

# G2402

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

BV <sub>DSS</sub>	20V
R <sub>DS(ON)</sub>	250mΩ
I <sub>D</sub>	3.2A

### Description

The G2402 provides the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

### Features

- Ultra Low On-Resistance
- Fast Switching

### Applications

- Power Management in Notebook Computer
- Portable Equipment
- Battery Powered System.

### Package Dimensions

**N-Channel**

Marking :

REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90	REF.
B	2.40	2.80	H	1.00	1.30
C	1.40	1.60	K	0.10	0.20
D	0.35	0.50	J	0.40	-
E	0	0.10	L	0.85	1.15
F	0.45	0.55	M	0°	10°

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current <sup>3</sup> , V <sub>GS</sub> @4.5V	I <sub>D</sub> @TA =25°C	3.2	A
Continuous Drain Current <sup>3</sup> , V <sub>GS</sub> @4.5V	I <sub>D</sub> @TA =70°C	2.6	A
Pulsed Drain Current <sup>1,2</sup>	I <sub>DM</sub>	7.4	A
Power Dissipation	P <sub>D</sub> @TA =25°C	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup> Max.	R <sub>thj-a</sub>	90	°C/W

## Electrical Characteristics(Tj = 25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	-	-	V	$V_{GS}=0, I_D=250\mu A$
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_j$	-	0.1	-	V/°C	Reference to 25°C, $I_D=1mA$
Gate Threshold Voltage	$V_{GS(th)}$	0.7	-	1.2	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Forward Transconductance	$g_{fs}$	-	6	-	S	$V_{DS}=10V, I_D=0.47A$
Gate-Source Leakage Current	$I_{GSS}$	-	-	±100	nA	$V_{GS}= \pm 12V$
Drain-Source Leakage Current(Tj=25°C)	$I_{DSS}$	-	-	1.0	uA	$V_{DS}=20V, V_{GS}=0$
Drain-Source Leakage Current(Tj=70°C)		-	-	10	uA	$V_{DS}=20V, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	250	mΩ	$I_D=0.93A, V_{GS}=4.5V$
		-	-	350		$I_D=0.47A, V_{GS}=2.7V$
Total Gate Charge <sup>2</sup>	$Q_g$	-	4.4	-	nC	$I_D=3.6A$
Gate-Source Charge	$Q_{gs}$	-	0.6	-		$V_{DS}=10V$
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	1.9	-		$V_{GS}=4.5V$
Turn-on Delay Time <sup>2</sup>	$T_{d(on)}$	-	5.2	-	ns	$V_{DS}=10V$
Rise Time	$T_r$	-	37	-		$I_D=3.6A$
Turn-off Delay Time	$T_{d(off)}$	-	15	-		$R_G=6\Omega$
Fall Time	$T_f$	-	5.7	-		$V_{GS}=5V$ $R_D=2.8\Omega$
Input Capacitance	$C_{iss}$	-	145	-	pF	$V_{GS}=0V$
Output Capacitance	$C_{oss}$	-	100	-		$V_{DS}=10V$
Reverse Transfer Capacitance	$C_{rss}$	-	50	-		$f=1.0MHz$

## Source-Drain Diode

Forward On Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$I_S=1.6A, V_{GS}=0 T_j=25^\circ C$
Continuous Source Current(Body Diode)	$I_S$	-	-	1	A	$V_D=V_G=0V, V_S=1.2V$
Pulsed Source Current (Body Diode) <sup>1</sup>	$I_{SM}$	-	-	7.4	A	

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

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board;270°C/w when mounted on min. copper pad.

## Characteristics Curve

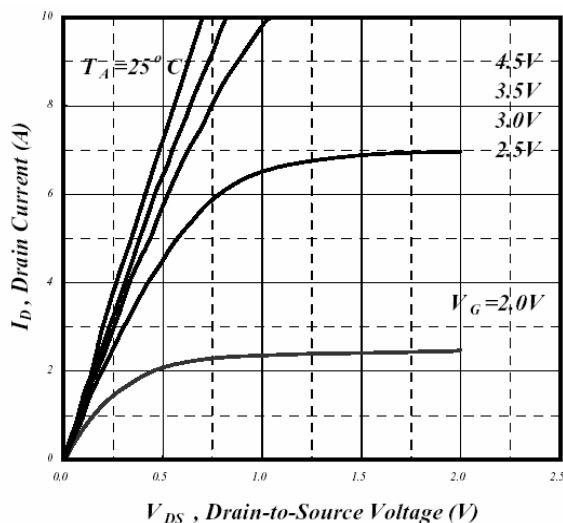


Fig 1. Typical Output Characteristics

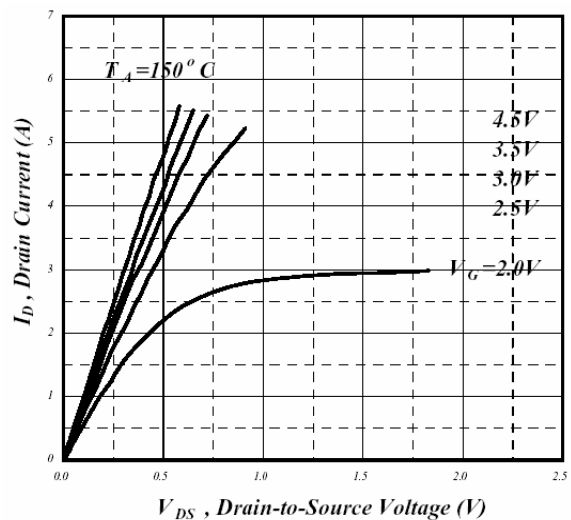
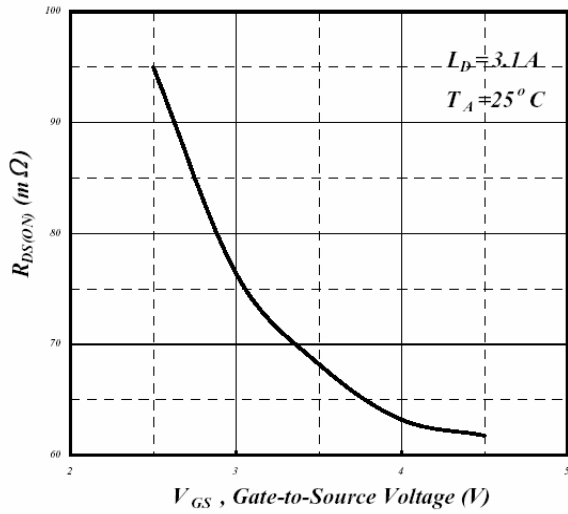
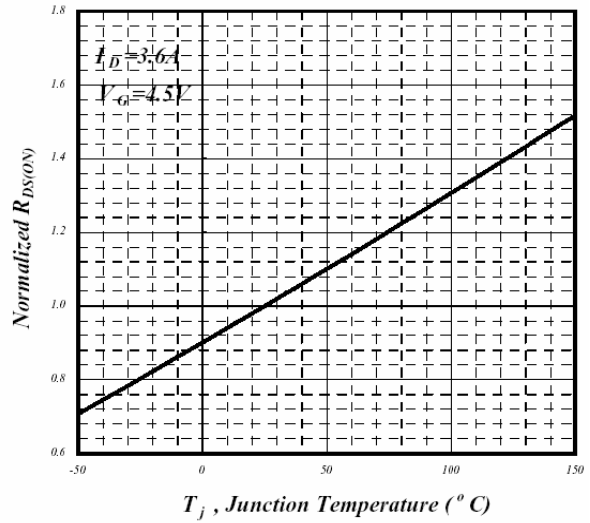


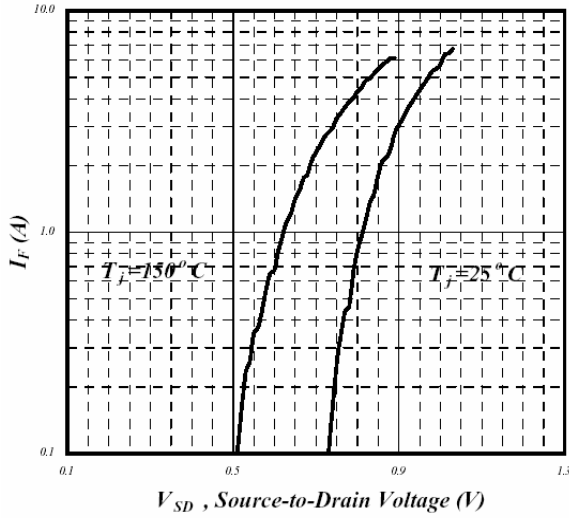
Fig 2. Typical Output Characteristics



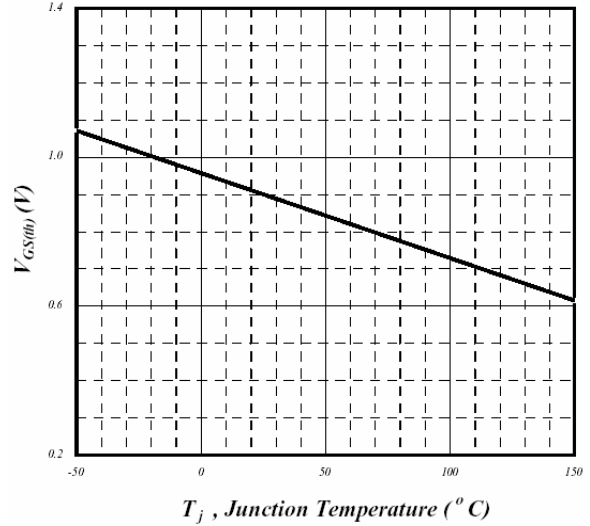
**Fig 3. On-Resistance v.s. Gate Voltage**



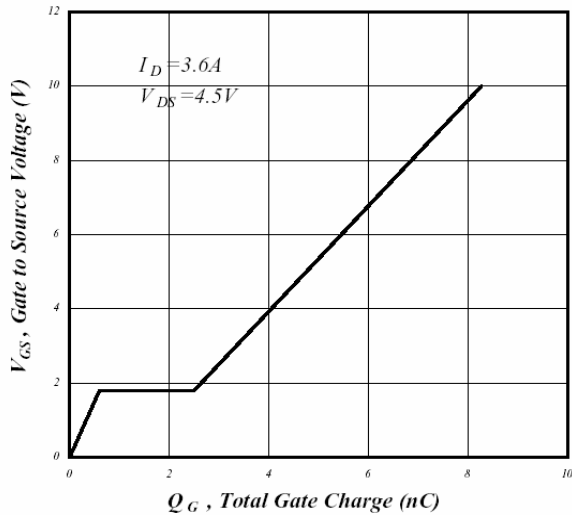
**Fig 4. Normalized On-Resistance**



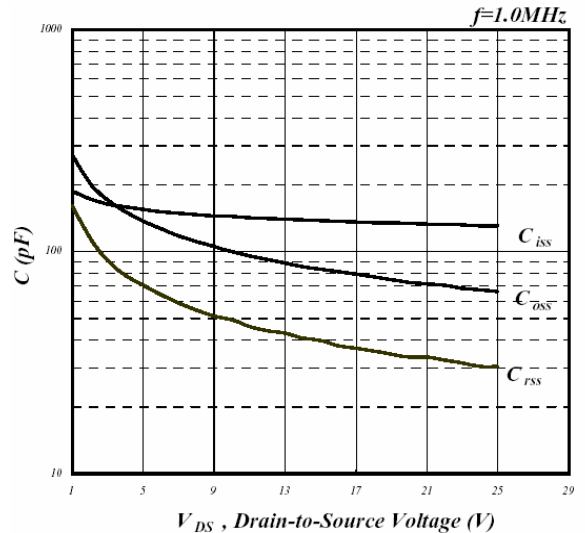
**Fig 5. Forward Characteristic of Reverse Diode**



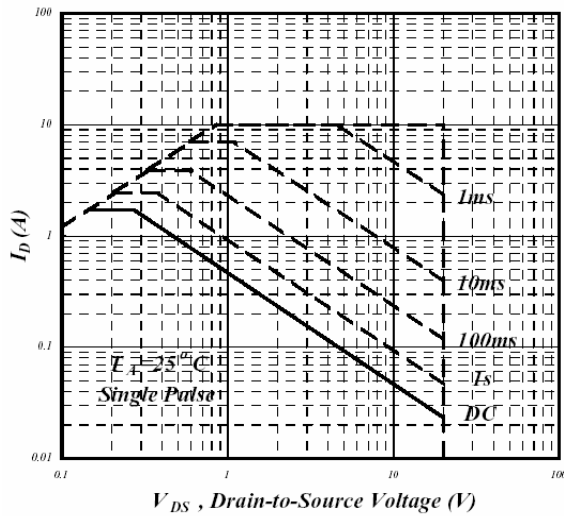
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



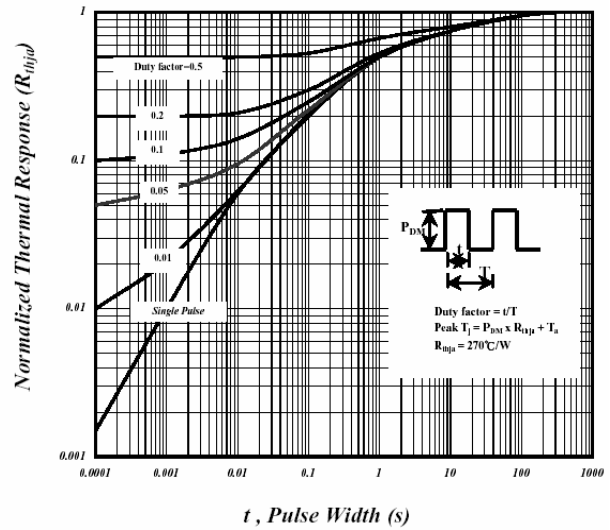
**Fig 7. Gate Charge Characteristics**



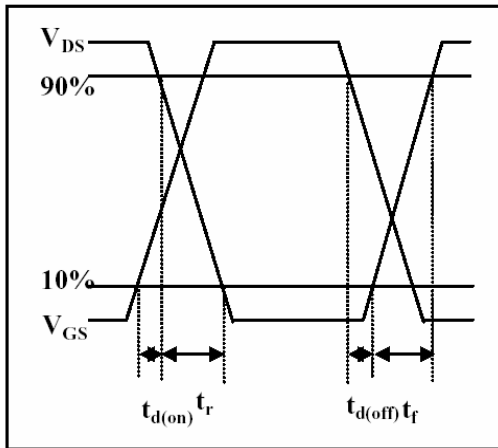
**Fig 8. Typical Capacitance Characteristics**



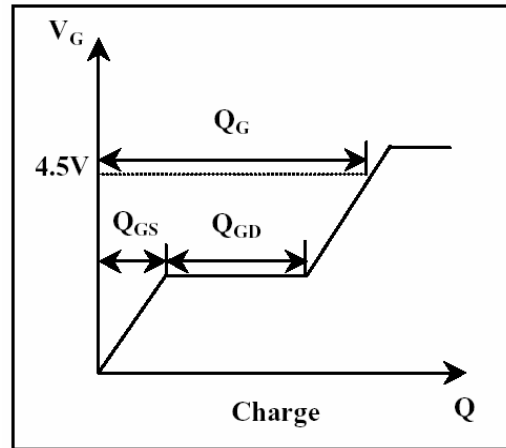
**Fig 9. Maximum Safe Operating Area**



**Fig10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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