

**GI20P02****P-CHANNEL ENHANCEMENT MODE POWER MOSFET**

BVDSS	-20V
RDS(ON)	52mΩ
ID	-18A

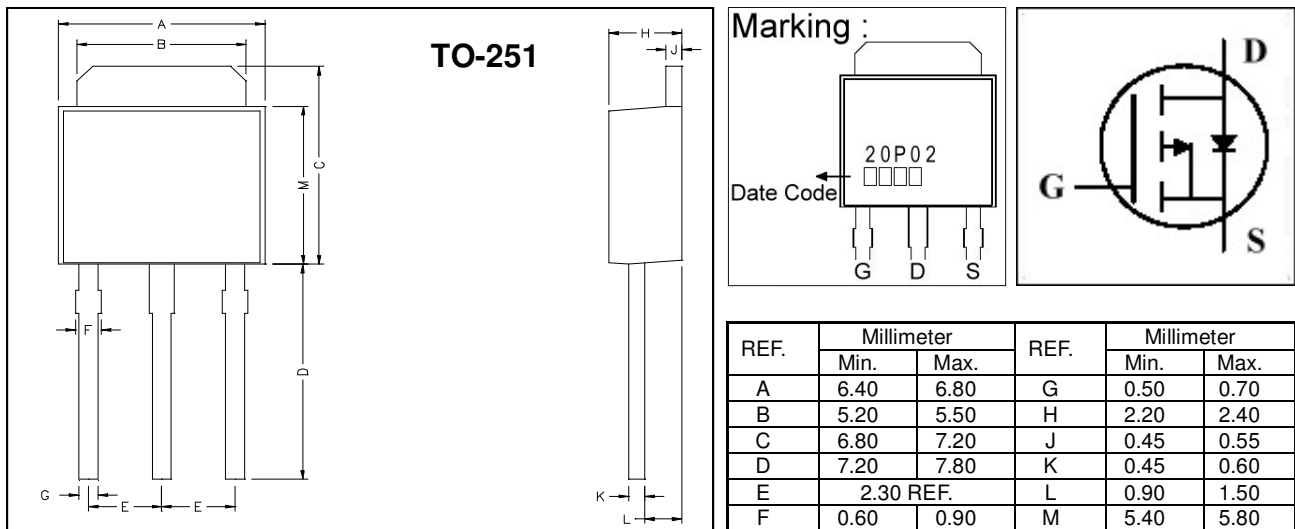
**Description**

The GI20P02 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The through-hole version (TO-251) is available for low-profile applications and suited for low voltage applications such as DC/DC converters.

**Features**

- \*Simple Drive Requirement
- \*2.5V Gate Drive Capability
- \*Fast Switching Characteristic

**Package Dimensions****Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	±12	V
Continuous Drain Current, $V_{GS}@10V$	$I_D @T_C=25^{\circ}C$	-18	A
Continuous Drain Current, $V_{GS}@10V$	$I_D @T_C=100^{\circ}C$	-14	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-50	A
Total Power Dissipation	$P_D @T_C=25^{\circ}C$	31.25	W
Linear Derating Factor		0.25	W/°C
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	°C

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-case Max.	$R_{thj-c}$	4.0	°C/W
Thermal Resistance Junction-ambient Max.	$R_{thj-a}$	110	°C/W

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	-0.03	-	V/°C	Reference to 25°C, I <sub>D</sub> =-1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.5	-	-	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA
Forward Transconductance	g <sub>fs</sub>	-	15	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-8A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±12V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =150°C)		-	-	-25	uA	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	52	mΩ	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A
		-	-	85		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	13.5	-	nC	I <sub>D</sub> =-8A V <sub>DS</sub> =-16V V <sub>GS</sub> =-4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	2.1	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	1.6	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	12	-	ns	V <sub>DS</sub> =-10V I <sub>D</sub> =-8A V <sub>GS</sub> =-4.5V R <sub>G</sub> =3.3Ω R <sub>D</sub> =1.25Ω
Rise Time	T <sub>r</sub>	-	20	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	45	-		
Fall Time	T <sub>f</sub>	-	27	-		
Input Capacitance	C <sub>iss</sub>	-	1050	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-16V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	410	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	110	-		

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> =-10A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C
Continuous Source Current (Body Diode)	I <sub>S</sub>	-	-	-10	A	V <sub>D</sub> =V <sub>G</sub> =0V, V <sub>S</sub> =-1.2
Pulsed Source Current (Body Diode) <sup>1</sup>	I <sub>SM</sub>	-	-	-50	A	

Notes: 1. Pulse width limited by safe operating area.

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

## Characteristics Curve

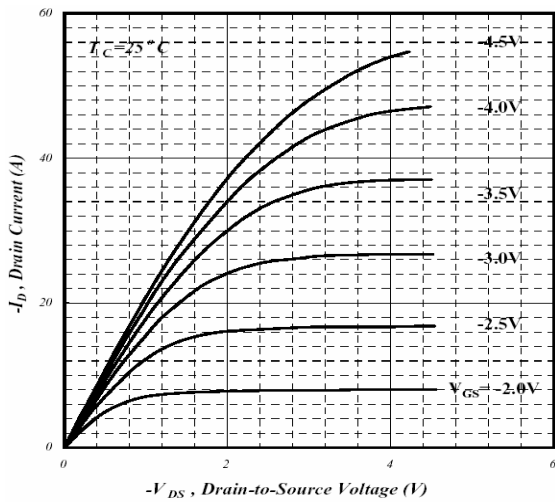


Fig 1. Typical Output Characteristics

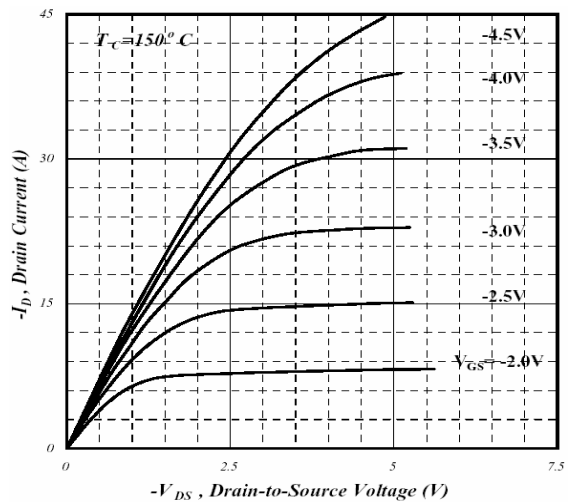


Fig 2. Typical Output Characteristics

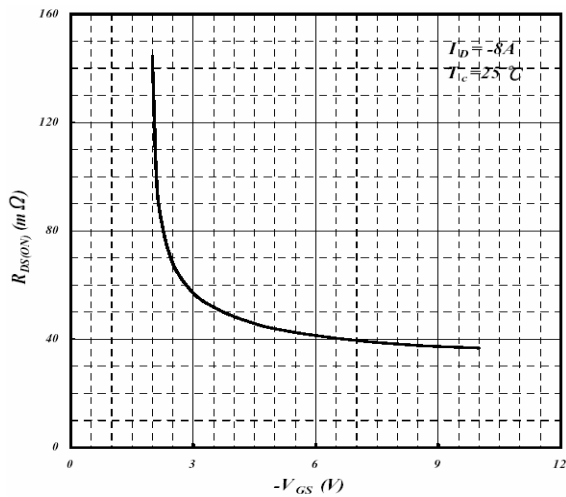


Fig 3. On-Resistance v.s. Gate Voltage

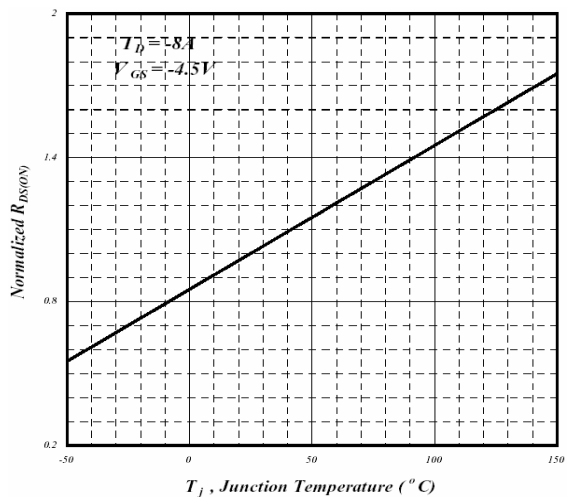


Fig 4. Normalized On-Resistance v.s. Junction Temperature

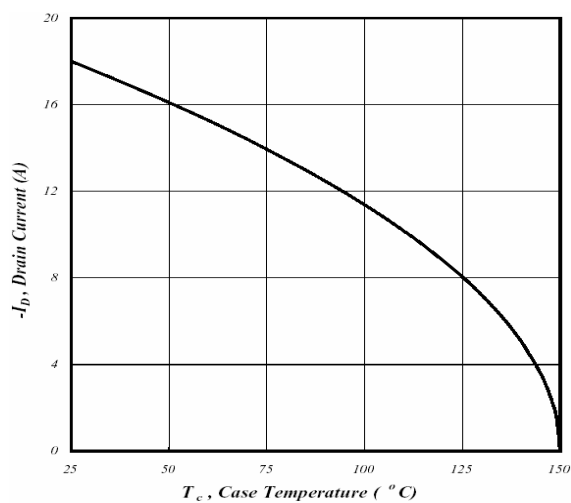


Fig 5. Maximum Drain Current v.s. Case Temperature

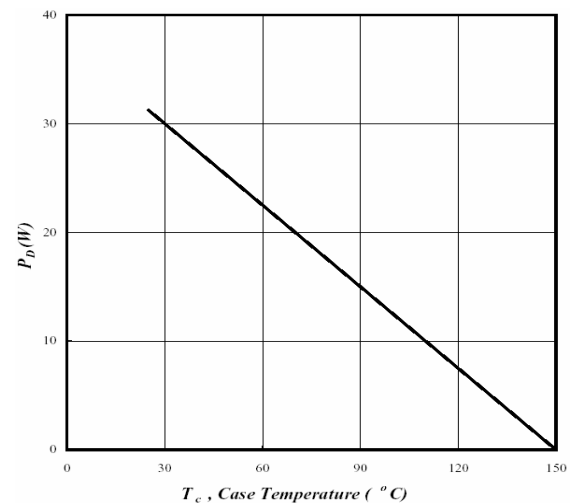


Fig 6. Type Power Dissipation

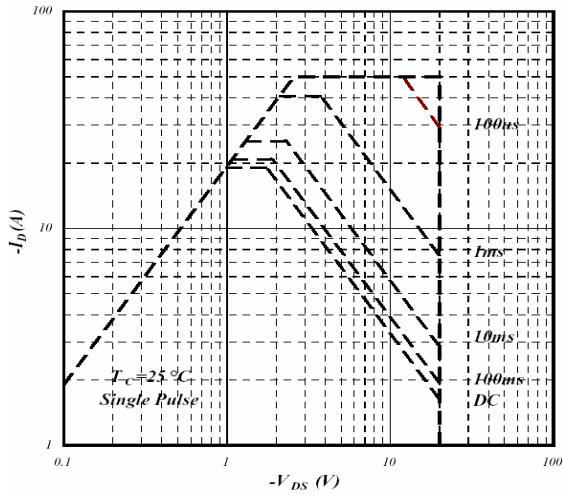


Fig 7. Maximum Safe Operating Area

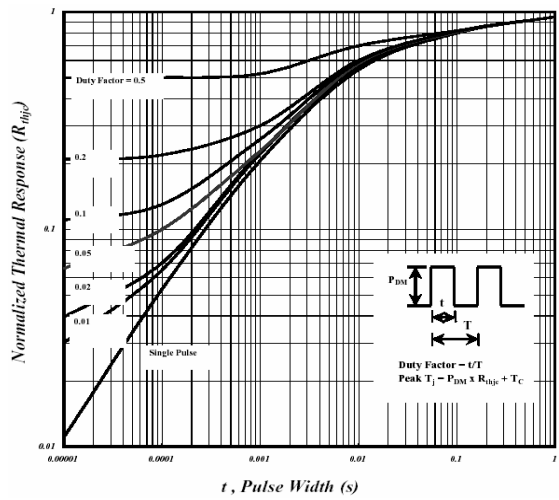


Fig 8. Effective Transient Thermal Impedance

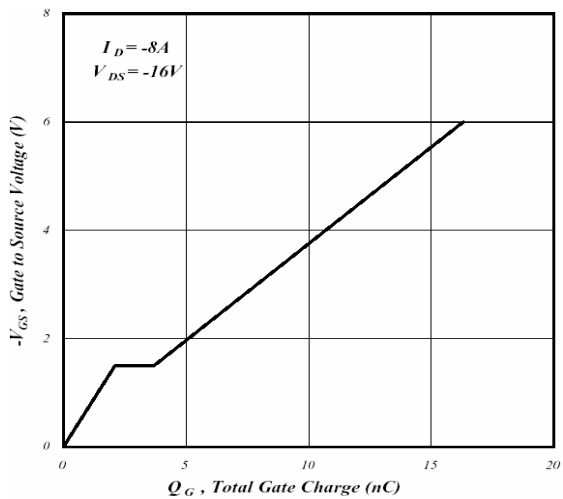


Fig 9. Gate Charge Characteristics

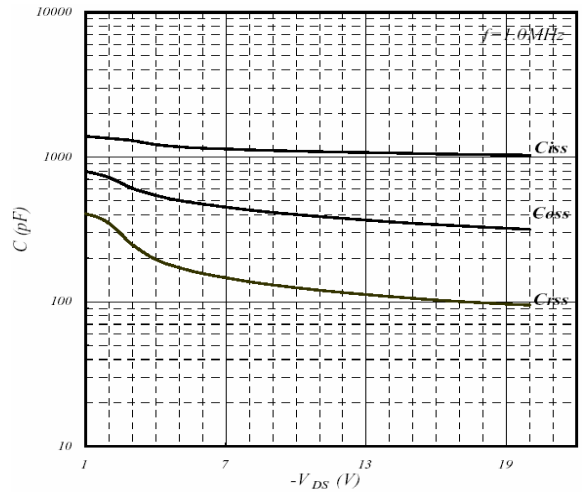


Fig 10. Typical Capacitance Characteristics

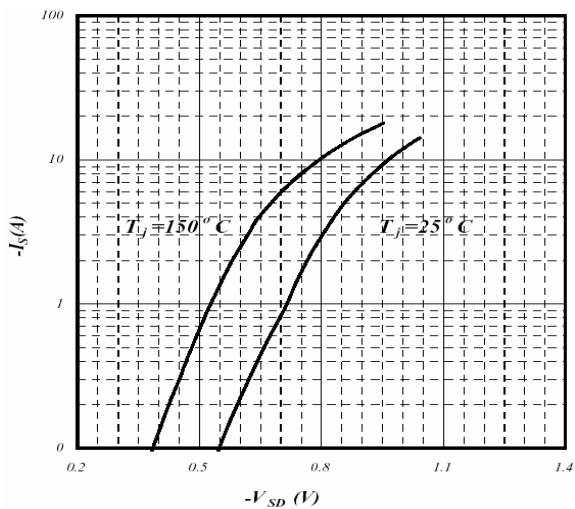


Fig 11. Forward Characteristics of Reverse Diode

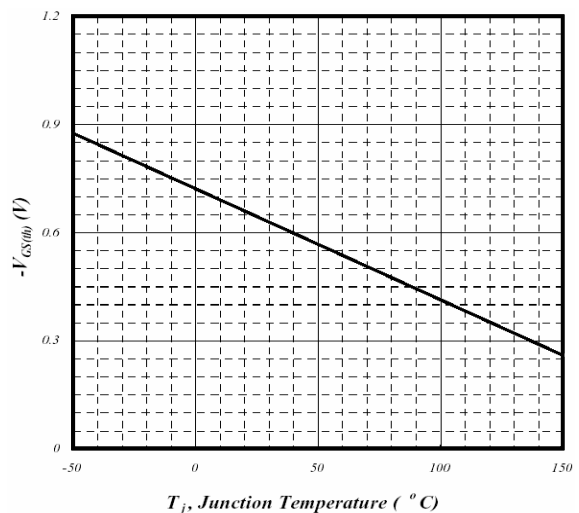
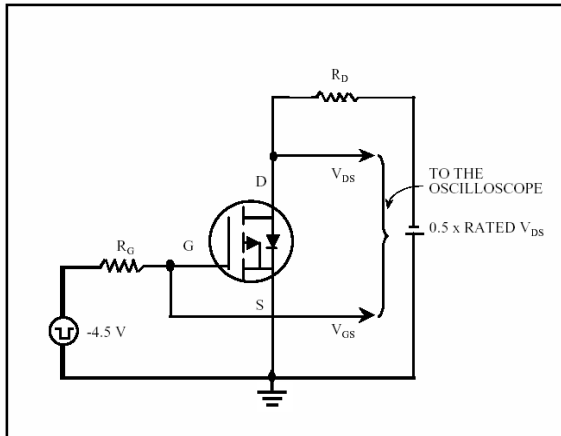
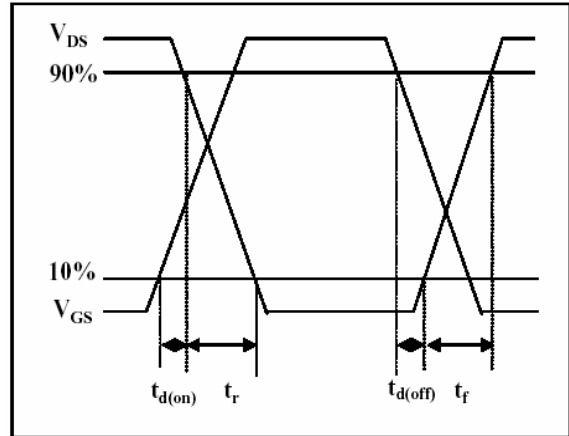


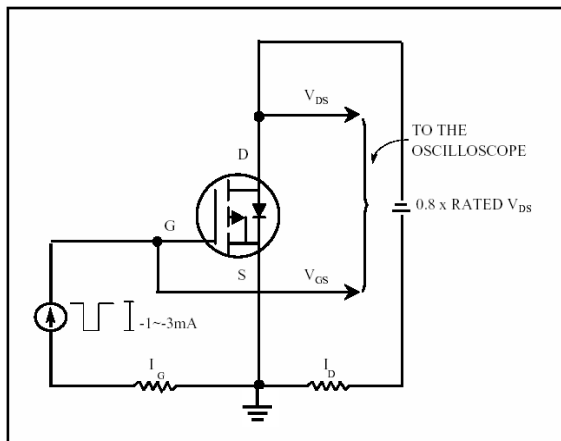
Fig 12. Gate Threshold Voltage v.s. Junction Temperature



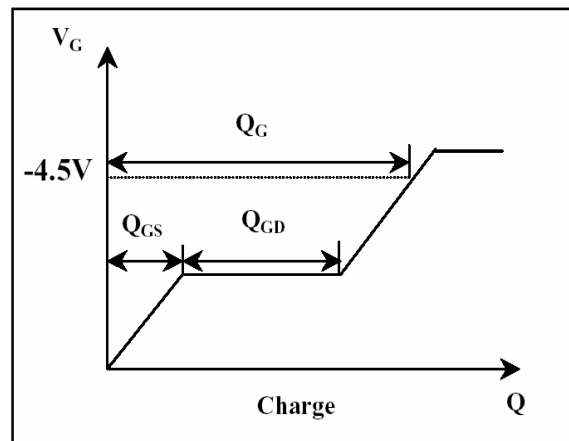
**Fig 13. Switching Time Circuit**



**Fig 14. Switching Time Waveform**



**Fig 15. Gate Charge Circuit**



**Fig 16. Gate Charge Waveform**

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**Head Office And Factory:**

- **Taiwan:** No. 17-1 Tatung Rd. Fu Kou Hsin-Chu Industrial Park, Hsin-Chu, Taiwan, R. O. C.
- TEL : 886-3-597-7061 FAX : 886-3-597-9220, 597-0785
- **China:** (201203) No.255, Jang-Jiang Tsai-Lueng RD. , Pu-Dung-Hsin District, Shang-Hai City, China
- TEL : 86-21-5895-7671 ~ 4 FAX : 86-21-38950165