

### FEATURES

- $R_{DS(ON)} < 0.7\Omega @ V_{GS} = 10V$
- 100% avalanche tested
- RoHS compliant

### MECHANICAL DATA

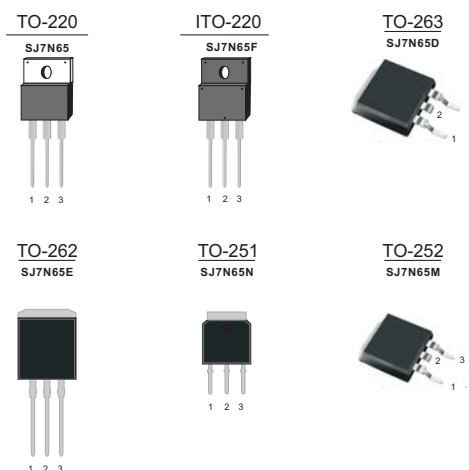
- Case: TO-220, ITO-220, TO-251, TO-252, TO-262, TO-263 package

### Ordering Information

Part No.	Package Type	Package	Quality(box)
SJ7N65	TO-220	Tube	1000
SJ7N65F	ITO-220	Tube	1000
SJ7N65E	TO-262	Tube	1000
SJ7N65D	TO-263	Tape & Reel	800
SJ7N65N	TO-251	Tube	1000
SJ7N65M	TO-252	Tape & Reel	2500

### PRODUCT SUMMARY

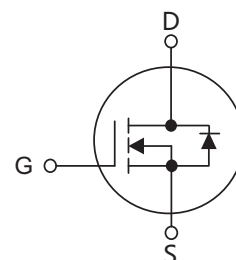
$V_{DS}(V)$	$R_{DS(on)} (m\Omega) Typ$	$I_D(A)$
650	0.6@ $V_{GS} = 10V$	7



Pin Definition:

1. Gate
2. Drain
3. Source

### Block Diagram



### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	30	V
Continuous Drain Current	$I_D$	7	A
Pulsed Drain Current (Note 1)	$I_{DM}$	42	A
Avalanche Energy (Note 2)	$E_{AS}$	86	mJ
Power Dissipation	$P_D$	TO-220/TO-263/TO-262	151
		TO-251/TO-252	
		ITO-220	35
Junction Temperature	$T_J$	+150	C
Storage Temperature	$T_{STG}$	-55 ~ +150	C

# SJ7N65 Series

## THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-251/TO-252 TO-262/TO-263	$\theta_{JA}$	62	C/W
	ITO-220		82	
Junction to Case	TO-220/TO-263/TO-262 TO-251/TO-252	$\theta_{JC}$	1.2	C/W
	ITO-220		4.1	

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25 C, unless otherwise specified)

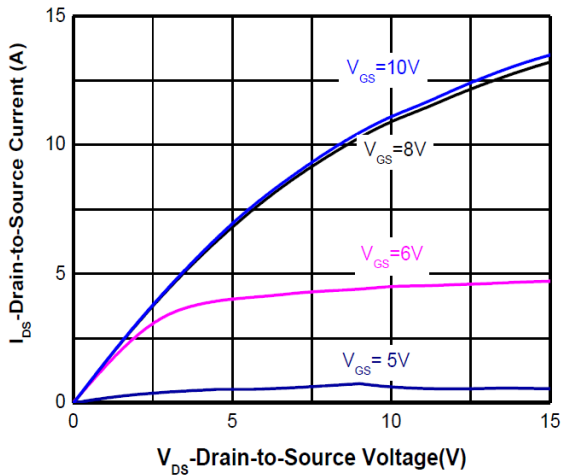
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>								
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	650			V	
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V			1	μA	
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =30V, V <sub>DS</sub> =0V			100	nA	
	Reverse		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V			-100	nA	
<b>ON CHARACTERISTICS(Note 3)</b>								
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.5		4.5	V	
DRAIN-SOURCE ON-RESISTANCE		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A		0.6	0.7	Ω	
<b>DYNAMIC CHARACTERISTICS</b>								
Input Capacitance		C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		400		pF	
Output Capacitance		C <sub>OSS</sub>				113		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>				6.4		pF
<b>SWITCHING CHARACTERISTICS</b>								
Turn-On Delay Time		t <sub>D(ON)</sub>	V <sub>DD</sub> =400V, I <sub>D</sub> =3.5A, R <sub>G</sub> =20Ω		25		ns	
Turn-On Rise Time		t <sub>r</sub>				55		ns
Turn-Off Delay Time		t <sub>D(OFF)</sub>				110		ns
Turn-Off Fall Time		t <sub>f</sub>				9		ns
Total Gate Charge		Q <sub>G</sub>				10.3		nC
Gate-Source Charge		Q <sub>GS</sub>	V <sub>DS</sub> =400V, I <sub>D</sub> =3.5A, V <sub>GS</sub> =10V		4.4		nC	
Gate-Drain Charge		Q <sub>GD</sub>			2.9		nC	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>								
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =7A		0.9	1.5	V	
Maximum Continuous Drain-Source Diode Forward Current		I <sub>S</sub>				7	A	
Reverse Recovery Current		I <sub>RRM</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =3.5A		18		A	
Reverse Recovery Time		t <sub>r</sub>	di <sub>F</sub> /dt=100A/μs (Note 1)		190		ns	
Reverse Recovery Charge		Q <sub>RR</sub>			2.3		μC	

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

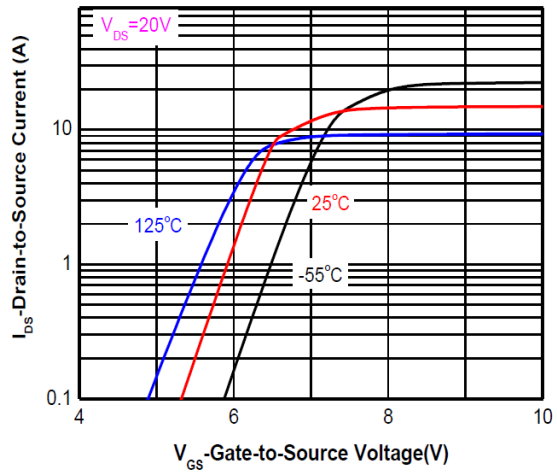
2. L=60mH, I<sub>AS</sub>=3A, V<sub>DD</sub>=150V, Starting T<sub>J</sub>=25 C

3. Pulse Test: Pulse width ≤300μs, Duty cycle≤1%.

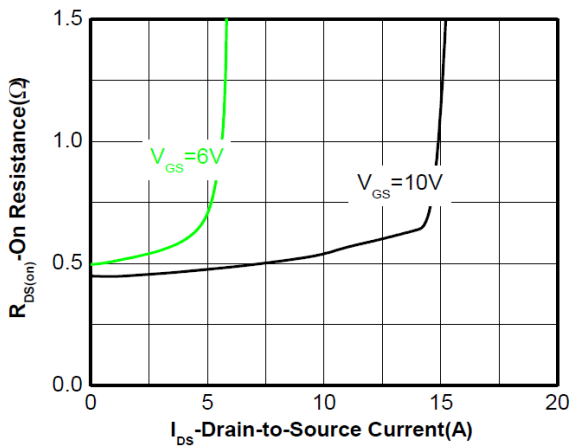
Typical characteristics Diagrams



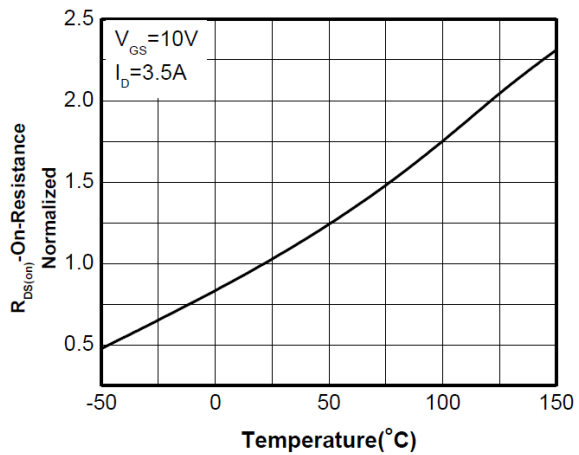
Output characteristics



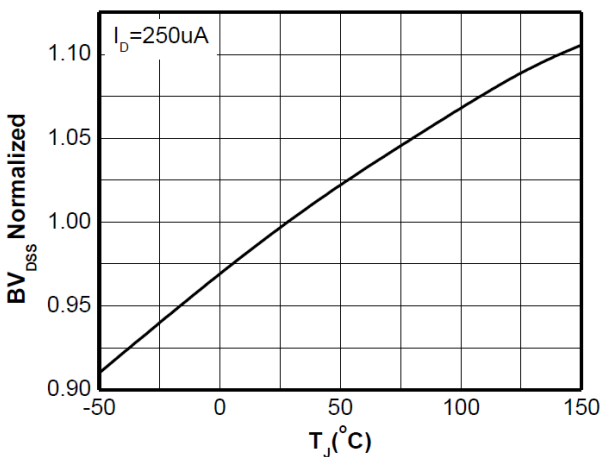
Transfer characteristics



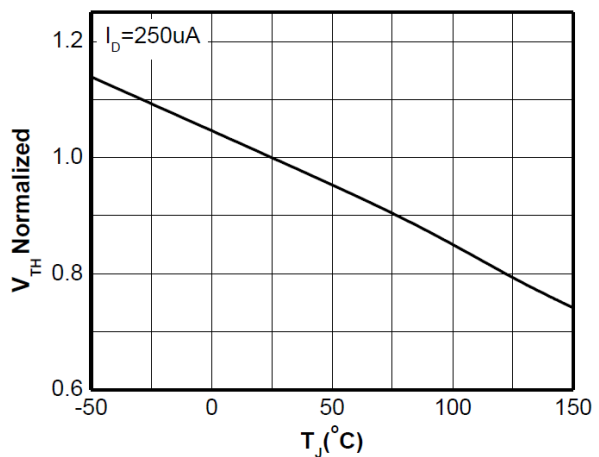
On-Resistance vs. Drain current



On-Resistance vs. Junction temperature

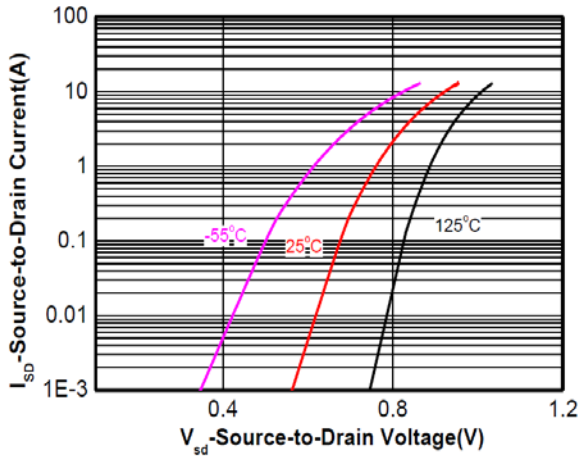


Breakdown Voltage vs. Junction temperature

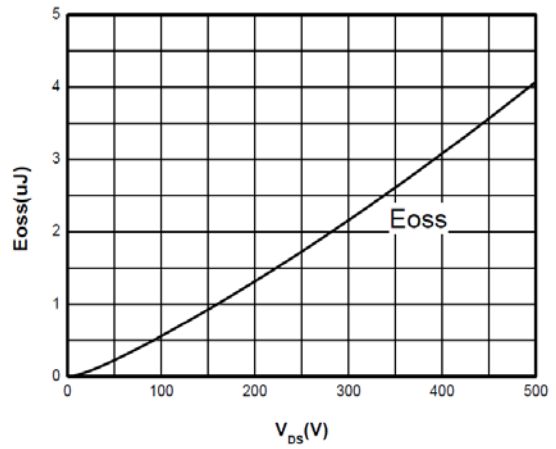


Threshold voltage vs. Junction temperature

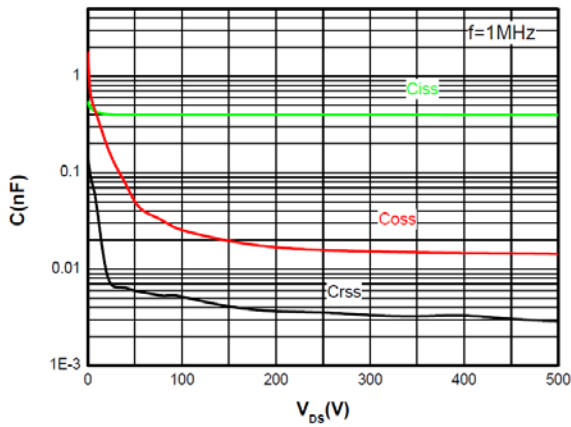
Typical characteristics Diagrams



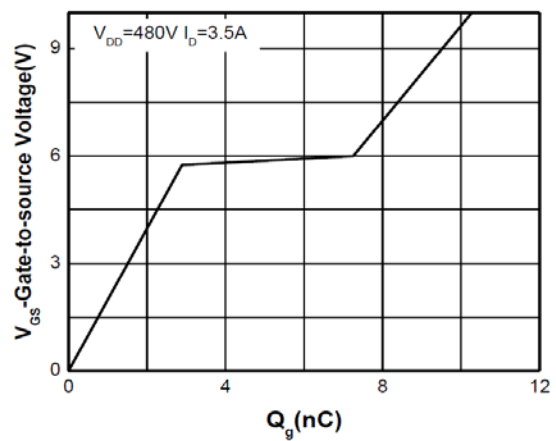
Body diode forward voltage



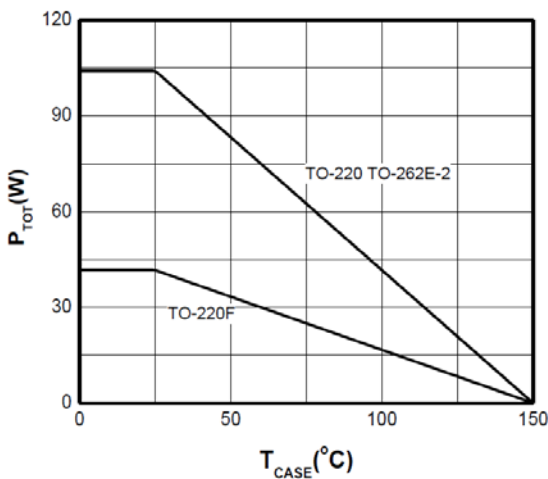
Coss stored Energy



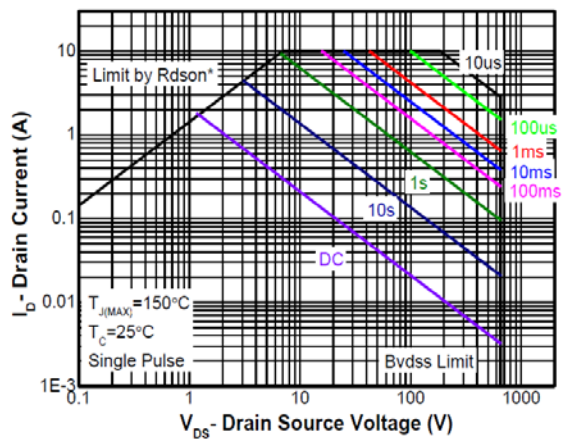
Capacitance



Gate charge Characteristics

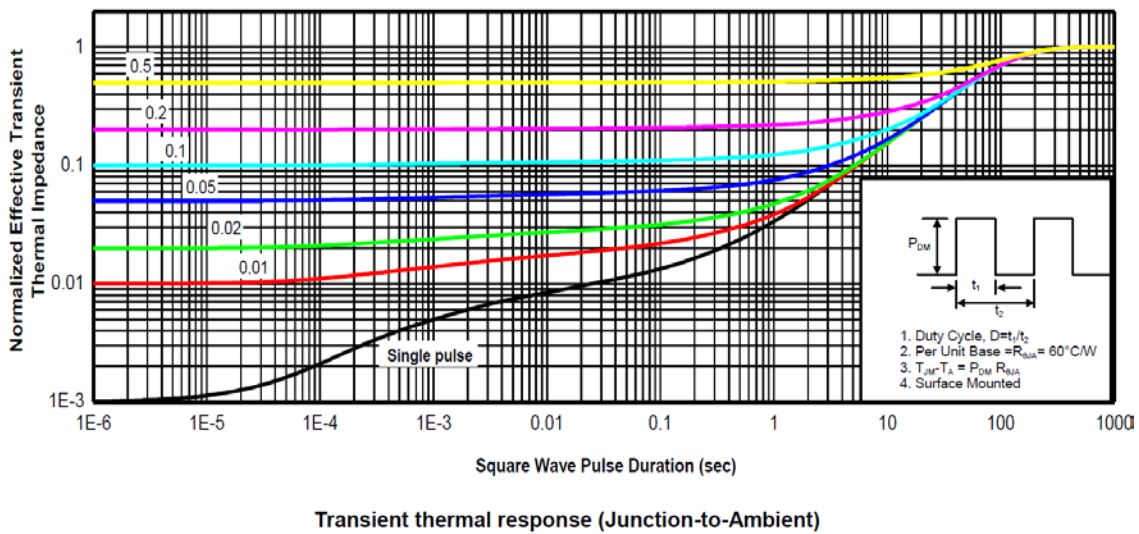


Power dissipation



Safe Operating Area

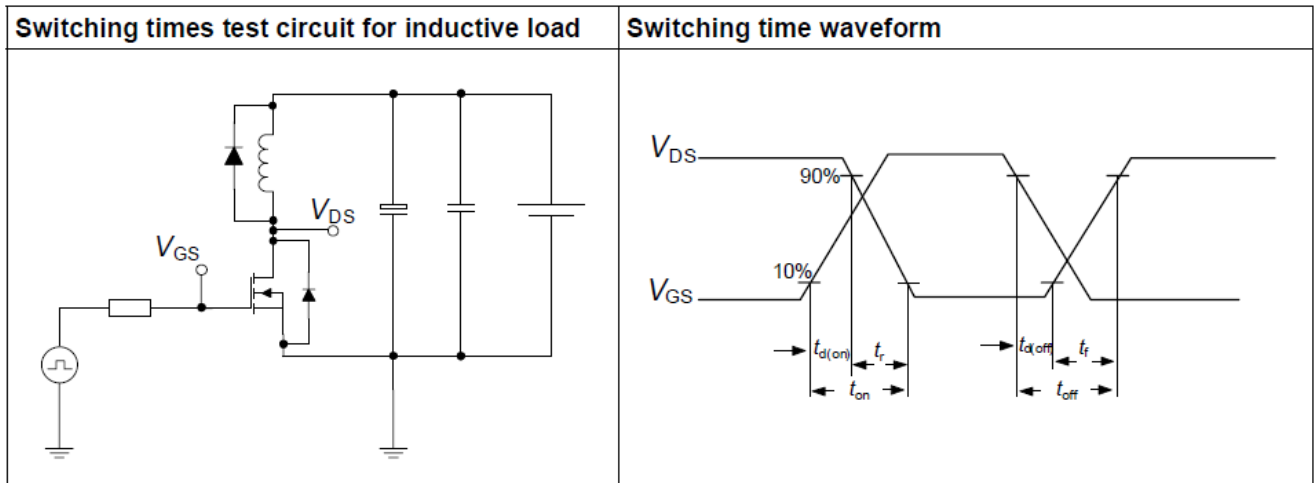
Typical characteristics Diagrams



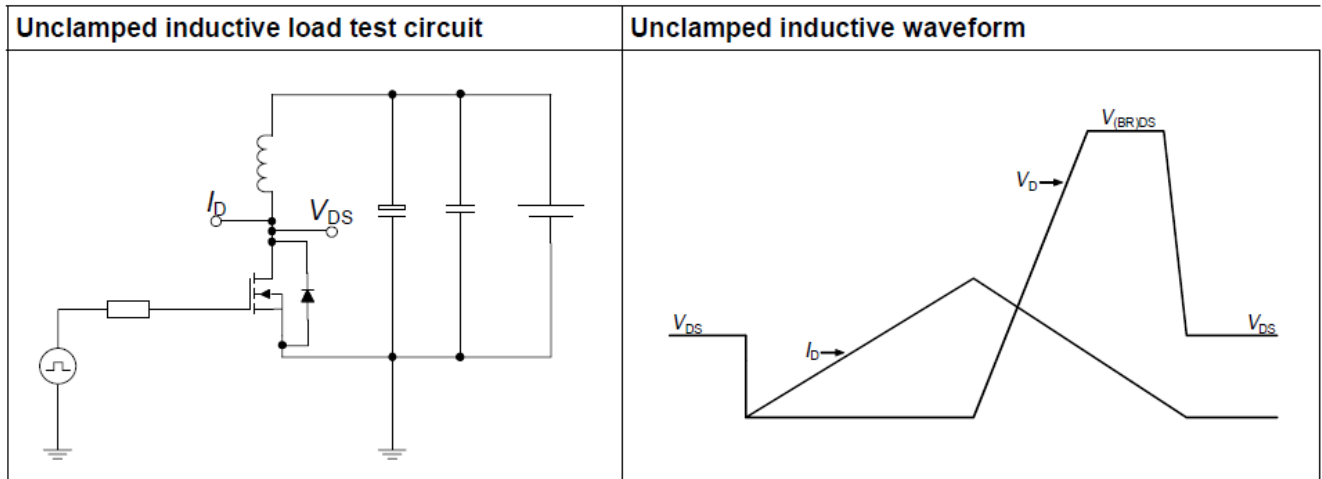
# SJ7N65 Series

## TYPICAL TEST CIRCUIT

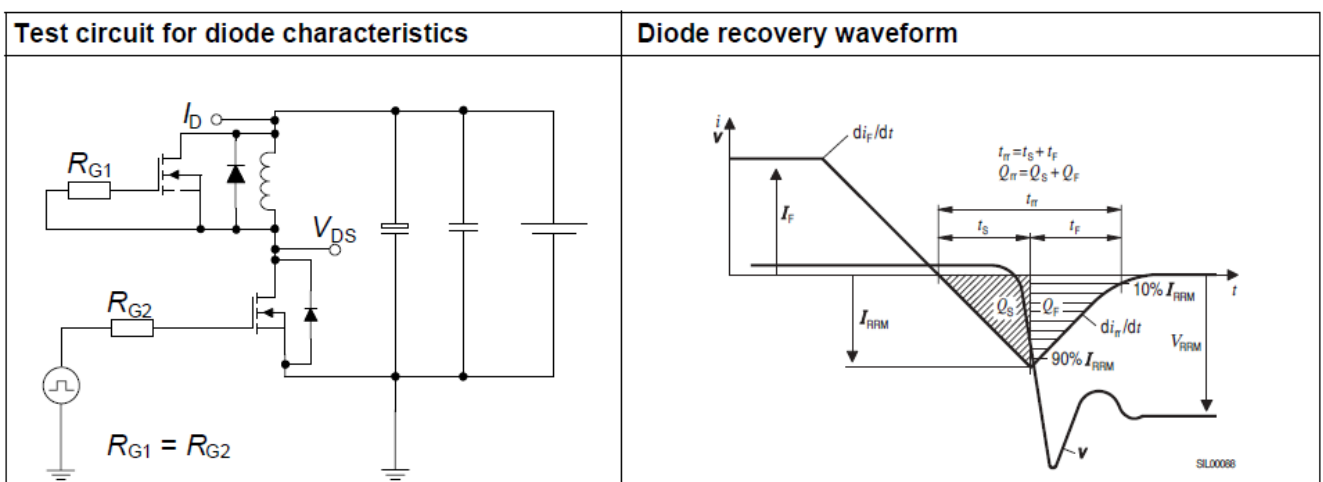
**Table 20** Switching times test circuit and waveform for inductive load



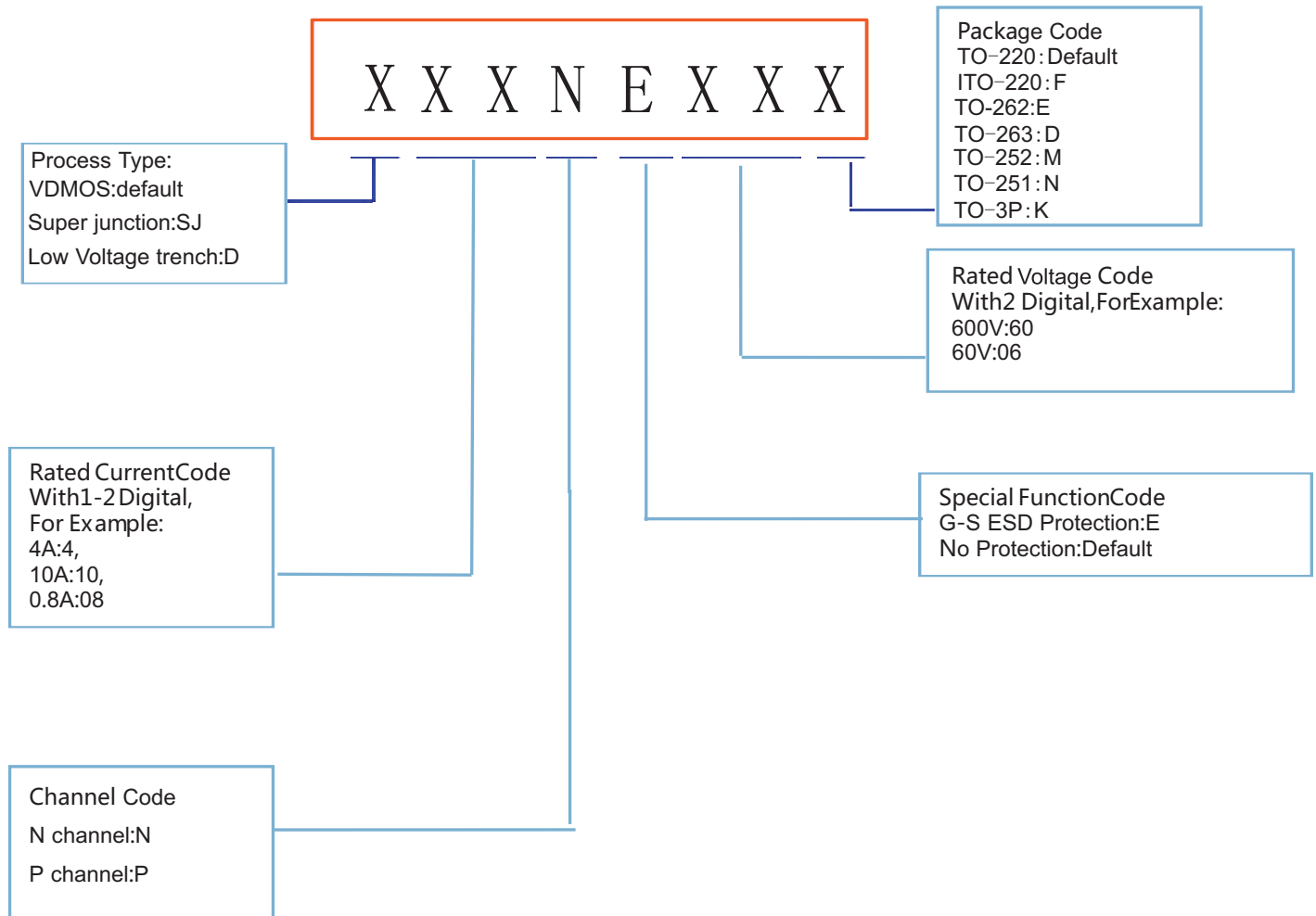
**Table 21** Unclamped inductive load test circuit and waveform



**Table 22** Test circuit and waveform for diode characteristics



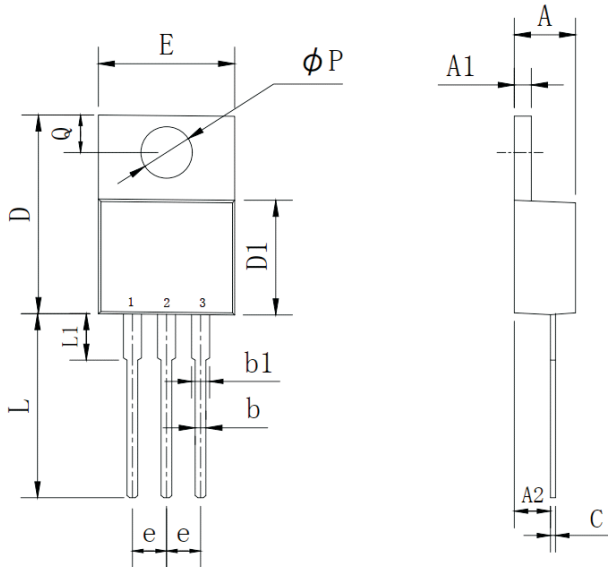
Product Names Rules



# SJ7N65 Series

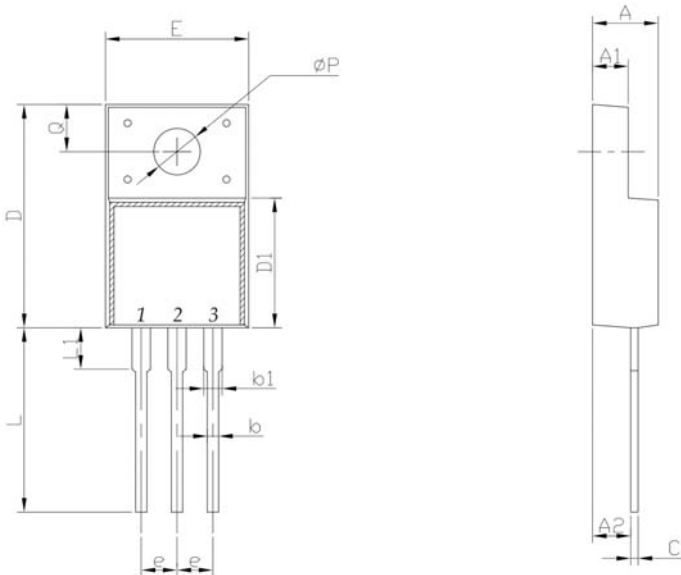
## Dimensions

### TO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	2.03	2.92	0.080	0.115
b	0.51	1.11	0.020	0.044
b1	0.97	1.6	0.038	0.063
C	0.3	0.7	0.012	0.028
D	14.6	15.9	0.575	0.626
D1	8.04	9.3	0.317	0.366
E	9.57	10.57	0.377	0.416
e	2.34	2.74	0.092	0.108
L	12.58	14.3	0.495	0.563
L1	2.8	4.2	0.110	0.165
P	3.4	4.14	0.134	0.163
Q	2.45	3	0.096	0.118

### ITO-220 PACKAGE OUTLINE DIMENSIONS



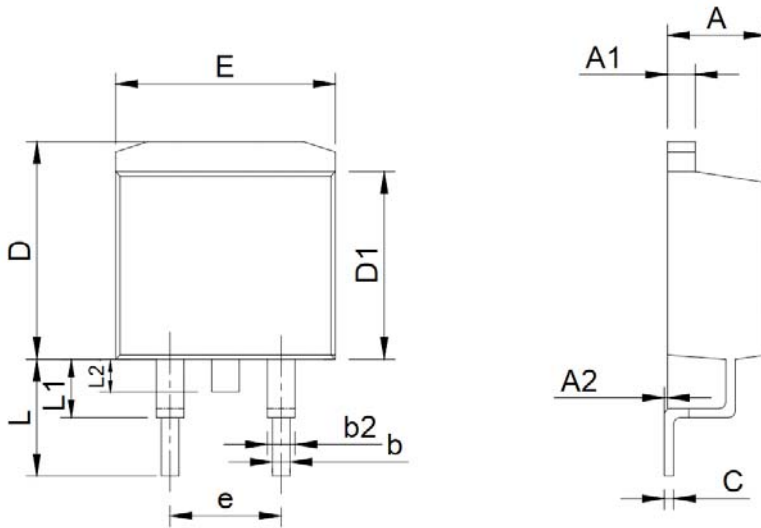
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
L	12.6	14	0.496	0.551
L1	2.45	4.3	0.096	0.169
P	2.9	3.8	0.114	0.150
Q	2.5	3.55	0.098	0.140



# SJ7N65 Series

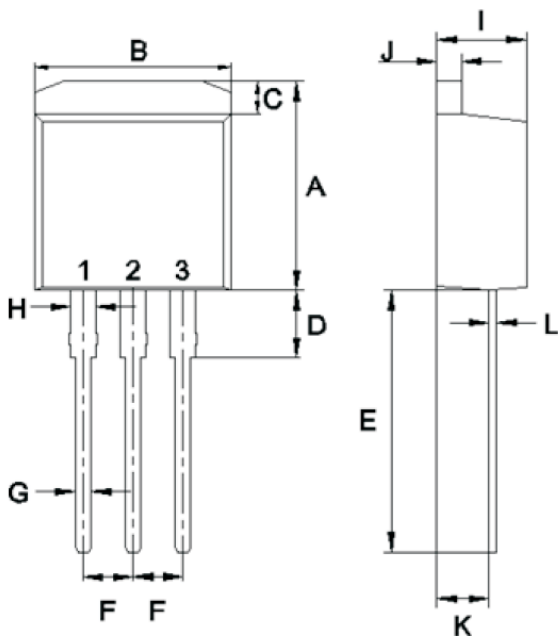
## Dimensions

### TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192	0.208
L	4.46	5.85	0.176	0.230
L1	1.33	2.33	0.052	0.092
L2	0	2.2	0.000	0.087

### TO-262 PACKAGE OUTLINE DIMENSIONS

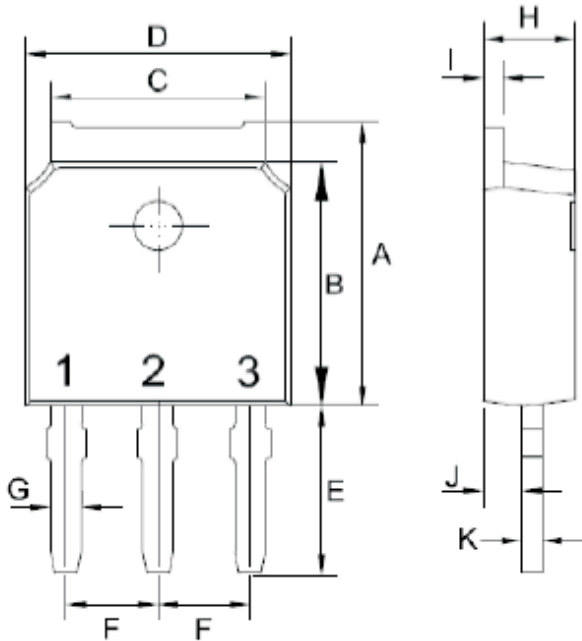


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	10.14	11.14	0.399	0.439
B	9.57	10.57	0.377	0.416
C	1.15	1.84	0.045	0.072
D	2.95	3.95	0.116	0.156
E	12.25	13.75	0.482	0.541
F	2.34	2.74	0.092	0.108
G	0.51	1.11	0.020	0.044
H	0.97	1.57	0.038	0.062
I	4.25	4.87	0.167	0.192
J	1.07	1.47	0.042	0.058
K	2.03	2.92	0.080	0.115
L	0.3	0.6	0.012	0.024

# SJ7N65 Series

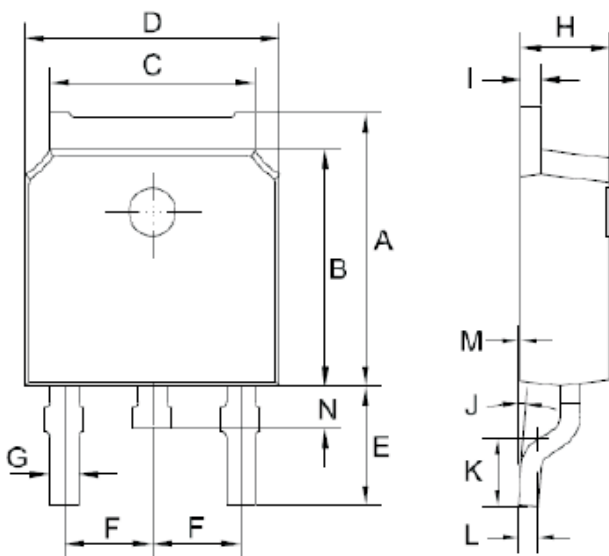
## Dimensions

### TO-251 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	3.5	4.35	0.138	0.171
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0.71	1.31	0.028	0.052
K	0.41	0.61	0.016	0.024

### TO-252 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	6.85	7.25	0.270	0.285
B	5.8	6.3	0.228	0.248
C	5	5.53	0.197	0.218
D	6.3	6.8	0.248	0.268
E	2.6	3.3	0.102	0.130
F	2.19	2.39	0.086	0.094
G	0.45	0.85	0.018	0.033
H	2.2	2.4	0.087	0.094
I	0.41	0.61	0.016	0.024
J	0	8	0	8
K	1.45	1.85	0.057	0.073
L	0.41	0.61	0.016	0.024
M	0	0.12	0.000	0.005
N	0.6	1	0.024	0.039

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