S80N22T
N-Channel Power MOSFET

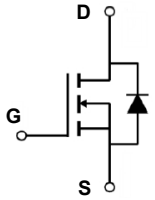
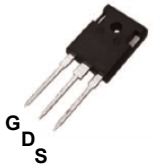
Features

- V_{DS}=80V,I_D=196A
  Rds(on)(typ)=3mΩ@Vgs=10V
- 100% Avalanche Tested
- 100% Rg Tested
- Lead-Free (RoHS Compliant)

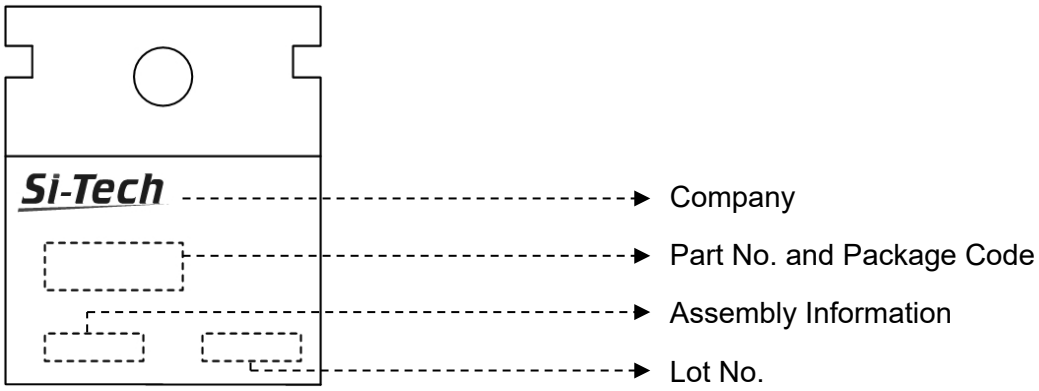
Applications

- DC Motor Control
- DC-DC Converters
- BMS
- SMPS
- Automotive Environment

Internal Circuit and Pin Description

	
Package	TO-247
Package Code	T

Package Marking



Absolute Maximum Ratings(T_C=25℃ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	80	V
I_D	Continuous Drain Current (TC=25℃)	196	A
	Continuous Drain Current (TC=100℃)	124	A
I_{DM}	Pulsed Drain Current (Note 1)	784	A
V_{GS}	Gate-Source Voltage	±25	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	1122	mJ
P_D	Maximum Power Dissipation (TC=25℃)	290	W
	Derating Factor above 25℃	2.32	W/℃
T_J	Operating Junction Temperature Range	-55 to +150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case	0.43	℃/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	80	-	-	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=76V, 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	2.4	3	3.6	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=40A	2.4	3	3.6	mΩ
Qg	Total Gate Charge	V_{DD}=60V	-	180	-	nC
Qgs	Gate-Source Charge	V_{GS}=10V	-	35	-	nC
Qgd	Gate-Drain Charge	I_D=40A (Note 3)	-	67	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=37.5V,V_{GS}=10V	-	28	-	ns
t_r	Turn-on Rise Time	I_D=45A,R_G=4.7Ω	-	19	-	ns
$t_{d(off)}$	Turn-off Delay Time	T_C=25℃	-	42	-	ns
t_f	Turn-off Fall Time	(Note 3)	-	53	-	ns
Rg	Gate Resistance	V_{DS}=0V,V_{GS}=0V,f=1MHz	-	1.1	-	Ω
Ciss	Input Capacitance	V_{DS}=25V	-	7823	-	pF
Coss	Output Capacitance	V_{GS}=0V	-	1068	-	pF
Crss	Reverse Transfer Capacitance	f = 1MHz	-	699	-	pF

Source-Drain Diode Characteristics (T_C=25℃ unless otherwise noted)

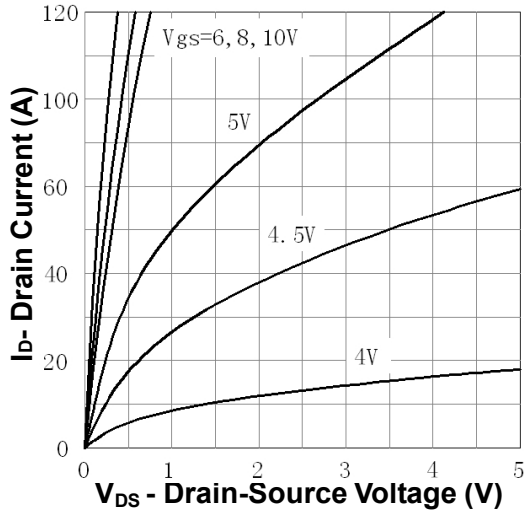
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Diode Forward Current		-	-	196	A
I_{SM}	Pulsed Source Diode Forward Current (Note 1)		-	-	784	A
V_{SD}	Forward On Voltage	V_{GS}=0V, I_S=45A	-	0.82	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V, I_S=45A	-	30	-	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt = 100A/us	-	54	-	nC

Notes:

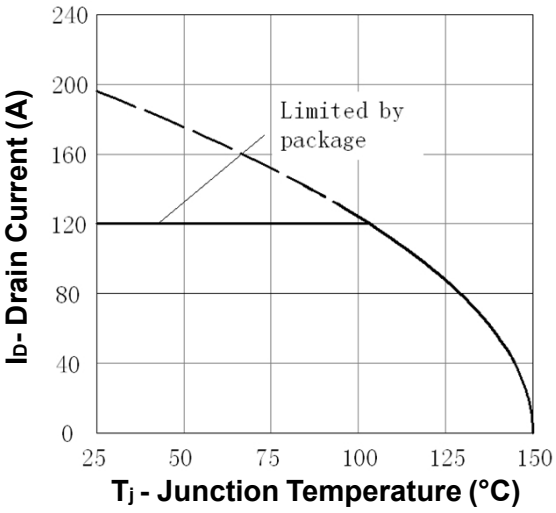
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=0.5mH, V_{DD}=64V, R_G=25Ω, Starting T_J=25℃
3. Pulse Width ≤ 300 us; Duty Cycle≤2%

Typical Characteristics

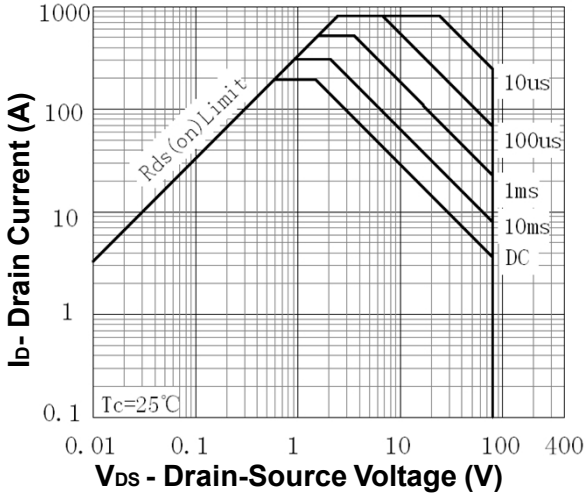
Output Characteristics



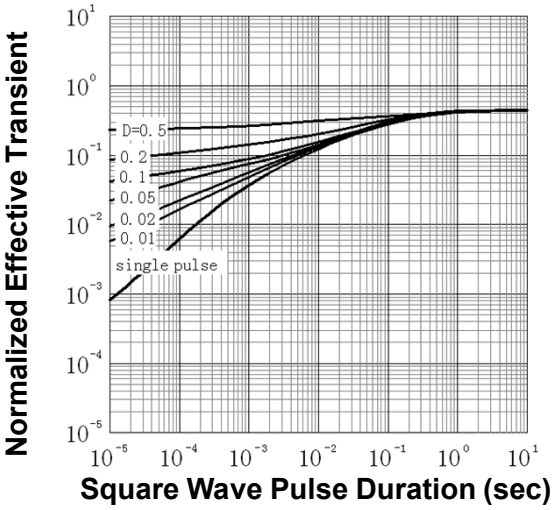
Drain Current



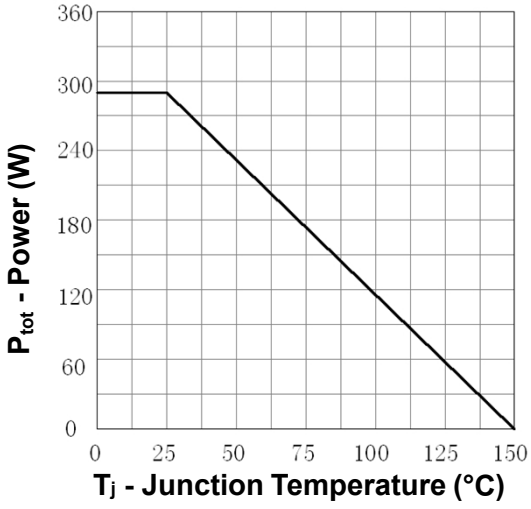
Safe Operation Area



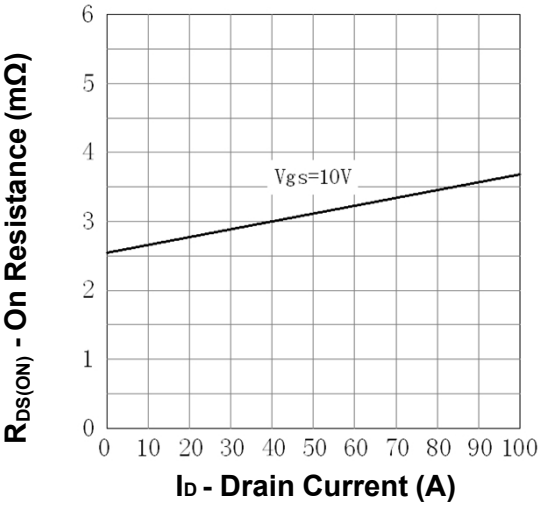
Thermal Transient Impedance



Power Dissipation



Drain-Source On Resistance



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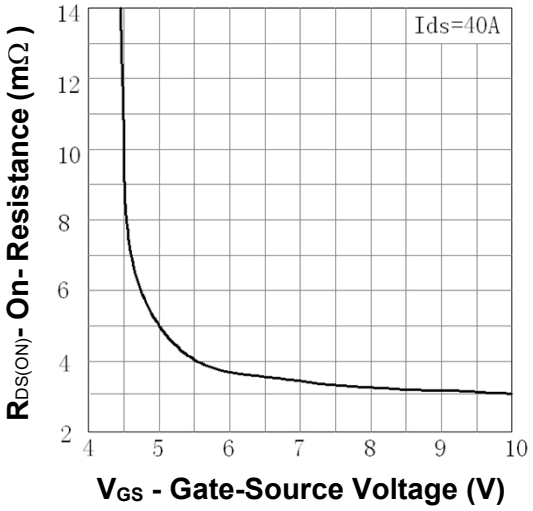
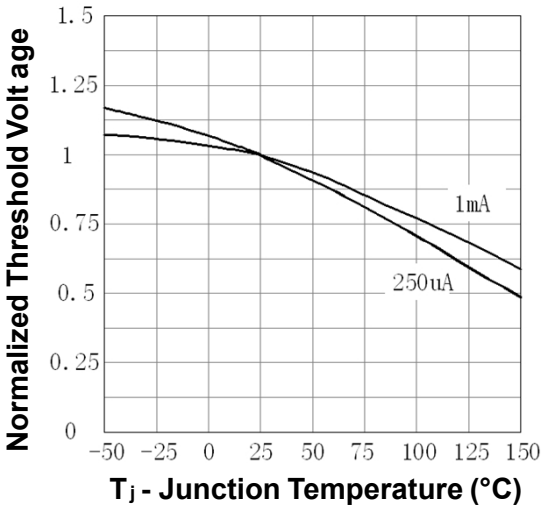
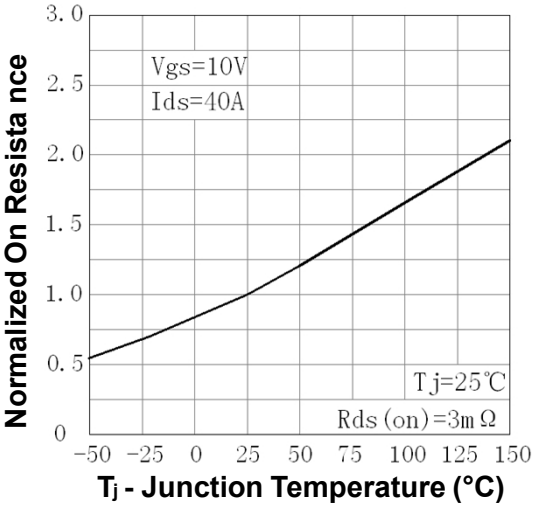


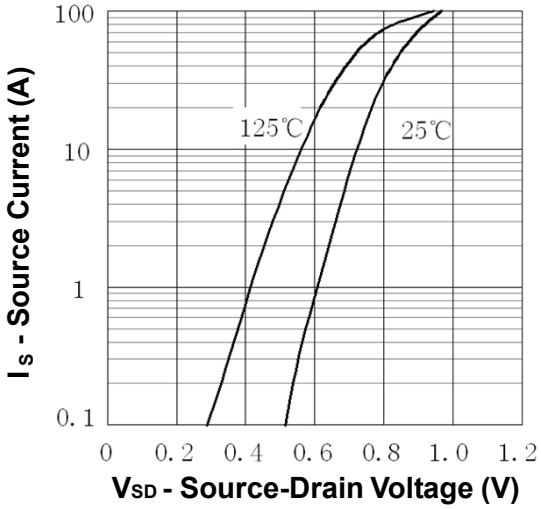
Gate Threshold Voltage



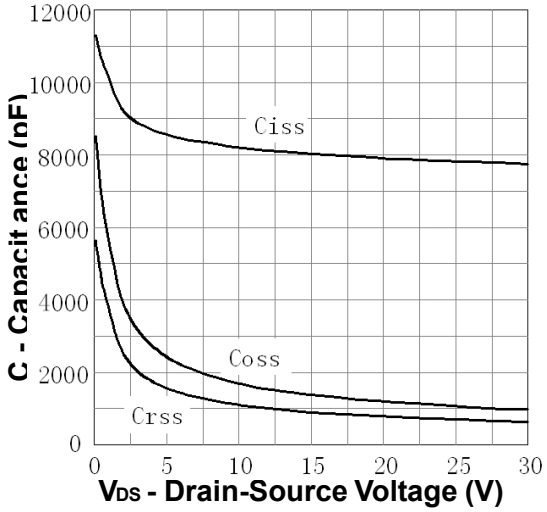
Drain-Source On Resistance



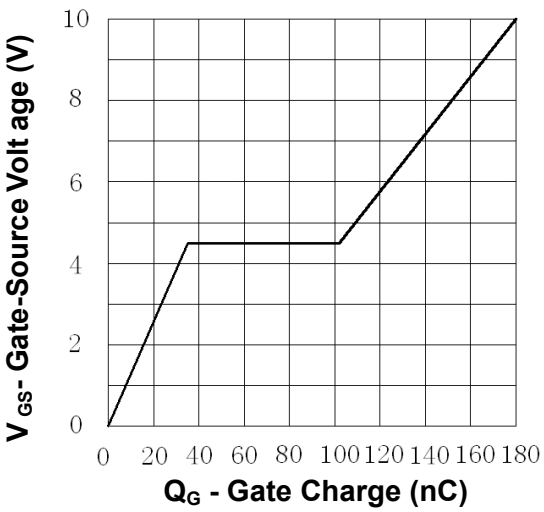
Source-Drain Diode Forward



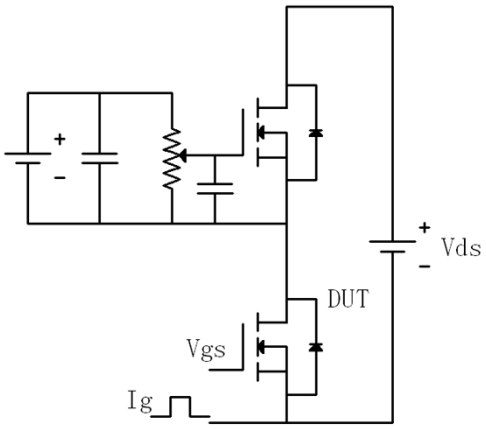
Capacitance

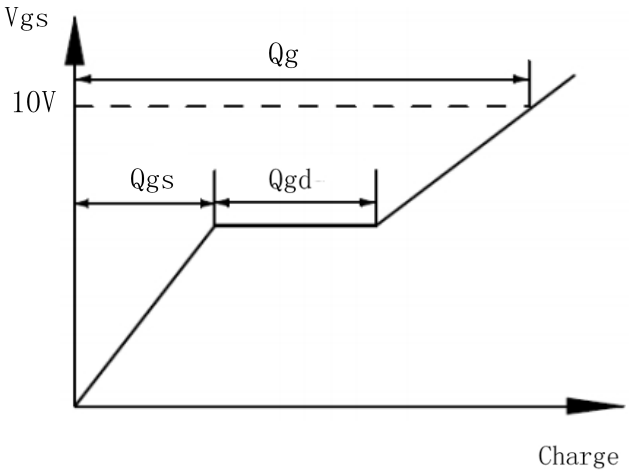


Gate Charge

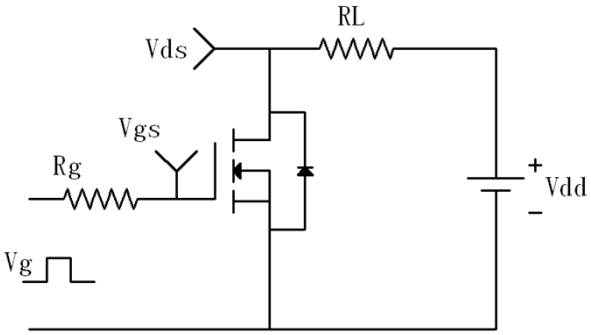


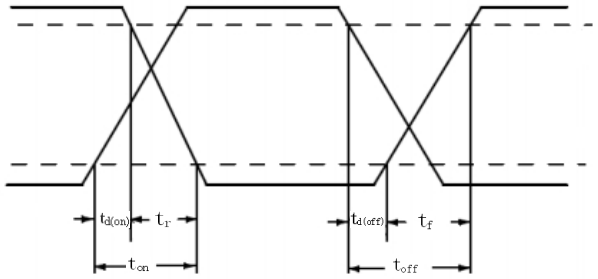
Gate Charge Test Circuit and Waveforms



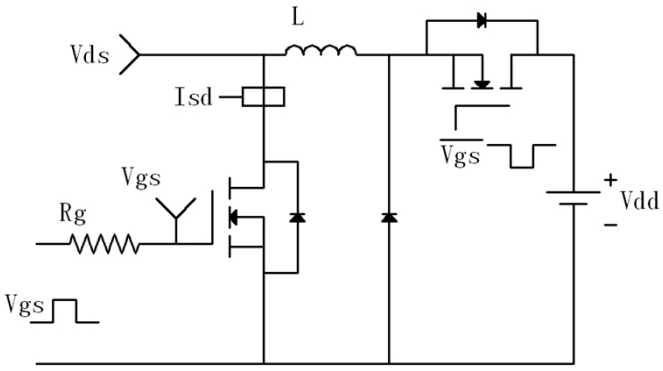


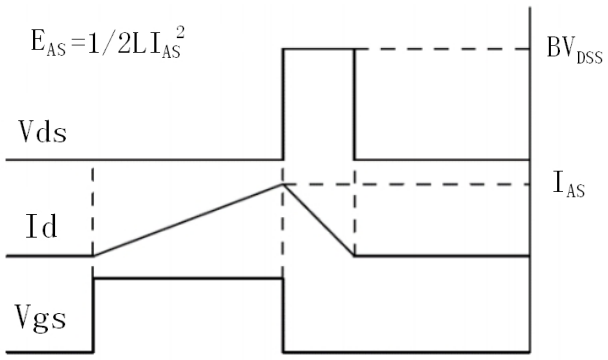
Switching Time Test Circuit & Waveforms





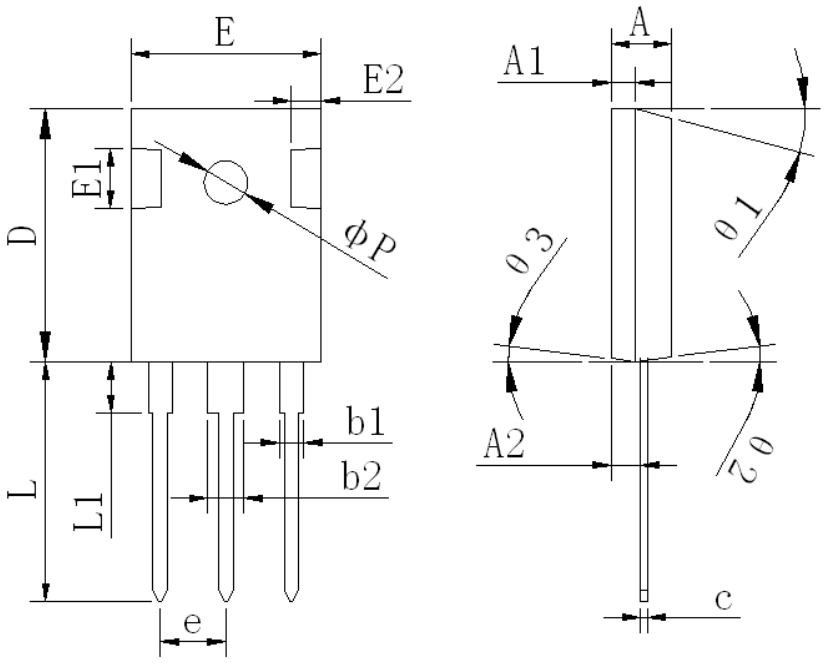
Avalanche Test Circuit& Waveforms





Package Outline

TO247



UNIT:mm

SYMBOL	MIN	NOM	MAX
A	4.92	5.00	5.08
A1	1.97	2.00	2.03
A2	2.36	2.41	2.46
b1	1.98	2.00	2.02
b2	2.98	3.00	3.02
c	0.59	0.60	0.61
E	15.75	15.80	15.85
E1	5.75	5.80	5.85
E2	2.45	2.50	2.55
e	5.44 BSC		
D	20.70	21.00	21.30
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.55	3.60	3.65
Θ1	13°	15°	17°
Θ2	5°	7°	9°
Θ2	5°	7°	9°