

# BRCS030N04RA

Rev.A May.-2023

## / Descriptions

TO-220 N

N-CHANNEL MOSFET in a TO-220 Plastic Package.

## / Features

$V_{DS}=40V$   $I_D=177A$   $V_{GS}=\pm 20V$

$R_{DS(on)}@10Vm3.0m$  (Type.2.5m )

$R_{DS(on)}@4.5Vm5.0m$  (Type.3.5m )

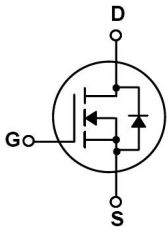
HF Product.

## / Applications

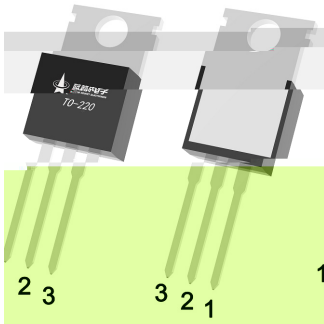
DC/DC

DC Motor Driver,Synchronous Rectification in DC/DC Converters.

## / Equivalent Circuit



## / Pinning



PIN1 G

PIN 2 4 D

PIN 3 S

## / Marking

See Marking Instructions.

## / Absolute Maximum Ratings(Ta=25 )

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DSS</sub>	40	V
Drain Current	I <sub>D</sub> (Tc=25 )	177	A
Pulsed Drain Current	I <sub>DM</sub>	560	A
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Single Pulsed Avalanche Energy L=0.5mH	E <sub>AS</sub>	435	mJ
Avalanche Current	I <sub>AS</sub>	33	A
Total Power Dissipation	P <sub>D</sub> (Tc=25 )	170	W
Junction and Storage Temperature Range	T <sub>J</sub> ,T <sub>STG</sub>	-55 to 150	
Thermal Resistance-Junction to Ambient	t 10s	R <sub>JA</sub>	15
	Steady-State		60
Thermal Resistance-Junction to Case	Steady-State	R <sub>JC</sub>	0.74

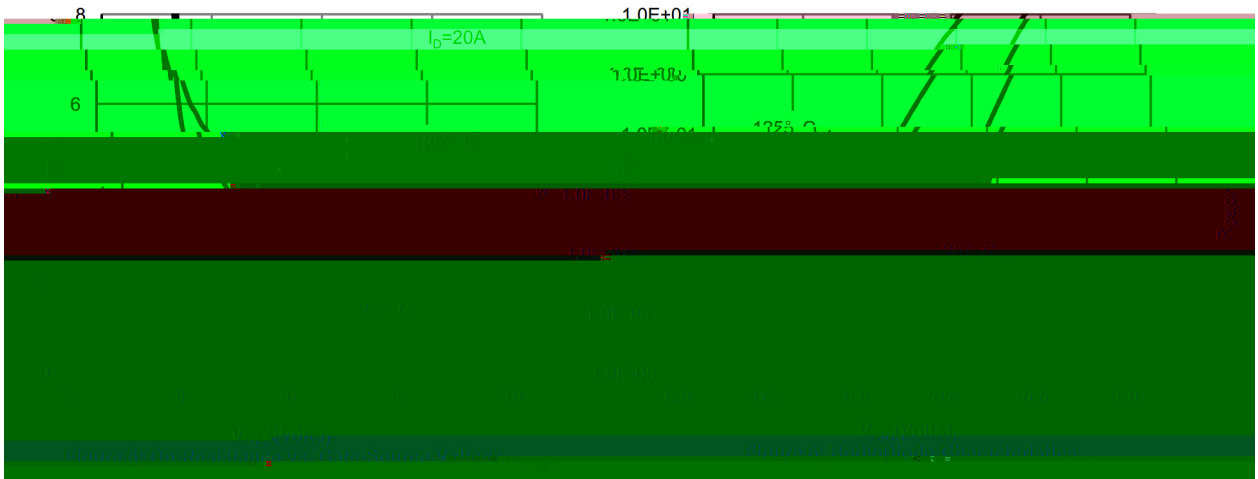
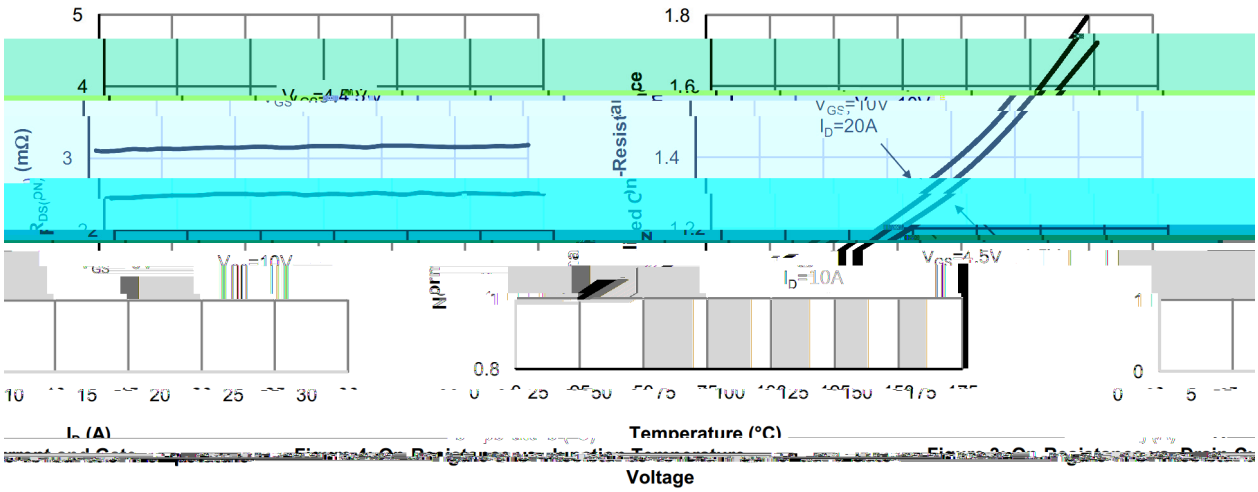
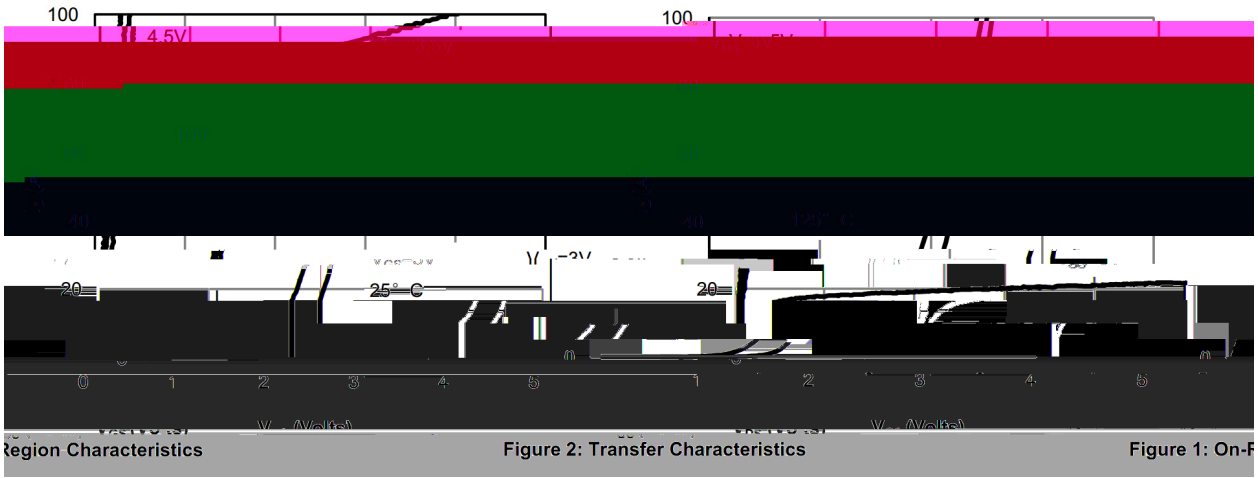
## / Electrical Characteristics(Ta=25 )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250 A	40	47		V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V V <sub>GS</sub> =0V			1	A
Gate-Body Leakage Current Forward	I <sub>GSS</sub>	V <sub>GS</sub> =±20V V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250 A	1	1.7	3	V
Static Drain-Source On-Resistance	R <sub>DSON</sub>	V <sub>GS</sub> =10V I <sub>D</sub> =20A		2.5	3	m
		V <sub>GS</sub> =4.5V I <sub>D</sub> =10A		3.5	5	
Forward On Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V I <sub>S</sub> =1A			1.2	V
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V V <sub>DS</sub> =0V, f=1MHz		1.3		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V V <sub>GS</sub> =0V f=1MHz		9600		pF
Output Capacitance	C <sub>oss</sub>			740		
Reverse Transfer Capacitance	C <sub>rss</sub>			650		
Total Gate Charge	Q <sub>g(10V)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A V <sub>DS</sub> =20V,		51		nC
Total Gate Charge	Q <sub>g(4.5V)</sub>			23		
Gate Source Charge	Q <sub>gs</sub>			13.2		
Gate Drain Charge	Q <sub>gd</sub>			3.1		

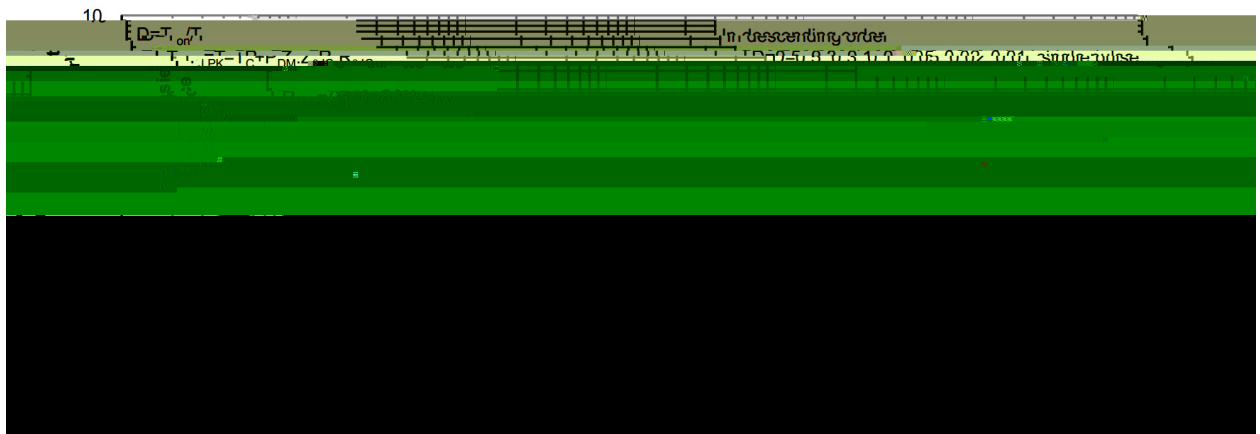
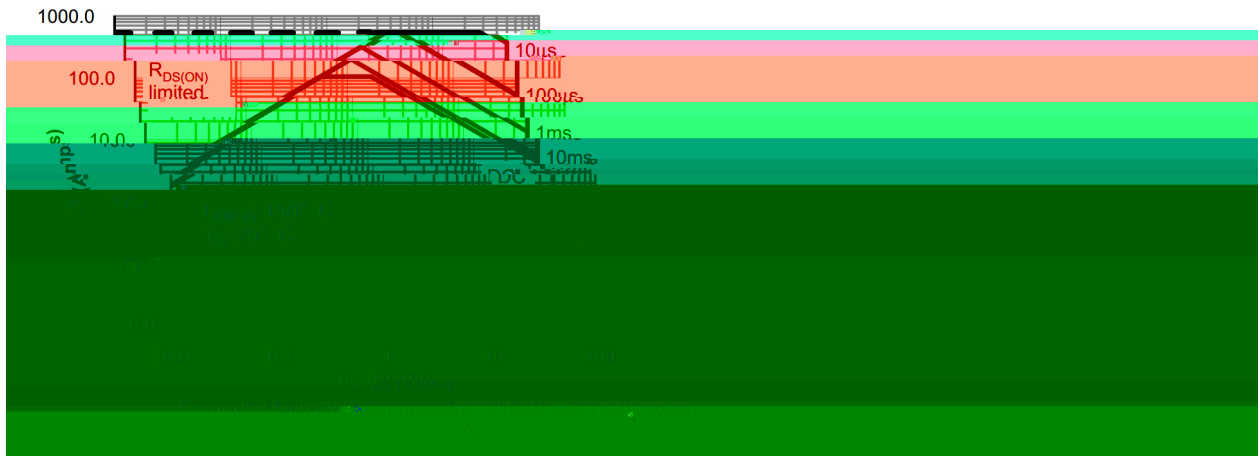
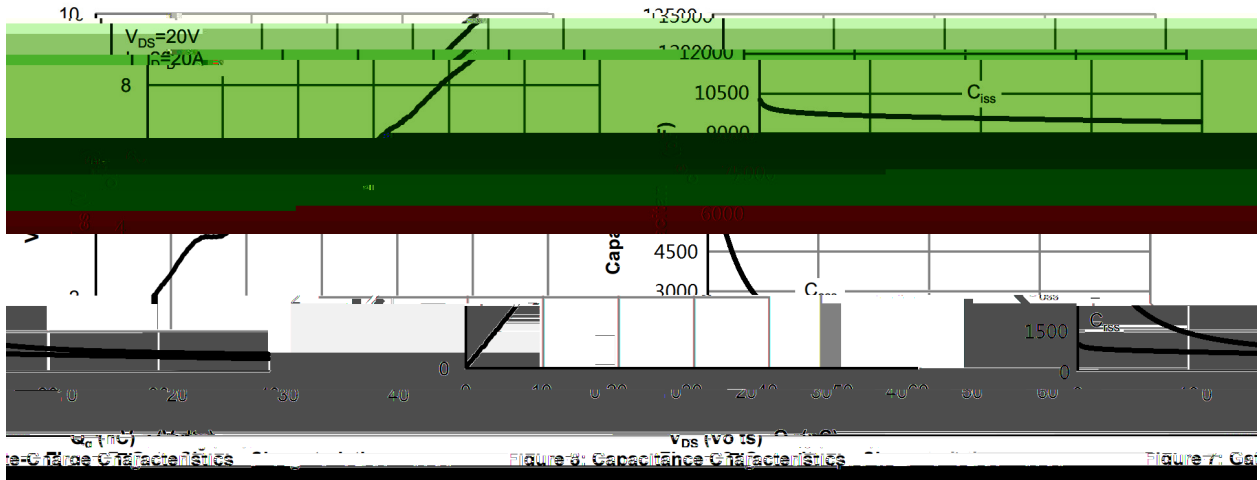
**/ Electrical Characteristics(Ta=25 )**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V$ $V_{DS}=20V$ $R_L=1$ $R_{GEN}=3$		11		ns
Turn-On Rise Time	$t_r$			11		
Turn-Off Delay Time	$t_{d(off)}$			40		
Turn-Off Fall Time	$t_f$			10		

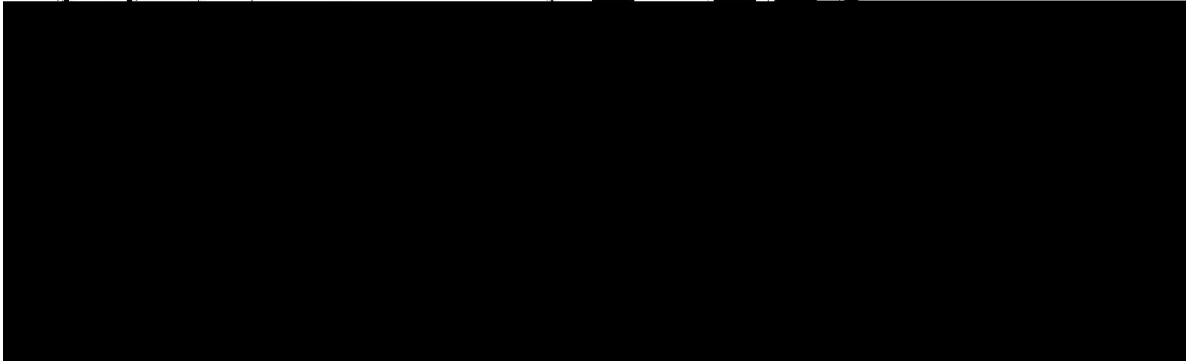
/ Electrical Characteristic Curve



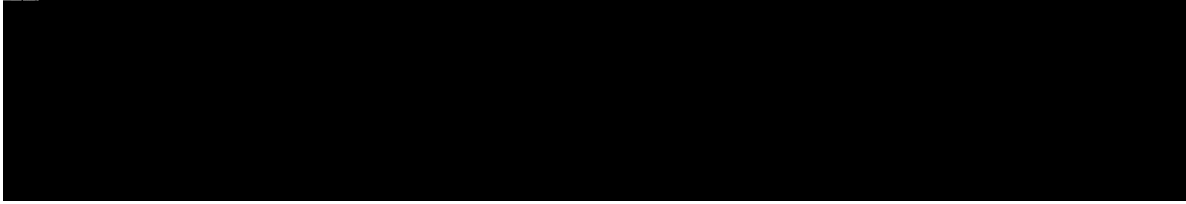
/ Electrical Characteristic Curve



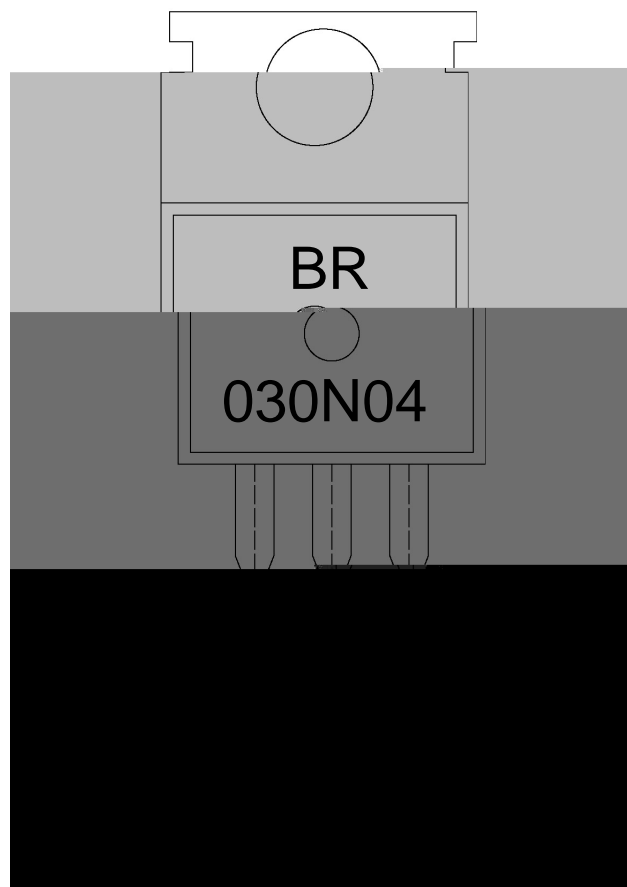
**/ Package Dimensions**



	Symbol	Min	Max	Symbol	Min	Max
6.7	A	9.8	10.2	C	12	14
9.4	R	3.56	3.64	B	6.3	
2.6	b	1.28	1.36	c1	2.3	



/ Marking Instructions



BR

030N04

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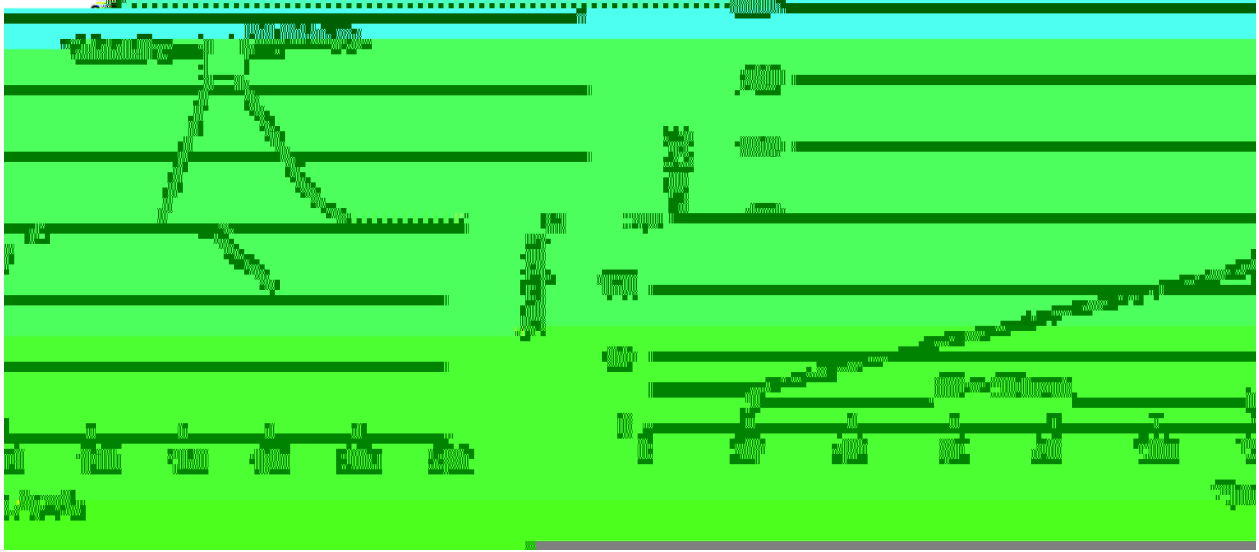
Note:

BR: Company Code

030N04: Product Type

\*\*\*\*: Lot No. Code, code change with Lot No

**( ) / Temperature Profile for Dip Soldering(Pb-Free)**



Note:

- |   |       |     |           |          |   |
|---|-------|-----|-----------|----------|---|
| 1 | 25    | 150 | 60        | 90sec;   | 1.Preheating:25~150 , Time:60~90sec.    |
| 2 | 255±5 |     | 5±0.5sec; |          | 2.Peak Temp.:255±5 , Duration:5±0.5sec. |
| 3 |       |     | 2         | 10 /sec. | 3. Cooling Speed: 2~10 /sec.            |

**/ Resistance to Soldering Heat Test Conditions**

270±5                      10±1 sec.                      Temp.:270±5                      Time:10±1 sec

**/ Packaging SPEC.**

/ BULK

Package Type	Units					Dimension (unit mm <sup>3</sup> )		
TO-220/F	200	10	2,000	5	10,000	135x190	237x172x102	560x245x195