BETTER POWER

BP9963

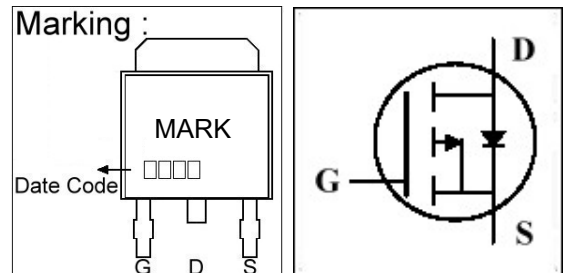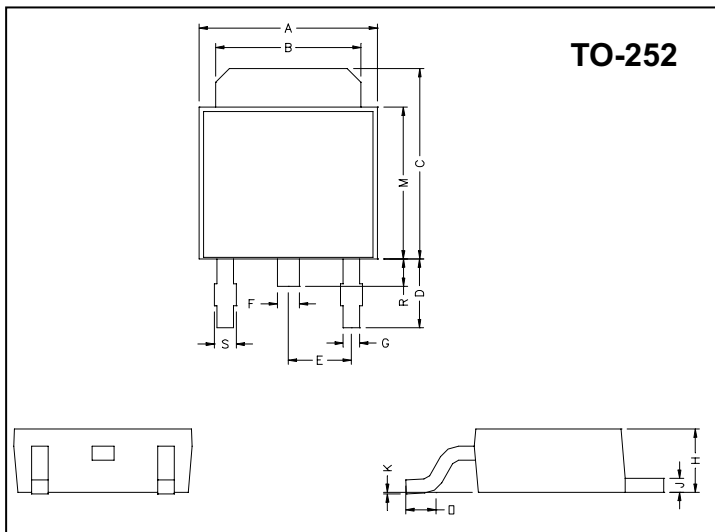|	
BV$_{DSS}$	-40V
R$_{DS(ON)}$	40mΩ
I$_D$	-20A

P-CHANNEL ENHANCEMENT MODE POWER MOSFET

Description
The BP9963 utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.
The TO-252 package is universally used for commercial-industrial applications.

Features
*Simple Drive Requirement
*Lower Gate Charge
*Fast Switching

Package Dimensions

TO-252

Marking :

MARK

Date Code

G D S

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.80	G	0.50	0.70
B	5.20	5.50	H	2.20	2.40
C	6.80	7.20	J	0.45	0.55
D	2.40	3.00	K	0	0.15
E	2.30 REF.		L	0.90	1.50
F	0.70	0.90	M	5.40	5.80
S	0.60	0.90	R	0.80	1.20

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V$_{DS}$	-40	V
Gate-Source Voltage	V$_{GS}$	±20	V
Continuous Drain Current	I$_D$ @T$_C$=25℃	-20	A
Continuous Drain Current	I$_D$ @T$_C$=100℃	-15	A
Pulsed Drain Current[1]	I$_{DM}$	-72	A
Total Power Dissipation	P$_D$ @T$_C$=25℃	31	W
Linear Derating Factor		0.25	W/℃
Operating Junction and Storage Temperature Range	Tj, Tstg	-55 ~ +150	℃

Thermal Data

Parameter		Symbol	Value	Unit
Thermal Resistance Junction-case	Max.	Rthj-case	4.0	℃/W
Thermal Resistance Junction-ambient	Max.	Rthj-amb	110	℃/W

Electrical Characteristics (Tj = 25℃ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	-40	-	-	V	$V_{GS}=0$, $I_D=-250uA$
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle Tj$	-	-0.1	-	V/℃	Reference to 25℃, $I_D=-1mA$
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	-	-3.0	V	$V_{DS}=V_{GS}$, $I_D=-250uA$
Forward Transconductance	g_{fs}	-	9.6	-	S	$V_{DS}=-10V$, $I_D=-10A$
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	$V_{GS}=\pm20V$
Drain-Source Leakage Current(Tj=25℃)	I_{DSS}	-	-	-1	uA	$V_{DS}=-30V$, $V_{GS}=0$
Drain-Source Leakage Current(Tj=70℃)		-	-	-25	uA	$V_{DS}=-24V$, $V_{GS}=0$
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	-	-	40	mΩ	$V_{GS}=-10V$, $I_D=-10A$
		-	-	60		$V_{GS}=-4.5V$, $I_D=-5A$
Total Gate Charge[2]	Q_g	-	10	16	nC	$I_D=-10A$ $V_{DS}=-24V$ $V_{GS}=-4.5V$
Gate-Source Charge	Q_{gs}	-	3	-		
Gate-Drain ("Miller") Change	Q_{gd}	-	5	-		
Turn-on Delay Time[2]	$T_{d(on)}$	-	9.6	-	ns	$V_{DS}=-15V$ $I_D=-10A$ $V_{GS}=-10V$ $R_G=3.3Ω$ $R_D=1.5Ω$
Rise Time	T_r	-	18	-		
Turn-off Delay Time	$T_{d(off)}$	-	19	-		
Fall Time	T_f	-	14	-		
Input Capacitance	C_{iss}	-	463	740	pF	$V_{GS}=0V$ $V_{DS}=-25V$ f=1.0MHz
Output Capacitance	C_{oss}	-	187	-		
Reverse Transfer Capacitance	C_{rss}	-	140	-		

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage[2]	V_{SD}	-	-	-1.2	V	$I_S=-10A$, $V_{GS}=0V$
Reverse Recovery Time	T_{rr}	-	34	-	ns	$I_S=-10A$, $V_{GS}=0V$ dI/dt=100A/μs
Reverse Recovery Charge	Q_{rr}	-	30	-	nC	

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width≦300us, duty cycle≦2%.
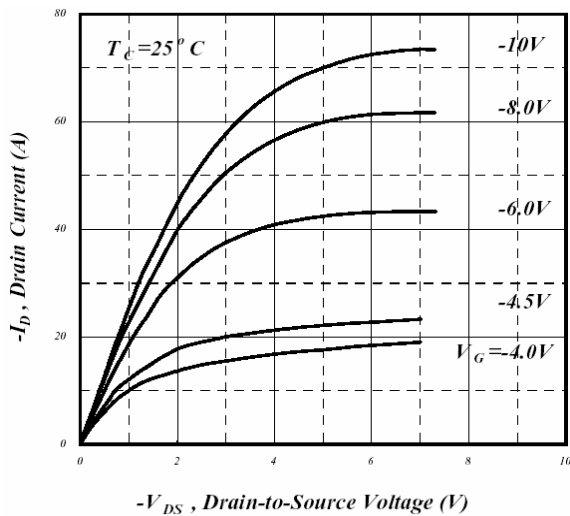
Characteristics Curve
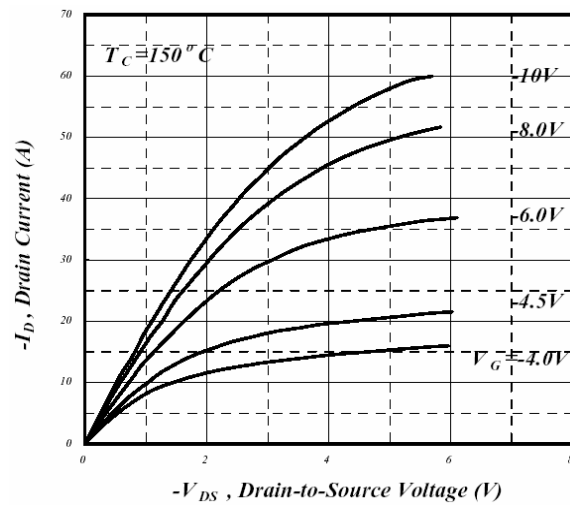

Fig 1. Typical Output Characteristics

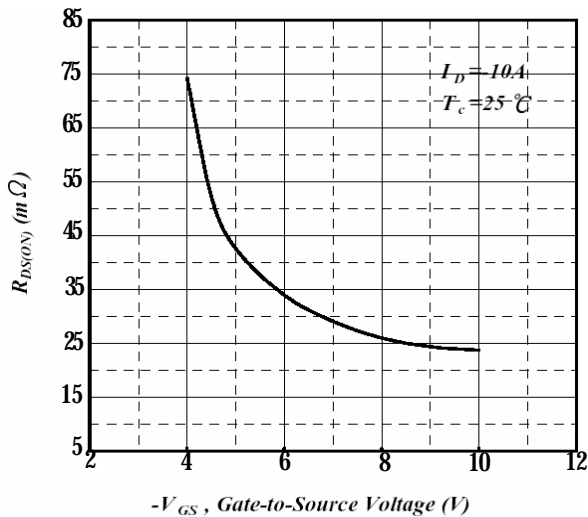**Fig 2. Typical Output Characteristics**
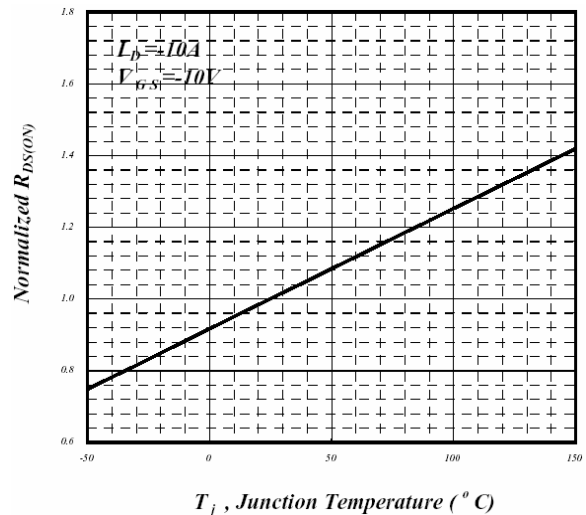

Fig 3. On-Resistance v.s. Gate Voltage

Fig 4. Normalized On-Resistance v.s. Junction Temperature
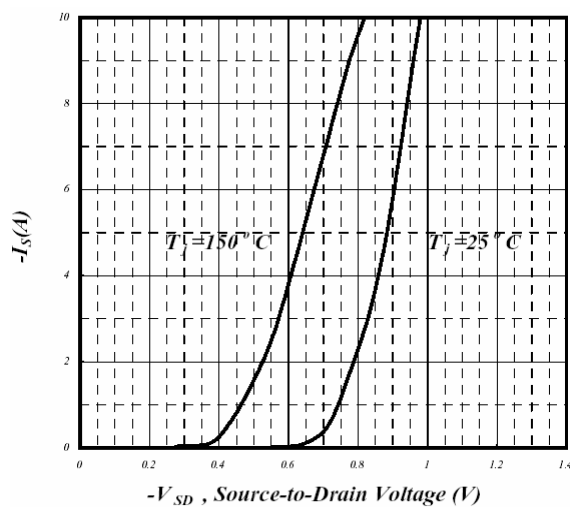

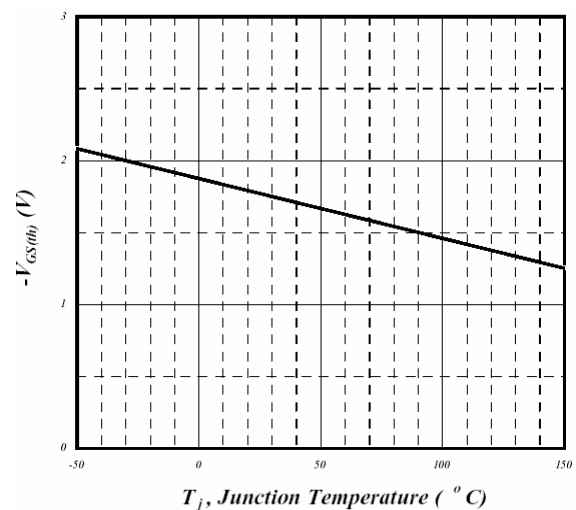**Fig 5. Forward Characteristics of Reverse Diode**

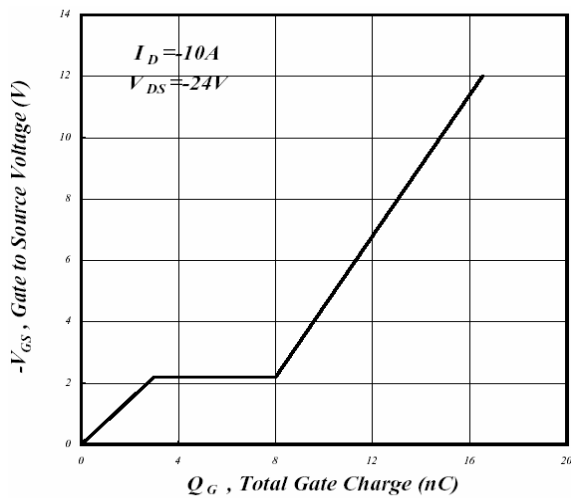**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**
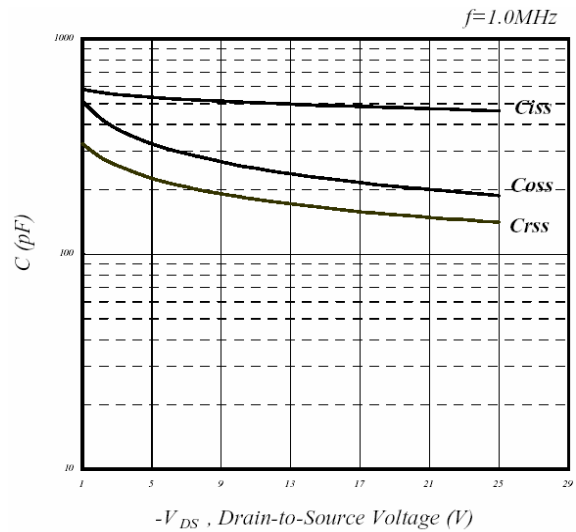
Fig 7. Gate Charge Characteristics
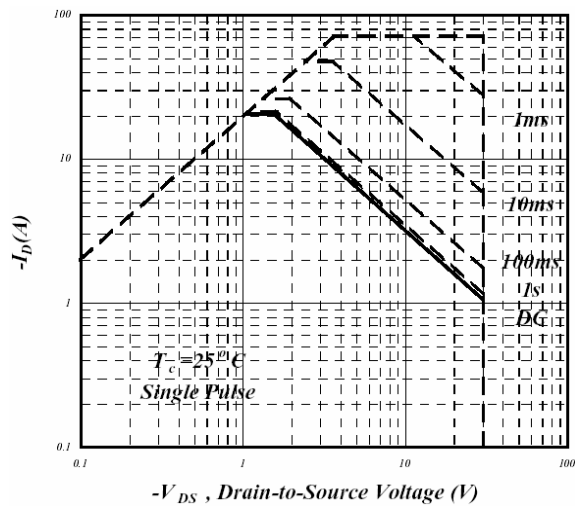

Fig 8. Typical Capacitance Characteristics

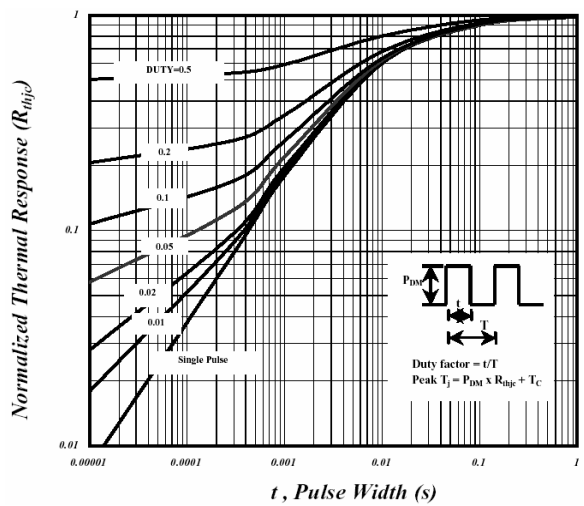**Fig 9. Maximum Safe Operating Area**
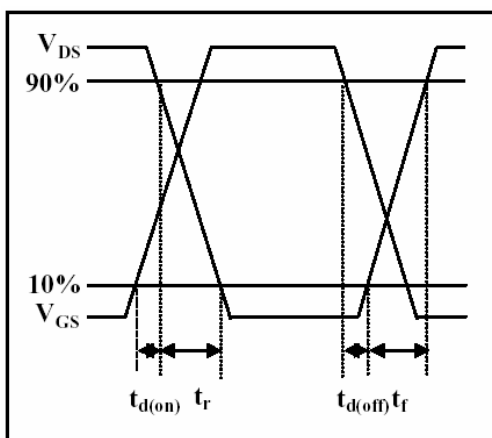

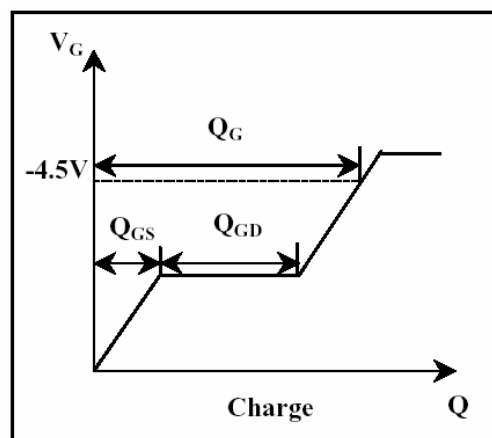**Fig 10. Effective Transient Thermal Impedance**

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform