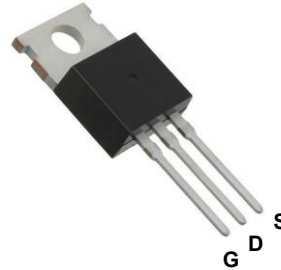
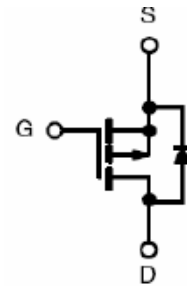


Main Product Characteristics

V_{DS}	-60V
$R_{DS(ON)}$	45m Ω
I_D	-25A



TO-220



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 GSFH0625 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}	-60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-25	A
Drain Current-Continuous($T_C=100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	-17.7	A
Pulsed Drain Current	I_{DM}	-60	A
Maximum Power Dissipation	P_D	90	W
Derating Factor		0.72	W/ $^{\circ}\text{C}$
Single Pulse Avalanche Energy ⁵	E_{AS}	300	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To +150	$^{\circ}\text{C}$
Thermal Resistance, Junction-to-Ambient ²	$R_{\theta JC}$	1.4	$^{\circ}\text{C}/\text{W}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-2	-2.9	-3.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	-	39	45	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-10A$	-	25	-	S
Dynamic Characteristics⁴						
Input Capacitance	C_{iss}	$V_{DS}=-30V, V_{GS}=0V, F=1.0MHz$	-	3430	-	PF
Output Capacitance	C_{oss}		-	391	-	PF
Reverse Transfer Capacitance	C_{rss}		-	272	-	PF
Switching Characteristics⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-30V, R_L=1.5\Omega, V_{GS}=-10V, R_G=3\Omega$	-	12	-	nS
Turn-On Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	$V_{DS}=-30V, I_D=-20A, V_{GS}=-10V$	-	46	-	nC
Gate-Source Charge	Q_{gs}		-	9.5	-	nC
Gate-Drain Charge	Q_{gd}		-	10.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=-10A$	-	-	-1.2	V
Diode Forward Current ²	I_S		-	-	-25	A
Reverse Recovery Time	t_{rr}	$T_J=25^\circ\text{C}, I_F=-10A, dI/dt=-100A/\mu s^3$	-	47	-	nS
Reverse Recovery Charge	Q_{rr}		-	53	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design
5. E_{AS} condition: $T_J=25^\circ\text{C}, V_{DD}=-20V, V_G=-10V, L=1mH, R_G=25\Omega, I_{AS}=33A.$ 2/6

Typical Electrical and Thermal Characteristic Curves

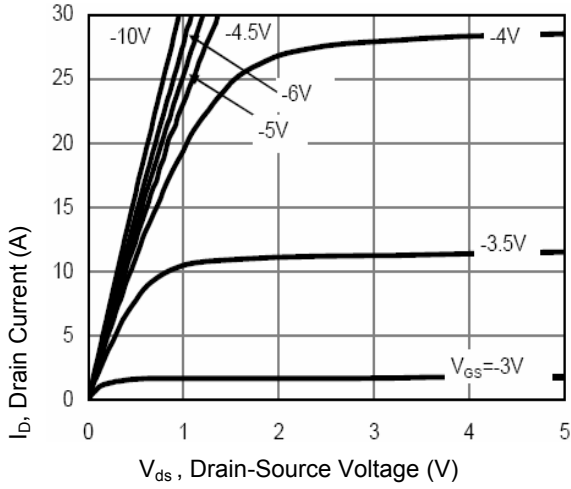


Figure 1. Output Characteristics

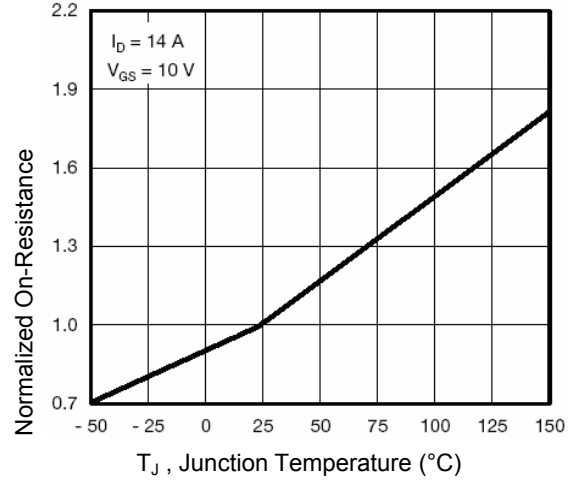


Figure 2. $R_{DS(on)}$ -Junction Temperature

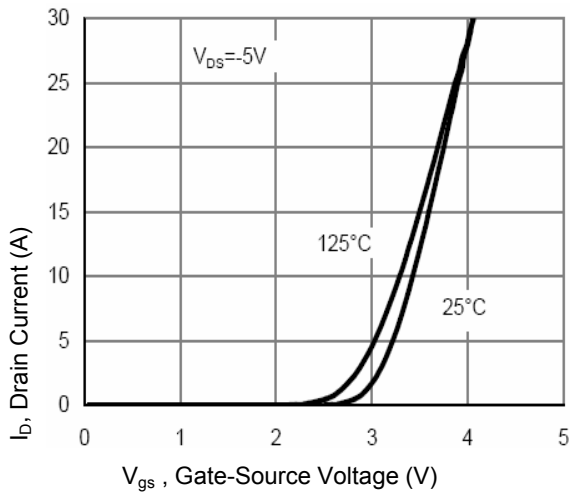


Figure 3. Transfer Characteristics

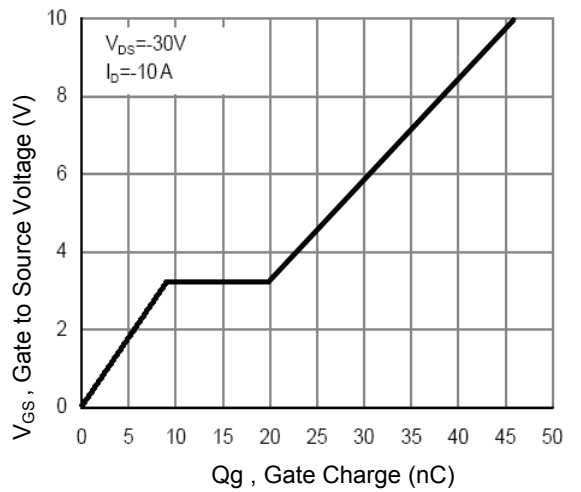


Figure 4. Gate Charge

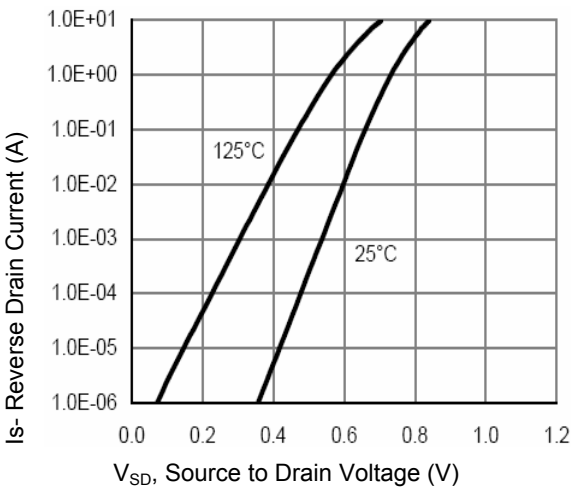


Figure 5. Source-Drain Diode Forward

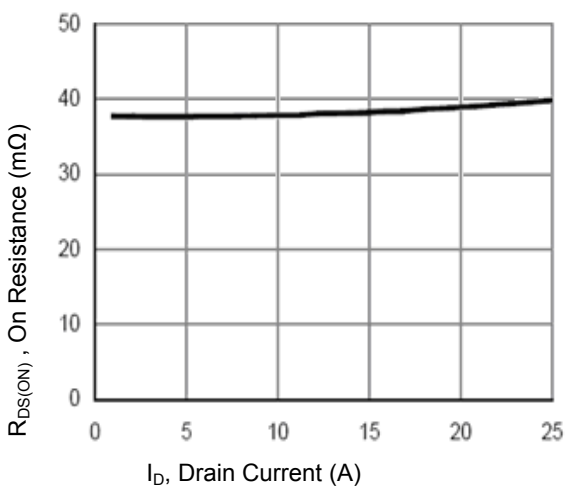


Figure 6. $R_{ds(on)}$ -Drain Current

Typical Electrical and Thermal Characteristic Curves

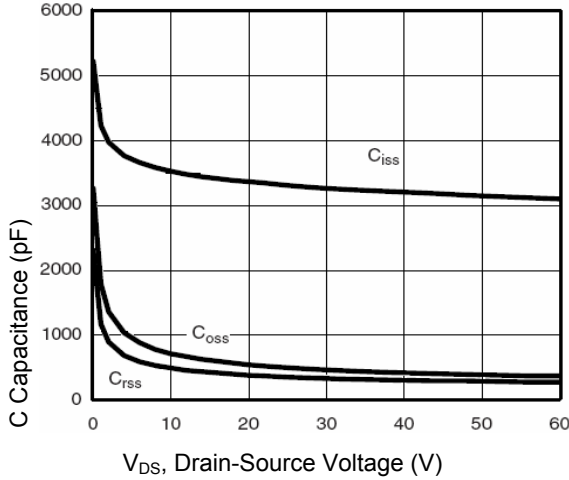


Figure 7. Capacitance vs. V_{DS}

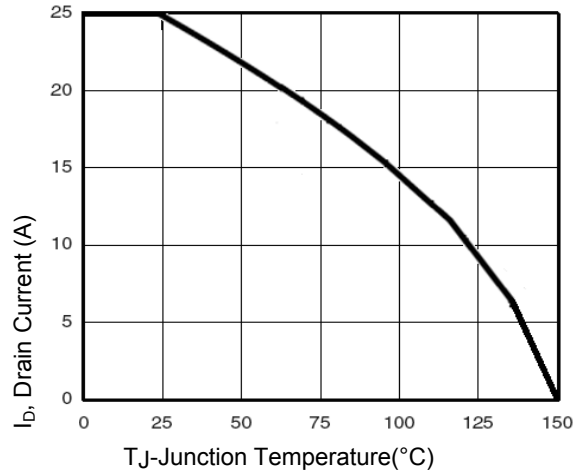


Figure 8. I_D Current De-rating

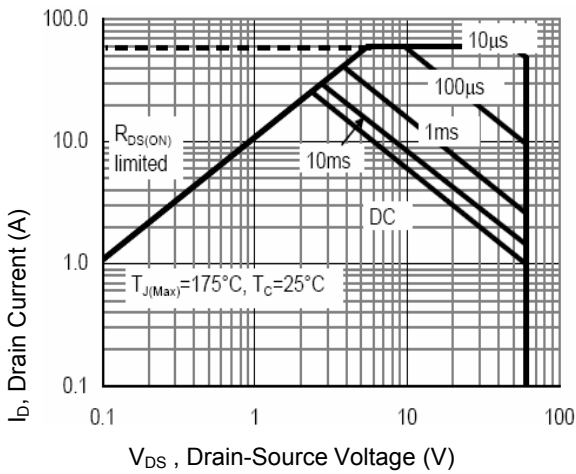


Figure 9. Safe Operation Area

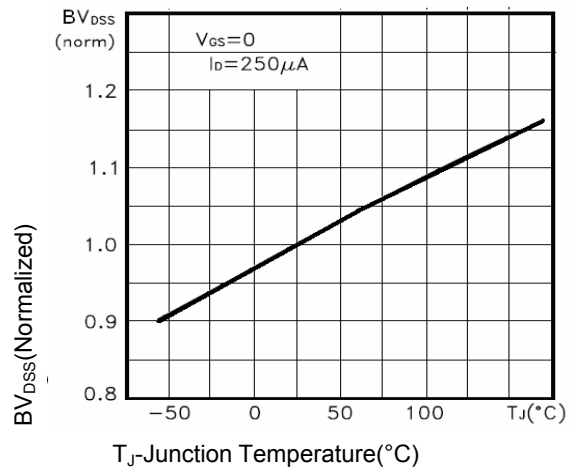


Figure 10. BV_{DS} vs Junction Temperature

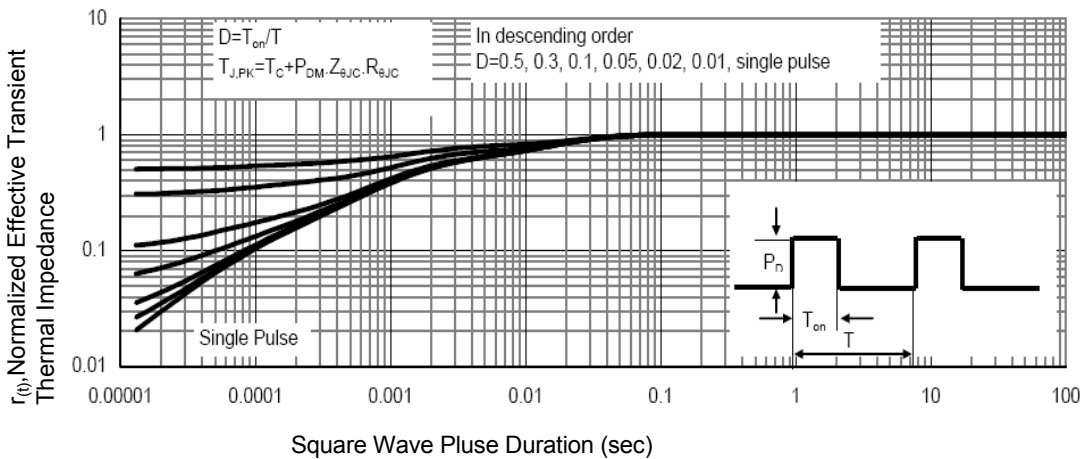


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

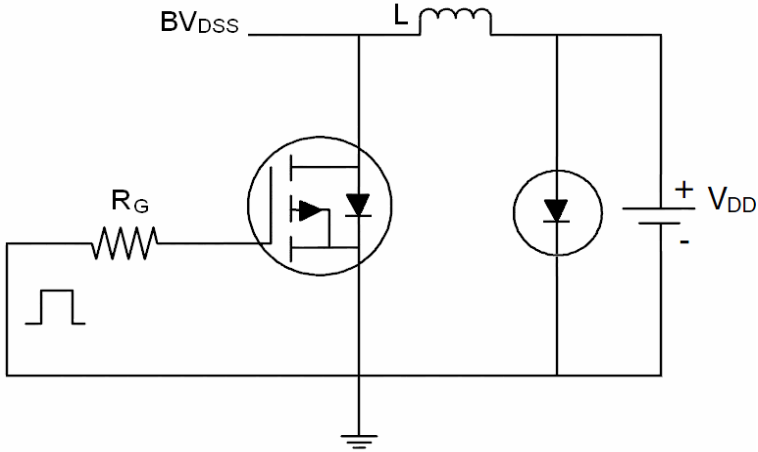


Figure 12. E_{AS} Test Circuit

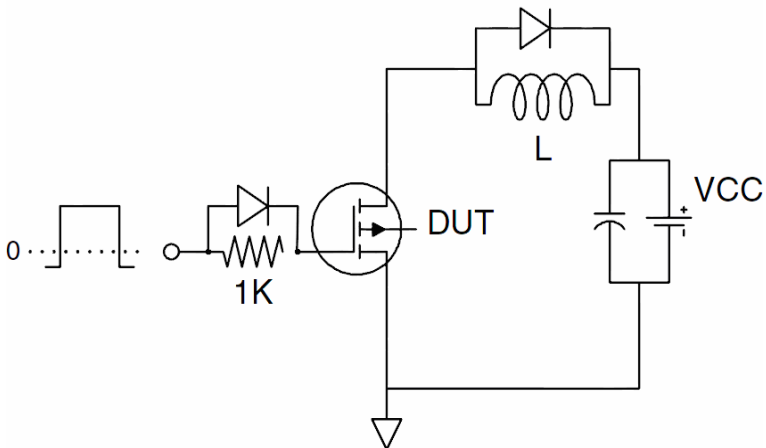


Figure 13. Gate Charge Test Circuit

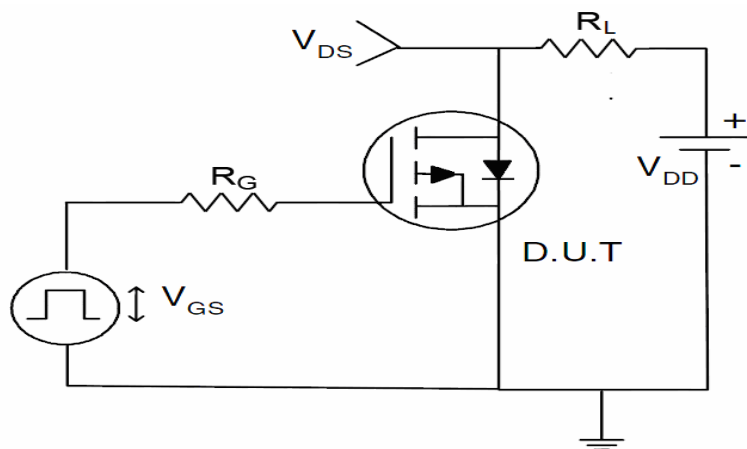
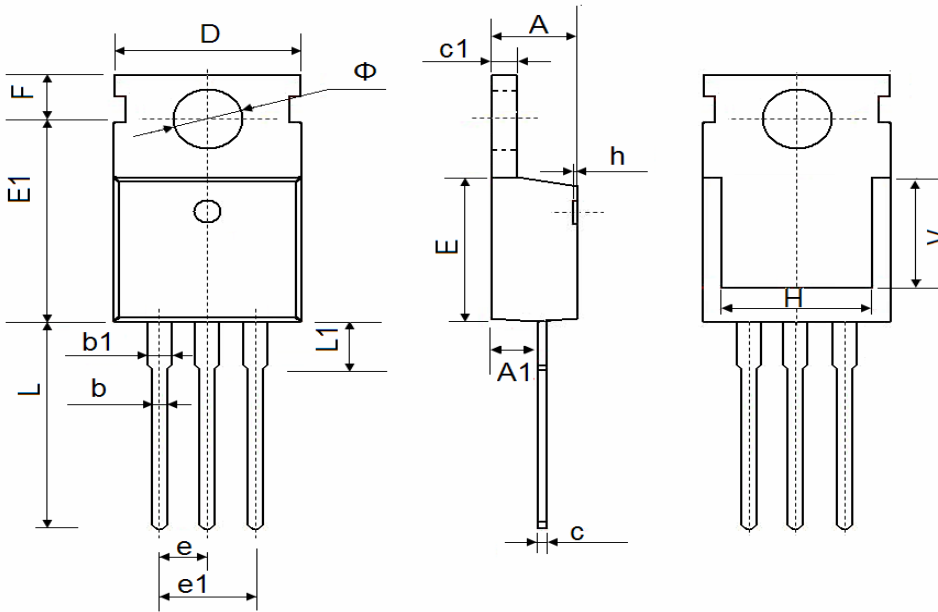


Figure 14. Switch Time Test Circuit

Package Outline Dimensions (TO-220-3L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150