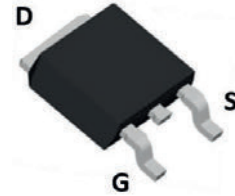
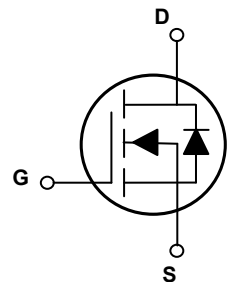


Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	35m Ω (typ.)
I_D	20A



TO-252 (DPAK)



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 GSFD6046 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 supplies and a wide variety of other applications.

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_A=25^{\circ}\text{C}$) ¹	I_D	20	A
Continuous Drain Current, @ Steady-State ($T_A=70^{\circ}\text{C}$)		15	A
Pulsed Drain Current ²	I_{DM}	80	A
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	40	W
Linear Derating Factor ($T_A=25^{\circ}\text{C}$)		0.32	W/ $^{\circ}\text{C}$
Single Pulse Avalanche Energy ³	E_{AS}	14	mJ
Junction-to-Case	$R_{\theta JC}$	3.1	$^{\circ}\text{C/W}$
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	65	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^{\circ}\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=20V$	-	-	100	nA
		$V_{GS}=-20V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	-	35	46	m Ω
		$V_{GS}=4.5V, I_D=4A$	-	38	50	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	1.6	2.6	V
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=6A$	-	6	-	S
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=30V$ $F=1\text{MHz}$	-	1180	-	pF
Output Capacitance	C_{oss}		-	69	-	
Reverse Transfer Capacitance	C_{rss}		-	46	-	
Total Gate Charge	Q_g	$I_D=8A, V_{DS}=30V,$ $V_{GS}=10V$	-	2.3	4.6	nC
Gate-to-Source Charge	Q_{gs}		-	15.6	22	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	3.9	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=30V,$ $I_D=1A, R_{GEN}=6\Omega$	-	4.6	9.0	nS
Rise Time	t_r		-	14.8	28	
Turn-Off Delay Time	$t_{d(off)}$		-	26.2	52	
Fall Time	t_f		-	7.8	16	
Gate Resistance	R_g	$F=1\text{MHz}$	-	2.1	4.2	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$I_S=4A, V_{GS}=0V$	-	1	1.2	V
Reverse Recovery Time	T_{rr}	$T_J=25^\circ\text{C}, I_F=1A,$ $di/dt=100A/\mu s$	-	14	28	ns
Reverse Recovery Charge	Q_{rr}		-	10	20	nc

Note:

1. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. $L=0.1\text{mH}$, $R_g=25\Omega$, $V_{DD}=25V$, $T_J=25^\circ\text{C}$.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

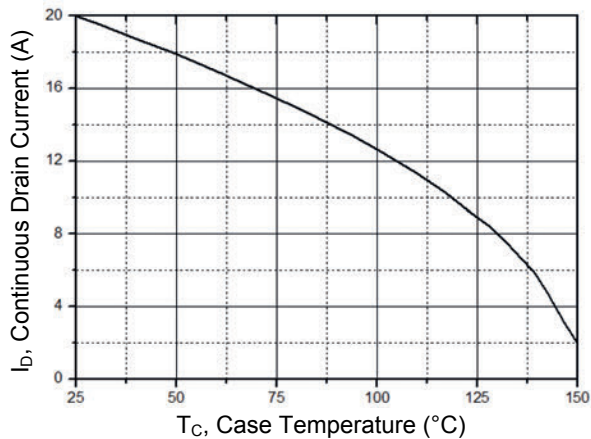


Figure 1. Continuous Drain Current vs. T_c

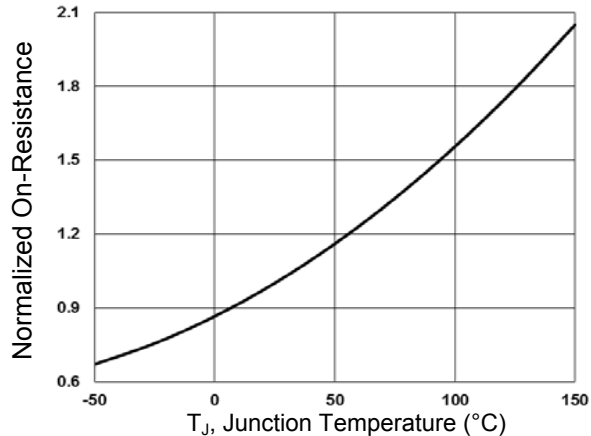


Figure 2. Normalized $R_{DS(ON)}$ vs. T_j

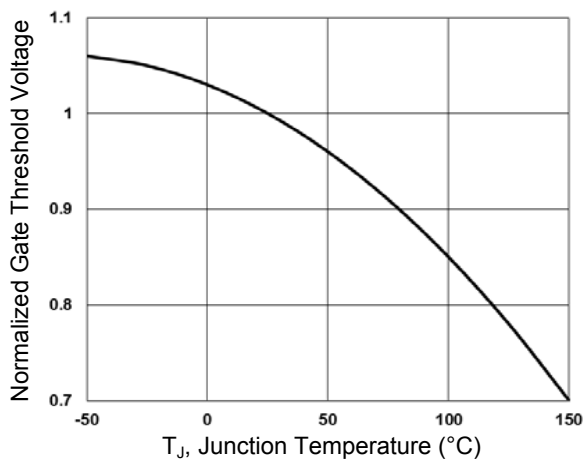


Figure 3. Normalized V_{th} vs. T_j

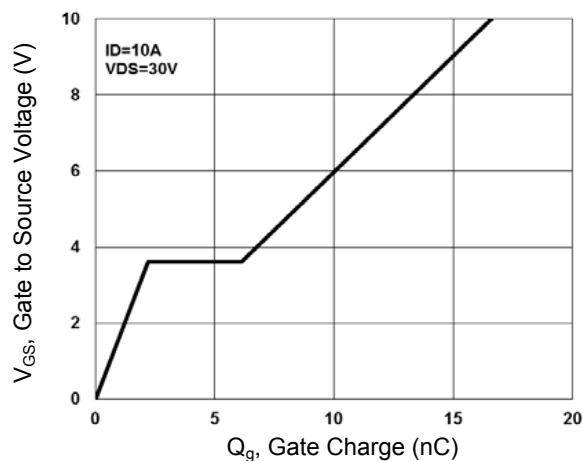


Figure 4. Gate Charge Waveform

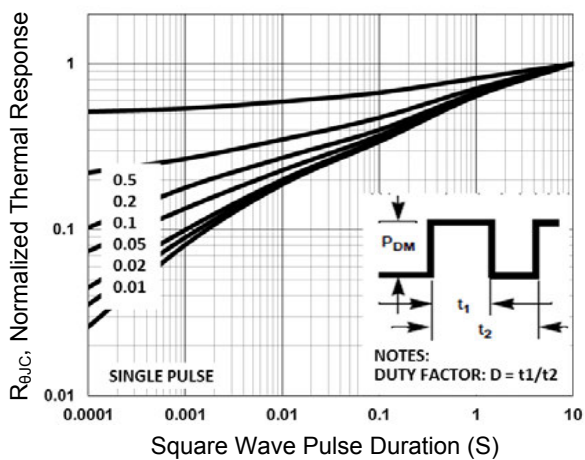


Figure 5. Normalized Transient Impedance

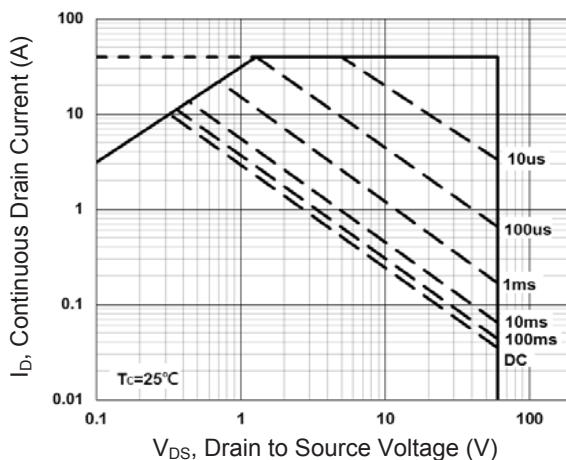
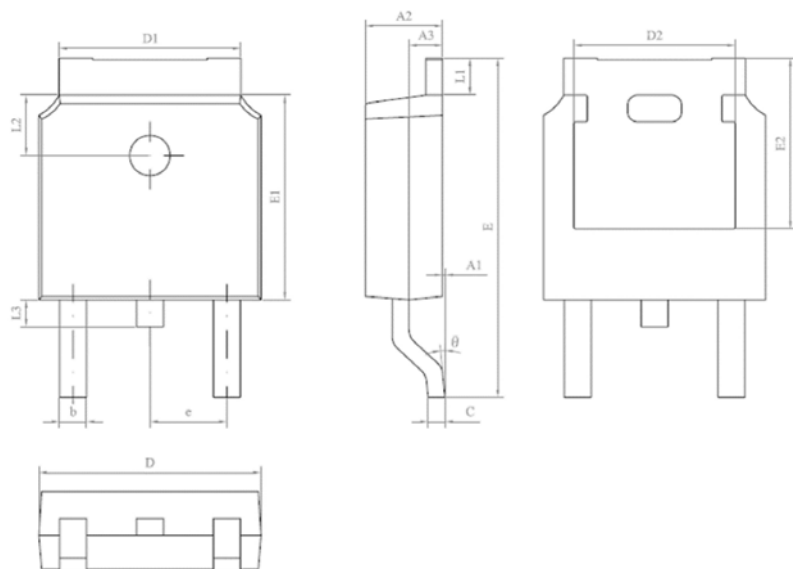


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions TO-252(DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	0.00	0.10	0.000	0.004
A2	2.20	2.40	0.087	0.094
A3	0.09	1.10	0.004	0.043
b	0.75	0.85	0.030	0.033
C	0.50	0.60	0.020	0.024
D	6.50	6.70	0.256	0.264
D1	5.30	5.50	0.209	0.217
D2	4.70	4.90	0.185	0.193
E	9.90	10.30	0.390	0.406
E1	6.00	6.20	0.236	0.244
E2	5.00	5.20	0.197	0.205
e	2.40	2.20	0.094	0.087
L1	0.90	1.25	0.035	0.049
L2	1.70	1.90	0.067	0.075
L3	0.60	1.00	0.024	0.039
θ	0°	8°	0°	8°