

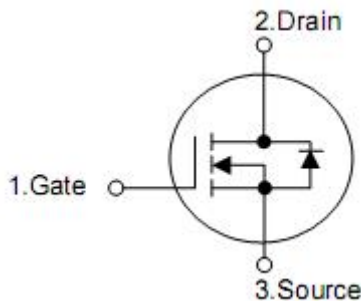
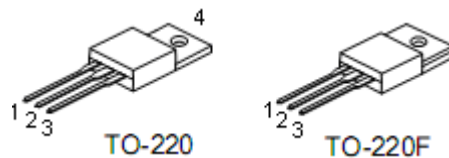
1. Description

This Power MOSFET is produced using SL semi's advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

2. Features

- n $R_{DS(on)}=1.4\Omega$ @ $V_{GS}=10V$
- n Low gate charge (typical 27nC)
- n High ruggedness
- n Fast switching
- n 100% avalanche tested
- n Improved dv/dt capability

3. Pin configuration



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C= 25 °C , unless otherwise noted)

Parameter	Symbol	Rating		Units	
		7N80HP	7N80HF		
Drain-source voltage	V _{DSS}	800		V	
Gate-source voltage	V _{GSS}	±30		V	
Drain current continuous	I _D	T _C =25°C	7.0	7.0*	A
		T _C =100°C	4.2	4.2*	A
Drain current pulsed (note1)	I _{DM}	28	28*	A	
Avalanche energy	Repetitive (note1)	16.7		mJ	
	Single pulse (note2)	650		mJ	
Peak diode recovery dv/dt (note3)	dv/dt	4.5		V/ns	
Total power dissipation	P _D	T _C =25 °C	167	56	W
		derate above 25 °C	1.33	0.44	W/°C
Operating and storage temperature range	T _J , T _{STG}	-55~+150		°C	
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T _L	300		°C	

* Drain current limited by maximum junction temperature

5. Thermal characteristics

Parameter	Symbol	Rating		Unit
		7N80HP	7N80HF	
Thermal resistance,Junction-ambient	R _{thJA}	62.5		°C/W
Thermal resistance,case-to-sink typ.	R _{thCS}	0.5	-	°C/W
Thermal resistance,Junction-case	R _{thJC}	0.75	2.25	°C/W

6. Electrical characteristics

 (T_C=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Off characteristics							
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	800	-	-	V	
Zero gate voltage drain current	I _{DSS}	V _{DS} =800V, V _{GS} =0V	-	-	10	μA	
		V _{DS} =640V, T _C =125°C	-	-	100	μA	
Gate-body leakage current	Forward	I _{GSS}	V _{GS} =30V, V _{DS} =0V	-	-	100	nA
	Reverse						
Breakdown voltage temperature coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, referenced to 25°C	-	1	-	V/°C	
On characteristics							
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	3.0	-	5.0	V	
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =3.5A	-	1.4	1.9	Ω	
Dynamic characteristics							
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	1300	-	pF	
Output capacitance	C _{oss}		-	120	-	pF	
Reverse transfer capacitance	C _{rss}		-	10	-	pF	
Switching characteristics							
Turn-on delay time	t _{d(on)}	V _{DD} =400V, I _D =7A, R _G =25Ω (note4,5)	-	40	-	ns	
Rise time	t _r		-	100	-	ns	
Turn-off delay time	t _{d(off)}		-	50	-	ns	
Fall time	t _f		-	60	-	ns	
Total gate charge	Q _g	V _{DS} =640V, I _D =7A, V _{GS} =10V (note4,5)	-	27	-	nC	
Gate-source charge	Q _{gs}		-	8	-	nC	
Gate-drain charge	Q _{gd}		-	11	-	nC	
Drain-source diode characteristics and maximum ratings							
Drain-source diode forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =7A	-	-	1.5	V	
Continuous drain-source current	I _{SD}		-	-	7.0	A	
Pulsed drain-source current	I _{SM}		-	-	28	A	
Reverse recovery time	t _{rr}	V _{GS} =0V, I _{SD} =7A diF/dt=100A/μs (note4)	-	650	-	ns	
Reverse recovery charge	Q _{rr}		-	7.0	-	μC	

Note: 1. repetitive rating: pulse width limited by maximum junction temperature

 2. L=25mH, I_{AS}=7A, V_{DD}=50V, R_G=25Ω, starting T_J=25°C

 3. I_{SD}≤7.0A, di/dt≤200A/μs, V_{DD}≤BV_{DSS}, starting T_J=25 °C

4. Pulse test: pulse width≤300μs, duty cycle≤2%

5. Essentially independent of operating temperature

7. Test circuits and waveforms

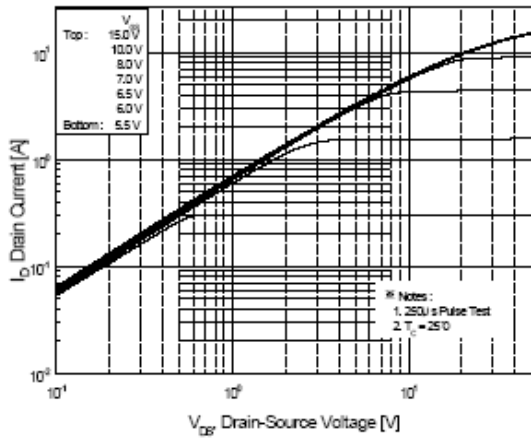


Figure 1. On-Region Characteristics

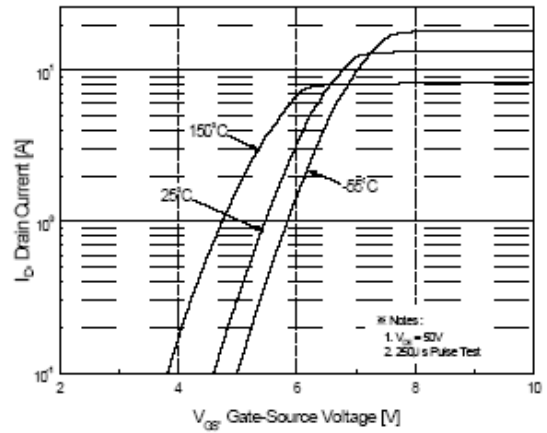


Figure 2. Transfer Characteristics

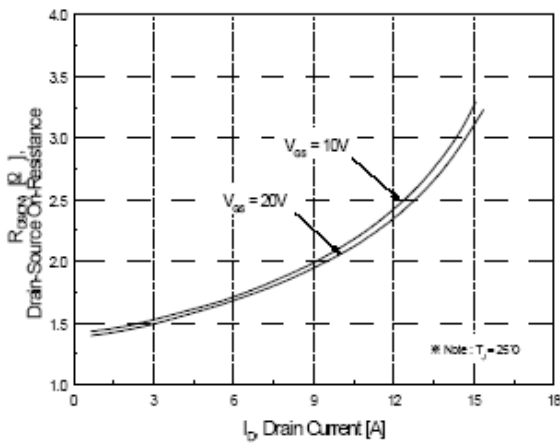


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

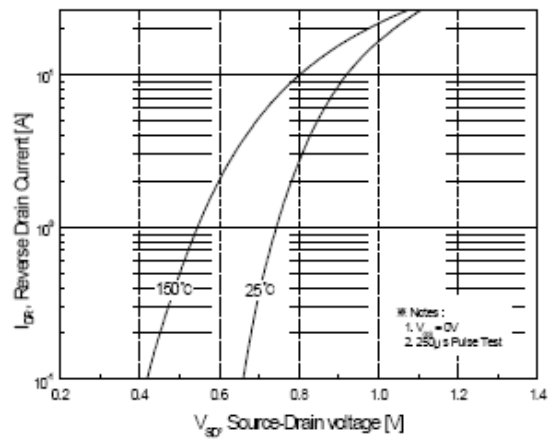


Figure 4. Body Diode Forward Voltage Variation with Source Current

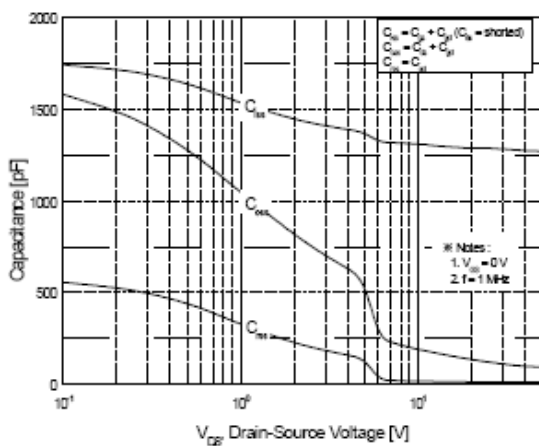


Figure 5. Capacitance Characteristics

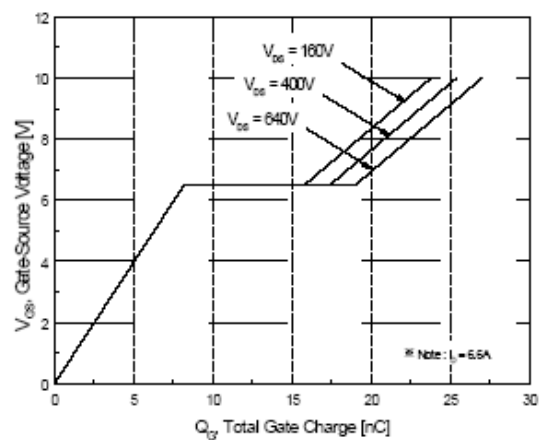


Figure 6. Gate Charge Characteristics

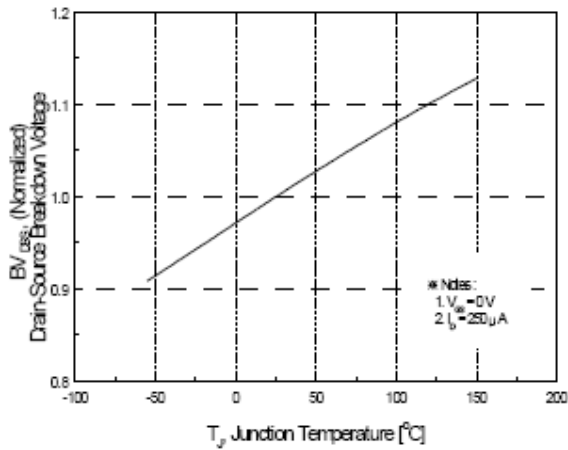


Figure 7. Breakdown Voltage Variation vs Temperature

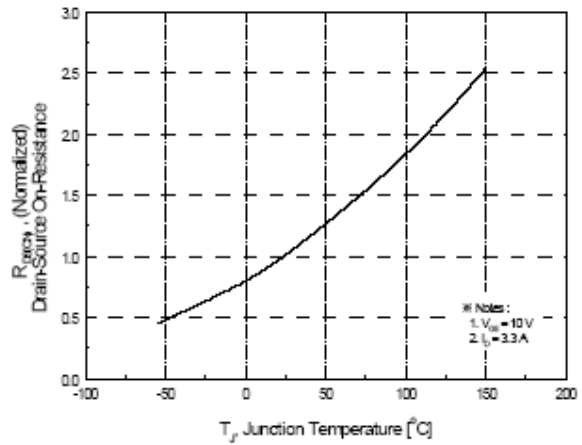


Figure 8. On-Resistance Variation vs Temperature

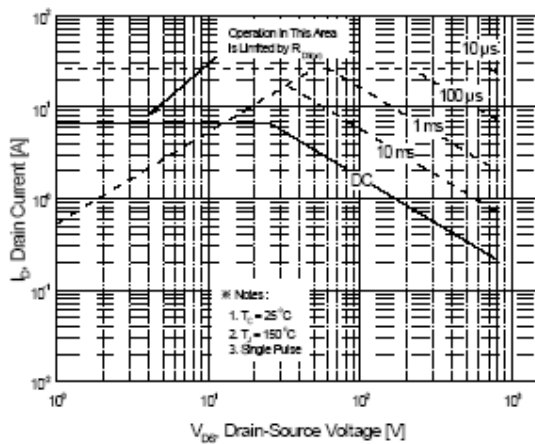


Figure 9-1. Maximum Safe Operating Area for 7N80HP

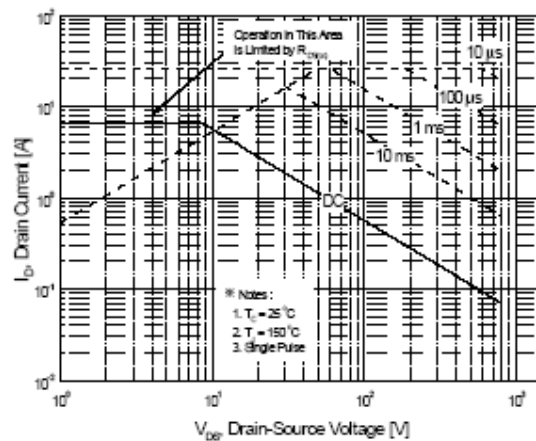


Figure 9-2. Maximum Safe Operating Area for 7H80HF

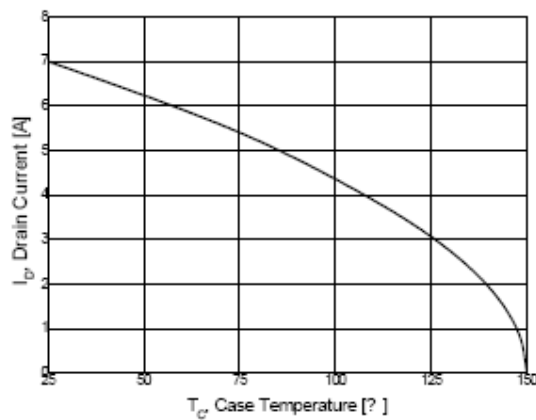


Figure 10. Maximum Drain Current vs Case Temperature

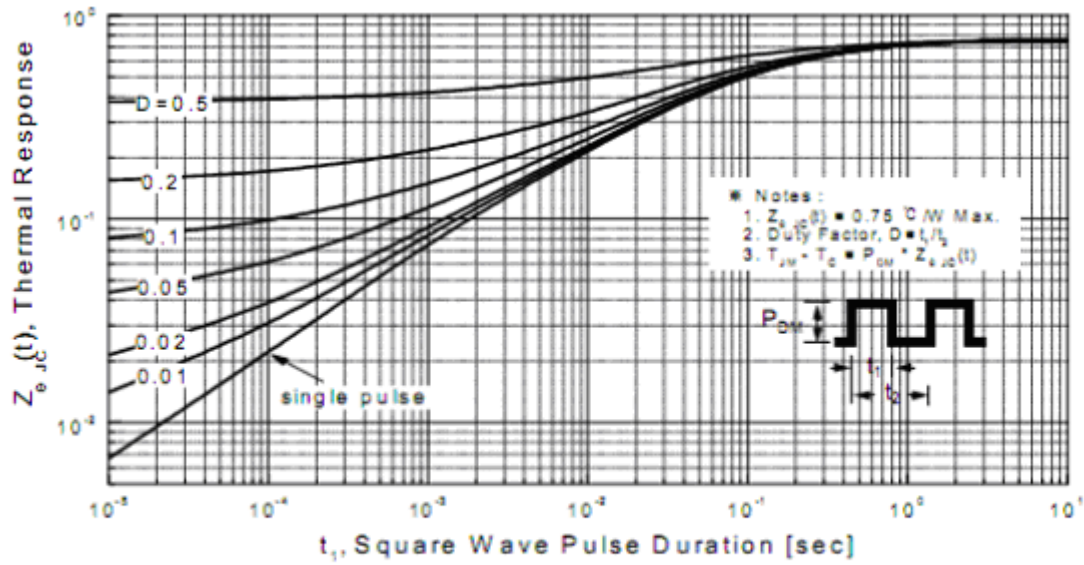


Figure 11-1. Transient Thermal Response Curve for TO220

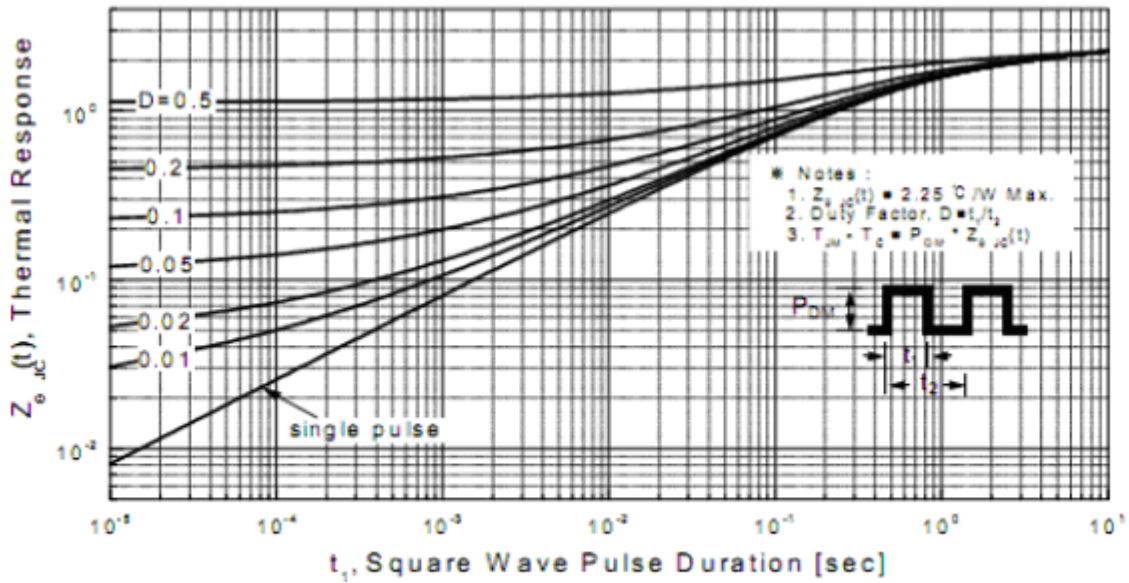


Figure 11-2. Transient Thermal Response Curve for TO220F