24.4	48	nC
Gate-Source Charge ^{7,8}	Q_{gs}	$V_{DS}=-15V, V_{GS}=-10V, I_D=-5A$	---	3.4	6	
Gate-Drain Charge ^{7,8}	Q_{gd}		---	4.2	8	
Turn-On Delay Time ^{7,8}	$T_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	5.8	11	nS
Rise Time ^{7,8}	T_r		---	18.8	36	
Turn-Off Delay Time ^{7,8}	$T_{d(off)}$		---	46.9	90	
Fall Time ^{7,8}	T_f		---	12.3	23	
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	1250	2500	pF
Output Capacitance	C_{oss}		---	160	320	
Reverse Transfer Capacitance	C_{rss}		---	90	180	
Thermal Characteristics						
Continuous Source Current	I_S	$V_{GS}=V_D=0V, \text{Force Current}$	---	---	-16	A
Pulsed Source Current	I_{SM}		---	---	-32	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	-1	V

Note:

- Repetitive Rating: Pulsed width limited by maximum junction temperature.
- $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-35A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
- The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- Essentially independent of operating temperature.

N-Channel Typical Characteristic Curves

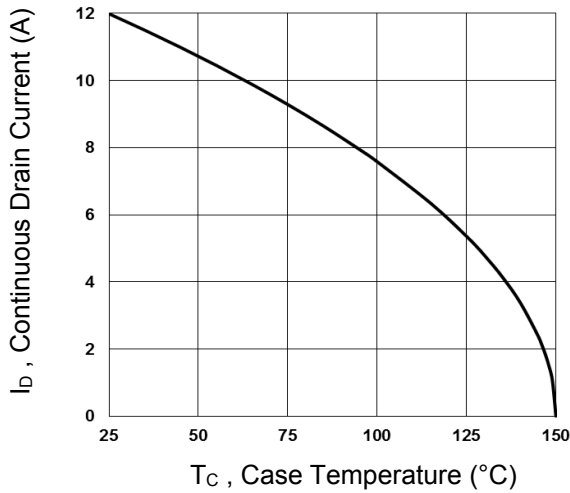


Fig.1 Continuous Drain Current vs. T_c

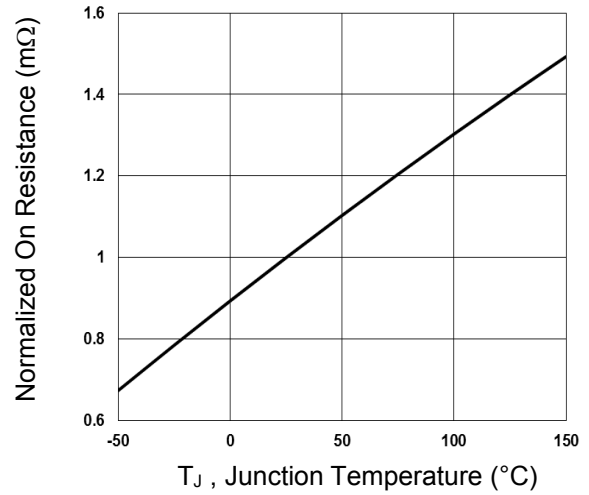


Fig.2 Normalized R_{DS(on)} vs. T_j

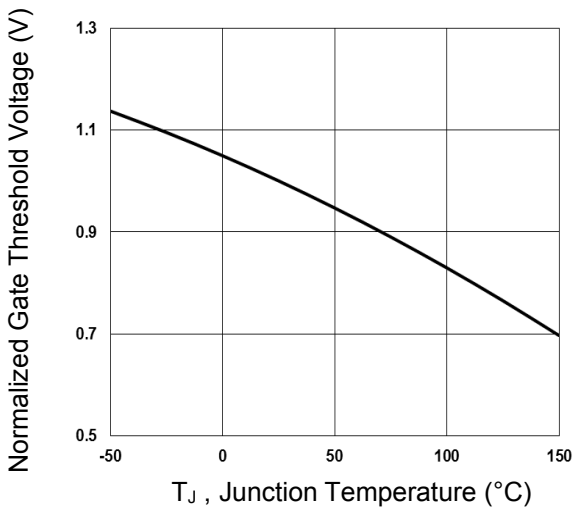


Fig.3 Normalized V_{th} vs. T_j

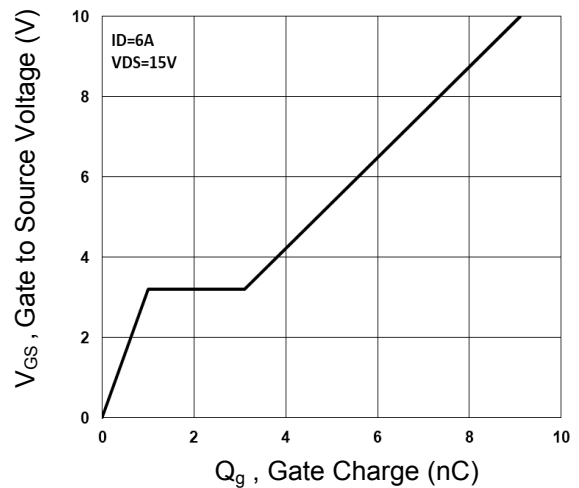


Fig.4 Gate Charge Waveform

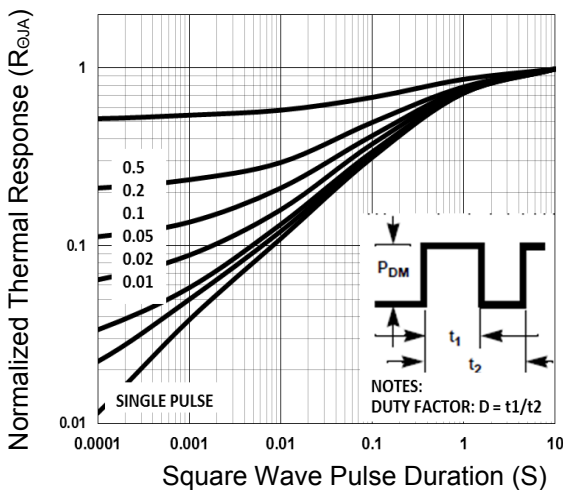


Fig.5 Normalized Transient Response

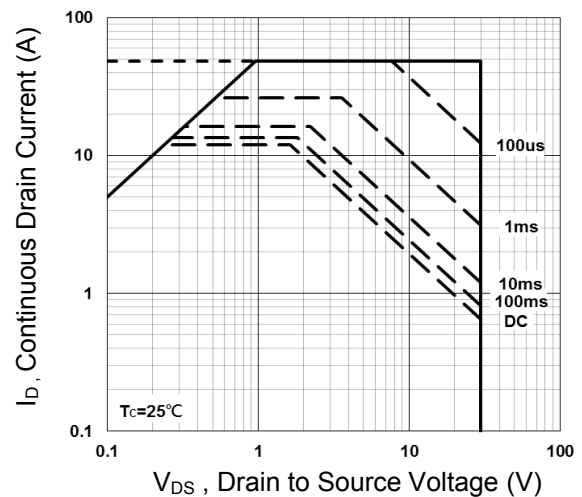


Fig.6 Maximum Safe Operation Area

P-Channel Typical Characteristic Curves

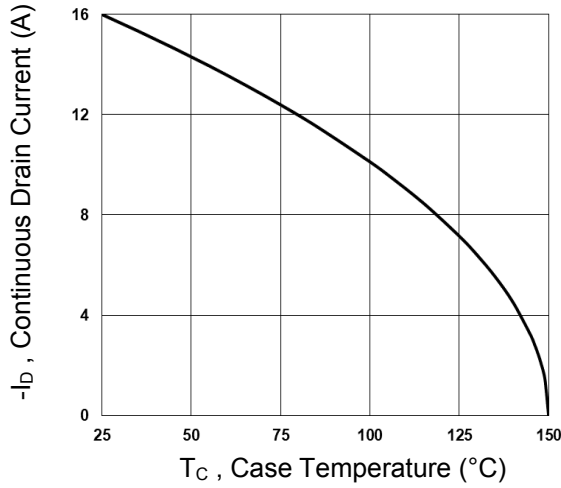


Fig.1 Continuous Drain Current vs. T_C

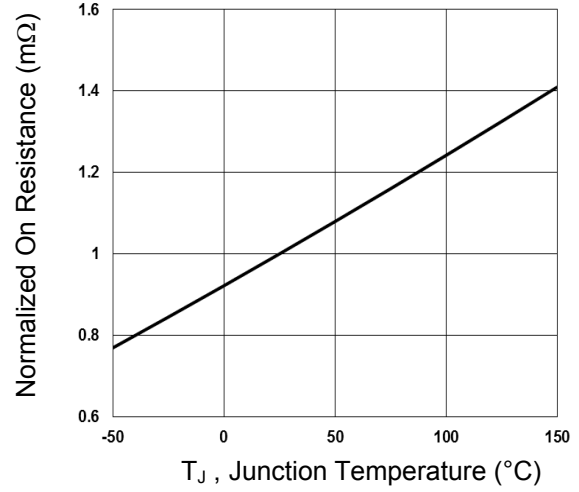


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

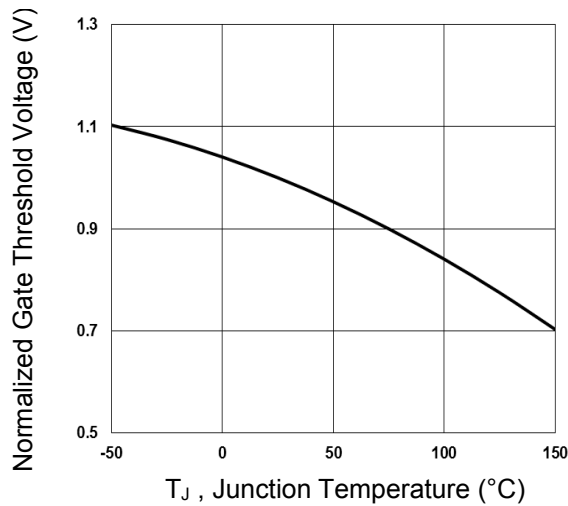


Fig.3 Normalized V_{th} vs. T_J

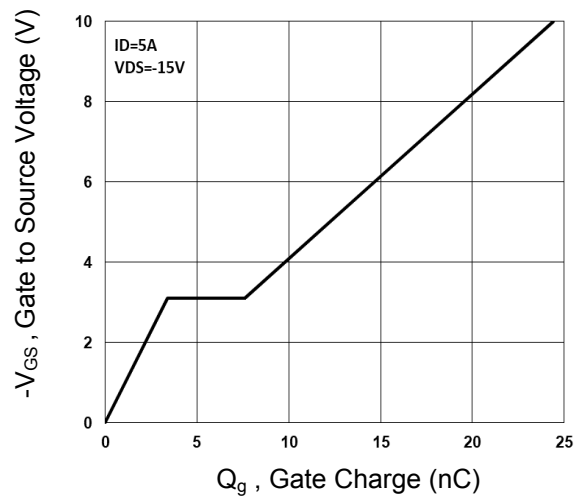


Fig.4 Gate Charge Waveform

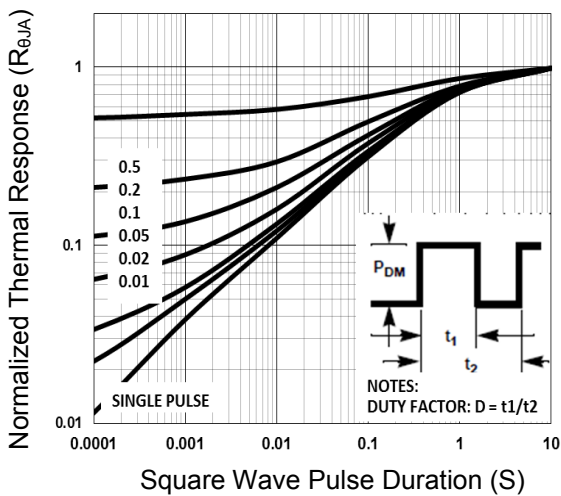


Fig.5 Normalized Transient Impedance

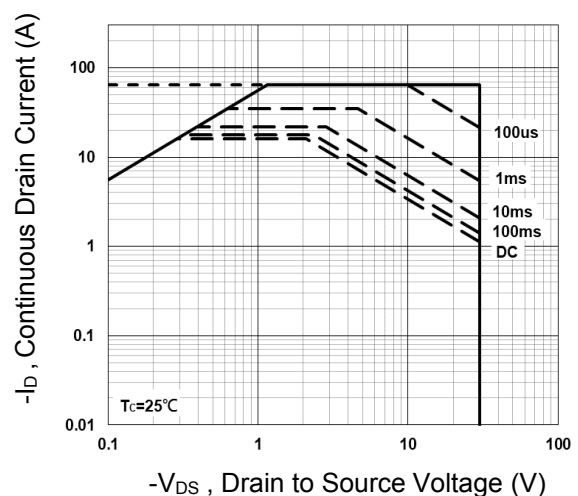
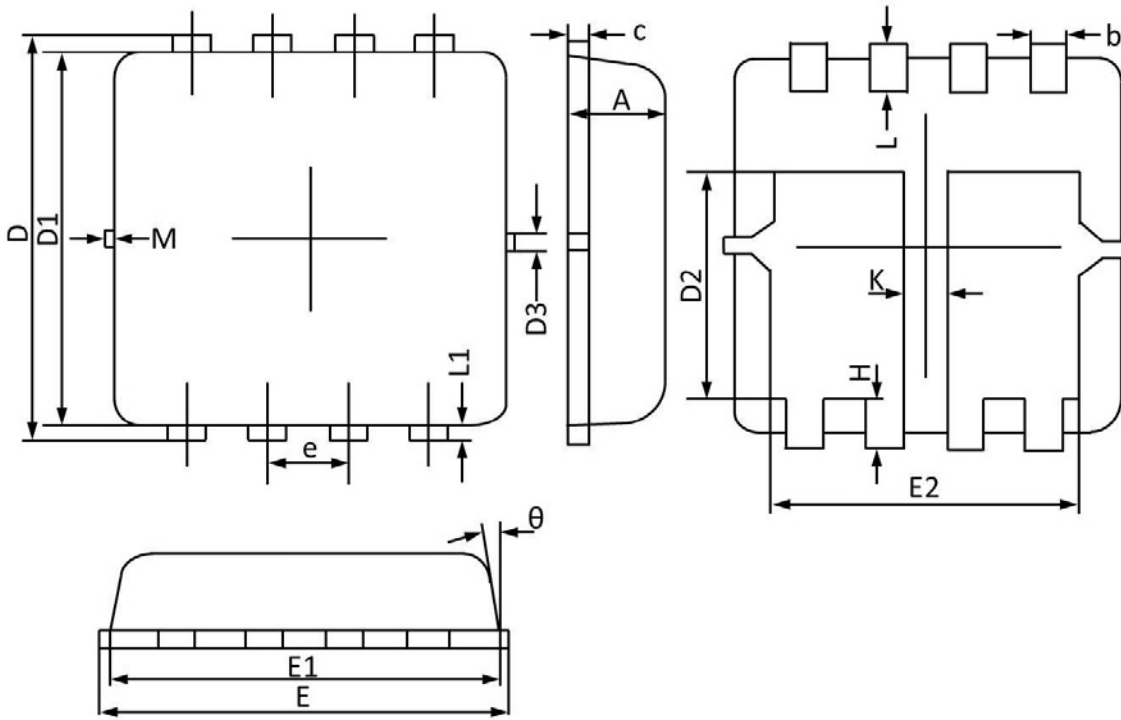


Fig.6 Maximum Safe Operation Area

Package Outline Dimensions

PPAK3X3 Dual 2EP Pin



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
K	0.300 REF		0.012 REF	
theta	0°	12°	0°	12°
M	0.150 REF		0.006 REF	