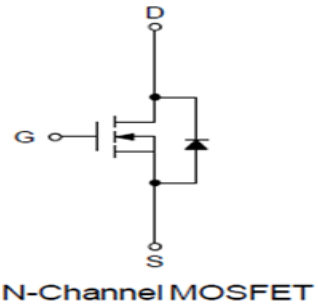
POWER MOSFET

Features

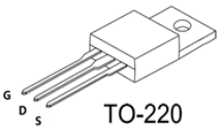
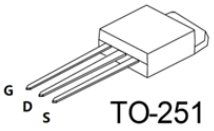
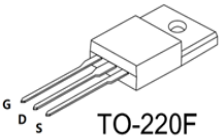
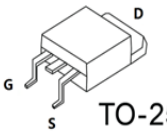
- 60V,50A N-Channel MOSFET
- $R_{DS(on)(typ.)}$=6mΩ @V_{GS}=10V
- High ruggedness
- Fast switching
- 100% avalanche tested
- Exceptional dv/dt capability



N-Channel MOSFET

Applications

- Switching application
- Motor drive

SF50N06P	 TO-220	SF50N06I	 TO-251
SF50N06F	 TO-220F	SF50N706D	 TO-252

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±25	V
I_D	Continuous Drain Current(TC=25 ℃)	50	A
	Continuous Drain Current(TC=100℃)	40	A
I_{DM}	Pulsed Drain Current(Note 1)	200	A
EAS	Single Pulsed Avalanche Energy(Note 2)	100	mJ
P_D	Maximum Power Dissipation (T_C=25℃)	70	W
	Maximum Power Dissipation (T_C=100℃)	34	W
T_J	Operating Junction Temperature Range	-55 to +175	℃
T_{STG}	Storage Temperature Range	-55 to +175	℃

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2.Starting T_J=25℃,L=1.0mH,R_G=50Ω,I_D=37A,V_{GS}=10V

Thermal data

Symbol	Parameter	Max.	Units
$R_{th\ J\text{-}C}$	Thermal Resistance, Junction to case	2.1	℃/W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

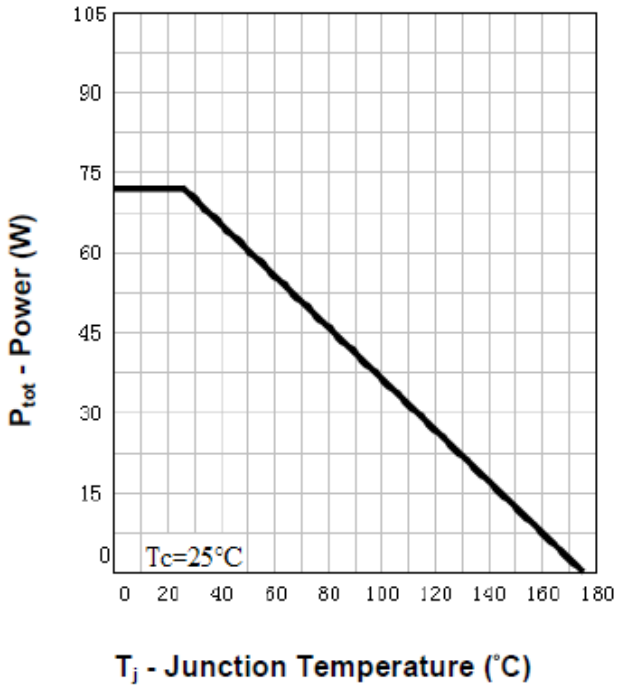
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	60			V
I_{DSSS}	Drain-Source Leakage Current	V_{DS}=60V, V_{GS}=0V			1	uA
I_{GSS}	Gate Leakage Current, Forward	V_{GS}=25V, V_{DS}=0V			100	nA
	Gate Leakage Current, Reverse	V_{GS}= -25V, V_{DS}=0V			-100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250uA	2	3	4	V
$R_{DS(on)}$	Collector-Emitter Saturation Voltage	V_{GS}=10V, I_D=25A		6	10	mΩ
gfs	Forward Transconductance	V_{DS}=15V, I_D=30A		18		S
Q_g	Total Gate Charge	V_{DD}=30V V_{GS}=10V I_D=25A		40		nC
Q_{gs}	Gate-Source Charge			10		nC
Q_{gd}	Gate-Drain Charge			9		nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V V_{GS}=10V I_D=25A R_G=4.7Ω	-	10	-	ns
t_r	Turn-on Rise Time		-	86	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	34	-	ns
t_f	Turn-off Fall Time		-	26	-	ns
C_{iss}	Input Capacitance	V_{DS}=30V V_{GS}=0V f = 1MHz	-	1650	-	pF
C_{oss}	Output Capacitance		-	380	-	pF
C_{rss}	Reverse Transfer Capacitance		-	165	-	pF
R_{Gint}	Integrated gate resistor			1.6		Ω

Source-Drain Ratings and Characteristics (TC=25 ℃ unless othe

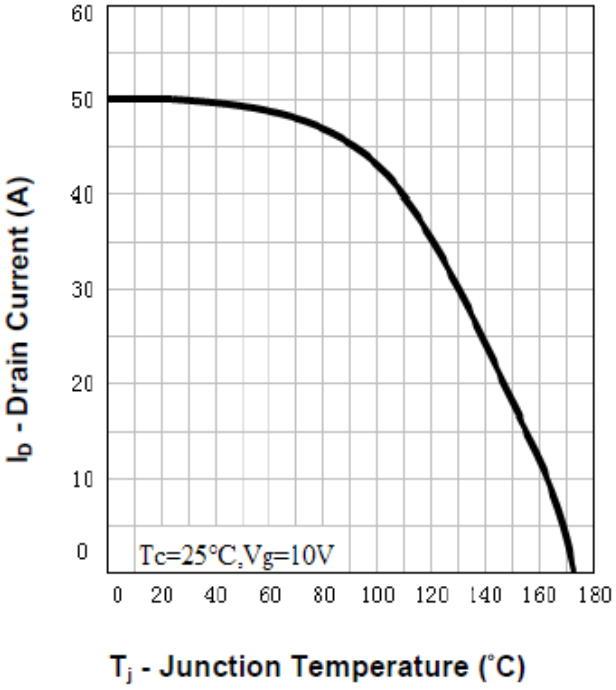
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage	V_{GS}=0V,I_S=20A	-		1.2	V
I_S	Continuous Diode Forward Current				50	A
t_{rr}	Reverse Recovery Time	V_{DD}=25V,I_S=25A dI_F/dt=100A/us	-	32		ns
Q_{rr}	Reverse Recovery Charge		-	40		nC

Typical Characteristic

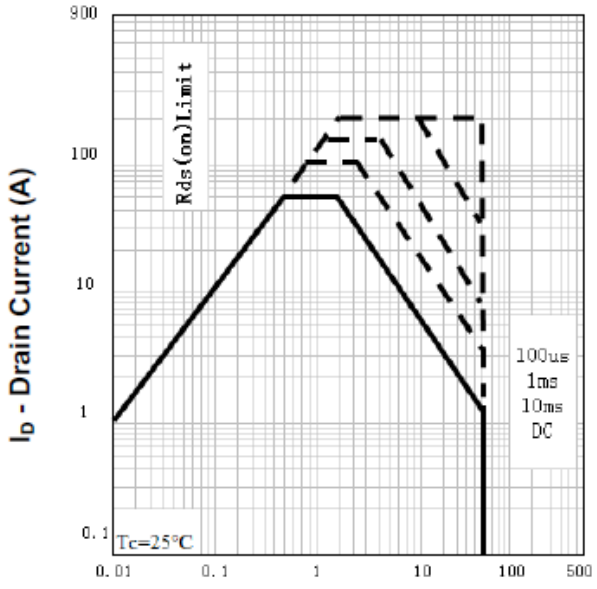
Power Dissipation



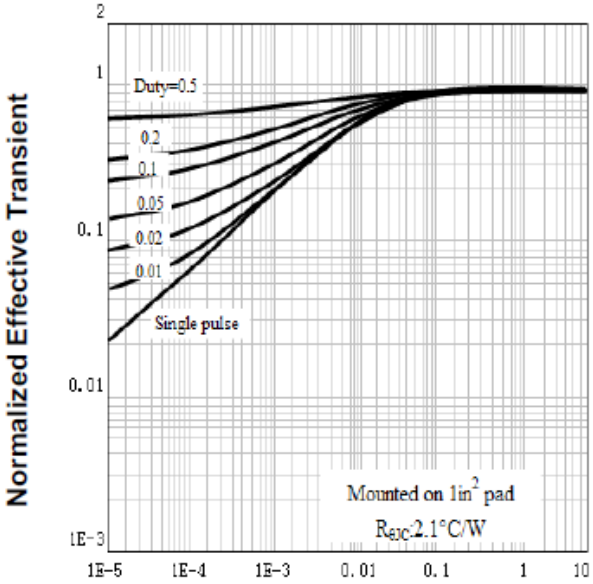
Drain Current



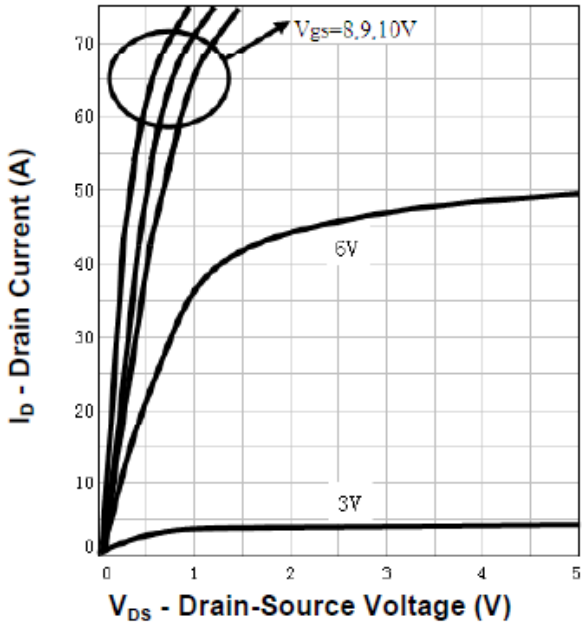
Safe Operation Area



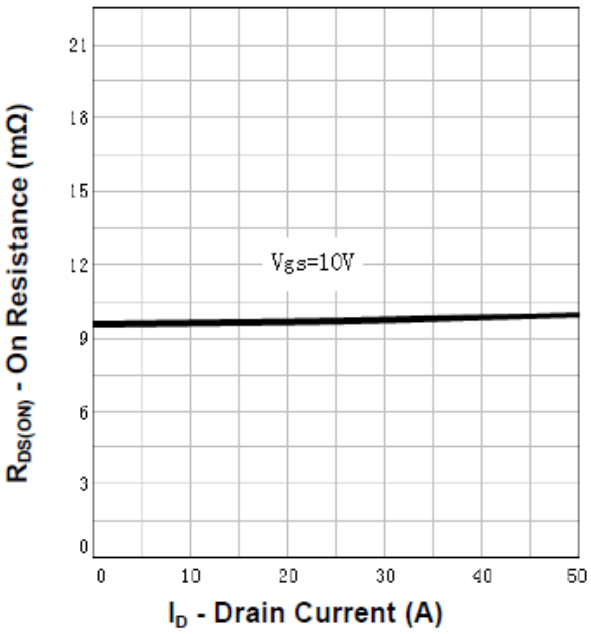
Thermal Transient Impedance



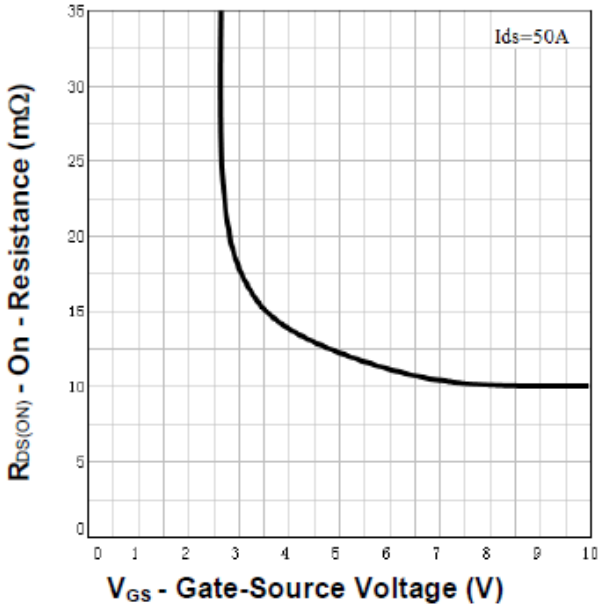
Output Characteristics



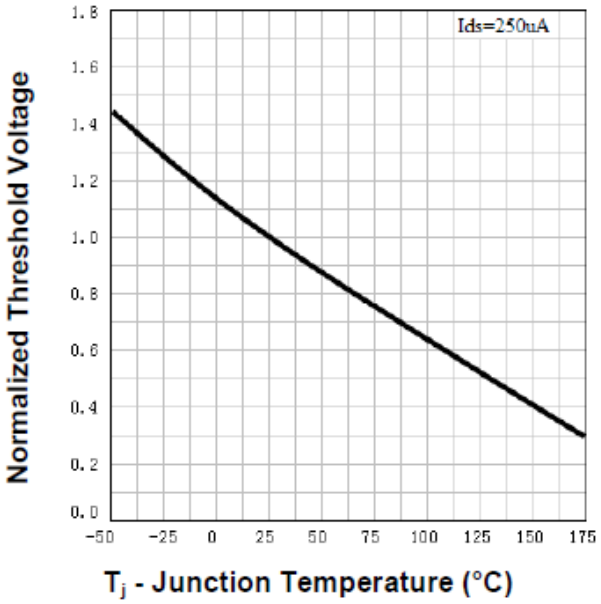
Drain-Source On Resistance



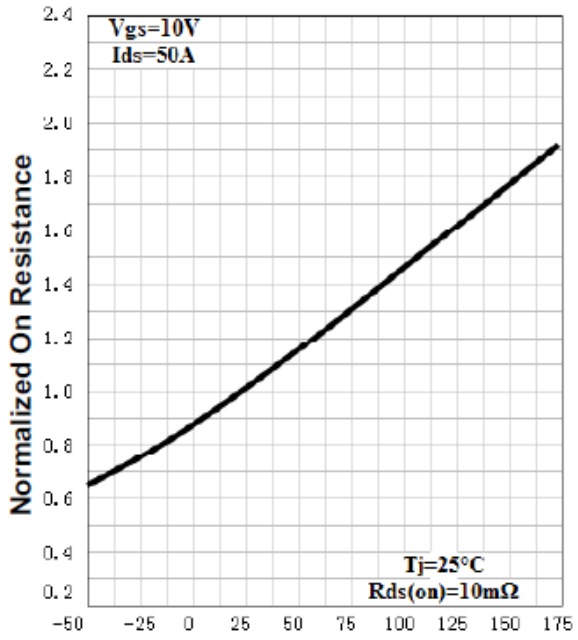
Drain-Source On Resistance



Gate Threshold Voltage

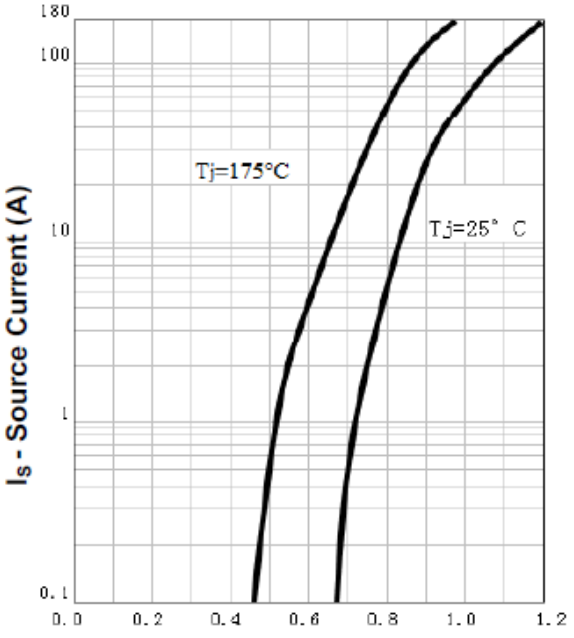


Drain-Source On Resistance



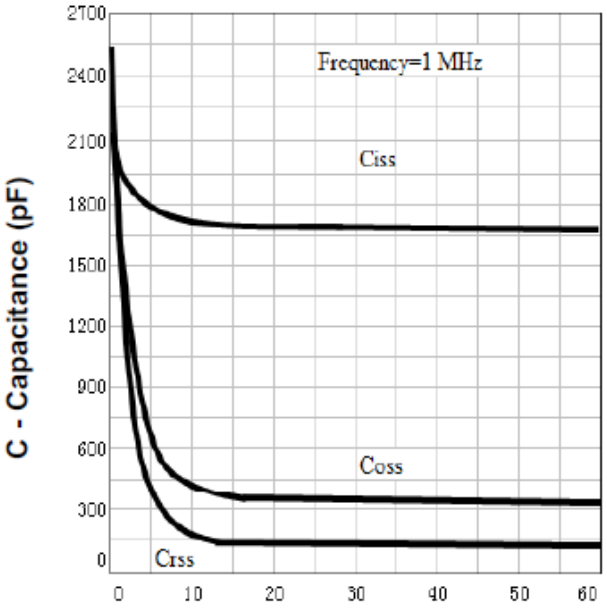
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



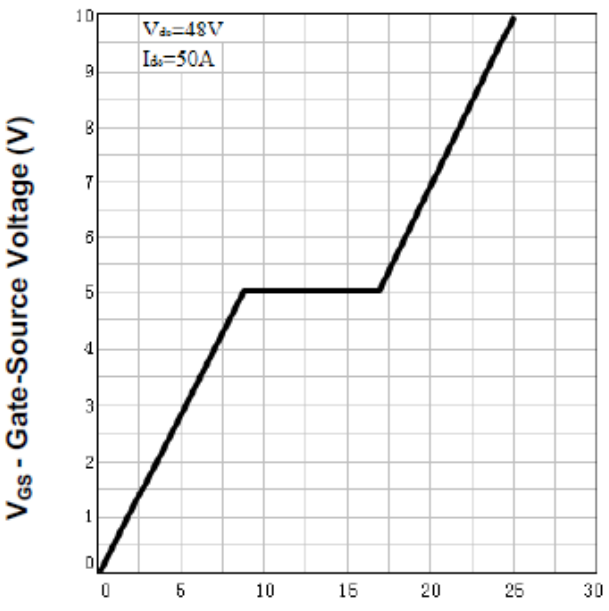
V_{SD} - Source-Drain Voltage (V)

Capacitance



V_{DS} - Drain-Source Voltage (V)

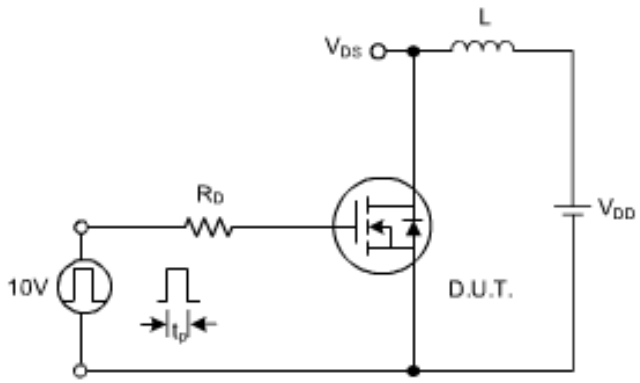
Gate Charge

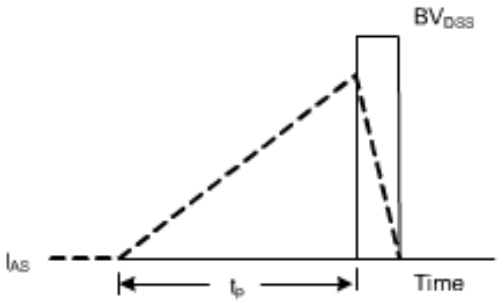
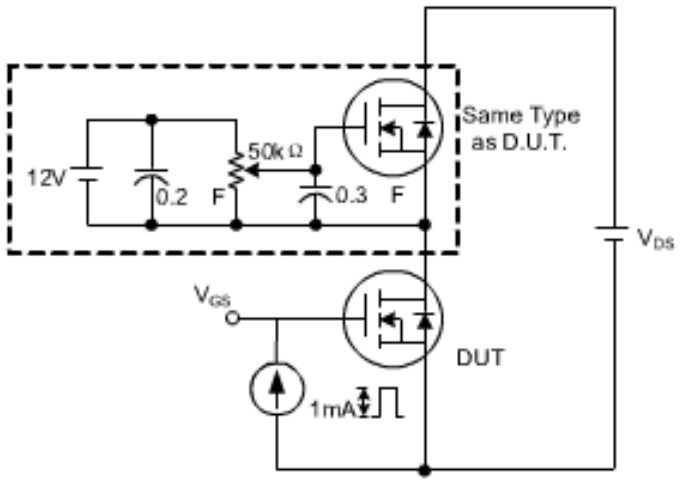
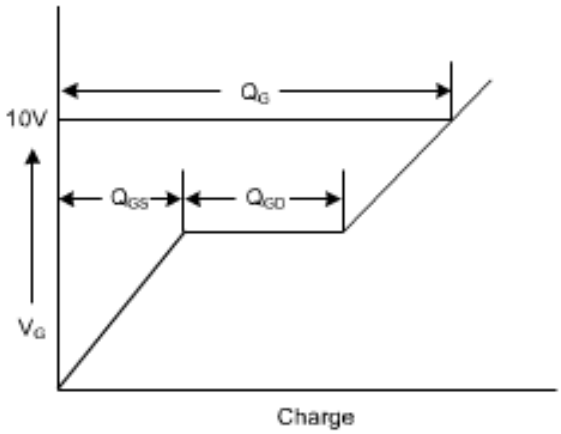


Q_G - Gate Charge (nC)

Test Circuits

Avalanche test circuits and waveforms





Gate charge test circuits and waveforms