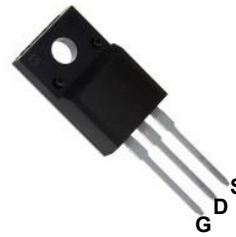
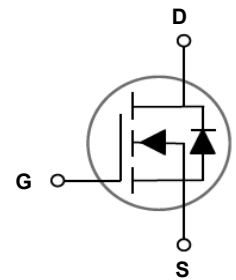


Main Product Characteristics

V_{DS}	250V
$R_{DS(ON)}$	18.5m Ω
I_D	80A



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 GSFU2580 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}	250	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous($T_C=100^\circ\text{C}$)		56.6	A
Drain Current-Pulsed	I_{DM}	320	A
Maximum Power Dissipation	P_D	50	W
Derating Factor		3	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ⁵	E_{AS}	1200	mJ
Thermal Resistance, Junction-to-Case ²	$R_{\theta JC}$	0.33	$^\circ\text{C}/\text{W}$
Storage Temperature Range	T_{STG}	-55 To +175	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 To +175	$^\circ\text{C}$

Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	250	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =250V, V _{GS} =0V	-	-	1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics³						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.5	-	4.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =40A	-	16	18.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =40A	70	-	-	S
Dynamic Characteristics⁴						
Input Capacitance	C _{iss}	V _{DS} =125V, V _{GS} =0V, F=1MHz	-	5400	-	pF
Output Capacitance	C _{oss}		-	329	-	
Reverse Transfer Capacitance	C _{rss}		-	12	-	
Switching Characteristics⁴						
Turn-On Delay Time	t _{d(on)}	V _{DD} =125V, R _G =4.7Ω V _{GS} =10V, I _D =40A	-	18	-	nS
Turn-On Rise Time	t _r		-	26	-	
Turn-Off Delay Time	t _{d(off)}		-	41	-	
Turn-Off Fall Time	t _f		-	11	-	
Total Gate Charge	Q _g	V _{DS} =125V, I _D =40A, V _{GS} =10V	-	76.7	-	nC
Gate-Source Charge	Q _{gs}		-	22.7	-	
Gate-Drain Charge	Q _{gd}		-	20	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} =0V, I _S =80A	-	-	1.2	V
Diode Forward Current ²	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =I _S =40A, di/dt=100A/μs ³	-	140	-	nS
Reverse Recovery Charge	Q _{rr}		-	600	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design.
5. EAS condition : T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25Ω

Typical Electrical and Thermal Characteristic Curves

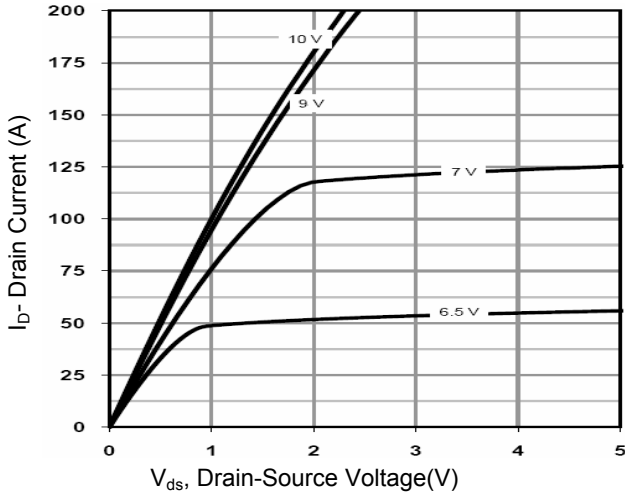


Figure 1. Output Characteristics

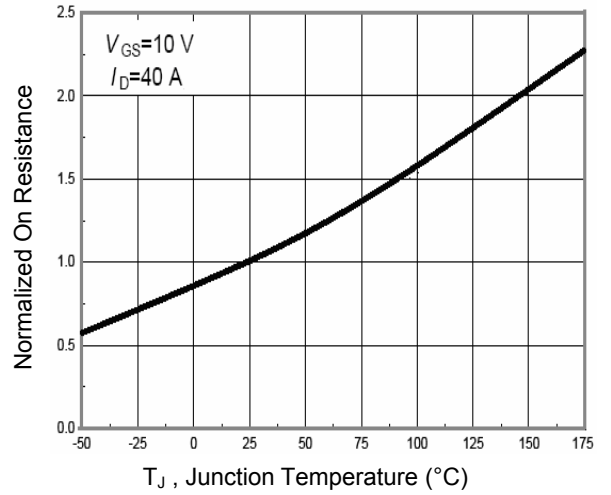


Figure 2. $R_{DS(on)}$ -Junction Temperature

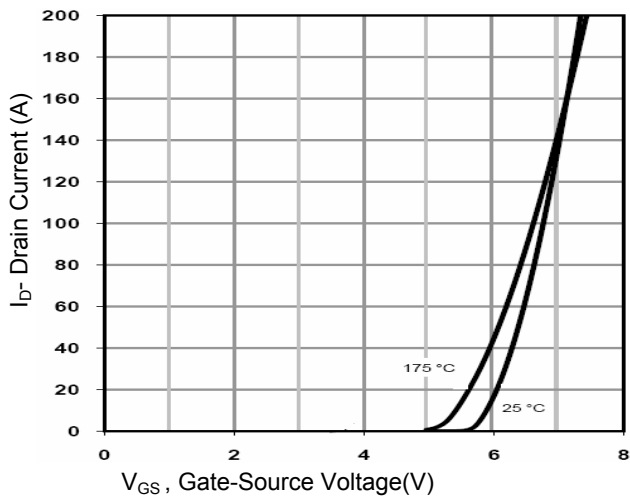


Figure 3. Transfer Characteristics

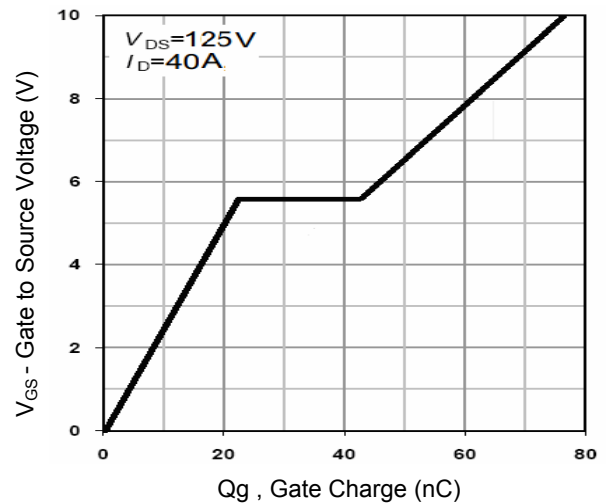


Figure 4. Gate Charge

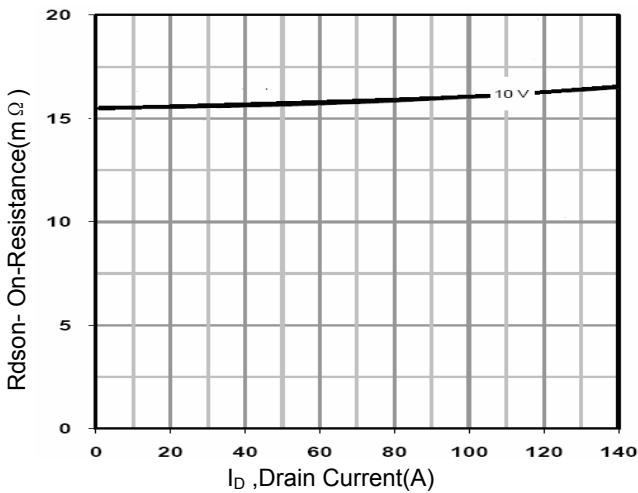


Figure 5. $R_{DS(on)}$ -Drain Current

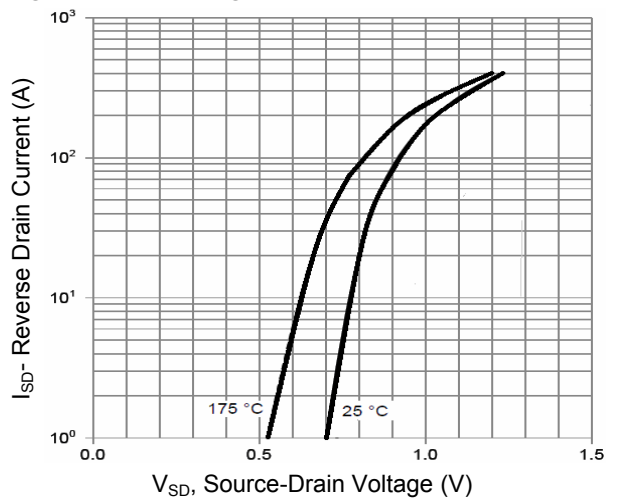


Figure 6. Source-Drain Diode Forward

Typical Electrical and Thermal Characteristic Curves

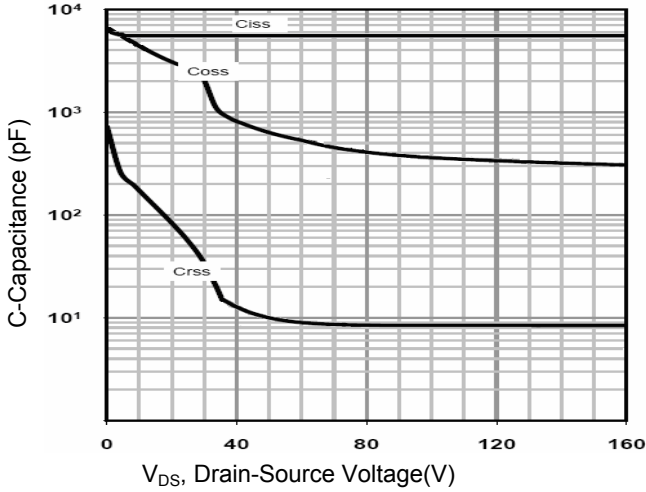


Figure 7. Capacitance vs. V_{DS}

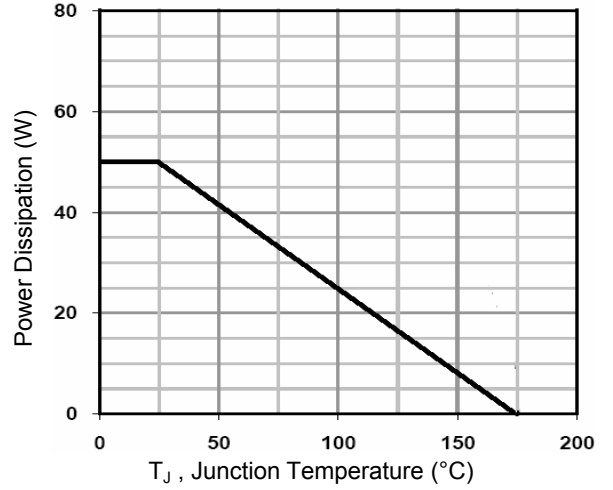


Figure 8. Power De-rating

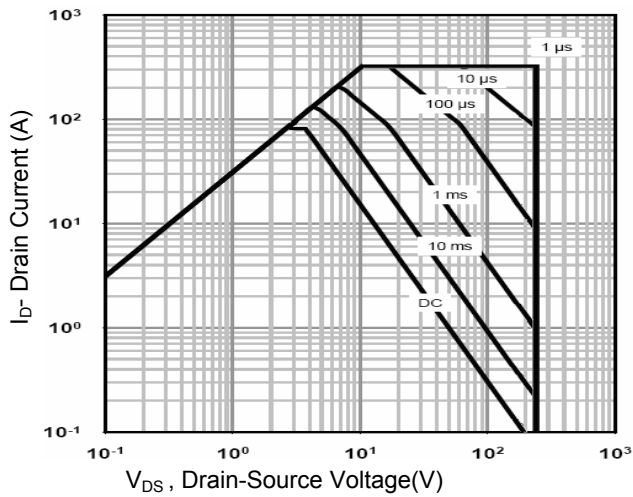


Figure 9. Safe Operation Area

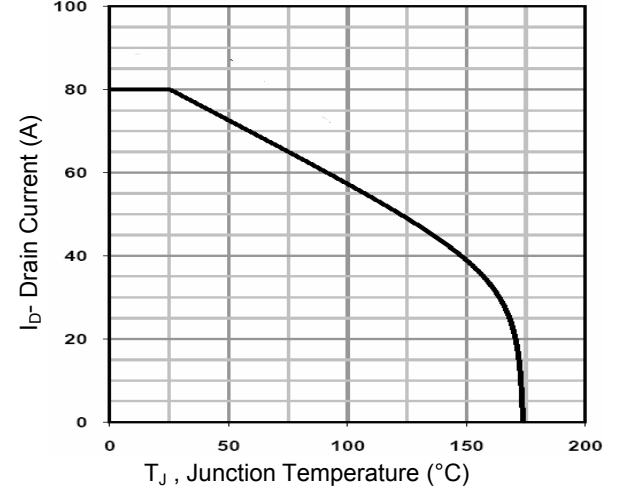


Figure 10. Current De-rating

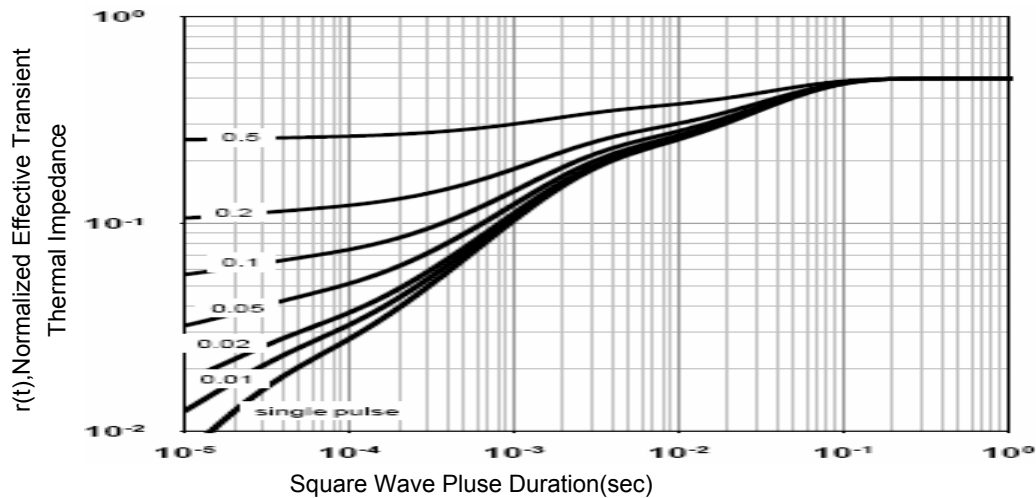


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

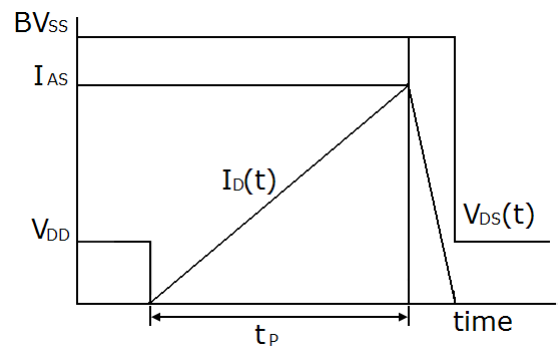
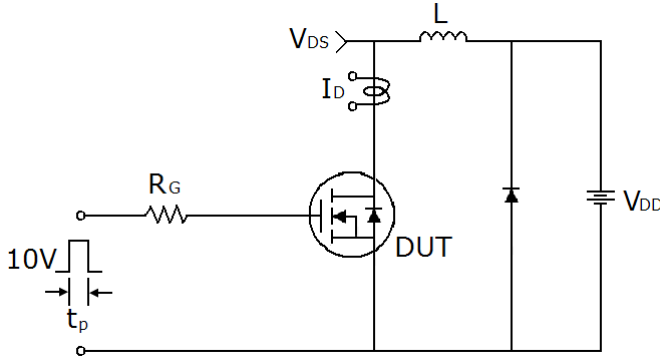


Figure 12. E_{AS} Test Circuit

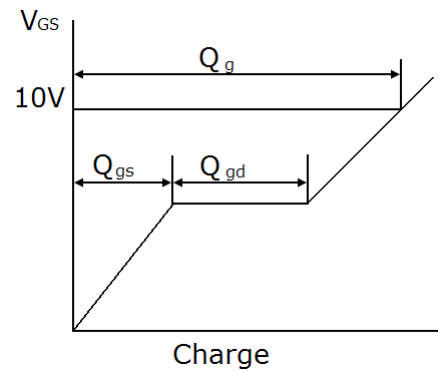
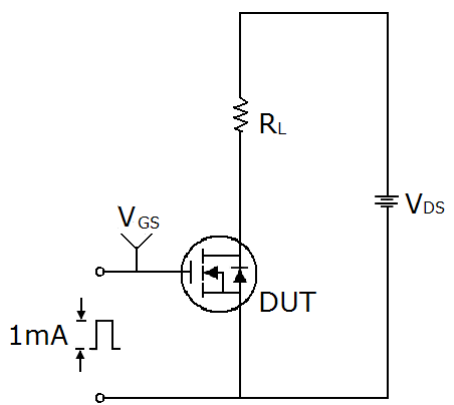


Figure 13. Gate Charge Test Circuit

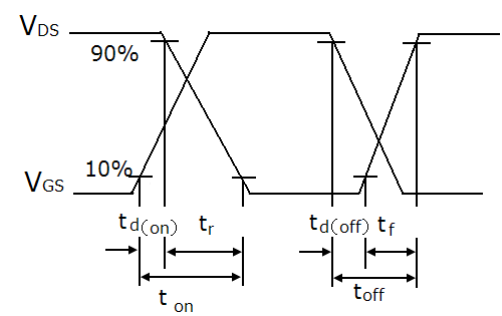
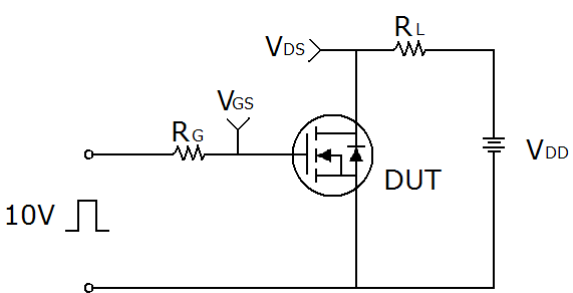
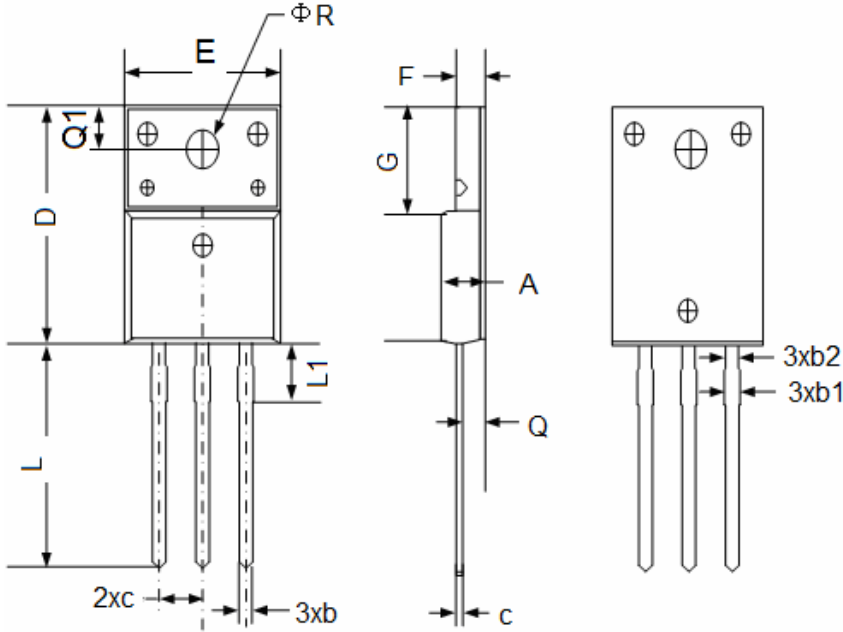


Figure 14. Switch Time Test Circuit

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.83	0.18	0.19
b	0.70	0.91	0.03	0.04
b1	1.20	1.47	0.05	0.06
b2	1.10	1.38	0.04	0.05
c	0.45	0.63	0.02	0.02
D	15.67	16.07	0.62	0.63
e	2.54 BSC		0.10 BSC	
E	9.96	10.36	0.39	0.41
F	2.34	2.74	0.09	0.11
G	6.48	6.90	0.26	0.27
L	12.68	13.30	0.50	0.52
L1	3.13	3.50	0.12	0.14
Q	2.56	2.93	0.10	0.12
Q1	3.20	3.40	0.13	0.13
ΦR	3.08	3.28	0.12	0.13