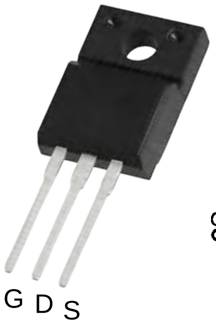
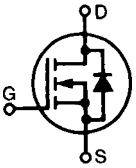
SMOS13N50A1

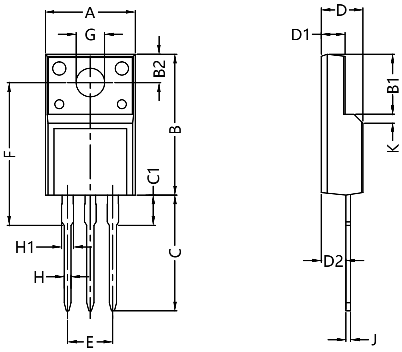
Power MOSFETs





G=Gate, D=Drain,
S=Source

Dimensions TO-220F



Dim.	Millimeter		Dim.	Millimeter	
	Min.	Max.		Min.	Max.
A	9.80	10.60	D2	2.30	3.30
B	15.40	16.40	E	5.08BSC	
B1	6.00	7.40	F	14.50	16.00
B2	3.20	3.80	ØG	2.90	3.40
C	12.80	13.50	H	0.60	1.00
C1	3.20	4.00	H1	1.15	1.55
D	4.35	4.95	J	0.35	0.65
D1	2.24	2.84	K	0.00	1.60

Symbol	Test Conditions	Maximum Ratings	Unit
V_{DSS}	T_J=25°C to 150°C	500	V
V_{DGR}	T_J=25°C to 150°C; R_{GS}=1MΩ	500	
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	
I_{D25}	T_C=25°C	13	A
I_{D100}	T_C=100°C	8.2	
I_{DM}	T_C=25°C; pulse width limited by T_{JM}	52	A
I_{AR}	T_C=25°C	13	A
E_{AR}	T_C=25°C	19.6	mJ
dv/dt	$I_S \le I_{DM}$; di/dt≤100A/us; $V_{DD} \le V_{DSS'}$ $T_J \le$150°C; R_G=2Ω	5	V/ns
P_D	T_C=25°C	170	W
T_J		-55...+150	°C
T_{JM}		150	
T_{stg}		-55...+150	
T_L	1.6mm(0.062 in.) from case for 10s	300	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight	typical	1.5	g

(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
V_{DSS}	V_{GS}=0V; I_D=250uA	500			V
$V_{GS(th)}$	V_{DS}=V_{GS}; I_D=0.25mA	2		4	V
I_{GSS}	V_{GS}=±20V_{DC}; V_{DS}=0			±100	nA
I_{DSS}	V_{DS}=0.8V_{DSS}; T_J=25°C			1	uA
	V_{GS}=0V; T_J=125°C			10	uA

(T_J=25°C, unless otherwise specified)

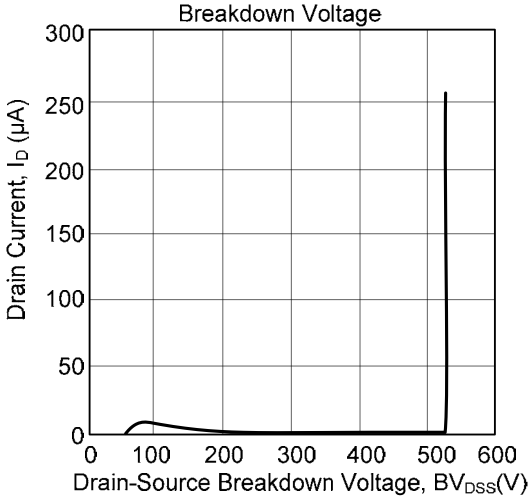
Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
$R_{DS(on)}$	V_{GS}=10V; I_D=0.5I_{D25} Pulse test, t≤300us, duty cycle≤2%		0.40	0.55	Ω
g_{ts}	V_{DS}=10V; I_D=0.5I_{D25}; pulse test	11	15		S
C_{ies}	V_{GS}=0V; V_{DS}=25V; f=1MHz		1600		pF
C_{oes}			185		
C_{res}			20		
$Q_{g(on)}$	V_{GS}=10V; V_{DS}=0.5V_{DSS}'; I_D=0.5I_{D25}		43		nC
Q_{gs}			8		
Q_{gd}			19		
$t_{d(on)}$	V_{GS}=10V; V_{DS}=0.5V_{DSS}; I_D=0.5I_{D25} R_G=2Ω (External)		25	55	ns
t_r			100	210	ns
$t_{d(off)}$			130	270	ns
t_f			100	210	ns
R_{thJC}				2.15	K/W
R_{thCS}				1.71	K/W

Source-Drain Diode

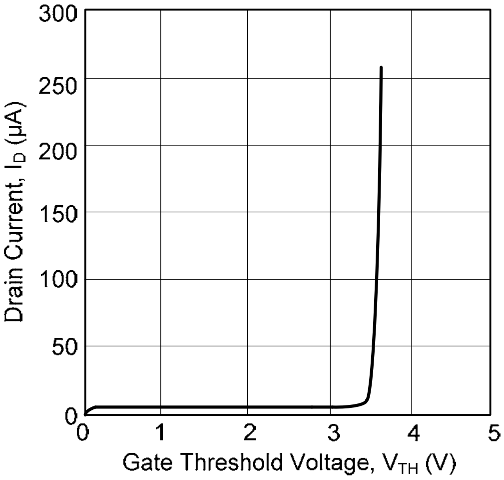
(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions		Characteristic Values			Unit
			min.	typ.	max.	
I_S	V_{GS}=0V				13	A
I_{SM}	Repetitive; pulse width limited by T_{JM}				52	A
V_{SD}	I_F=I_S; V_{GS}=0V; Pulse test, t≤300us, duty cycle d≤2%				1.5	V
t_{rr}	I_F=I_S; -di/dt=100A/us; V_R=100V;	T_J=25°C		112		ns
Q_{rr}		T_J=25°C		0.35		uC
I_{RM}		T_J=25°C		8.6		A

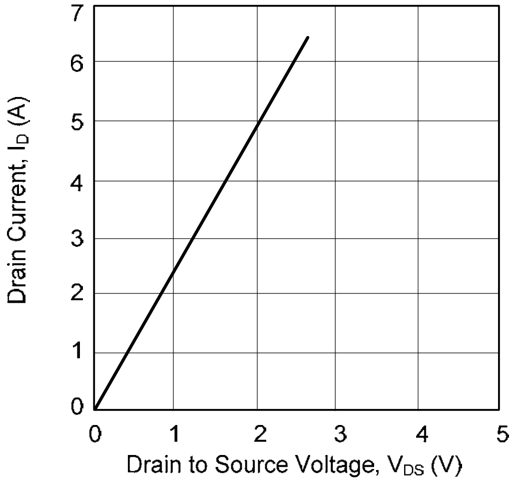
Drain Current vs. Drain-Source Breakdown Voltage



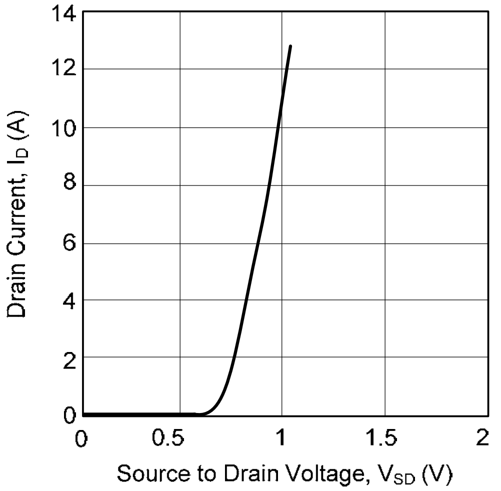
Drain Current vs. Gate Threshold Voltage



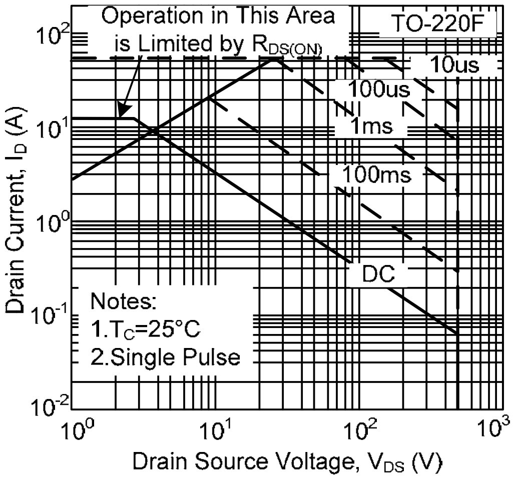
Drain-Source On-State Resistance Characteristics



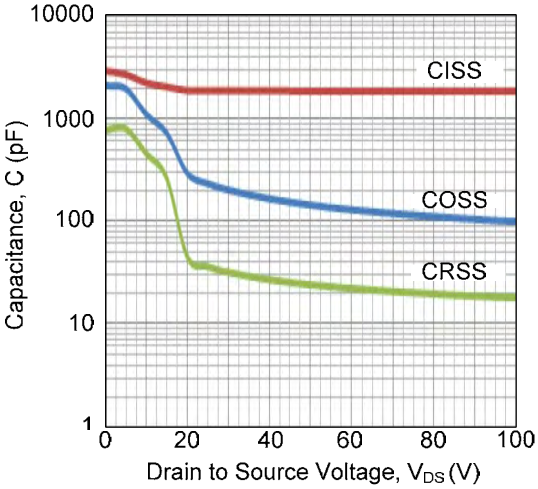
Drain Current vs. Source to Drain Voltage

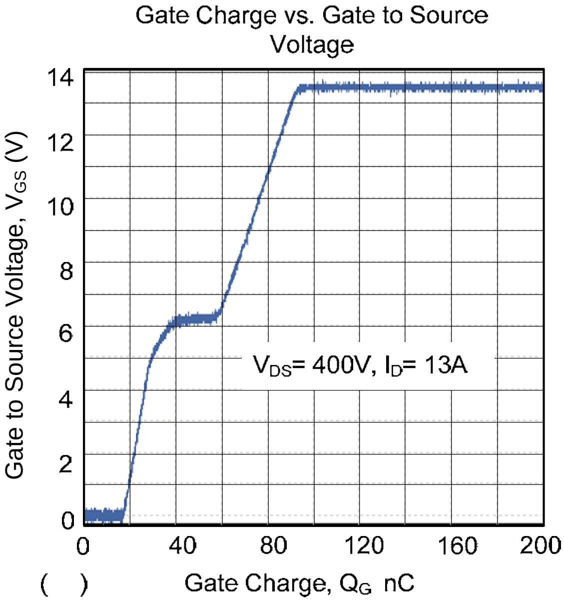


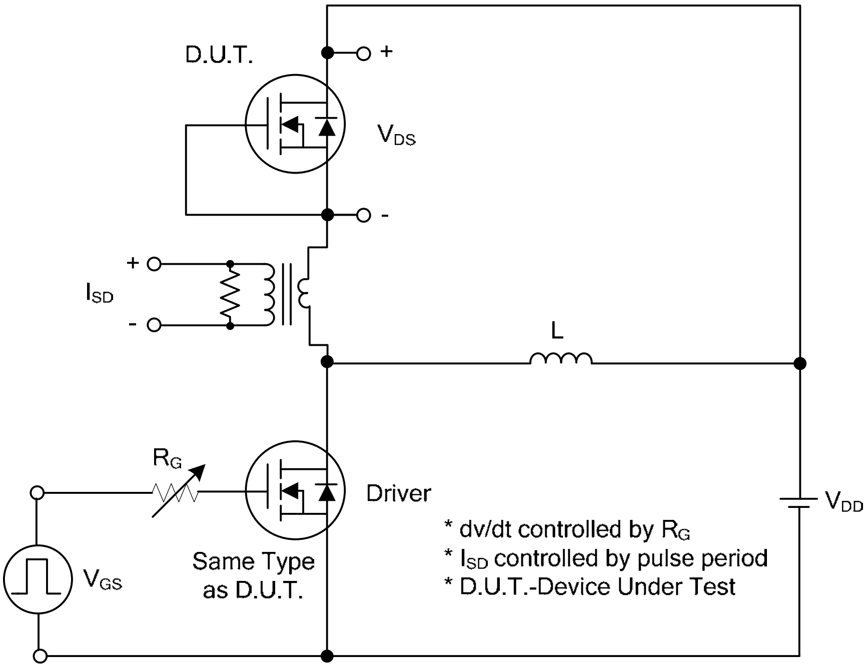
Maximum Safe Operating Area



Capacitance Characteristics

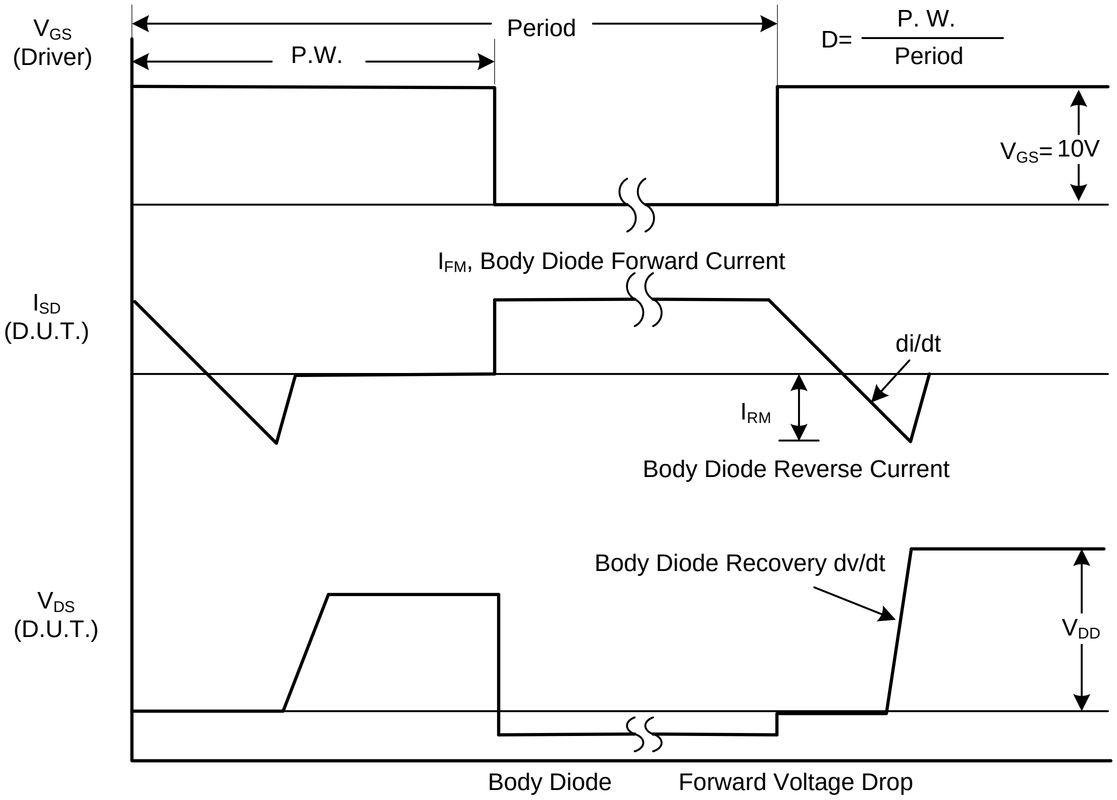




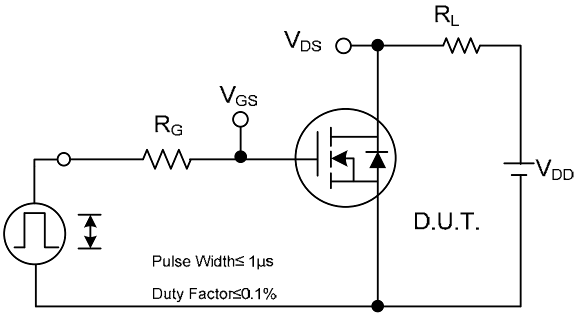


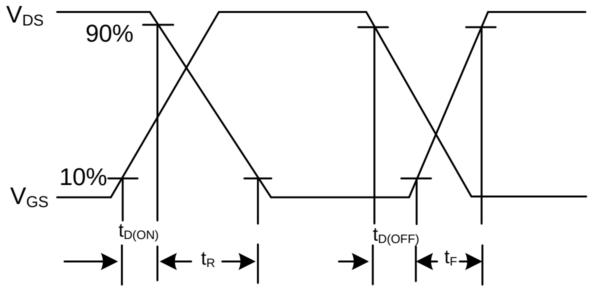
* dv/dt controlled by R_G
* I_{SD} controlled by pulse period
* D.U.T.-Device Under Test

Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms





Switching Test Circuit

Switching Waveforms

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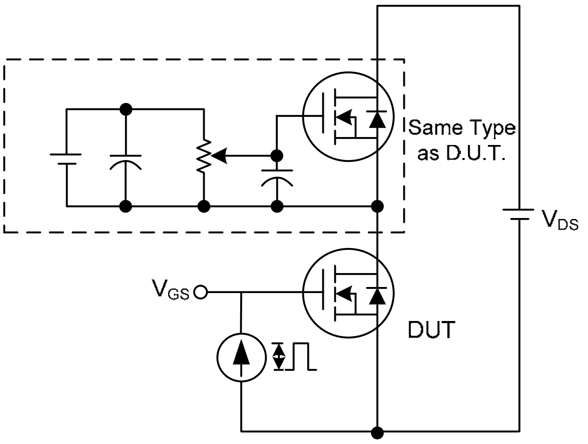
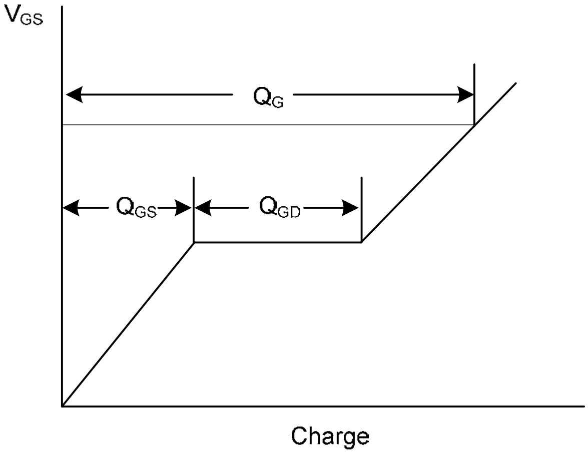
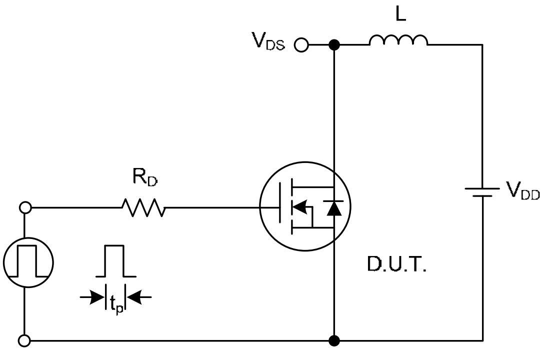


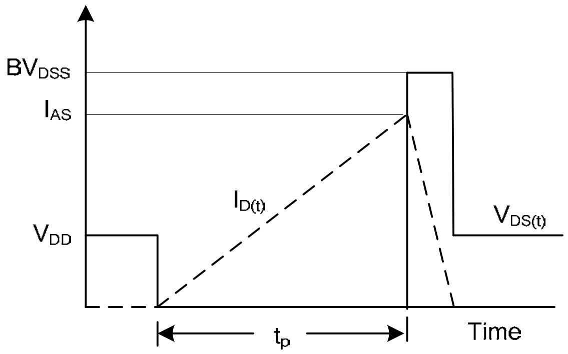
Gate Charge Test Circuit



Gate Charge Waveform

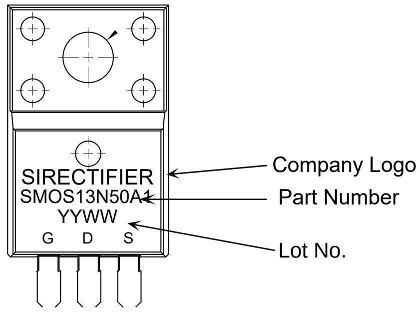


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Marking



ORDERING INFORMATION

Part Number	Package	Shipping	Marking Code
SMOS13N50A1	TO-220F-3L	50pcs / Tube	SMOS13N50A1