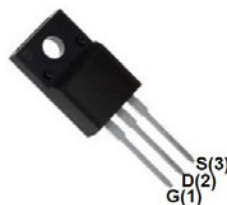
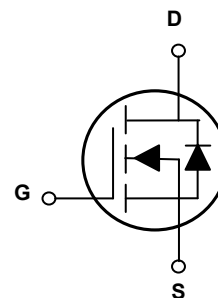


Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	36m Ω (Typ.)
I_D	20A



TO-220F



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 GSFU6046 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°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current @ Steady-State ¹ , T _A =25°C	I_D	20	A
Continuous Drain Current @ Steady-State, T _A =70°C		15	A
Pulsed Drain Current ²	I_{DM}	80	A
Single Pulsed Avalanche Energy ³	E_{AS}	14	mJ
Power Dissipation, T _A =25°C	P_D	24	W
Linear Derating Factor, T _A =25°C		0.19	W/°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	5.21	°C/W
Junction to Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	65	°C/W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
On/Off Characteristic						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Drain-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}	$V_{GS}=\pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	1.6	2.6	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	-	36	46	m Ω
		$V_{GS}=4.5V, I_D=4A$	-	39	50	
Forward Transconductance	gfs	$V_{DS}=10V, I_D=6A$	-	6	-	S
Gate Resistance	R_g	f=1.0MHz	-	2.1	4.2	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V,$ f=1.0MHz	-	1170	-	pF
Output Capacitance	C_{oss}		-	69	-	pF
Reverse Transfer Capacitance	C_{rss}		-	46	-	pF
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=8A,$ $V_{GS}=10V$	-	2.3	-	nC
Gate-Source Charge	Q_{gs}		-	15.6	-	nC
Gate-Drain ("Miller") Charge	Q_{gd}		-	3.9	-	nC
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=30V, I_D=1A,$ $R_G=6\Omega, V_{GS}=10V$	-	4.6	-	nS
Turn-On Rise Time	t_r		-	14.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26.2	-	nS
Turn-Off Fall Time	t_f		-	7.8	-	nS
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Source Pulse Current (Body Diode)	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=4A$	-	1.2	1.4	V
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=1A,$	-	14	-	nS
Reverse Recovery Charge	Q_{rr}	di/dt= 100A/ μ S	-	10	-	nC

Notes:

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

Typical Electrical and Thermal Characteristic Curves

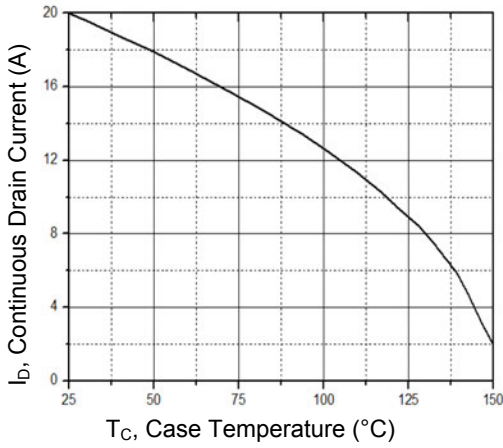


Figure 1. Continuous Drain Current vs. T_C

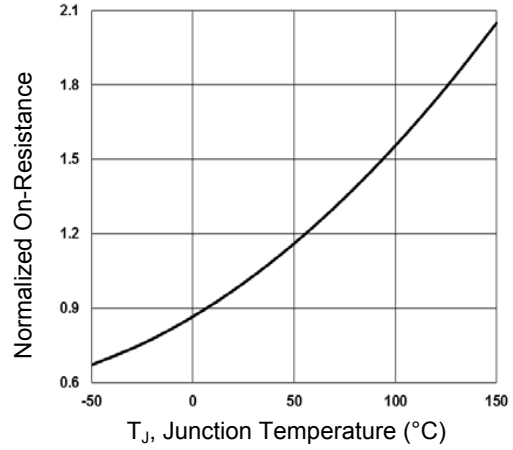


Figure 2. Normalized $R_{DS(ON)}$ vs. Junction Temperature

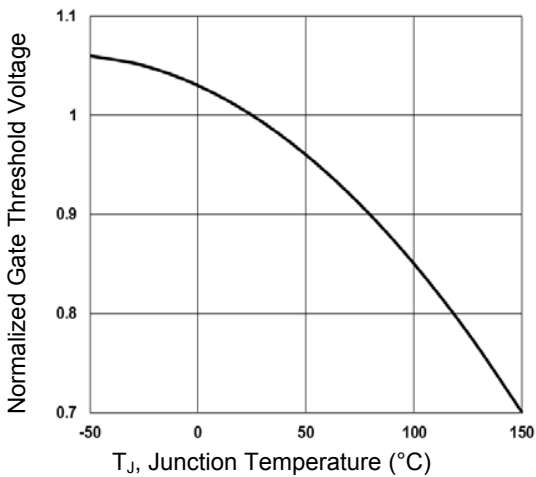


Figure 3. Normalized V_{th} vs. Junction Temperature

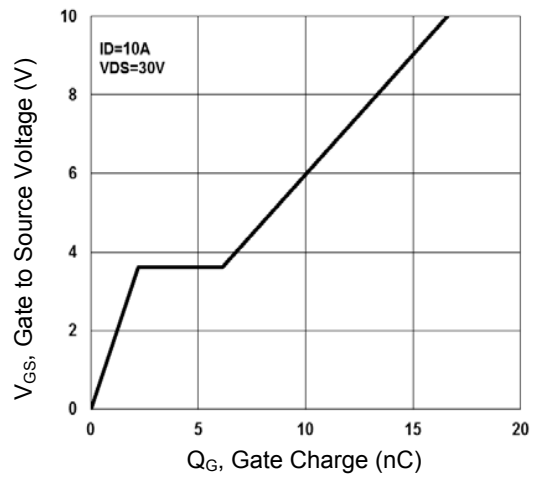


Figure 4. Gate Charge

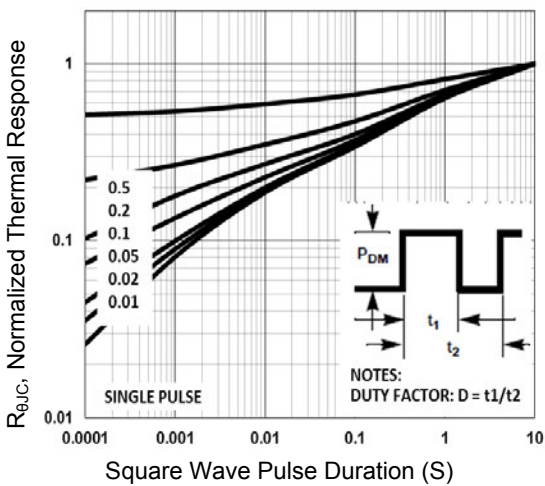


Figure 5. Normalized Transient Impedance

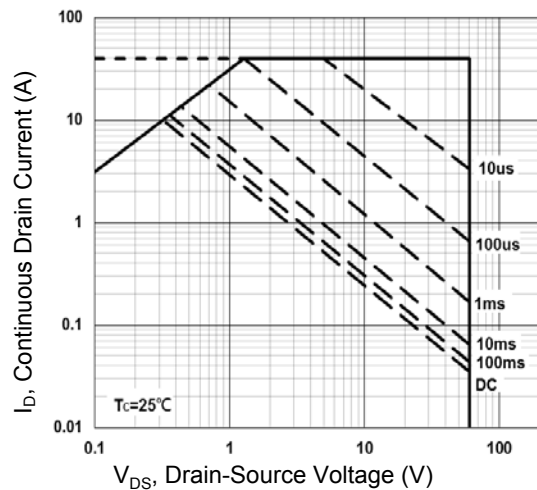
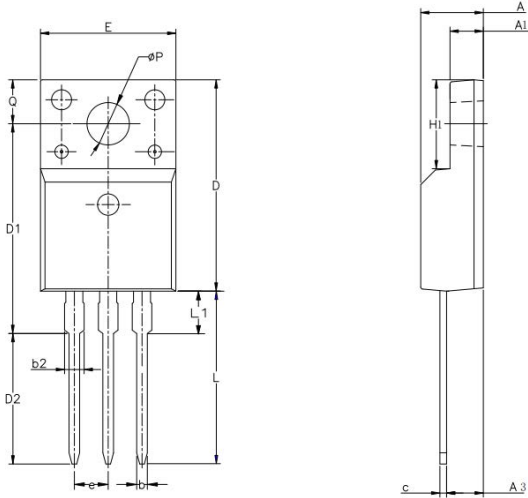


Figure 6. Safe Operation Area

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.420	5.020	0.174	0.198
A1	2.300	2.800	0.091	0.110
A3	2.500	3.100	0.098	0.122
b	0.550	0.850	0.022	0.033
b2	-	1.290	-	0.051
c	0.350	0.650	0.014	0.026
D	15.250	16.250	0.600	0.640
D1	13.970	14.970	0.550	0.589
D2	10.580	11.580	0.417	0.456
E	9.730	10.360	0.383	0.408
e	2.540 BCS		0.100 BCS	
H1	6.400	7.000	0.252	0.276
L	12.480	13.480	0.491	0.531
L1	-	2.000	-	0.079
ΦP	3.000	3.400	0.118	0.134
Q	3.050	3.550	0.120	0.140

Order Information

Device	Package	Marking	Quantity	HSF Status
GSFU6046	TO-220F	U6046	50pcs / Tube	RoHS Compliant

For more information, please contact us at: inquiry@goodarksemi.com