

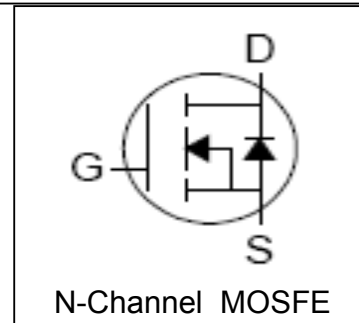
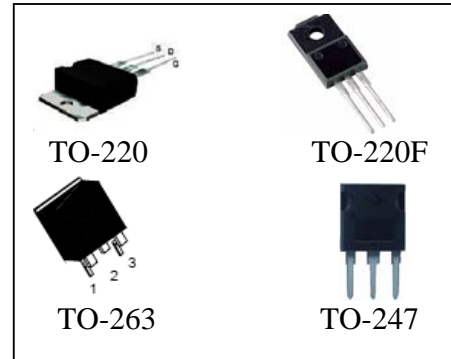
Features

- 80V/190A
 $R_{DS(ON)}=3.9m\Omega(Typ.) @ V_{GS}=10V$
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available

Applications

- Automotive applications and a wide variety of other applications
- High Efficiency Synchronous in SMPS
- High Speed Power Switching

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	80	V
V_{GSS}	Gate-Source Voltage	± 25	
T_J	Maximum Junction Temperature	175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 190	A
Mounted on Large Heat Sink			
I_{DP}	300 μs Pulsed Drain Current Tested	$T_C=25^\circ\text{C}$ 700 ^a	A
I_D	Continue Drain Current	$T_C=25^\circ\text{C}$ 190 ^b $T_C=100^\circ\text{C}$ 140	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 400 $T_C=100^\circ\text{C}$ 220	W
$R_{\theta JC}$	Thermal Resistance -Junction to Case	0.45	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	
Drain-Source Avalanche Ratings			
E_{AS}	Avalanche Energy ,Single Pulsed	$L=2\text{mH}$ 2000	mJ

Note : a : Pulse width limited by safe operating area.

b: Current limited by package(Limitation Current is 75A)

Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

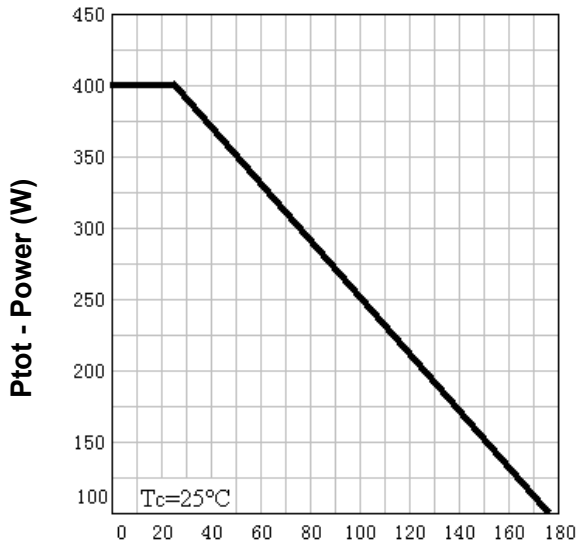
Symbol	Parameter	Test Condition	RU190N08			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	80			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			1	μA
					30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	2	3	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^c$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		3.9	4.8	$m\Omega$
Diode Characteristics						
V_{SD}^c	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.8	1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		68		ns
q_{rr}	Reverse Recovery Charge			130		nC
Dynamic Characteristics^d						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		1.0		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=30V,$ Frequency=1.0MHz		6800		pF
C_{oss}	Output Capacitance			1100		
C_{riss}	Reverse Transfer Capacitance			490		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=35V, R_L=35\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$		38	70	ns
t_r	Turn-on Rise Time			22	41	
$t_{d(OFF)}$	Turn-off Delay Time			120	210	
t_f	Turn-off Fall Time			75	140	
Gate Charge Characteristics^d						
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V,$ $I_{DS}=40A$		155	220	nC
Q_{gs}	Gate-Source Charge			45		
Q_{gd}	Gate-Drain Charge			48		

Notes: c 、 Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

d 、 Guaranteed by design, not subject to production testing.

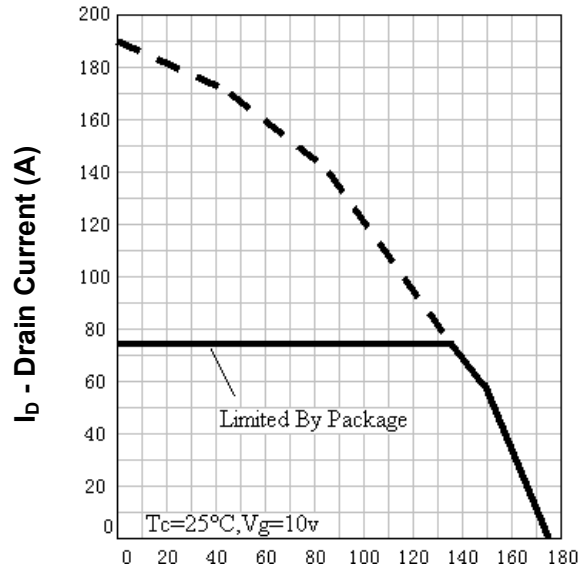
Typical Characteristics

Power Dissipation



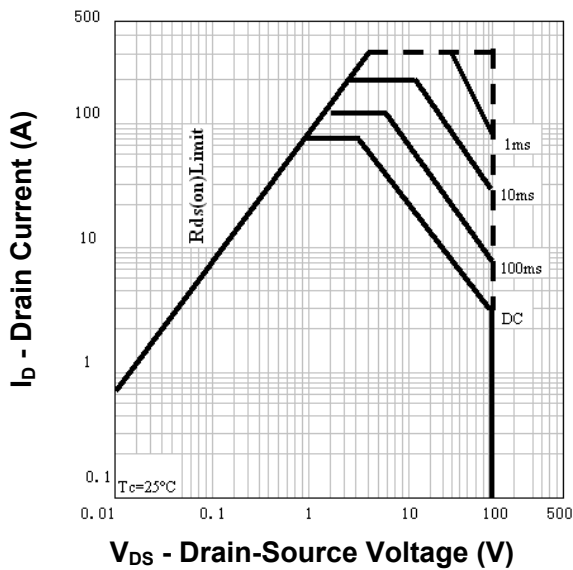
T_j - Junction Temperature (°C)

Drain Current



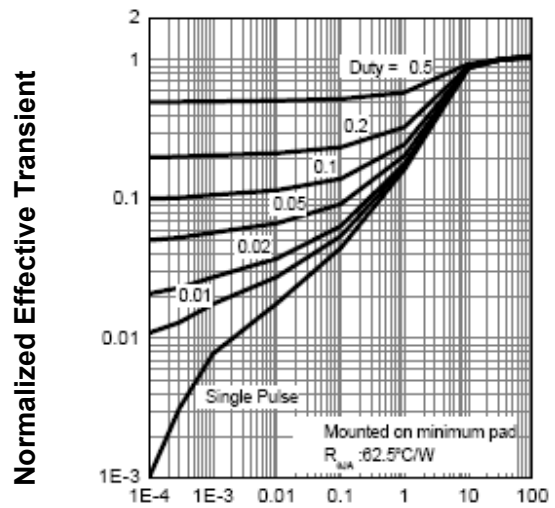
T_j - Junction Temperature (°C)

Safe Operation Area



V_{ds} - Drain-Source Voltage (V)

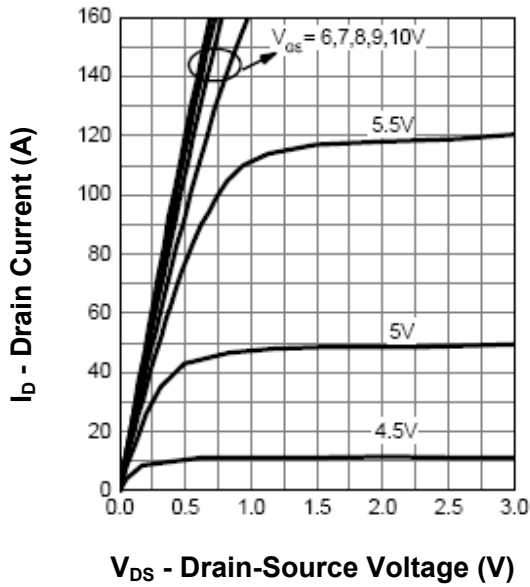
Thermal Transient Impedance



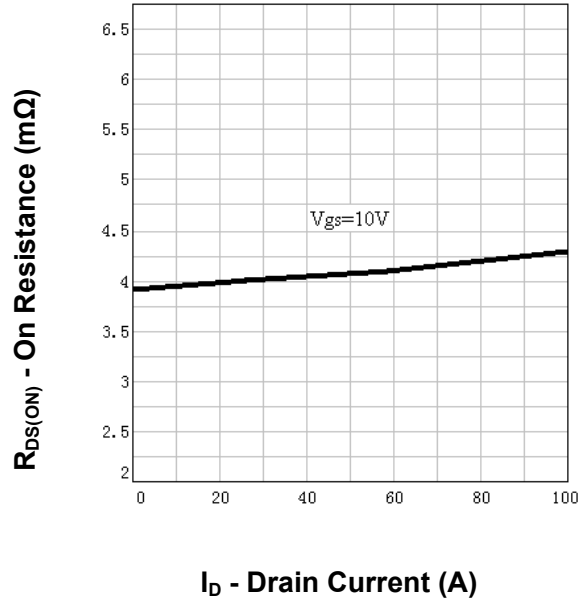
Square Wave Pulse Duration (sec)

Typical Characteristics

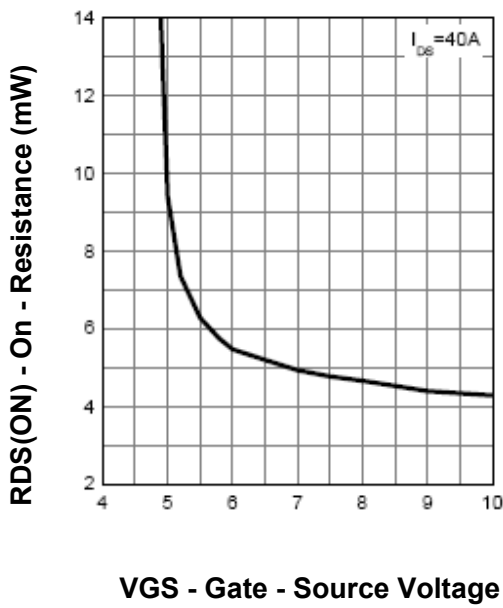
Output Characteristics



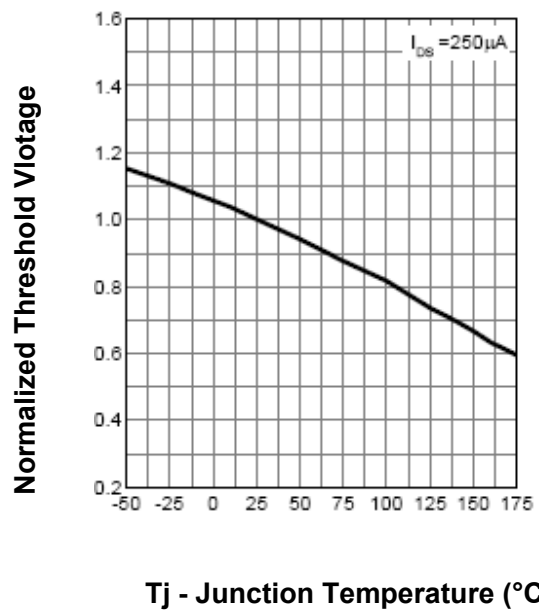
Drain-Source On Resistance



Drain-Source On Resistance

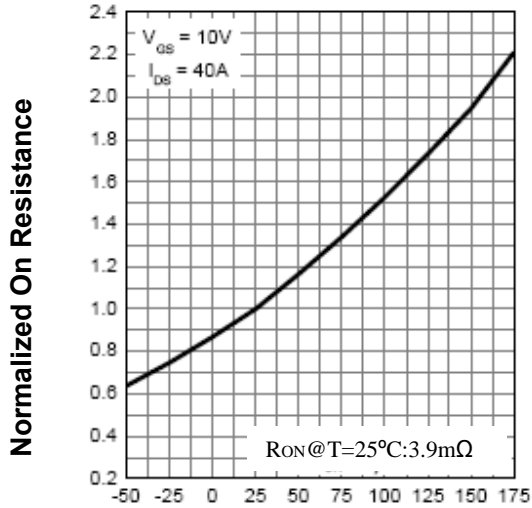


Gate Threshold Voltage



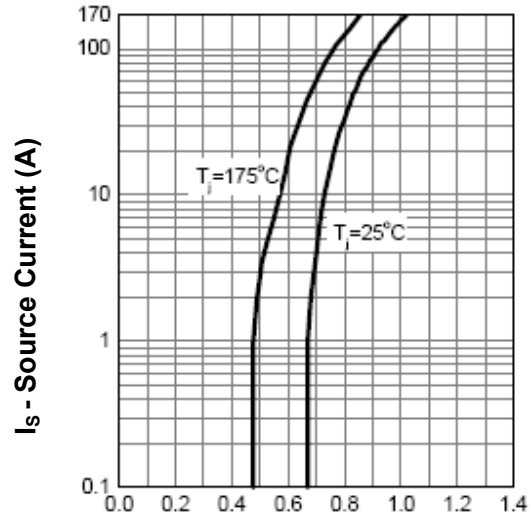
Typical Characteristics

Drain-Source On Resistance



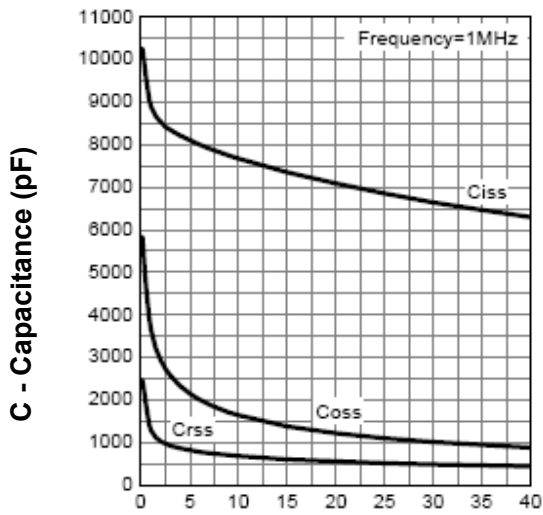
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



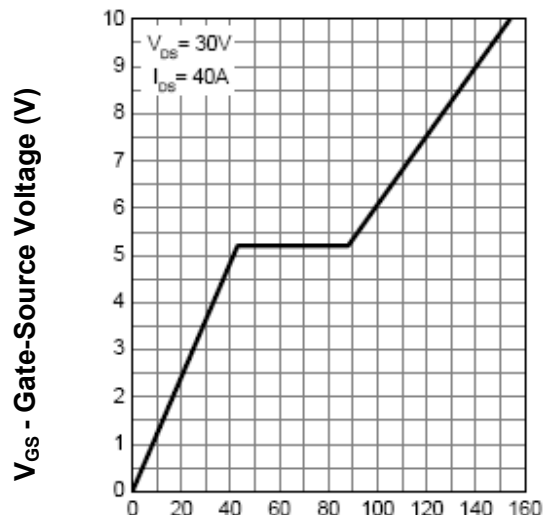
V_{SD} - Source-Drain Voltage (V)

Capacitance



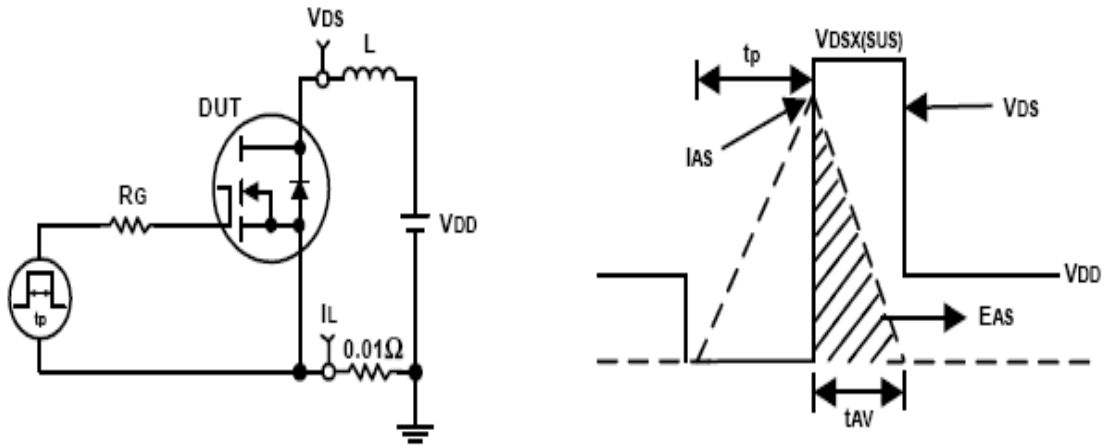
V_{DS} - Drain-Source Voltage (V)

Gate Charge

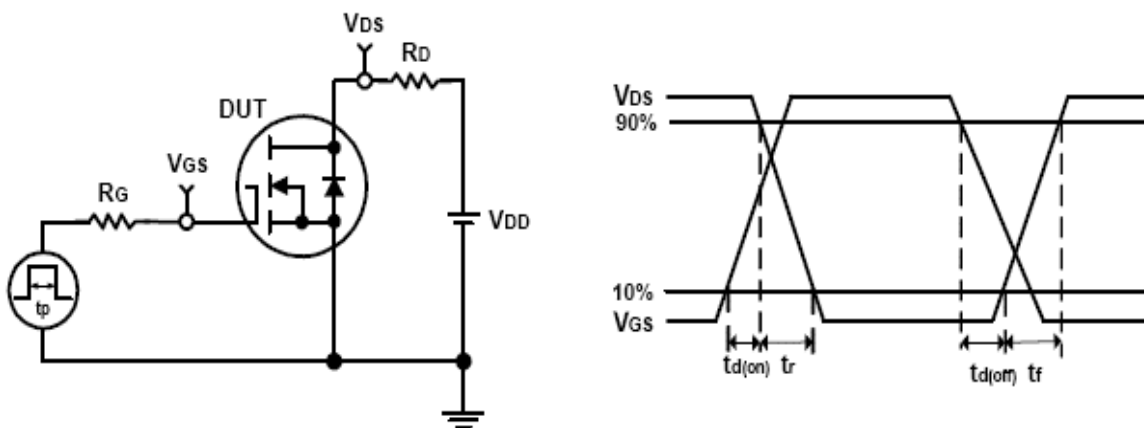


Q_G - Gate Charge (nC)

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

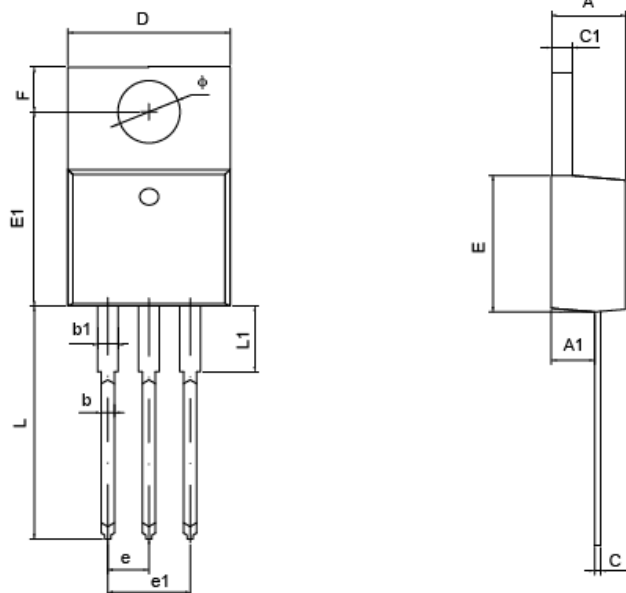


Ordering and Marking Information

RU190N08 Package (Available) Q:TO-247 ; R: TO-220 ; S: TO-263 Operating Temperature Range C : -55 to 175 °C Assembly Material G : Green & Lead Free Device Packaging T : TUBE TR : Tape & Reel																			
<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><u>RU</u></td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;"><u>XX</u></td> <td style="text-align: center;"><u>N</u></td> <td style="text-align: center;"><u>XX</u></td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;"><u>X</u></td> </tr> <tr> <td style="text-align: center;">Company</td> <td style="text-align: center;">Device</td> <td style="text-align: center;">ID</td> <td style="text-align: center;">BVDS</td> <td style="text-align: center;">Package</td> <td style="text-align: center;">Temperature</td> <td style="text-align: center;">Green</td> <td style="text-align: center;">Packaging</td> <td></td> </tr> </table>		<u>RU</u>	<u>X</u>	<u>XX</u>	<u>N</u>	<u>XX</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	Company	Device	ID	BVDS	Package	Temperature	Green	Packaging	
<u>RU</u>	<u>X</u>	<u>XX</u>	<u>N</u>	<u>XX</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>											
Company	Device	ID	BVDS	Package	Temperature	Green	Packaging												
Company RU : RUICHIPS Device None: A version F: Low Qg B: B version G: Low Rdson C: C version L: Low VGS(th) voltage D: D version H: High VGS(th) voltage ID 08 : 8 A 10: 10A 85: 85A 110: 110A 210: 210 A Polarity N: Single N; DP: Dual-P ; DN: Dual-N; P: Single P; NP: Complementary N+P BVDS 04: 40V 50: 500V 10: 100V 60: 600V 15: 150V 65: 650 V 40: 400V 	Package A: SC-70 N: TO-261 B: SOT-23 S: TO-263 B5: SOT-23-5 S5: TO-263-5L B6: SOT-23-6 S7: TO-263-7L C: SOT-223 R: TO-220 D: SOT-89 R5: TO-220-5L E: TSOP-6 R7: TO-220-7L F: TSSOP-8 P: TO-220F G: SOP-8 Q: TO-247 H: JSOT-8 K4:TO-252-4L I: DIP-8 K5:TO-252-5L J: TO-251 M: KPAK K: TO-252 Temperature C : Commercial Version I : Industry Version Green G : Green & Lead Free Device Packaging T: TUBE TR: Tape & Reel																		

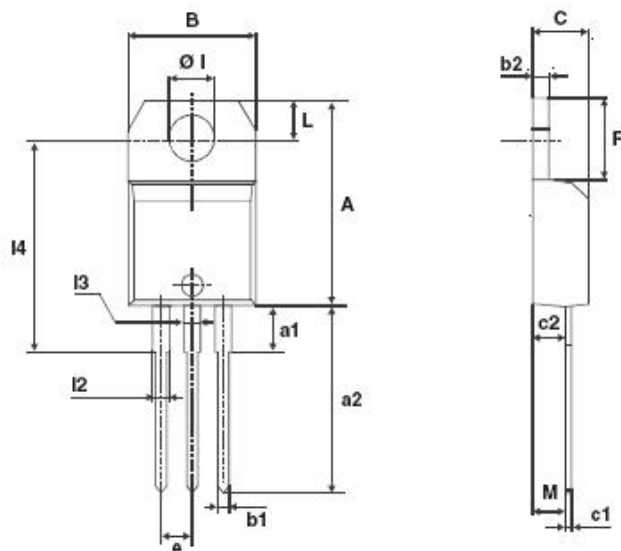
Package Information

TO-220-3L



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.420	4.720	1.174	0.186
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.360	0.460	0.014	0.018
c1	1.170	1.370	0.046	0.054
D	9.950	10.250	0.392	0.404
E	8.990	9.290	0.354	0.366
E1	12.550	12.850	0.494	0.506
e	2.540TYP		0.100TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
L	13.080	13.480	0.515	0.531
L1	2.470	2.870	0.097	0.113
Ø	3.790	3.890	0.149	0.153

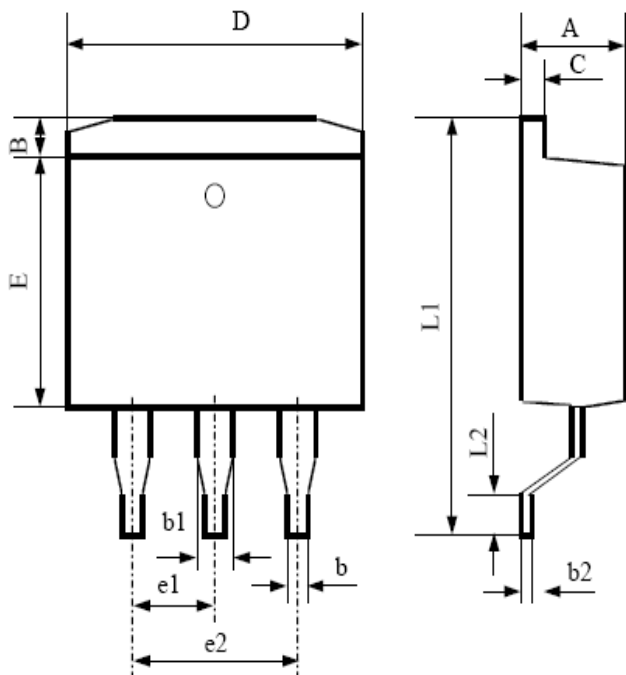
TO-220F-3L



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

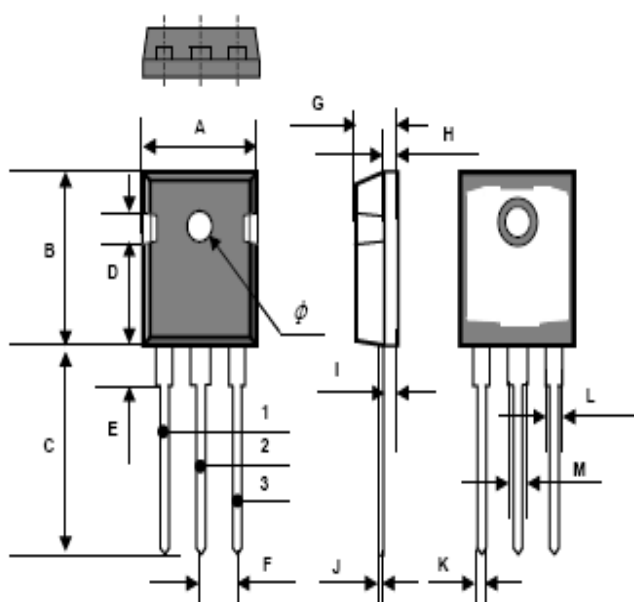
Package Information

TO-263-3L



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.42	4.72	0.174	0.186
B	1.22	1.32	0.048	0.052
b	0.076	0.086	0.030	0.034
b1	1.22	1.32	0.048	0.052
b2	0.33	0.43	0.013	0.017
C	1.22	1.32	0.048	0.052
D	9.95	10.25	0.392	0.404
E	8.99	9.29	0.354	0.366
e1	2.44	2.64	0.096	0.104
e2	4.98	5.18	0.196	0.204
L1	15.19	15.79	0.598	0.622
L2	1.94	2.19	0.076	0.086

TO-247-3L



Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.77		16.03	0.621		0.631
B	20.77		21.07	0.818		0.830
C	20.05		20.31	0.789		0.800
D	4.40		4.50	0.173		0.177
E	4.22		4.32	0.166		0.170
F	5.32		5.58	0.209		0.220
G	4.90		5.10	0.193		0.200
H	1.92		2.08	0.076		0.082
I	2.33		2.43	0.092		0.096
J		0.6			0.024	
K	1.15		1.25	0.045		0.049
L	1.95		2.05	0.077		0.081
M	2.85		3.11	0.112		0.122
φ	3.65		3.75	0.144		0.148

Customer Service

RUICHIPS Semiconductor (Korea) CO., LTD

7805-17Th Dongil Techno Town, 823, Kwanyang-Dong, Dongan-Gu, Anyang-City, Kyunggi-Do, 431-060, Korea.

주소 : 경기도 안양시 동안구 관양동823번지 동일테크노타운7차 7805-1 우)431-060

E-mail: Sales-KR@ruichips.com

Shen Zhen RUICHIPS Semiconductor CO., LTD

Room 501, the 5floor An Tong Industrial Building,
NO.207 Mei Hua Road Fu Tian Area Shen Zhen City, CHINA

TEL: (86-755) 8311-5334

FAX: (86-755) 8311-4278

E-mail: Sales-SZ@ruichips.com

Worldwide Sales and Service:

Sales@ruichips.com

Technical Support:

Technical@ruichips.com

Investor Relations Contacts:

Investor@ruichips.com

Marcom Contact:

Marcom@ruichips.com

Editorial Contact:

Editorial@ruichips.com

HR Contact:

HR@ruichips.com

Legal Contact:

Legal@ruichips.com