30V /3.6A Single 2N Power MOSFET

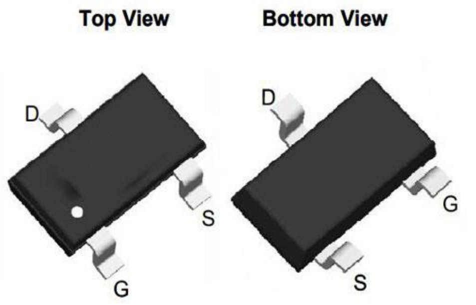
General Description

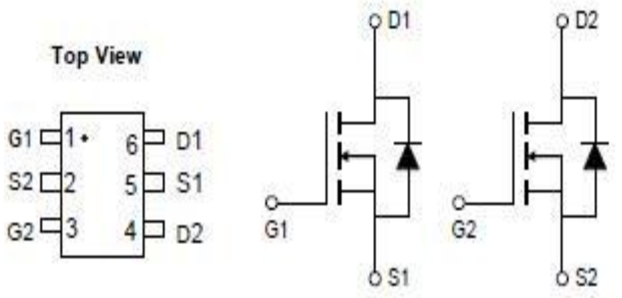
30V /3.6A Single 2N Power MOSFET

Very low on-resistance RDS(on) @ VGS=4.5 V

Pb-free lead plating; RoHS compliant

V_{DS}	30	V
$R_{DS(on),TYP@VGS=10V}$	39.0	mΩ
$R_{DS(on),TYP@VGS=4.5}$	60.0	mΩ
I_D	3.6	A





Part ID	Package Type	Marking	Tape and reel infomation
SM6802S1RL	SOT23-6	H29K	3000

100% UIS Tested
100% Rg Tested

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	20	±V
Continuous Drain Current A	T_A=25°C	I_D	3.6	A
	T_A=70°C		3.0	
Pulsed Drain Current B		I_{DM}	5.8	
Avalanche Current G		I_{AR}	1.2	
Repetitive avalanche energy L=0.1mH G		E_{AR}	2.6	mJ
Power Dissipation A	T_A=25°C	P_D	2	W
	T_A=70°C		1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{θJA}$	107	161	°C/W
Maximum Junction-to-Ambient A	Steady State		215	258	°C/W
Maximum Junction-to-Lead C	Steady State	$R_{θJL}$	64	103	°C/W

STATIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	**I_D** = -250uA, V_{GS} = 0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V			1	uA
					5	
I_{GSS}	Gate-Body leakage current	**V_{DS}** = 0V, V_{GS} = ±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	**V_{DS}** = V_{GS} I_D = 250μA	1.2	1.5	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	VGS=-10V, ID=3A		39.0	52.0	mΩ
		VGS=4.5V, ID=3A		60.0	95.0	
g_{FS}	Forward Transconductance	VDS=5V, ID=5A		80		S
V_{SD}	Diode Forward Voltage	IS=1A,VGS=0V		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				5	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	VGS=0V, VDS=15V, f=1MHz		380	400	pF
C_{oss}	Output Capacitance			100	120	pF
C_{rss}	Reverse Transfer Capacitance			90	95	pF
R_g	Gate resistance	VGS=0V, VDS=0V, f=1MHz			0.65	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Q_g (10V)	Total Gate Charge	VGS=10V, VDS=15V, ID=5A		2.55		nC
Q_g 4.5V)	Total Gate Charge			1.275		
Q_{gs}	Gate Source Charge			0.91		
Q_{gd}	Gate Drain Charge			1.3		
$t_{D(on)}$	Turn-On DelayTime	VGS=10V, VDS=15V,RL=0.75Ω, RGEN=3Ω		4.25		ns
t_r	Turn-On Rise Time			3.4		
$t_{D(off)}$	Turn-Off DelayTime			11.9		
t_f	Turn-Off Fall Time			3.825		
t_{rr}	Body Diode Reverse Recovery Time	I_F=-8A, dI/dt=500A/μs		8.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=18A, dI/dt=500A/μs		2.2		nC

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

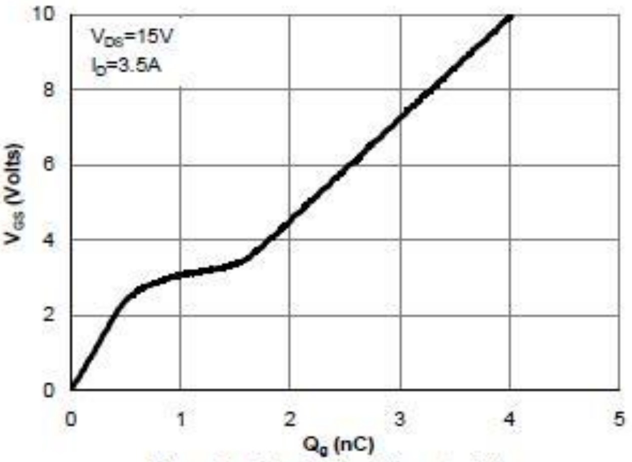


Figure 7: Gate-Charge Characteristics

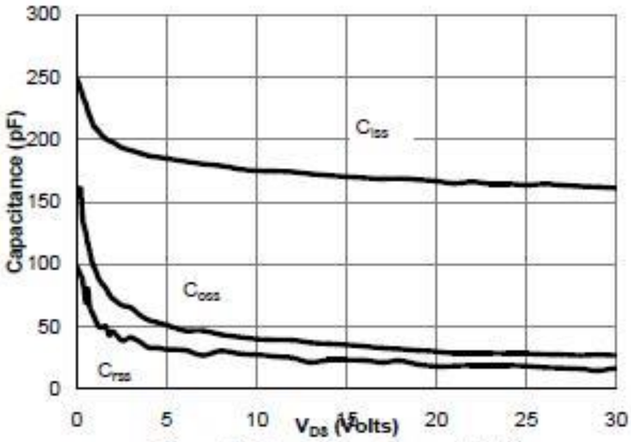


Figure 8: Capacitance Characteristics

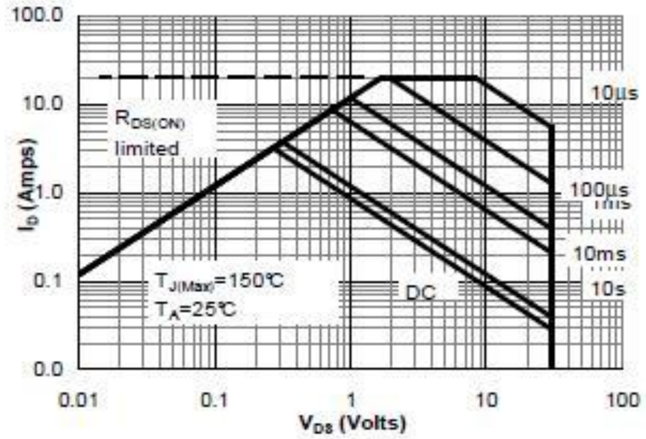


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

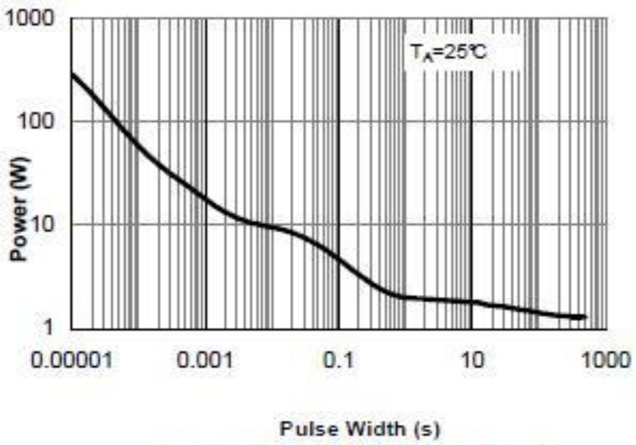


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

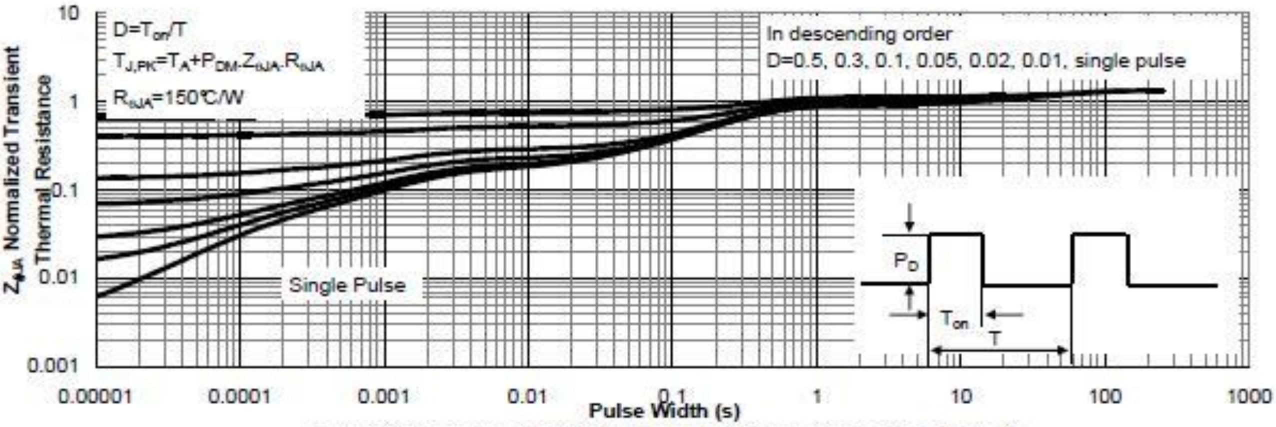
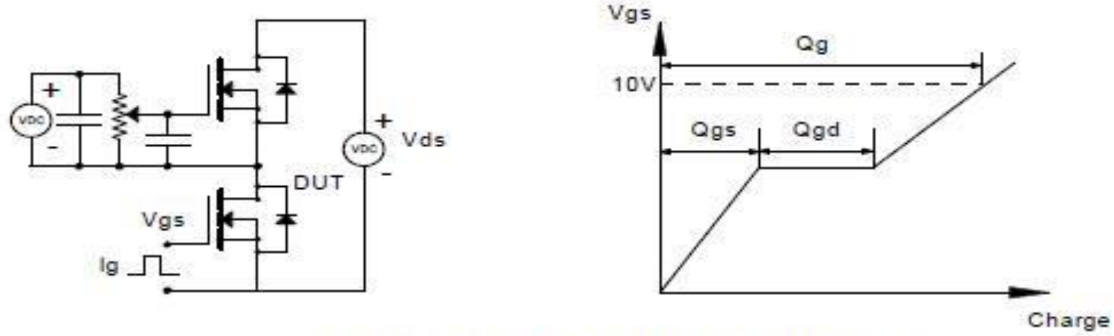
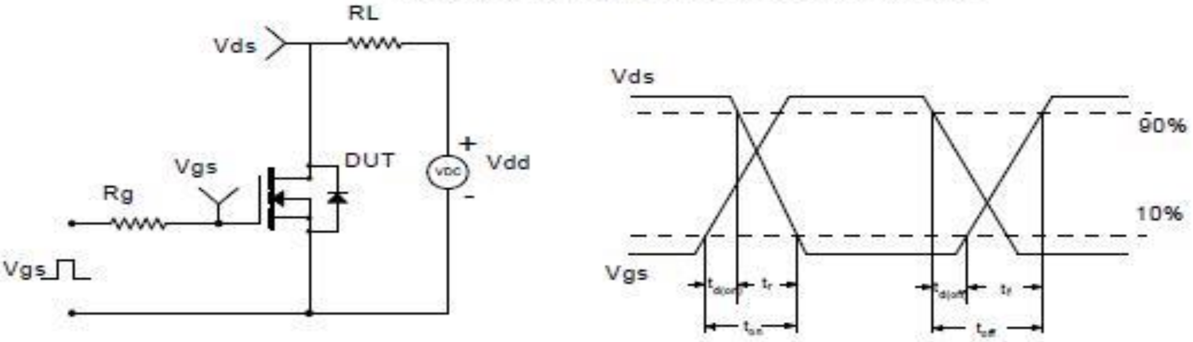


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

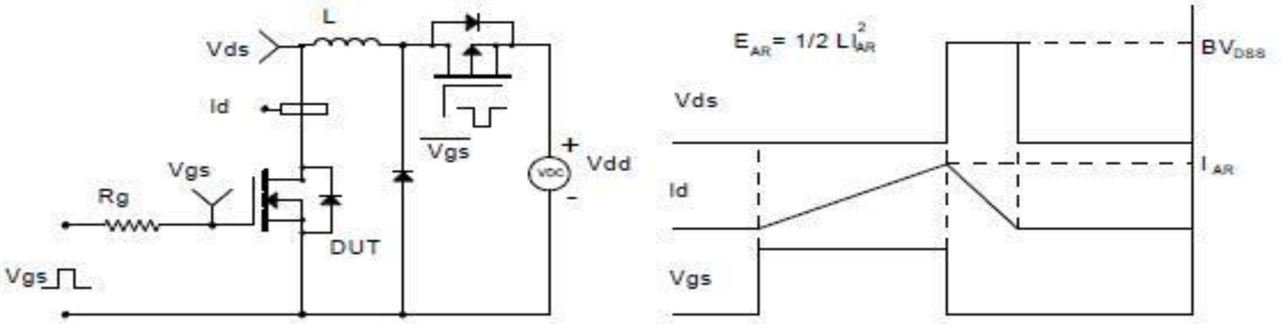
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms