

General Description

These N-channel enhancement mode power mosfets used advanced trench technology design, provided excellent R_{ds(on)} and low gate charge. Which accords with the RoHS standard.

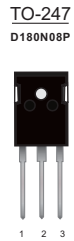
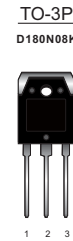
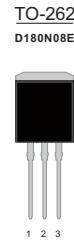
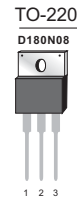
Features

- Fast switching
- Low on-resistance
- Low gate charge
- 100% Single Pulse Avalanche Energy Test

Mechanical Data

• Case:TO-220,TO-263,TO-262,TO-3P,TO-247 Package

Product Summary			
V _{DS}	R _{DS(on)} (mΩ) Typ	I _D (A)	Q _g (Typ)
80V	2.9@10V	180	195nc



Ordering Information

Part No.	Package Type	Package	Quality(box)
D180N08	TO-220	Tube	1000
D180N08D	TO-263	Tape & Reel	800
D180N08E	TO-262	Tube	1000
D180N08K	TO-3P	Tube	600
D180N08P	TO-247	Tube	600

Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

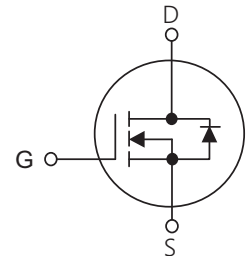


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	TO-220/TO-263/TO-262 TO-3P/TO-247	Unit
Drain-Source Voltage	V _{DS}	80	V
Gate-Source Voltage	V _{GS}	±25	V
Continuous Drain Current	I _D	T _c =25°C	180
		T _c =100°C	134
Pulsed Drain Current (Note 1)	I _{DM}	780	A
Single Pulse Avalanche Energy(Note 2)	E _{AS}	1720	mJ
Power Dissipation T _c =25°C	P _D	245	W
Isolation Voltage	V _{ISO}	/	V
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C
Maximum Temperature for soldering	T _L	300	°C

Table 2. Thermal Characteristics

Parameter	Symbol	TO-220/TO-263/TO-262 TO-3P/TO-247	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	75	$^{\circ}C/W$
Thermal resistance Junction to Case	$R_{\theta JC}$	0.61	$^{\circ}C/W$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Off Characteristics							
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	80	85	--	V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$	--	--	1	μA	
Gate- Source Leakage Current	Forward	I_{GSS}	$V_{GS}=25V, V_{DS}=0V$	--	--	100	nA
	Reverse	I_{GSS}	$V_{GS}=-25V, V_{DS}=0V$	--	--	-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.0	4.0	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=80A$	--	2.9	4.0	m Ω	
Dynamic Characteristics(Note 5)							
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	--	8200	--	pF	
Output Capacitance	C_{OSS}		--	1030	--	pF	
Reverse Transfer Capacitance	C_{RSS}		--	660	--	pF	
Switching Characteristics (Note 5)							
Turn-On Delay Time	$t_d(on)$	$V_{DD}=40V, I_D=40A,$ $V_{GS}=10V, R_{GEN}=6\Omega$	--	28	--	ns	
Turn-On Rise Time	t_r		--	18	--	ns	
Turn-Off Delay Time	$t_d(off)$		--	44	--	ns	
Turn-Off Fall Time	t_f		--	55	--	ns	
Total Gate Charge	Q_G	$V_{DS}=40V, I_D=40A,$ $V_{GS}=10V$	--	195	--	nC	
Gate-Source Charge	Q_{GS}		--	32	--	nC	
Gate-Drain Charge	Q_{GD}		--	74	--	nC	
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=80A$	--	--	1.3	V	
Maximum Continuous Drain-Source Diode Forward Current	I_S		--	--	180	A	
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_F=40A$	--	30	--	ns	
Reverse Recovery Charge	Q_{RR}	$di_F/dt=100A/\mu s$ (Note 1)	--	54	--	nC	

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

2 $L=0.5mH, I_D=83A, V_{DD}=64V, V_{GATE}=80V$, Starting $T_J=25^{\circ}C$

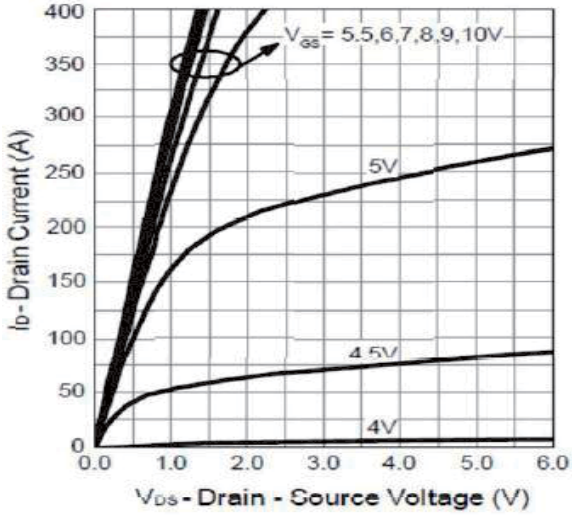
4 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

5 Guaranteed by design, not subject to production

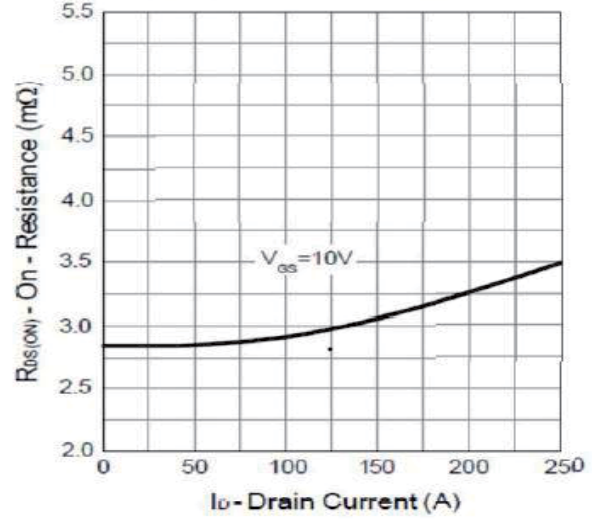


Typical characteristics diagrams

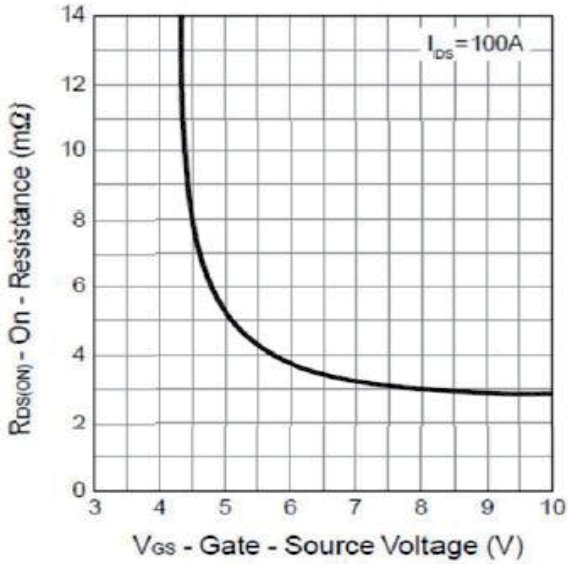
Output Characteristics



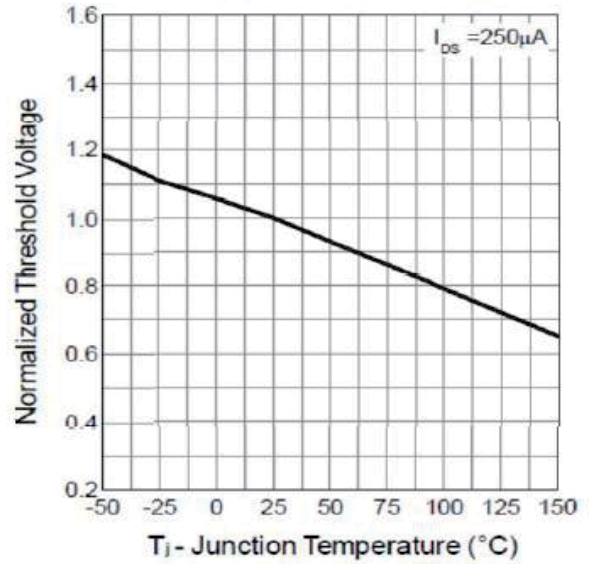
Drain-Source On Resistance



Gate-Source On Resistance



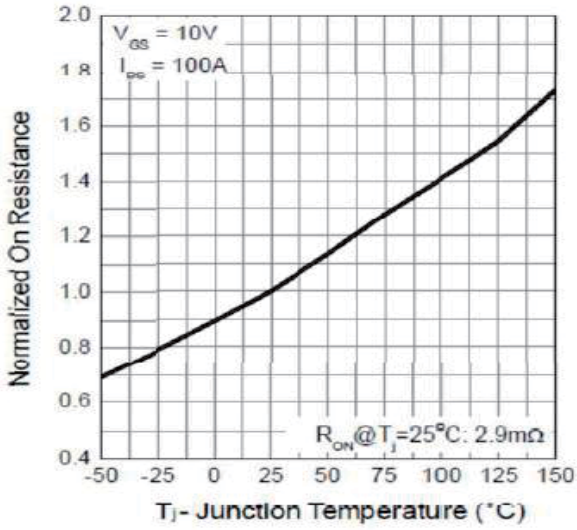
Gate Threshold Voltage



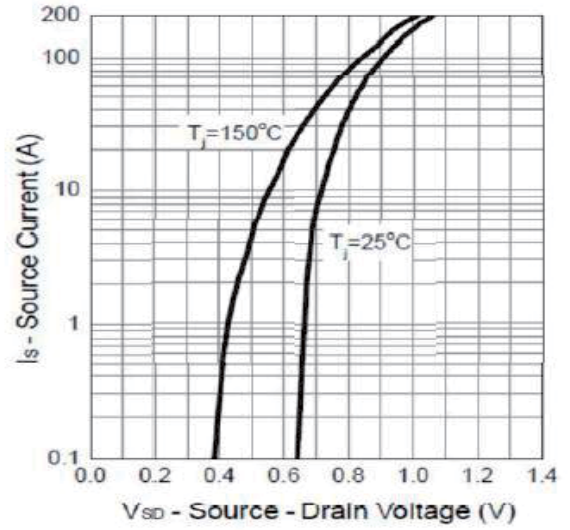


Typical characteristics diagrams

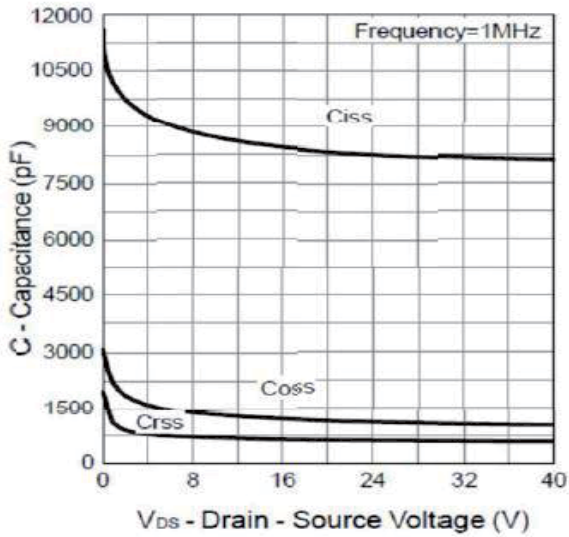
Drain-Source On Resistance



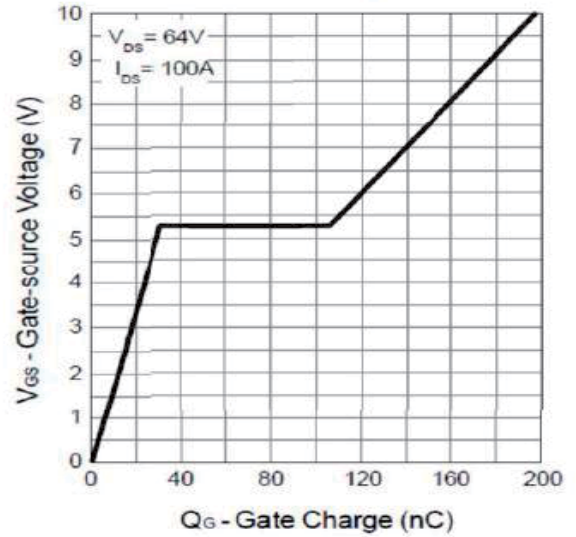
Source-Drain Diode Forward



Capacitance



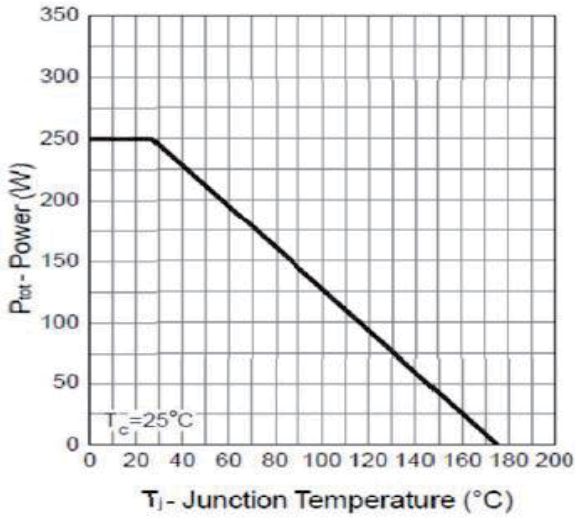
Gate Charge



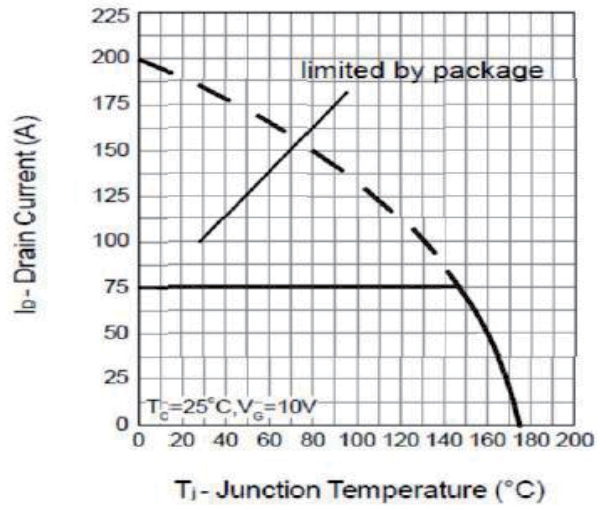


Typical Test Circuit

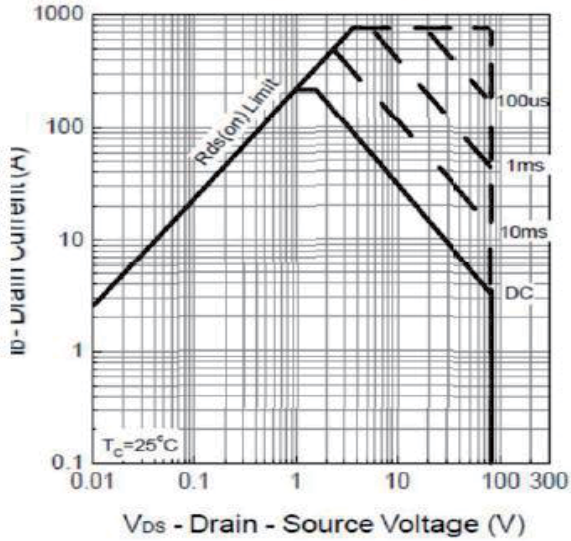
Power Dissipation



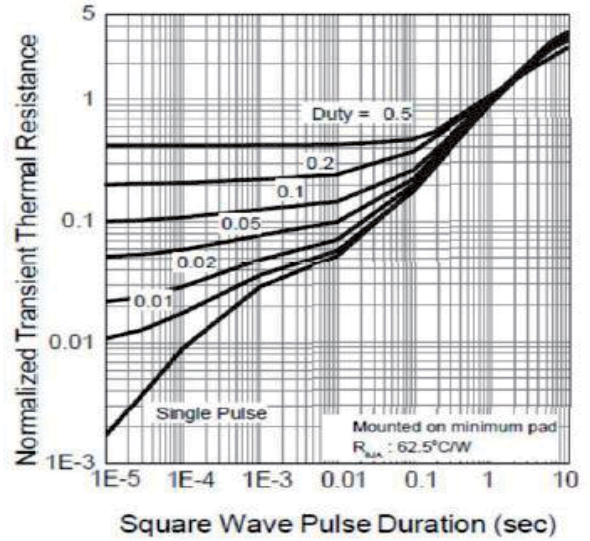
Drain Current



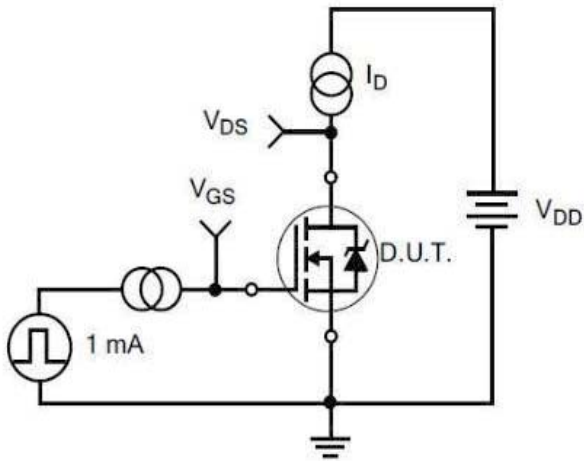
Safe Operation Area



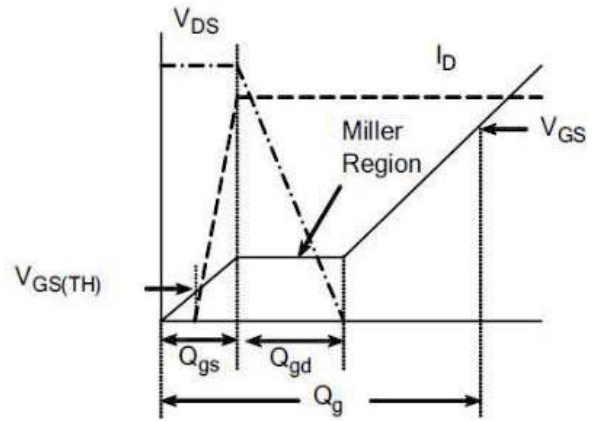
Thermal Transient Impedance



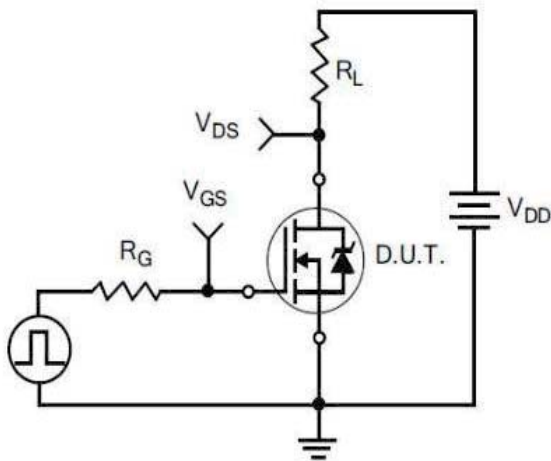
Typical Test Circuit



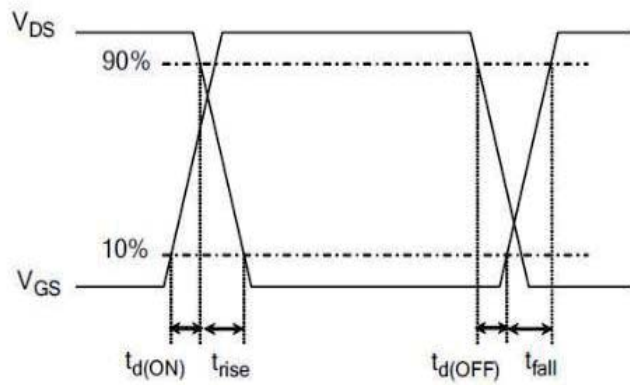
1) Gate Charge Test Circuit



2) Gate Charge Waveform

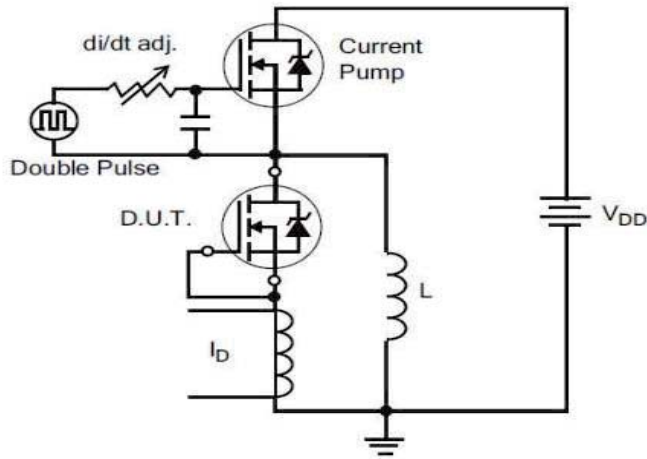


3) Resistive Switching Test Circuit

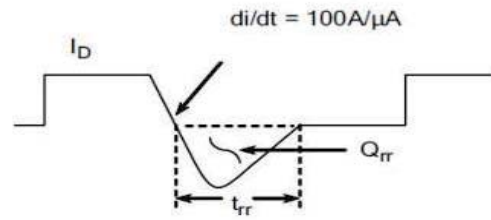


4) Resistive Switching Waveforms

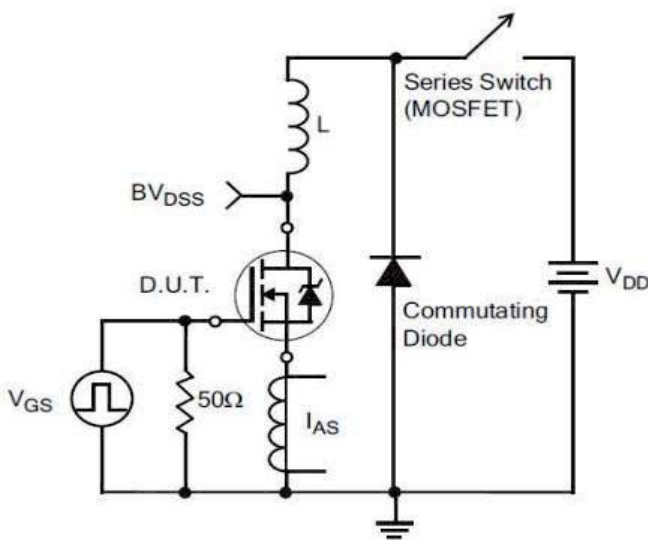
Typical Test Circuit and Waveform(continues)



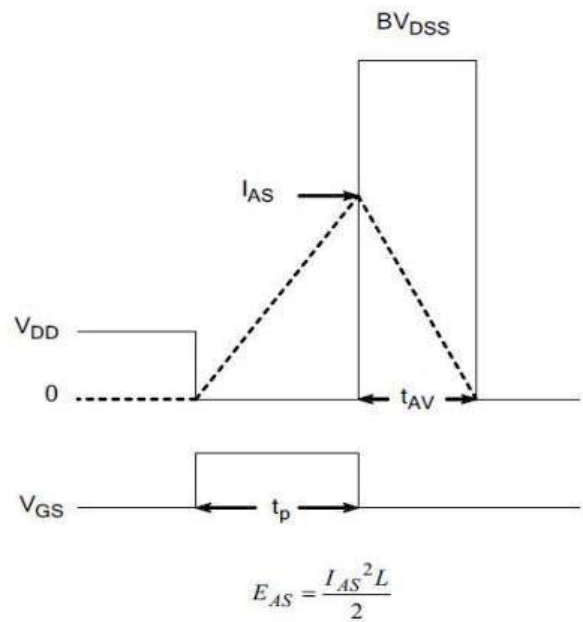
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

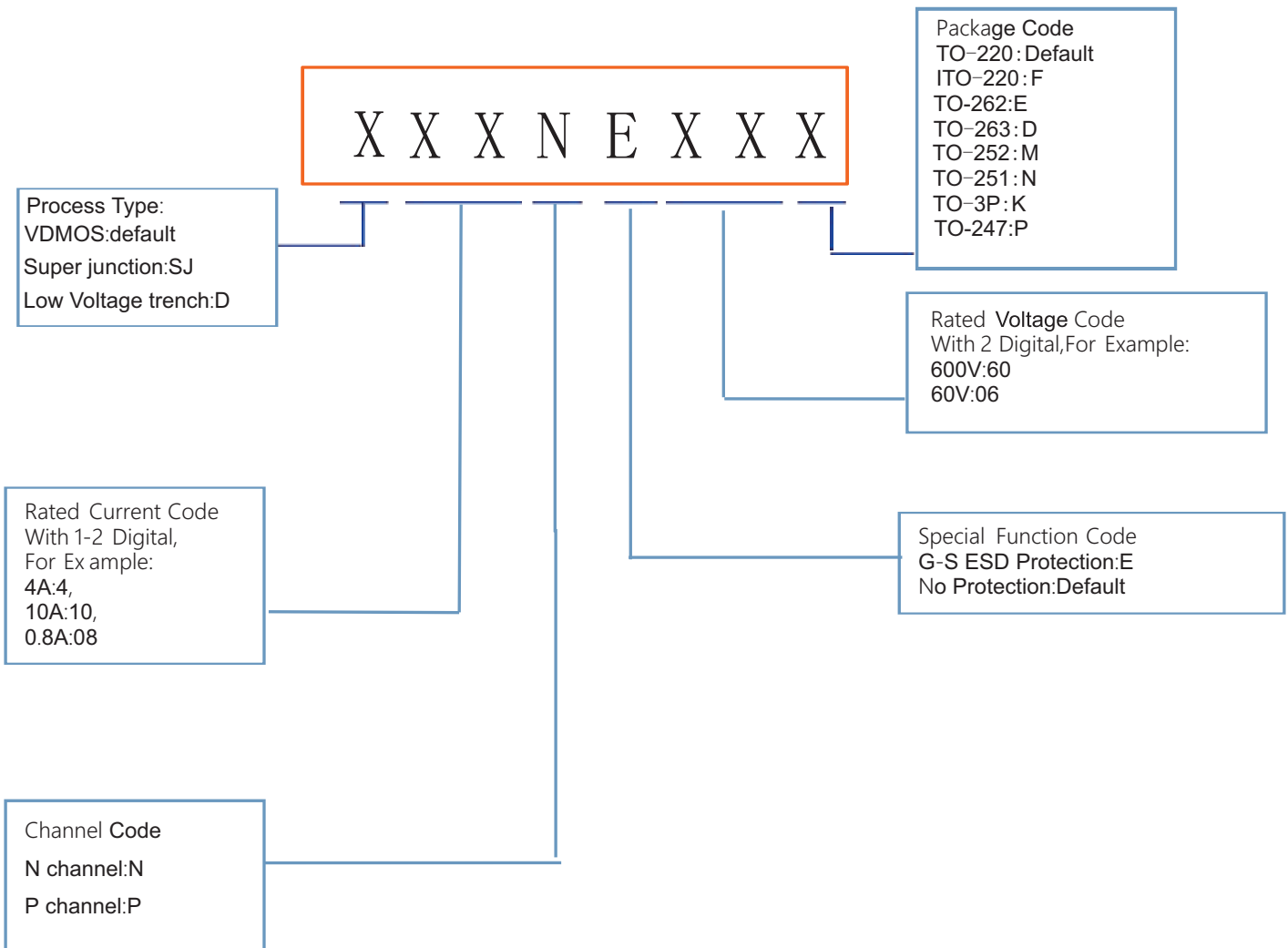


7) . Unclamped Inductive Switching Test Circuit



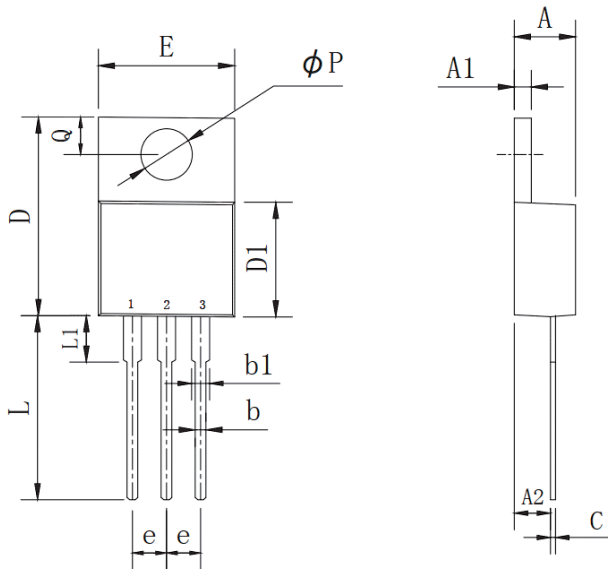
8) Unclamped Inductive Switching Waveforms

Product Names Rules



Dimensions

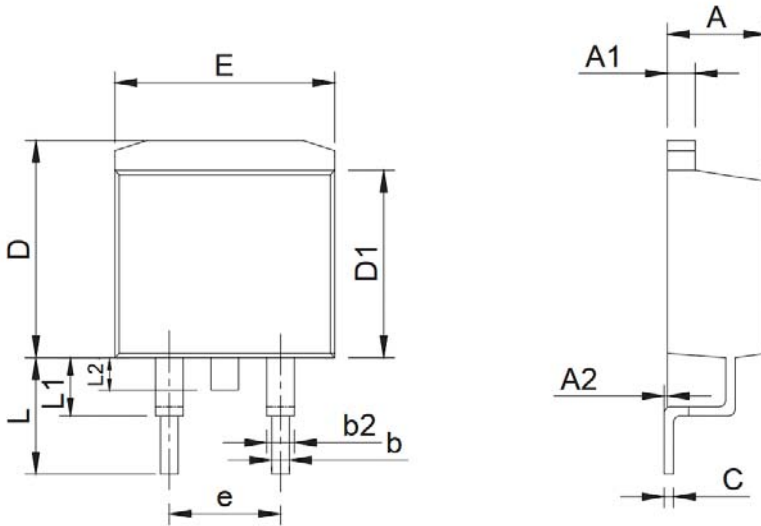
TO-220 PACKAGE OUTLINE DIMENSIONS



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

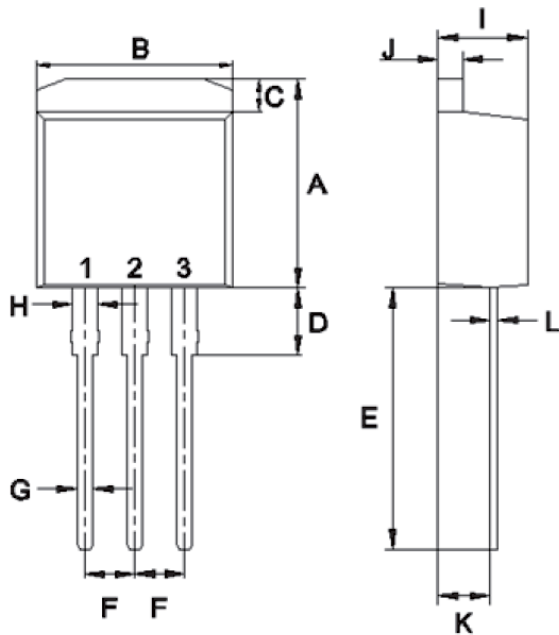
Dimensions

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

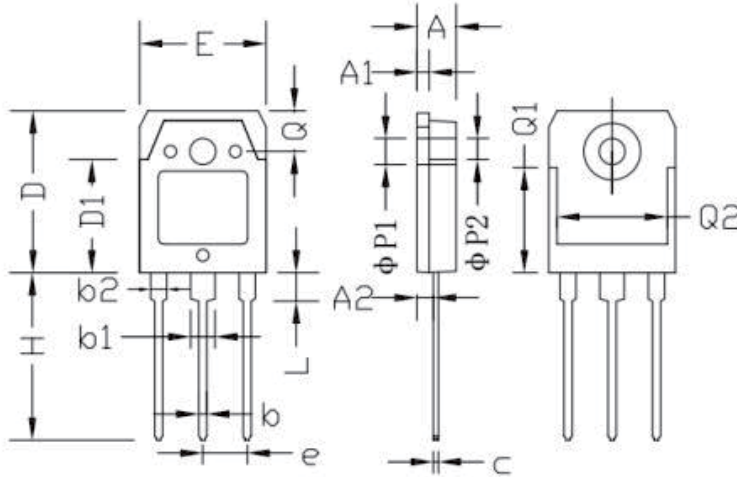
TO-262 PACKAGE OUTLINE DIMENSIONS



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

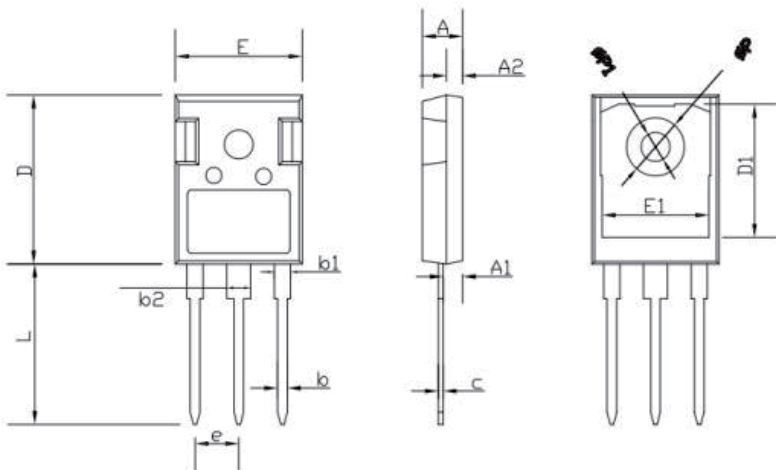
Dimensions

TO-3P PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.60	5.00	0.181	0.197
A1	1.45	1.65	0.057	0.065
A2	2.20	2.60	0.087	0.102
b	0.80	1.20	0.032	0.047
b1	2.80	3.20	0.110	0.126
b2	1.80	2.20	0.071	0.087
C	0.55	0.75	0.022	0.030
D	19.20	19.70	0.756	0.776
D1	13.10	14.70	0.516	0.578
E	15.40	15.80	0.607	0.623
e	5.45 TYP		0.215 TYP	
H	19.80	20.20	0.780	0.826
L	3.30	3.70	0.130	0.146
ΦP1	3.20 TYP		0.126 TYP	
ΦP2	3.50 TYP		0.138 TYP	
Q	5.00 TYP		0.197 TYP	
Q1	12.40 TYP		0.488 TYP	
Q2	12.6	-	0.496	-

TO-247 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.90	5.10	0.193	0.201
A1	2.31	2.51	0.091	0.099
A2	1.90	2.10	0.075	0.083
b	1.16	1.26	0.046	0.050
b1	1.96	2.06	0.0772	0.0812
b2	2.96	3.06	0.117	0.121
c	0.59	0.66	0.0232	0.0260
D	20.90	21.10	0.8235	0.8313
D1	16.25	16.85	0.6403	0.6639
E	15.70	15.90	0.6186	0.6265
E1	13.10	13.50	0.5161	0.5319
e	5.44		0.2143	
L	19.80	20.10	0.7801	0.7919
ΦP	3.50	3.70	0.1379	0.1458
ΦP1	0	7.30	0	0.2876

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