

General Description

This series of power MOSFET use N channel Multi-EPI Super-Junction technology and design to provide better characteristics, such as fast switching time, low Ciss and Crss, low on resistance and excellent avalanche characteristics, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

- Low on-resistance
- Ultra low gate charge and input capacitance
- 100% avalanche tested
- Rohs compliant

Mechanical Data

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

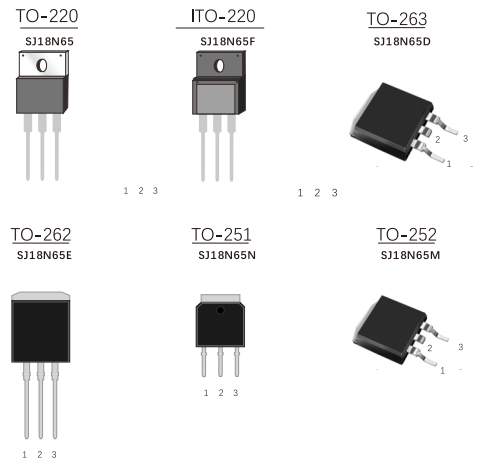
Application

- Switching applications

Ordering Information

Part No.	Package Type	Package	Quality(box)
SJ18N65	TO-220	Tube	1000
SJ18N65F	ITO-220	Tube	1000
SJ18N65D	TO-263	Tape & Reel	800
SJ18N65E	TO-262	Tube	1000
SJ18N65N	TO-251	Tube	1000
SJ18N65M	TO-252	Tape & Reel	2500

Product Summary			
V _{DS}	R _{DS(on)} (Ω)Typ	I _b (A)	Q _g (Typ)
650V	0.22 @ 10V, 9 A	18	42nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

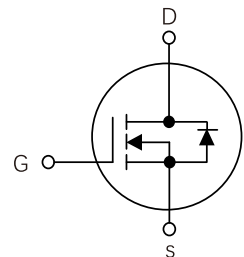


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameters	Symbol	SJ158N65 SJ18N65M SJ18N65D SJ18N65N SJ18N65E		SJ18N65F	Unit
Drain-Source Voltage	V _{DS}	650			V
Gate-Source Voltage	V _{GS}	±30			V
Contionous Drain Current	I _D	T _C =25°C	18	18*	A
		T _C =100°C	13	13*	
Pulsed Drain Current (Note 1)	I _{DM}	55			A
Single Pulse Avalanche Energy(Note 2)	EAS	320			mJ
Avalanche Current(Note 1)	I _{AR}	3			A
Repetitive Avalanche Energy(Note 1)	EAR	2			mJ
Reverse Diode Recovery dv/dt(Note 3)	dv/dt	15			V/ns
Drain Source Voltage Slope (V _{DS} =720V)	dv/dt	50			V/ns
Power Dissipation T _c =25°C	P _D	151		35	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ + 150			°C

※ limited by maximum junction temperature

Table 2. Thermal Characteristics

Parameters	Symbol	SJ18N65	SJ18N65M	SJ18N65F	Unit
		SJ18N65D	SJ18N65N		
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62		82	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	1.2		4.1	$^{\circ}\text{C}/\text{W}$

 Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameters	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu\text{A}$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	nA
On Characteristics(Note 4)						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.5		4.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=9A$		0.22	0.25	Ω
Dynamic Characteristics(Note 5)						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$		1230		pF
Output Capacitance	C_{OSS}			30		pF
Reverse Transfer Capacitance	C_{RSS}			2.6		pF
Switching Characteristics (Note 5)						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=400V, I_D=9A, R_G=20\Omega$		20		ns
Turn-On Rise Time	t_r			17		ns
Turn-Off Delay Time	$t_{d(off)}$			170		ns
Turn-Off Fall Time	t_f			13		ns
Total Gate Charge	Q_G	$V_{DS}=400V, I_D=6.5A, V_{GS}=10V$		42		nC
Gate-Source Charge	Q_{GS}			6		nC
Gate-Drain Charge	Q_{GD}			29		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=9A$		0.9	1.5	V
Maximum Continuous Drain-Source Diode Forward Current(Note 4)	I_S				18	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=9A$		380		ns
Reverse Recovery Charge	Q_{RR}	$di/dt=100A/\mu\text{s}$ (Note 4)		4.5		μC

- Notes: 1 Repetitive Rating: Pulse width limited by maximum junction temperature
 2 $L=60\text{mH}, I_{AS}=4A, V_{DD}=150V$, Starting $T_J=25^{\circ}\text{C}$
 3 $I_{SD}\leq 4.5A, di/dt\leq 200A/\mu\text{s}, V_{DD}\leq BV_{DSS}$, starting $T_J=25^{\circ}\text{C}$
 4 Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
 5 Guaranteed by design, not subject to production

Typical Characteristics Diagrams

Figure 1. Output Characteristics

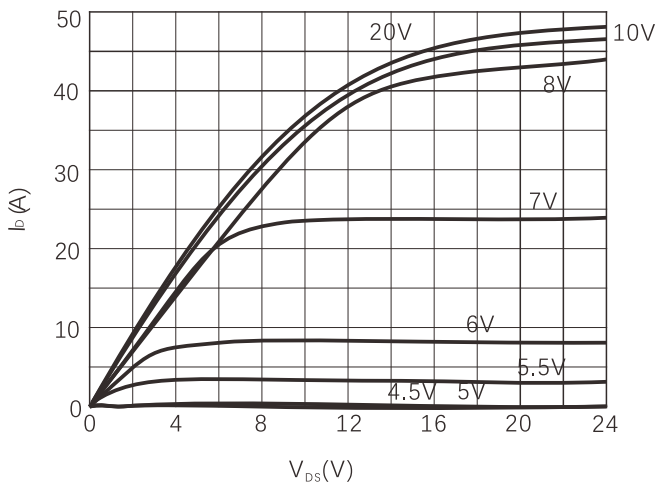


Figure 2. Transfer Characteristics

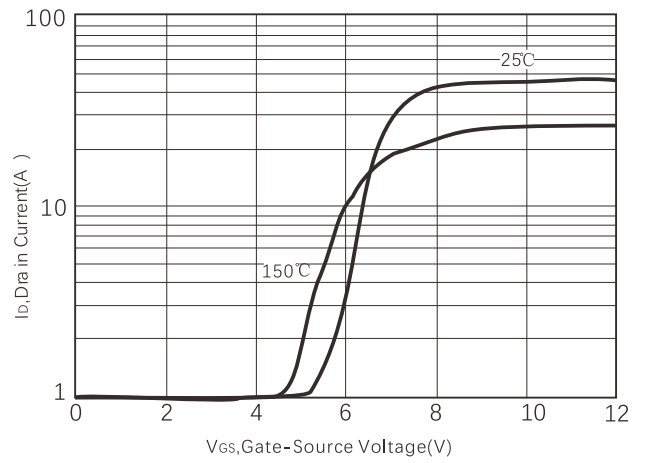


Figure 3. On-Resistance vs. Drain Current

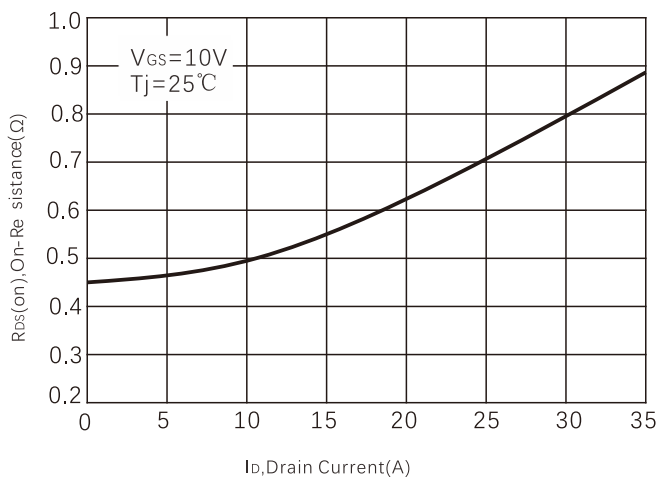


Figure 4. Capacitance

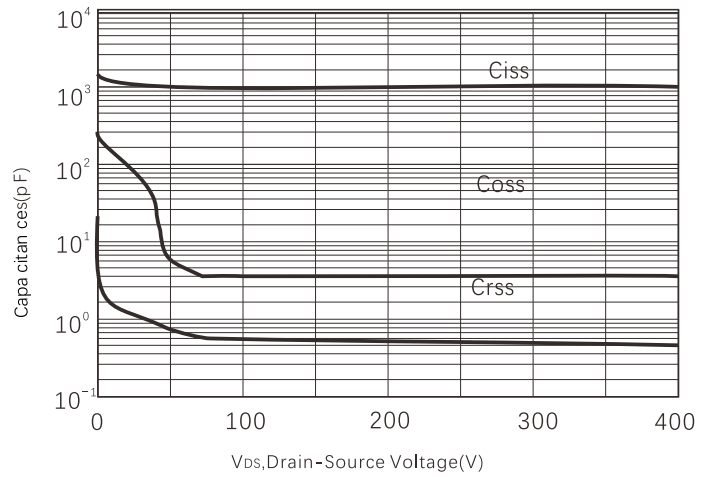


Figure 5. Gate charge

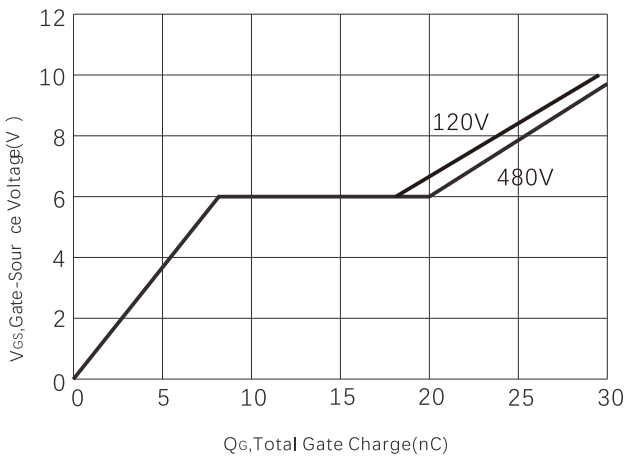


Figure 6. Power dissipation

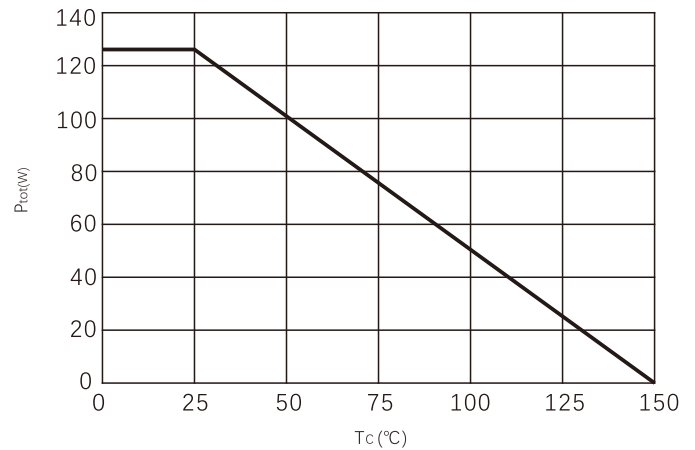


Figure 7. Normalized $R_{DS(ON)}$ vs Junction Temperature

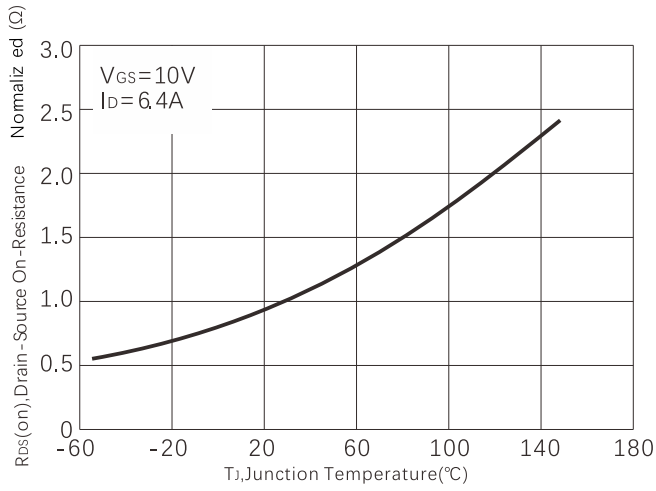


Figure 8. BV_{DSS} vs Junction Temperature

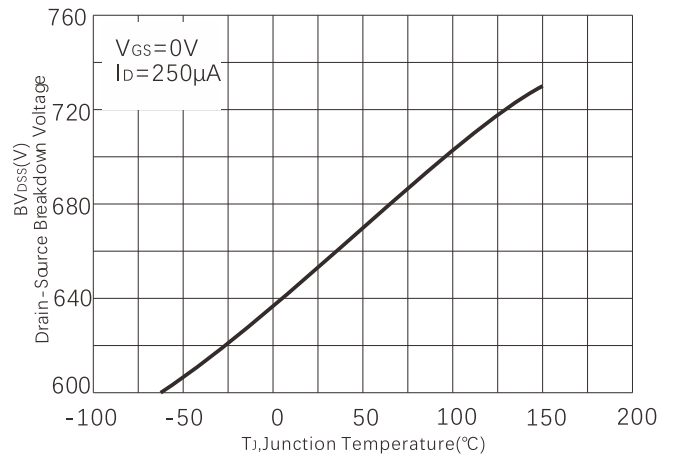


Figure 9. Safe operating area -Non ITO-220

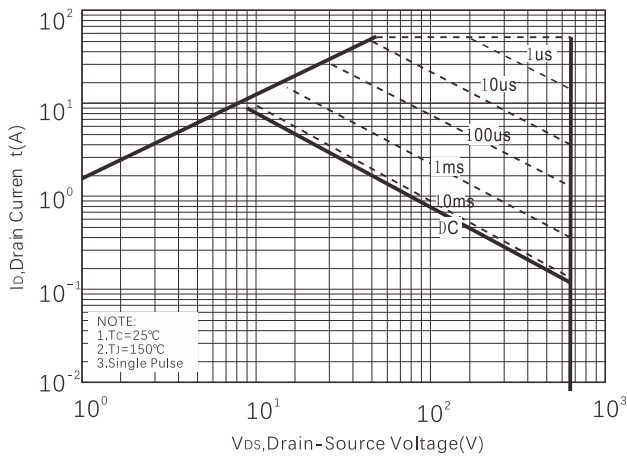


Figure 10. Safe operating area for ITO-220

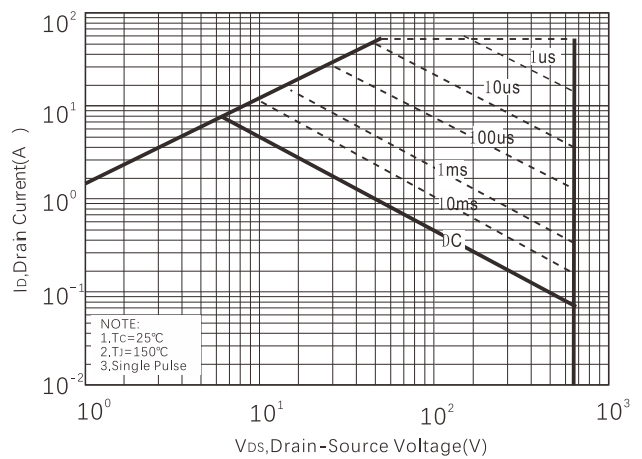


Figure 11. Maximum Transient Thermal Impedance -Non ITO-220

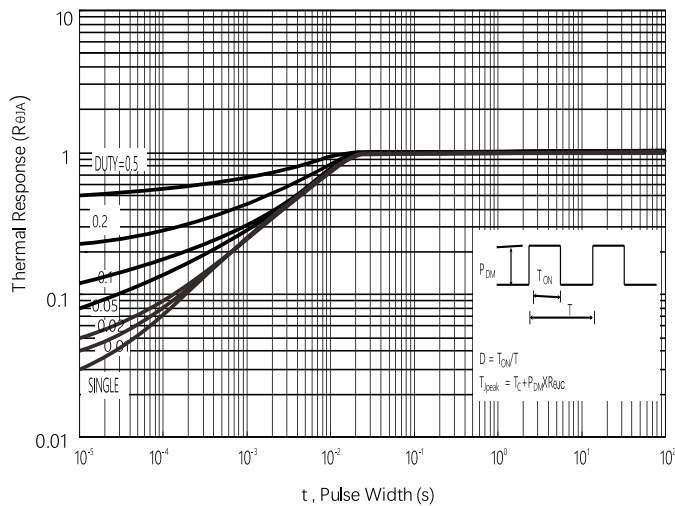
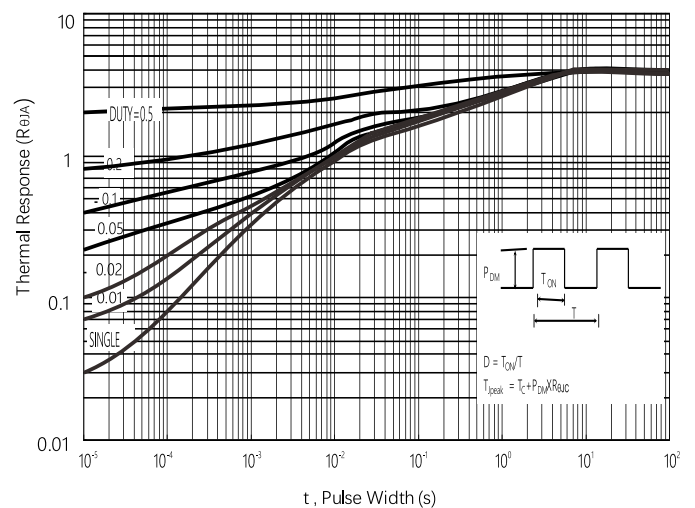
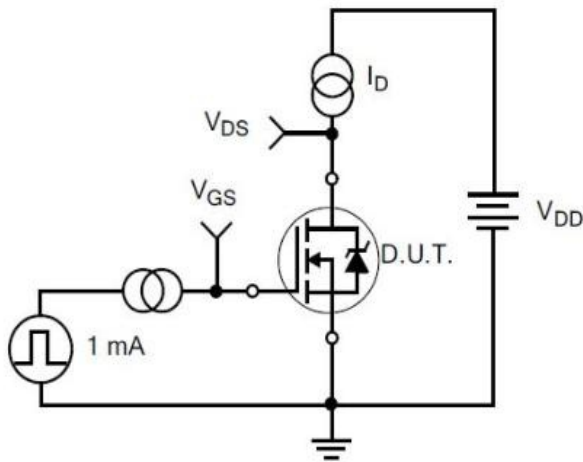


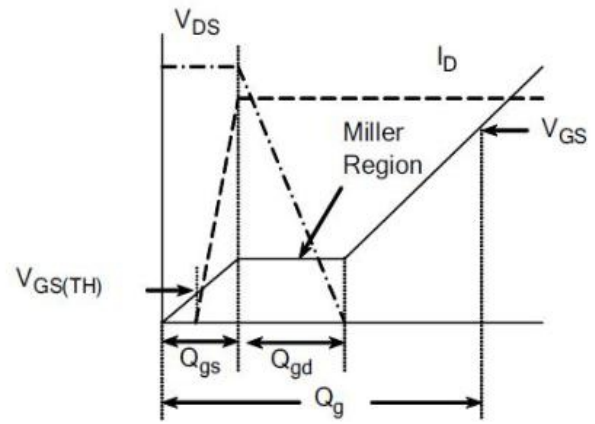
Figure 12. Maximum Transient Thermal Impedance - ITO-220



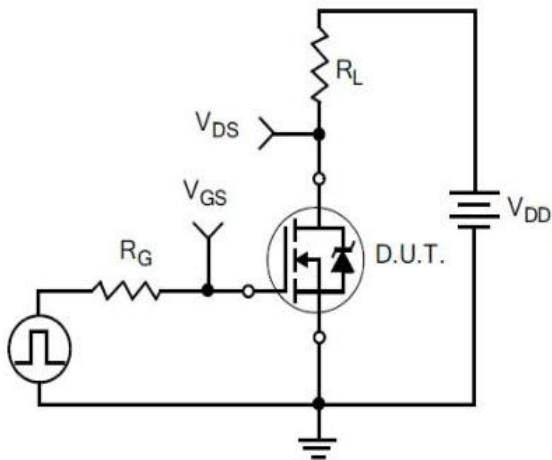
Typical Test Circuit



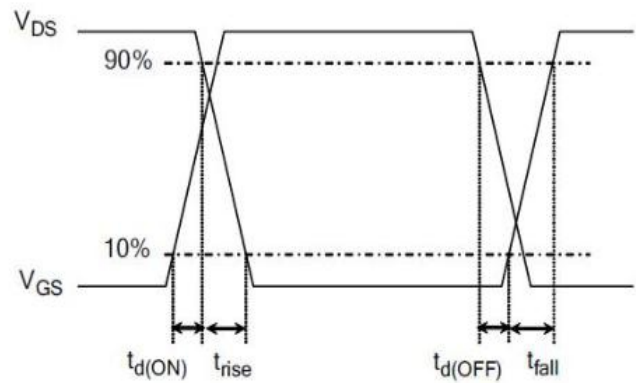
1) Gate Charge Test Circuit



2) Gate Charge Waveform

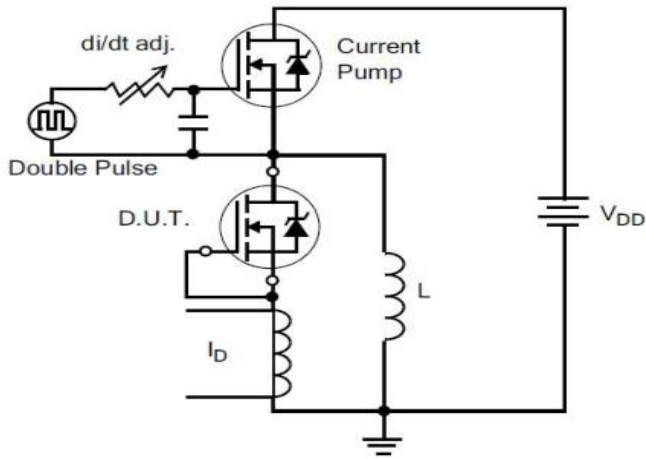


3) Resistive Switching Test Circuit

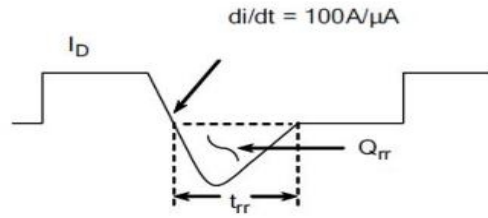


4) Resistive Switching Waveforms

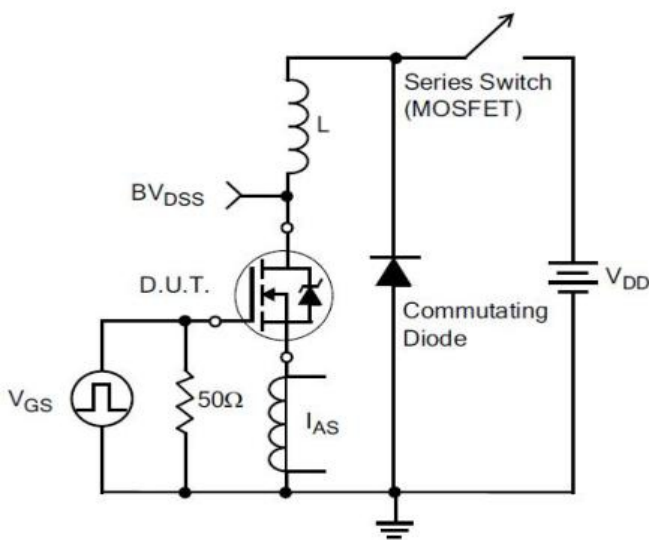
Typical Test Circuit



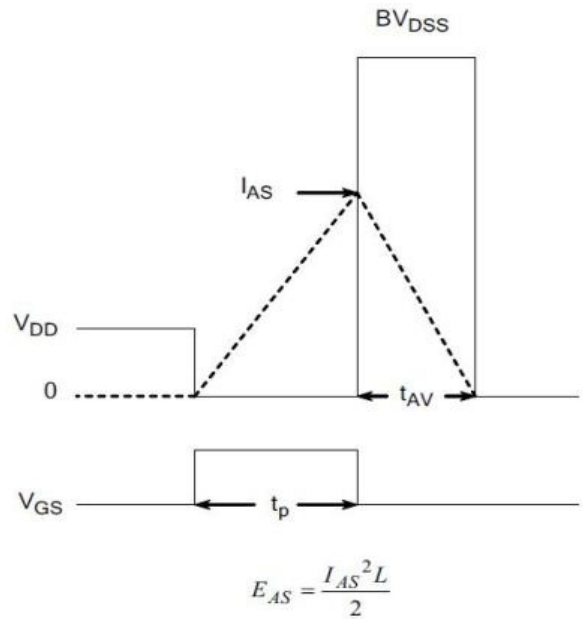
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

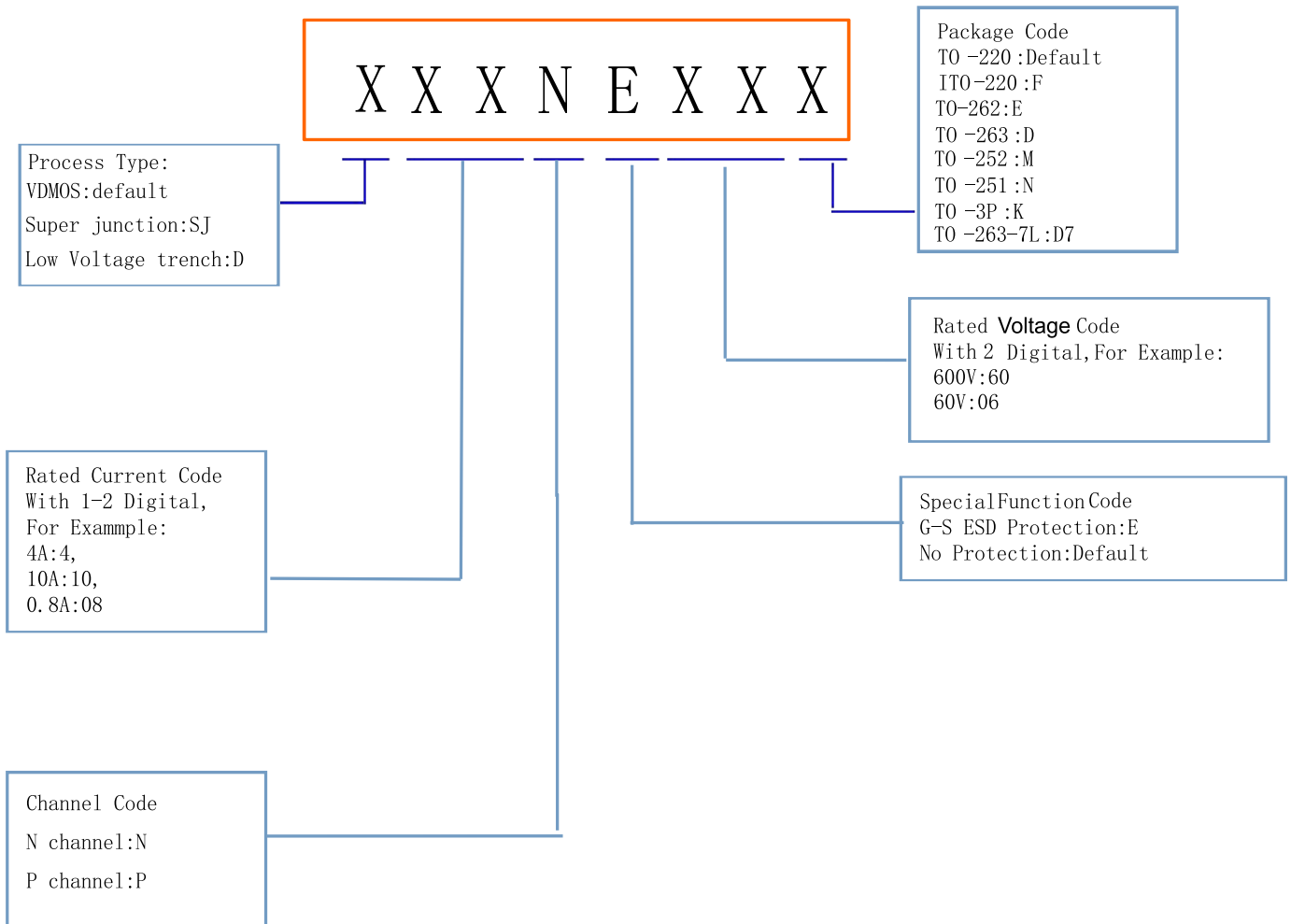


7) . Unclamped Inductive Switching Test Circuit



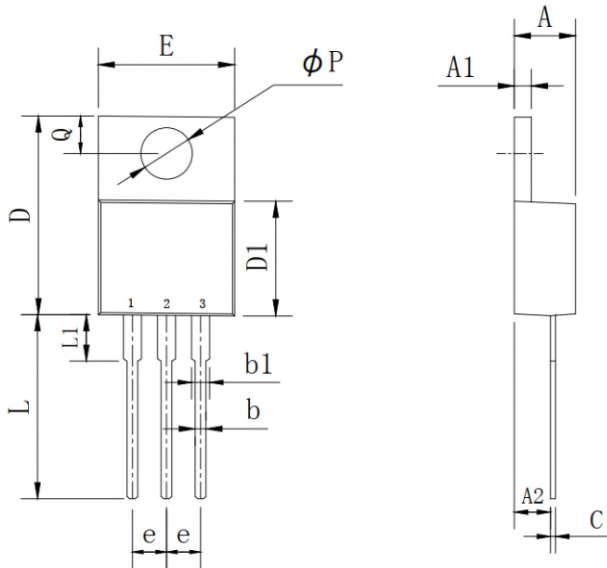
8) Unclamped Inductive Switching Waveforms

Product Names Rules



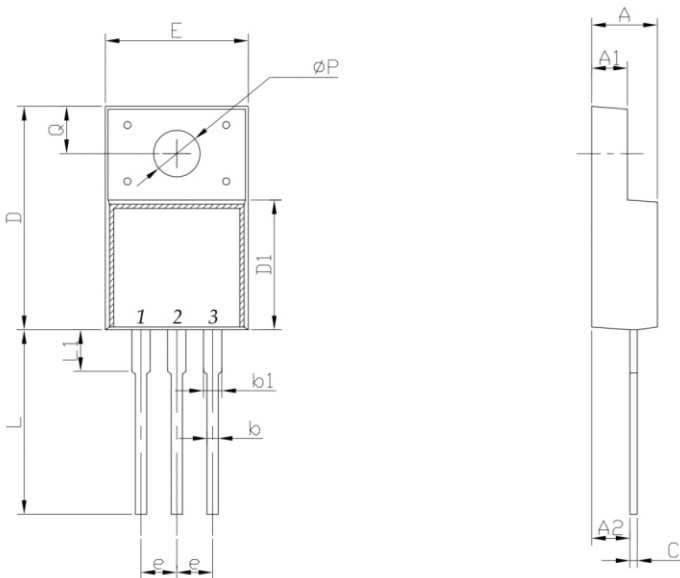
Dimensions

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

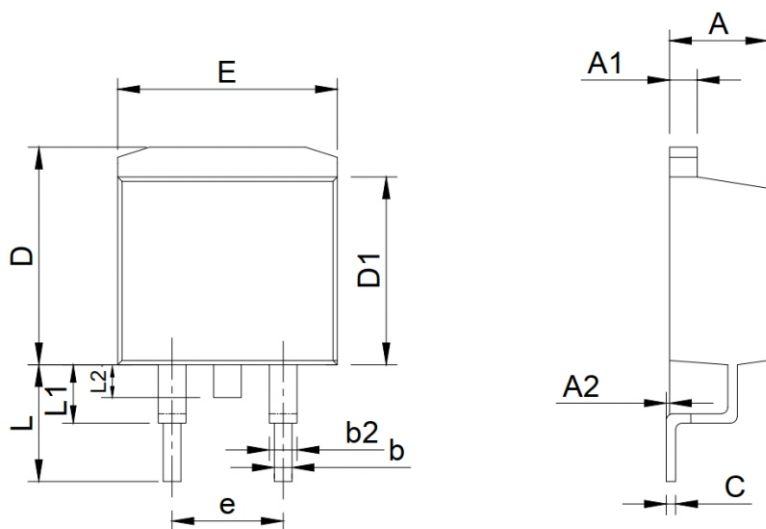
ITO-220 PACKAGE OUTLINE DIMENSIONS



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

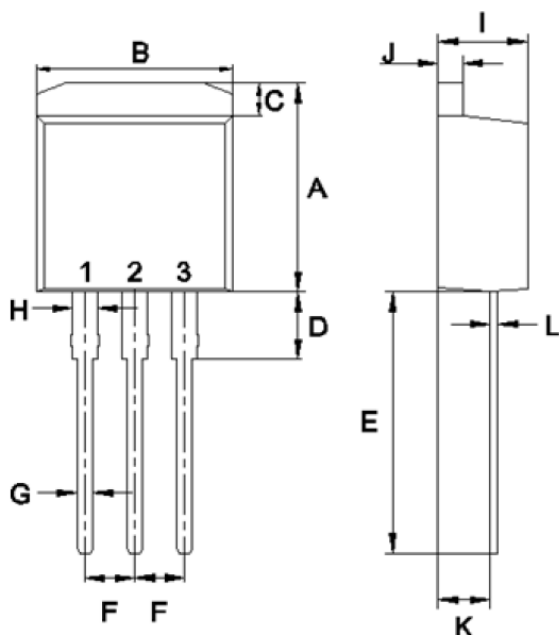
Dimensions

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

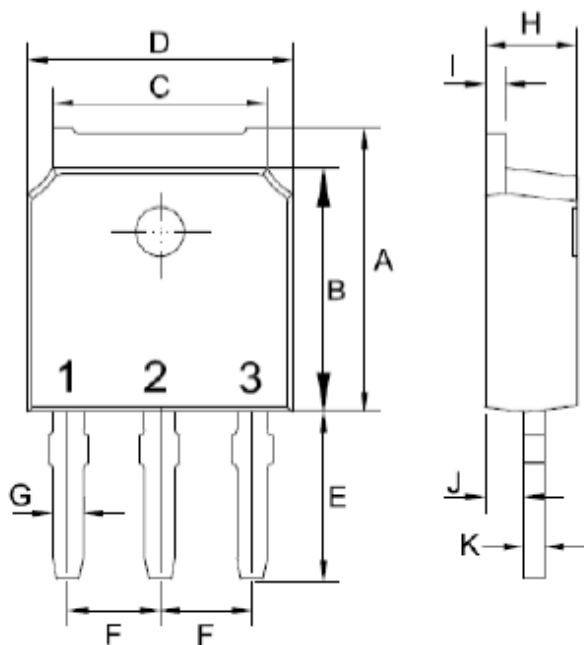
TO -262 PACKAGE OUTLINE DIMENSIONS



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

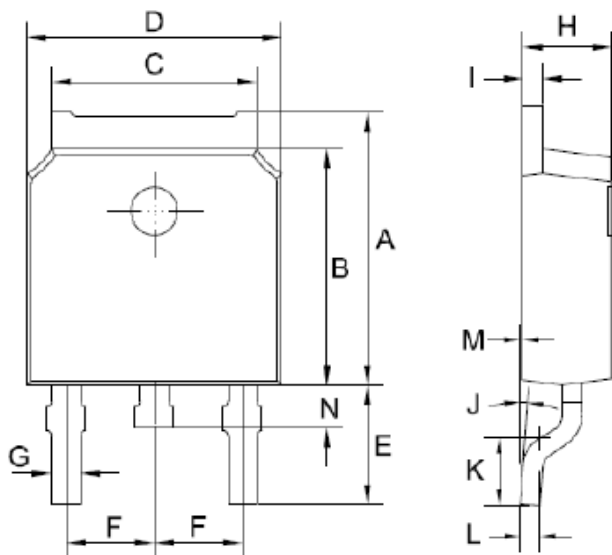
Dimensions

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	0.71	1.31	0.028	0.052
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
?	0.6	1	0.024	0.039

Friendship Reminder

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