Description
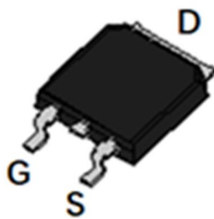
N-channel Enhancement Mode Power MOSFET

Features

- 30V,90A

  $R_{DS(ON)}$<4.5mΩ @ V_{GS} =10V

  $R_{DS(ON)}$<9.5mΩ @ V_{GS} =4.5V

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
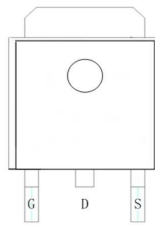- Lead free product is acquired

Application

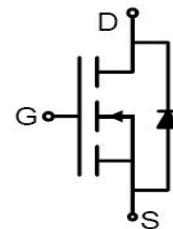- Load Switch
- PWM Application
- Power management

  100% UIS TESTED!
  100% ΔVds TESTED!

RoHS

TO-252(DPAK) top view

Marking and pin Assignment

Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
BCD90N03	BCD90N03	TAPING	TO-252	13inch	2500	25000

Absolute Maximum Ratings (T$_C$=25℃ unless otherwise specified)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	90	A
		T_C = 100℃	59	A
I_{DM}	Pulsed Drain Current [note1]		360	A
E_{AS}	Single Pulsed Avalanche Energy [note2]		95	mJ
P_D	Power Dissipation	T_C = 25℃	68	W
$R_{θJC}$	Thermal Resistance, Junction to Case		2.2	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

Electrical Characteristics (T$_J$=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V$_{(BR)DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=250μA	30	-	-	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$ =30V, V$_{GS}$ = 0V,	-	-	1.0	μA
I$_{GSS}$	Gate to Body Leakage Current	V$_{DS}$ =0V, V$_{GS}$ = ±20V	-	-	±100	nA
On Characteristics						
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$= V$_{GS}$, I$_D$=250μA	1.0	1.5	2.5	V
R$_{DS(on)}$	Static Drain-Source on-Resistance note3	V$_{GS}$ =10V, I$_D$ =30A	-	3.3	4.5	mΩ
		V$_{GS}$ =4.5V, I$_D$ =20A	-	6.7	9.5	
Dynamic Characteristics						
C$_{iss}$	Input Capacitance	V$_{DS}$ =15V, V$_{GS}$ =0V, f = 1.0MHz	-	2100	-	pF
C$_{oss}$	Output Capacitance		-	326	-	pF
C$_{rss}$	Reverse Transfer Capacitance		-	282	-	pF
Q$_g$	Total Gate Charge	V$_{DS}$ =15V, I$_D$ =30A, V$_{GS}$ =10V	-	45	-	nC
Q$_{gs}$	Gate-Source Charge		-	3	-	nC
Q$_{gd}$	Gate-Drain("Miller") Charge		-	15	-	nC
Switching Characteristics						
t$_{d(on)}$	Turn-on Delay Time	V$_{DS}$=15V, I$_D$=30A, R$_{GEN}$=3Ω, V$_{GS}$ =10V	-	21	-	ns
t$_r$	Turn-on Rise Time		-	32	-	ns
t$_{d(off)}$	Turn-off Delay Time		-	59	-	ns
t$_f$	Turn-off Fall Time		-	34	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I$_S$	Maximum Continuous Drain to Source Diode Forward Current	-	-	-	90	A
I$_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current	-	-	-	360	A
V$_{SD}$	Drain to Source Diode Forward Voltage	V$_{GS}$ = 0V, I$_S$=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I$_F$=20A,dI/dt=100A/μs	-	15	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T$_J$=25℃, V$_{DD}$=15V, V$_G$=10V, R$_G$=25Ω, L=0.5mH, I$_{AS}$=19.5A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%
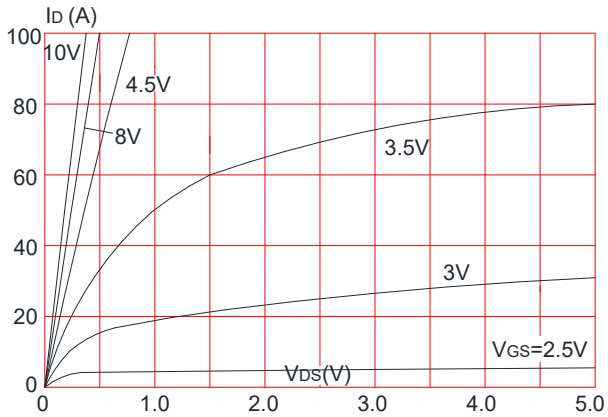
Figure1: Output Characteristics
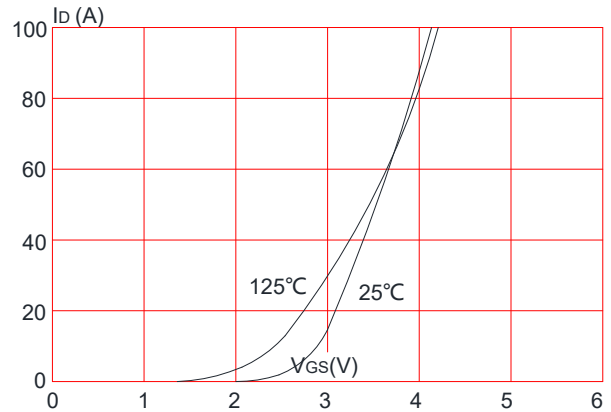

Figure 2: Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current
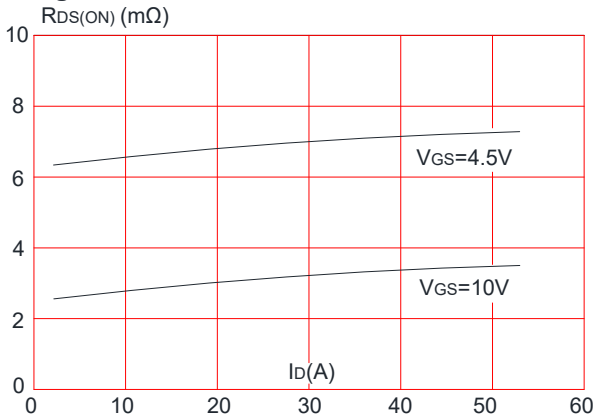

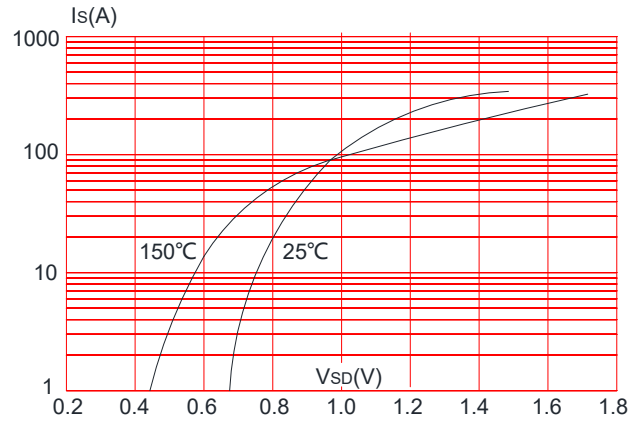**Figure 4**: Body Diode Characteristics

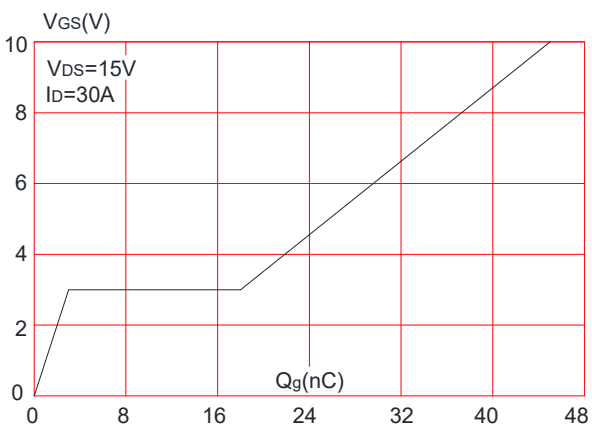
Figure 5: Gate Charge Characteristics

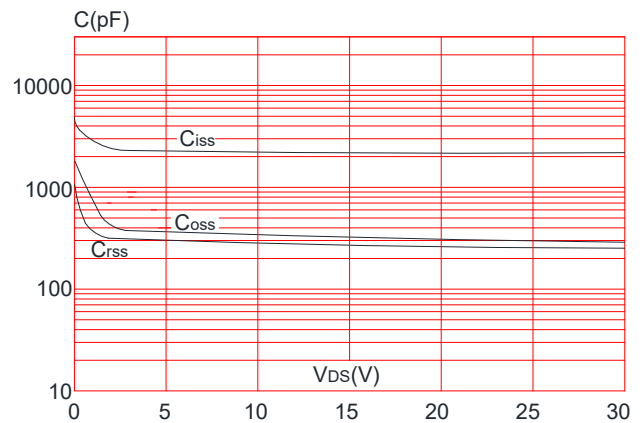

Figure 6: Capacitance Characteristics

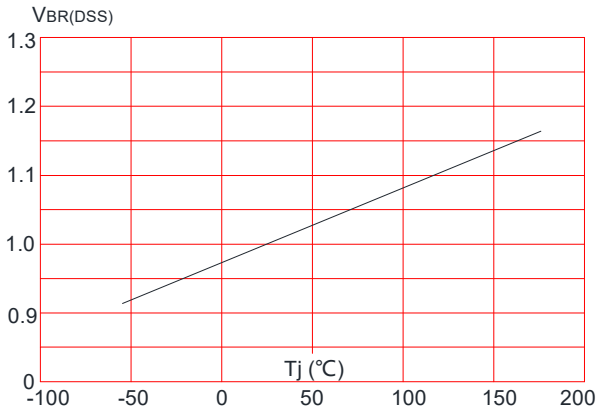**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

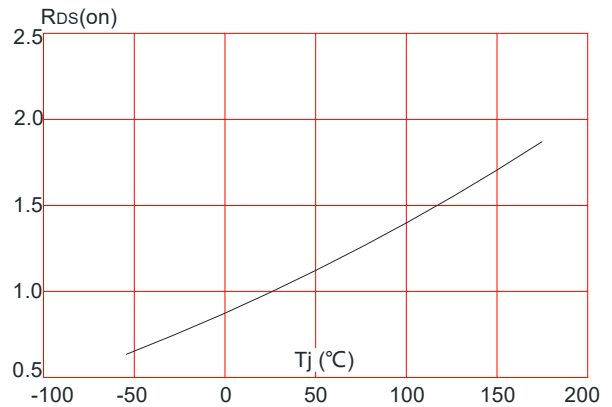**Figure 8:** Normalized on Resistance vs. Junction Temperature

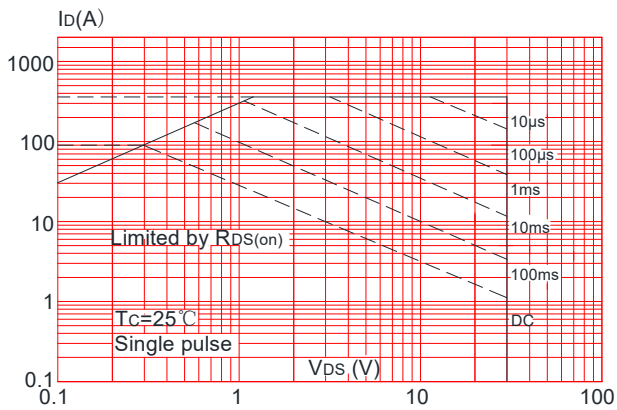**Figure 9:** Maximum Safe Operating Area

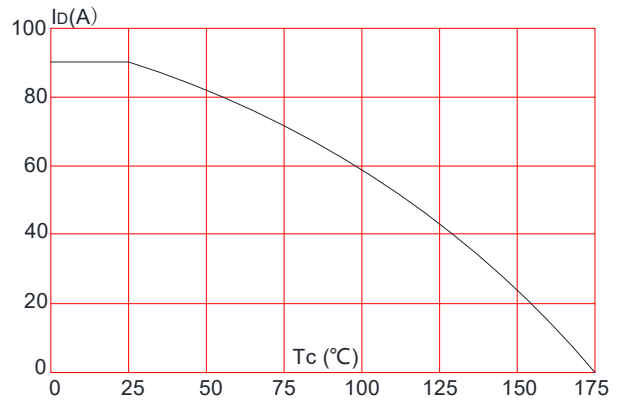**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Notes:
1.Duty factor D=t1/t2
2.Peak $T_J=P_{DM}*Z_{thJC}+T_C$

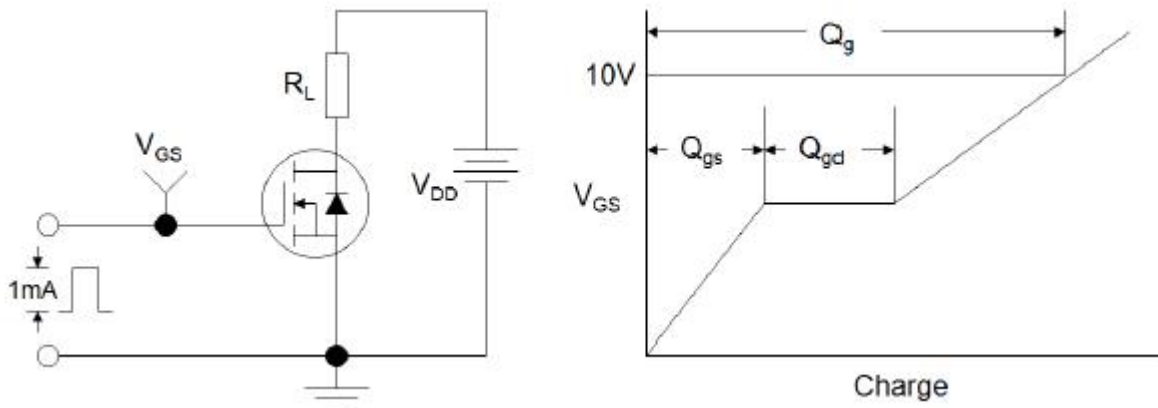Qingdao Yintec McroelectronicsCo ,Ltd

Test Circuit

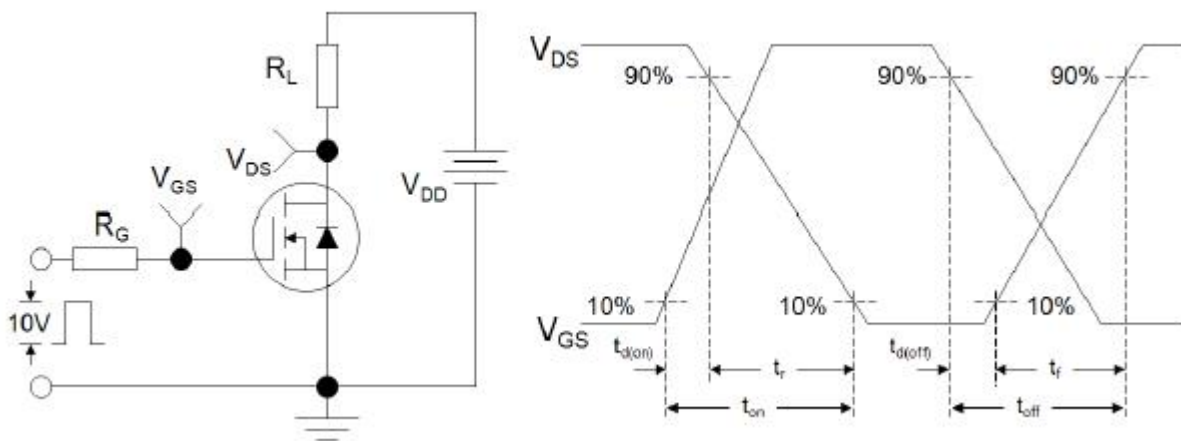Figure1:Gate Charge Test Circuit & Waveform

Figure 2: Resistive Switching Test Circuit & Waveforms

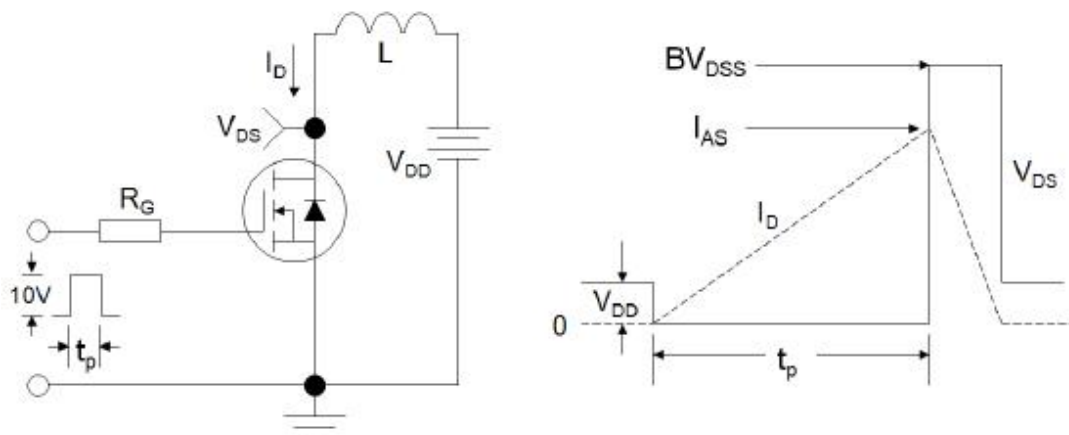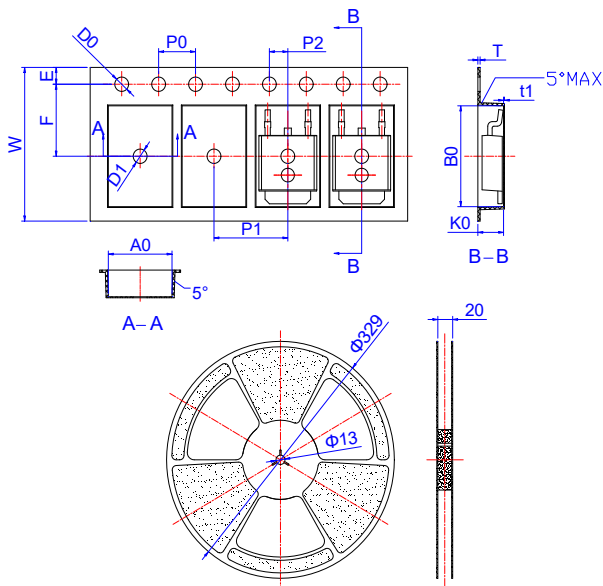Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

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Package Mechanical Data-TO-252

TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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