

### Features

- Fast switching
- Low reverse transfer capacitances
- Low gate charge and Low on-resistance
- 100% avalanche tested

### Mechanical Data

- Case:TO-220,TO-220C,TO-263 Package

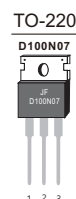
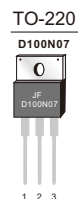
### Application

- Power switching applications
- DC-DC converters
- Power tools
- Automotive electronics

### Ordering Information

Part No.	Package Type	Package	Quality(box)
D100N07	TO-220	Tube	1000
D100N07	TO-220	Tube	1000
D100N07D	TO-263	Tape & Reel	800

Product Summary			
V <sub>DS</sub>	R <sub>DS(on)</sub> (mΩ) Typ	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ)
70V	6.3 @ 10V 60A	100	69nc



### Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

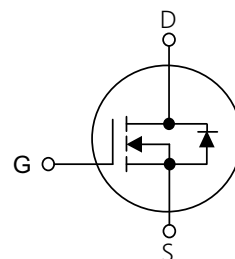


Table1 Absolute Maximum Ratings (T<sub>c</sub>=25°C, unless otherwise specified)

Parameter	Symbol	D100N07/D100N07D	Unit
Drain-Source Voltage	V <sub>DS</sub>	70	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous (Note 5) Drain Current	I <sub>D</sub>	T <sub>c</sub> =25°C	100
		T <sub>c</sub> =100°C	63
Pulsed Drain Current (Note 1)	I <sub>DM</sub>	400	A
Single Pulse Avalanche Energy(Note 2)	E <sub>AS</sub>	400	mJ
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C	1.7
		T <sub>c</sub> =25°C	114
Operating Junction and Storage Temperature	T <sub>J</sub> /T <sub>STG</sub>	-55~+150	°C

Table 2. Thermal Characteristics

Parameter	Symbol	D100N07/D100N07D	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	75	$^{\circ}\text{C/W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	1.1	$^{\circ}\text{C/W}$

Table 3. Electrical Characteristics (T<sub>c</sub>=25°C, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> =0V,I <sub>D</sub> =250μA	70	-	-	V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =70V,V <sub>GS</sub> =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =20V,V <sub>DS</sub> =0V	-	-	100	nA
	Reverse		V <sub>GS</sub> = -20V,V <sub>DS</sub> =0V	-	-	-100	nA
On Characteristics(Note 3)							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	2.0	-	4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V,I <sub>D</sub> =60A	-	6.3	7.5	mΩ
Dynamic Characteristics(Note 4)							
Input Capacitance		C <sub>ISS</sub>	V <sub>DS</sub> =35V,V <sub>GS</sub> =0V,f=1MHz	-	3475	-	pF
Output Capacitance		C <sub>OSS</sub>		-	238	-	pF
Reverse Transfer Capacitance		C <sub>RSS</sub>		-	192	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		td(on)	V <sub>DD</sub> =50V,I <sub>D</sub> =40A V <sub>GS</sub> =10V,R <sub>G</sub> =3Ω,	-	14	-	ns
Turn-On Rise Time		t <sub>r</sub>		-	40	-	ns
Turn-Off Delay Time		td(off)		-	37	-	ns
Turn-Off Fall Time		t <sub>f</sub>		-	14	-	ns
Total Gate Charge		Q <sub>G</sub>	V <sub>DD</sub> =35V,I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	69	-	nC
Gate-Source Charge		Q <sub>GS</sub>		-	18	-	nC
Gate-Drain Charge		Q <sub>GD</sub>		-	21	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	V <sub>GS</sub> =0V,I <sub>S</sub> =60A	-	-	1.2	V
Maximum Continuous Drain-Source Diode Forward Current		I <sub>S</sub>		-	-	100	A
Reverse Recovery Time		t <sub>rr</sub>	V <sub>GS</sub> =0V,I <sub>F</sub> =20A dI <sub>F</sub> /dt=100A/μs(Note 1)	-	30	-	ns
Reverse Recovery Charge		Q <sub>RR</sub>		-	37	-	nC

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

2 L=0.5mH, R<sub>G</sub>=25 $\Omega$ , Starting T<sub>J</sub>=25°C

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

4 Guaranteed by design, not subject to production

5 The maximum current is limited by the package.

## Typical Characteristics Diagrams

Figure 1. Output Characteristics

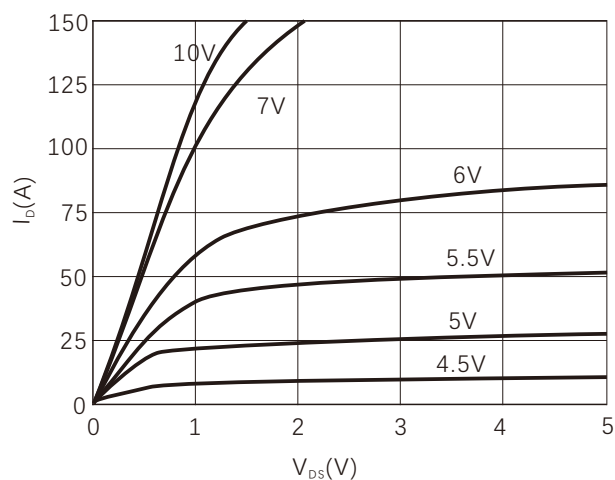


Figure 2. Transfer Characteristics

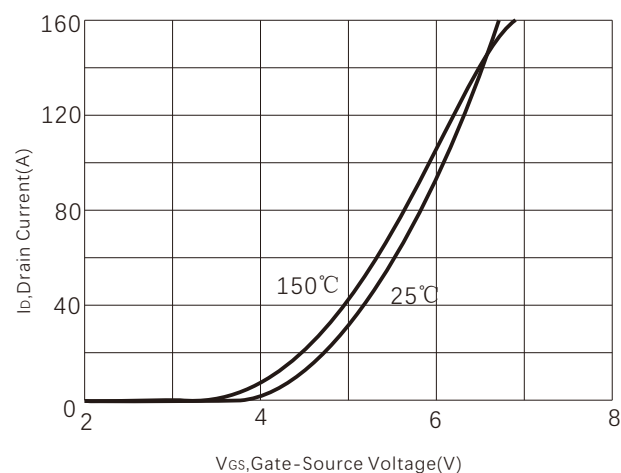


Figure 3. Normalized  $R_{DS(on)}$  vs Temperature

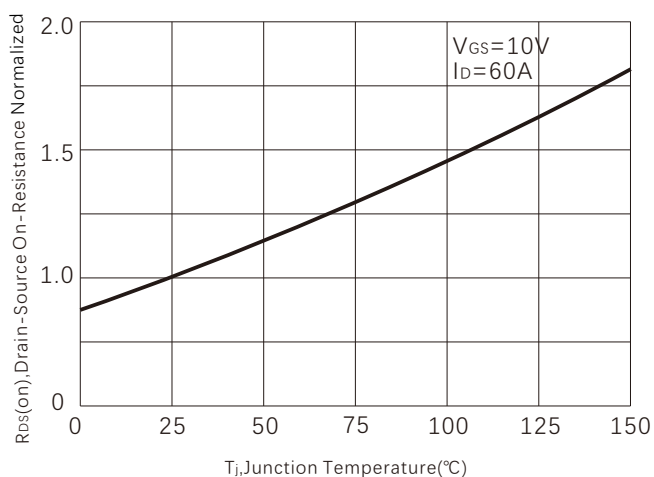


Figure 4. Capacitance

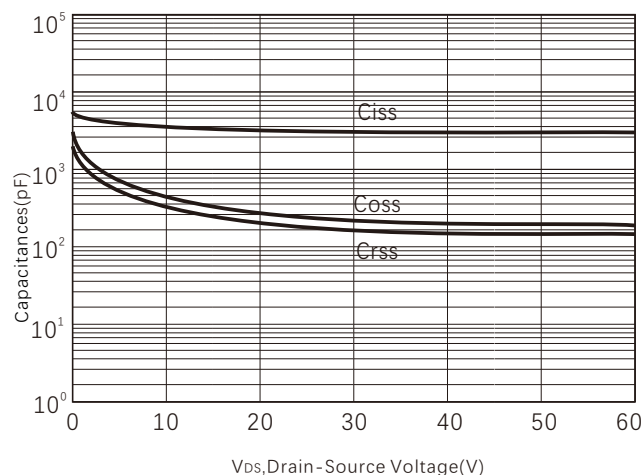


Figure 5. Gate charge

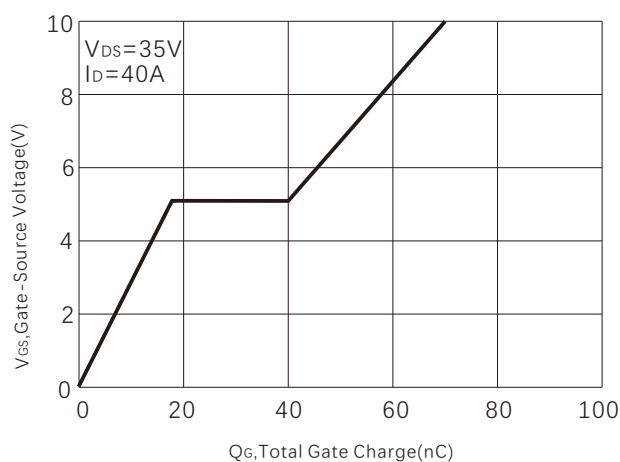


Figure 6. Source-Drain Diode Forward Voltage

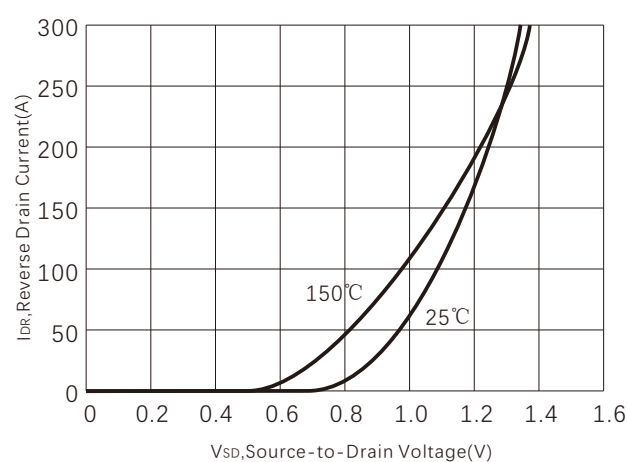


Figure7.Maximum Drain Current vs Temperature

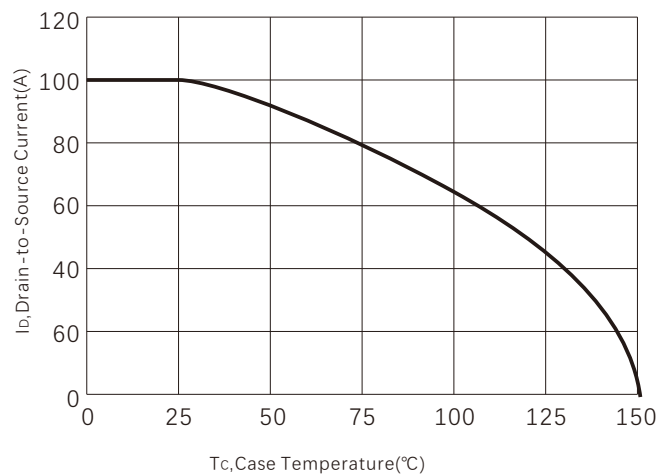


Figure 8. Power dissipation

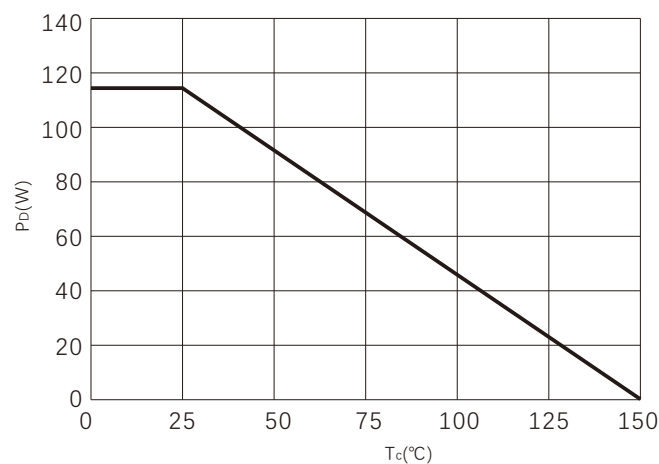


Figure 9. Safe operating area

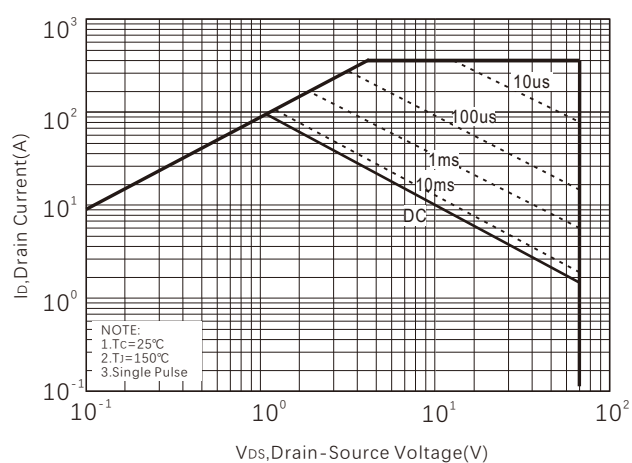
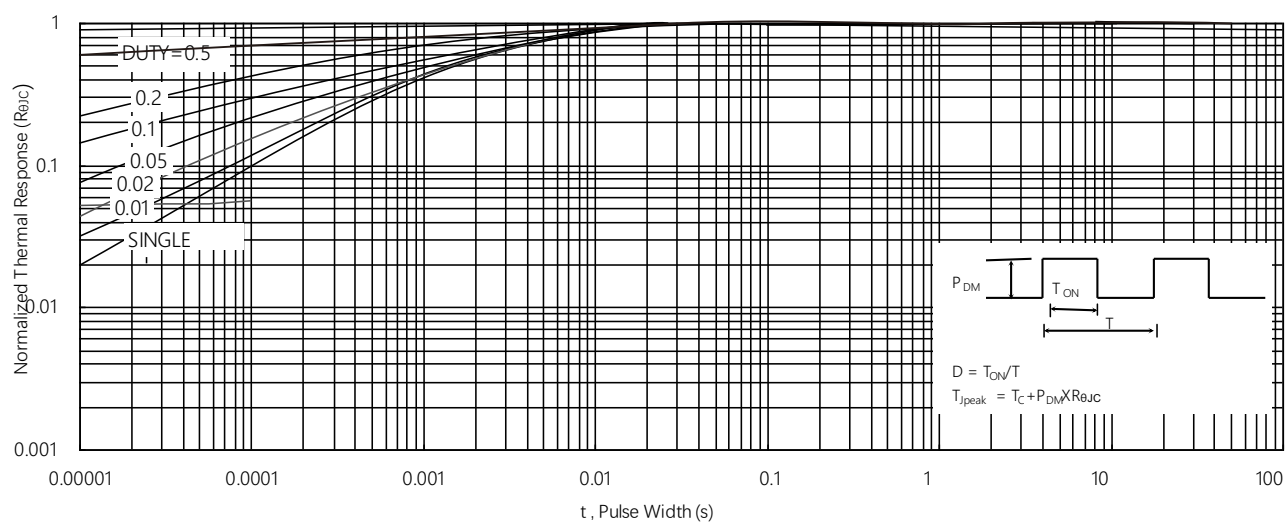
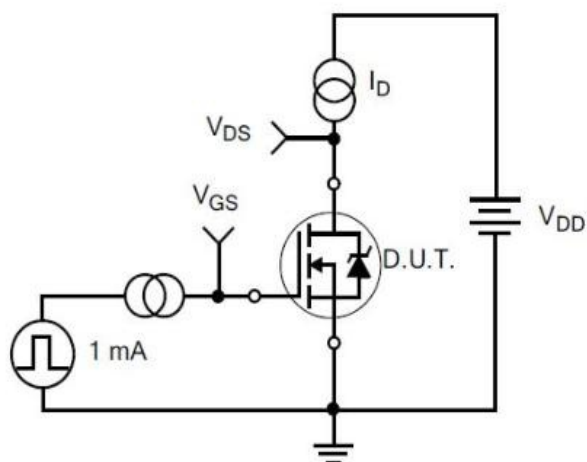


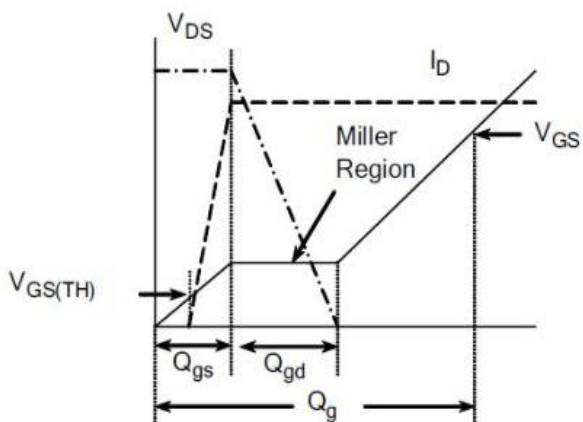
Figure 10.Normalized Maximum Transient Thermal Impedance



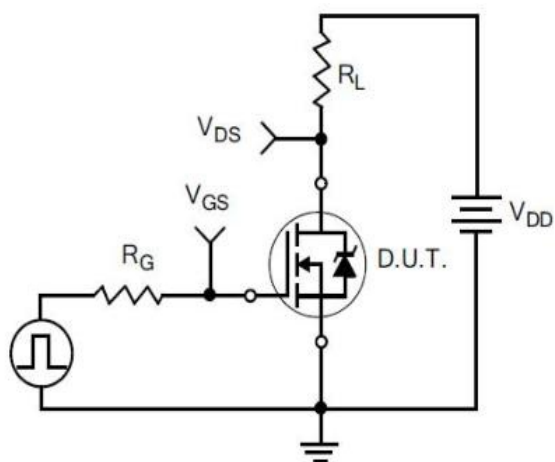
## Typical Test Circuit



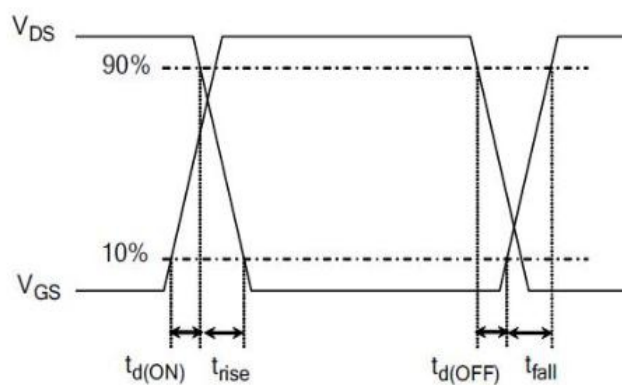
1) Gate Charge Test Circuit



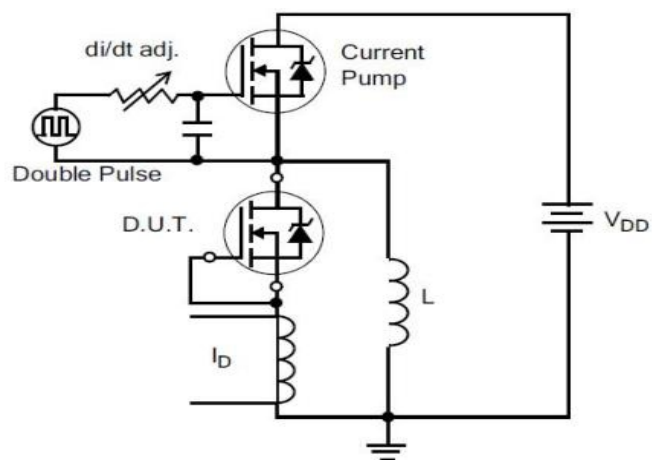
2) . Gate Charge Waveform



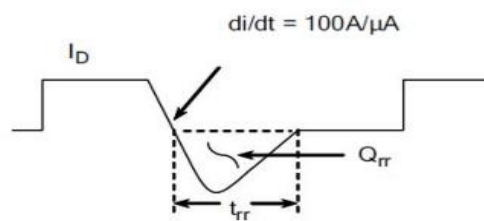
3) Resistive Switching Test Circuit



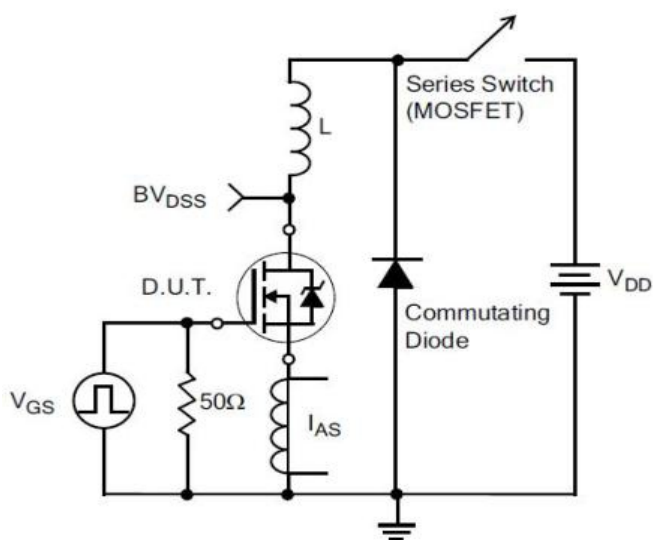
4) Resistive Switching Waveforms



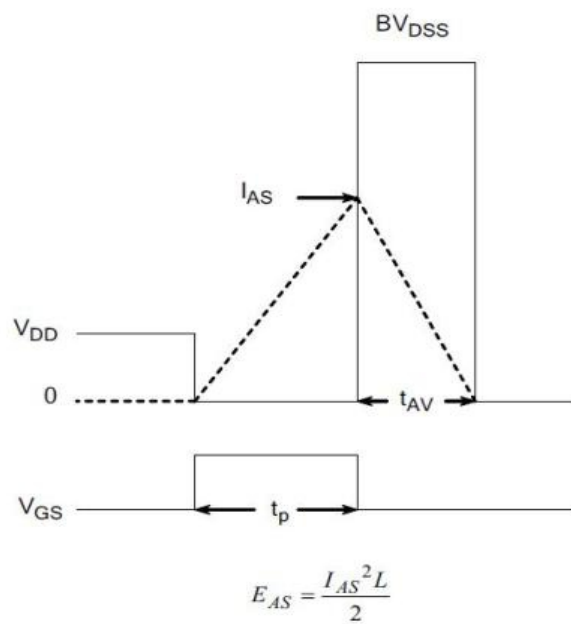
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

# Product Names Rules

X X X N E X X X-X X X

Process Type:  
VDMOS:default  
Super junction:SJ  
Low Voltage trench:D

Rdson Code  
2Ω :2D0  
9.5mΩ :9M5

Rated Current Code  
With 1-2 Digital,  
For Ex ample:  
4A:4,  
10A:10,  
0.8A:08

Package Code  
TO-220:Default  
ITO-220:F  
TO-262:E  
TO-263:D  
TO-252:M  
TO-251:N  
TO-263-7L:D7

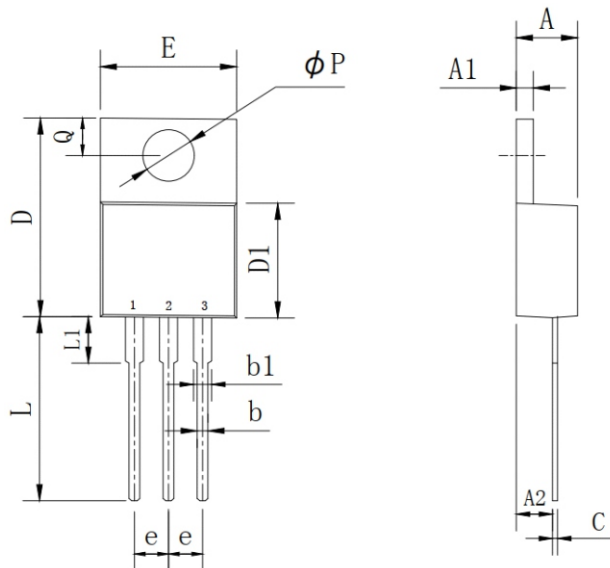
Channel Code  
N channel:N  
P channel:P

Rated Voltage Code  
With 2 Digital,For Example:  
600V:60  
60V:06

Special Function Code  
G-S ESD Protection:E  
No Protection:Default

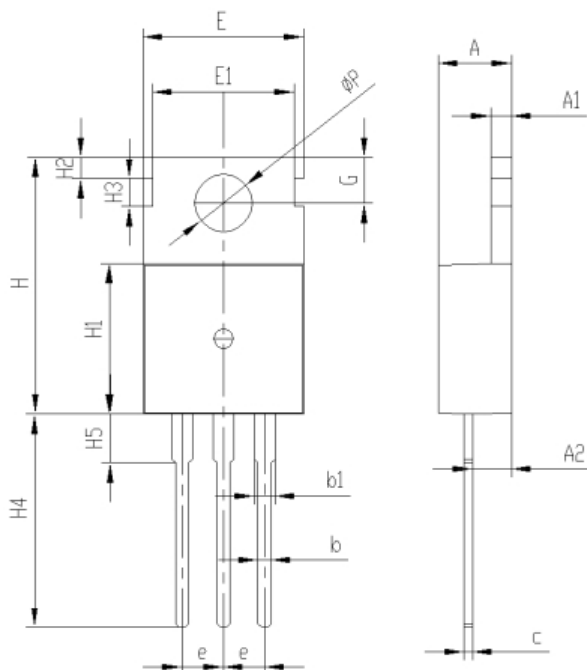
## Dimensions

### 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

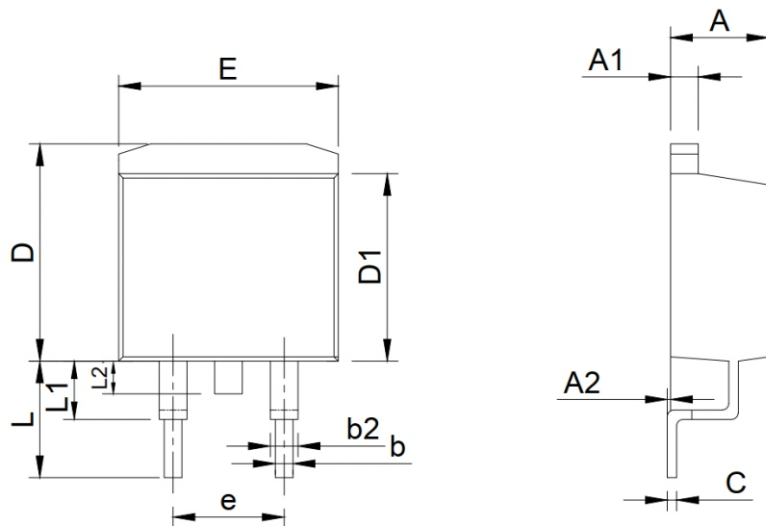
### TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions (millimeters)	
	Min.	Max.
A	4.30	4.70
A1	1.17	1.37
A2	2.20	2.60
b	0.60	1.00
b1	1.17	1.37
b2	1.90	2.30
c	0.30	0.70
e	2.34	2.74
E	9.70	10.1
E1	8.50	8.90
H	15.5	15.9
H1	9.00	9.40
H2	1.10	1.50
H3	1.50	1.90
H4	12.58	13.58
H5	2.80	3.20
G	2.60	3.00
$\phi P$	3.40	3.80

# 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

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