Pb Free Plating Product

GTM CORPORATION

ISSUED DATE :2005/08/10
REVISED DATE :

GP2030S

N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

N-CH	BV_{DSS}	20V
	$R_{DS(ON)}$	60mΩ
	I_D	2.6A
P-CH	BV_{DSS}	-20V
	$R_{DS(ON)}$	80mΩ
	I_D	-2.3A

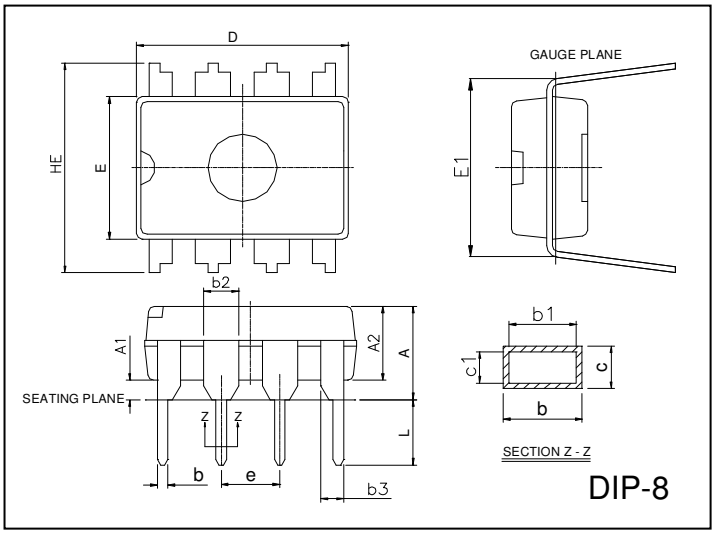
Description

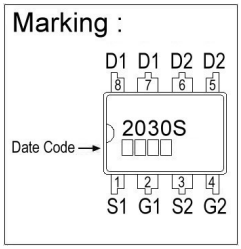
The GP2030S provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

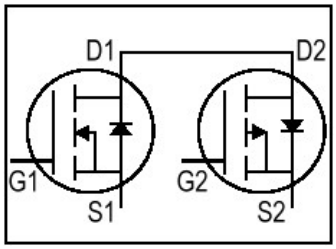
Features

*Simple Drive Requirement
*Lower On-resistance
*Fast Switching

Package Dimensions







REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	-	0.5334	c1	0.203	0.279
A1	0.381	-	D	9.017	10.16
A2	2.921	4.953	E	6.096	7.112
b	0.356	0.559	E1	7.620	8.255
b1	0.356	0.508	e	2.540 BSC	
b2	1.143	1.778	HE	-	10.92
b3	0.762	1.143	L	2.921	3.810
c	0.203	0.356			

Absolute Maximum Ratings

Parameter	Symbol	Ratings		Unit
		N-channel	P-channel	
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	±12	±12	V
Continuous Drain Current[3]	I_D @T_A=25℃	2.6	-2.3	A
Continuous Drain Current[3]	I_D @T_A=70℃	2.1	-1.8	A
Pulsed Drain Current[1]	I_{DM}	15	-10	A
Total Power Dissipation	P_D @T_A=25℃	2.0		W
Linear Derating Factor		0.016		W/℃
Operating Junction and Storage Temperature Range	Tj, Tstg	-55 ~ +150		℃

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient[3] Max.	Rthj-a	62.5	℃/W

N-Channel Electrical Characteristics(Tj = 25℃ Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	20	-	-	V	V_{GS}=0, I_D=250uA
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle Tj$	-	0.037	-	V/℃	Reference to 25℃, I_D=1mA
Gate Threshold Voltage	$V_{GS(th)}$	0.5	-	1.2	V	V_{DS}=V_{GS}, I_D=250uA
Forward Transconductance	g_{fs}	-	3.6	-	S	V_{DS}=5V, I_D=2.6A
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{GS}= ±12V
Drain-Source Leakage Current(Tj=25℃)	I_{DSS}	-	-	1	uA	V_{DS}=20V, V_{GS}=0
Drain-Source Leakage Current(Tj=150℃)		-	-	25	uA	V_{DS}=16V, V_{GS}=0
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	-	-	60	mΩ	V_{GS}=4.5V, I_D=2.6A
		-	-	90		V_{GS}=2.5V, I_D=1.8A
Total Gate Charge[2]	Q_g	-	9	-	nC	I_D=2.6A V_{DS}=10V V_{GS}=4.5V
Gate-Source Charge	Q_{gs}	-	1	-		
Gate-Drain (“Miller”) Change	Q_{gd}	-	4	-		
Turn-on Delay Time[2]	$T_{d(on)}$	-	6.5	-	ns	V_{DS}=10V I_D=1A V_{GS}=4.5V R_G=6Ω R_D=10Ω
Rise Time	T_r	-	14	-		
Turn-off Delay Time	$T_{d(off)}$	-	20	-		
Fall Time	T_f	-	15	-		
Input Capacitance	C_{iss}	-	300	-	pF	V_{GS}=0V V_{DS}=8V f=1.0MHz
Output Capacitance	C_{oss}	-	255	-		
Reverse Transfer Capacitance	C_{rss}	-	115	-		

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage[2]	V_{SD}	-	-	1.2	V	I_S=1.7A, V_{GS}=0V, Tj=25℃
Continuous Source Current (Body Diode)	I_S	-	-	1.7	A	V_D=V_G=0V, V_S=1.2V

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

2. Pulse width≦300us, duty cycle≦2%.

3. Mounted on 1 in^2 copper pad of FR4 board; 90℃/W when mounted on Min. copper pad.

P-Channel Electrical Characteristics(Tj = 25℃ Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	-20	-	-	V	V_{GS}=0, I_D=-250uA
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle Tj$	-	-0.037	-	V/℃	Reference to 25℃, I_D=-1mA
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.0	V	V_{DS}=V_{GS}, I_D=-250uA
Forward Transconductance	g_{fs}	-	2.7	-	S	V_{DS}=-5V, I_D=-2.2A
Gate-Source Leakage Current	I_{GSS}	-	-	±100	nA	V_{GS}= ±12V
Drain-Source Leakage Current(Tj=25℃)	I_{DSS}	-	-	-1	uA	V_{DS}=-20V, V_{GS}=0
Drain-Source Leakage Current(Tj=150℃)		-	-	-25	uA	V_{DS}=-16V, V_{GS}=0
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	-	-	80	mΩ	V_{GS}=-4.5V, I_D=-2.2A
		-	-	135		V_{GS}=-2.5V, I_D=-1.8A
Total Gate Charge[2]	Q_g	-	11.5	-	nC	I_D=-2.2A V_{DS}=-6V V_{GS}=-4.5V
Gate-Source Charge	Q_{gs}	-	3.2	-		
Gate-Drain ("Miller") Change	Q_{gd}	-	1.5	-		
Turn-on Delay Time[2]	$T_{d(on)}$	-	10	-	ns	V_{DS}=-10V I_D=-2.2A V_{GS}=-4.5V R_G=6Ω R_D=4.5Ω
Rise Time	T_r	-	25	-		
Turn-off Delay Time	$T_{d(off)}$	-	50	-		
Fall Time	T_f	-	30	-		
Input Capacitance	C_{iss}	-	940	-	pF	V_{GS}=0V V_{DS}=-15V f=1.0MHz
Output Capacitance	C_{oss}	-	440	-		
Reverse Transfer Capacitance	C_{rss}	-	130	-		

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage[2]	V_{SD}	-	-0.75	-1.2	V	I_S=-1.8A, V_{GS}=0V, Tj=25℃
Continuous Source Current (Body Diode)	I_S	-	-	-1.7	A	V_D=V_G=0V, V_S=-1.2V

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

2. Pulse width≦300us, duty cycle≦2%.

3. Mounted on 1 in^2 copper pad of FR4 board; 90℃/W when mounted on Min. copper pad.

Characteristics Curve N-Channel

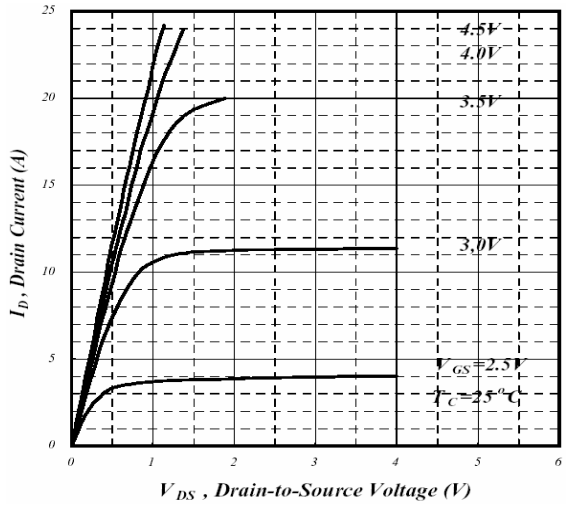


Fig 1. Typical Output Characteristics

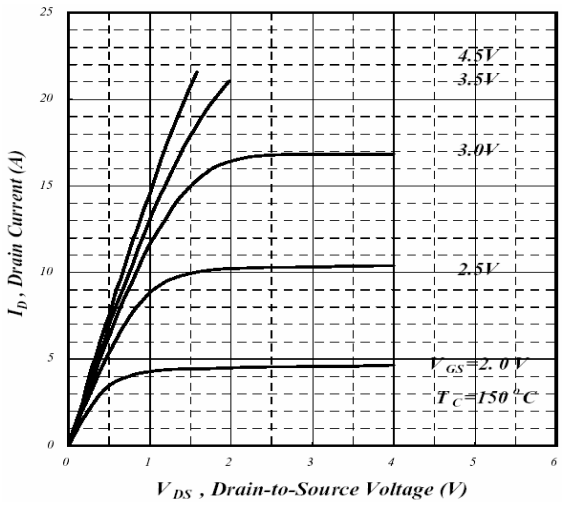


Fig 2. Typical Output Characteristics

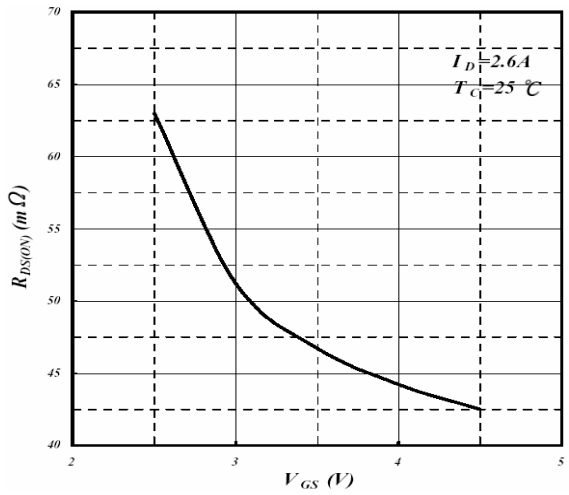


Fig 3. On-Resistance v.s. Gate Voltage

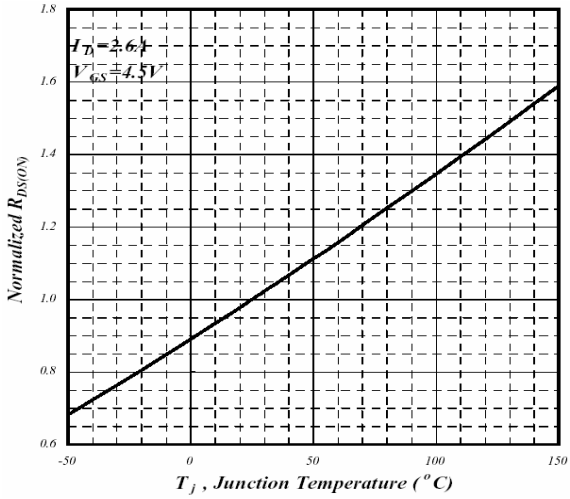


Fig 4. Normalized On-Resistance v.s. Junction Temperature

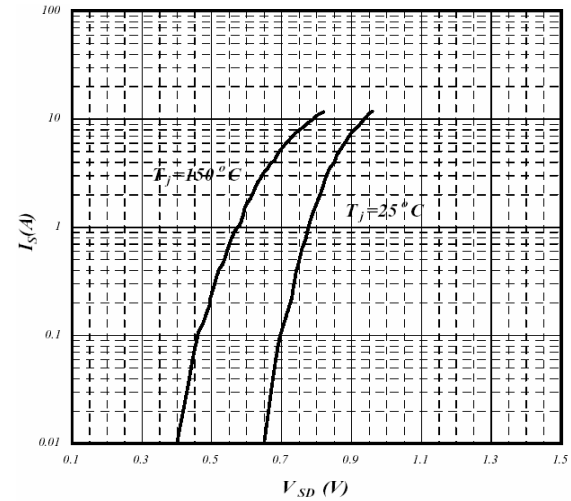


Fig 5. Forward Characteristics of Reverse Diode

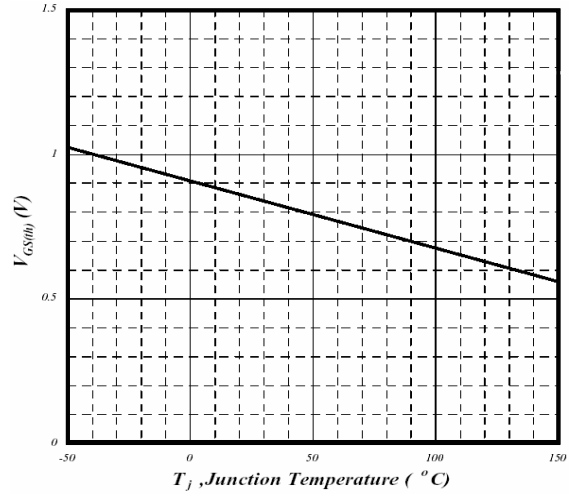


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

N-Channel

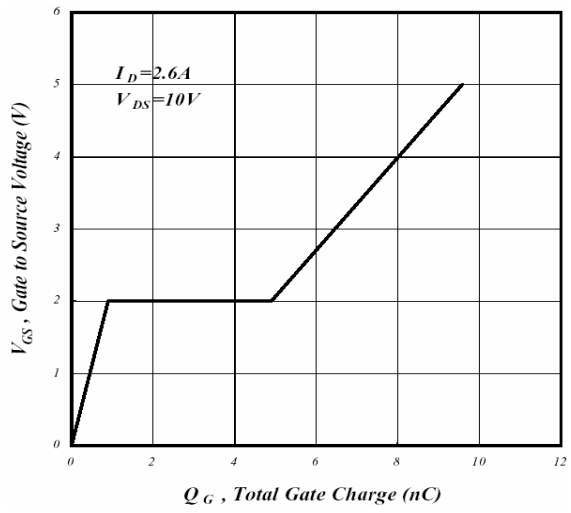


Fig 7. Gate Charge Characteristics

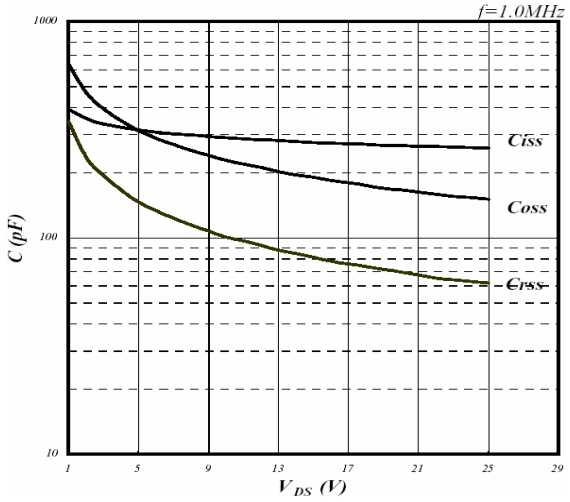


Fig 8. Typical Capacitance Characteristics

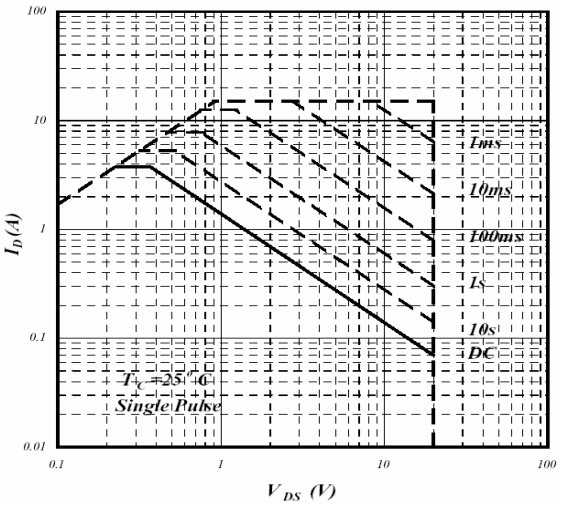


Fig 9. Maximum Safe Operating Area

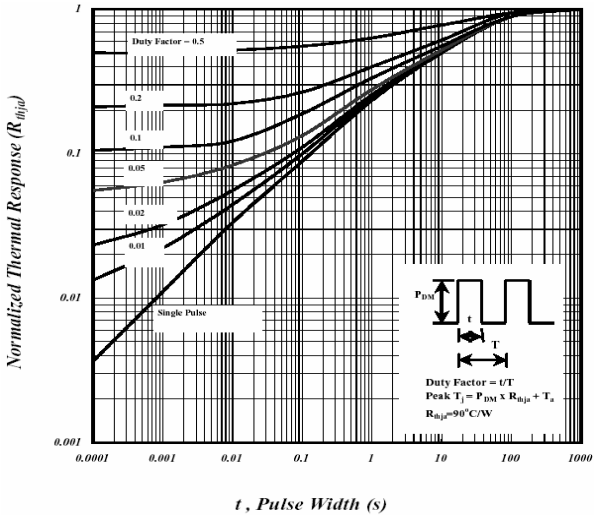


Fig 10. Effective Transient Thermal Impedance

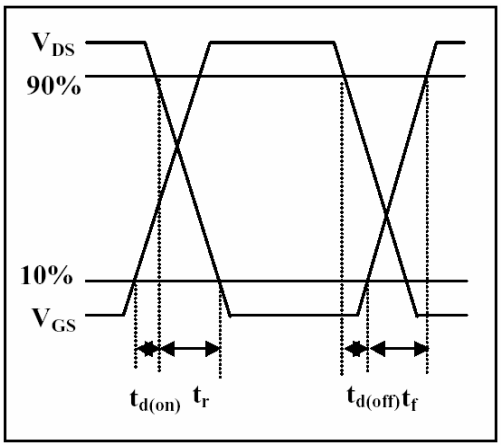


Fig 11. Switching Time Waveform

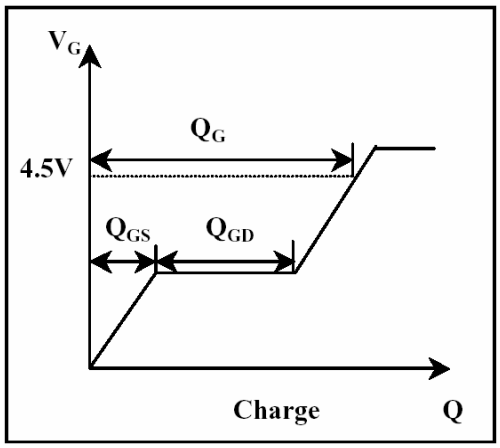


Fig 12. Gate Charge Waveform

P-Channel

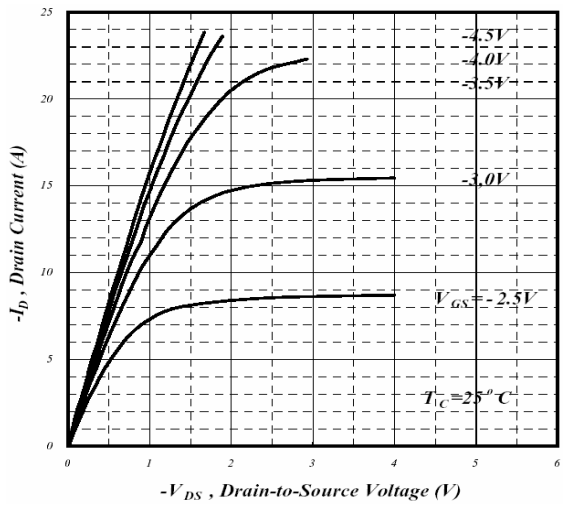


Fig 1. Typical Output Characteristics

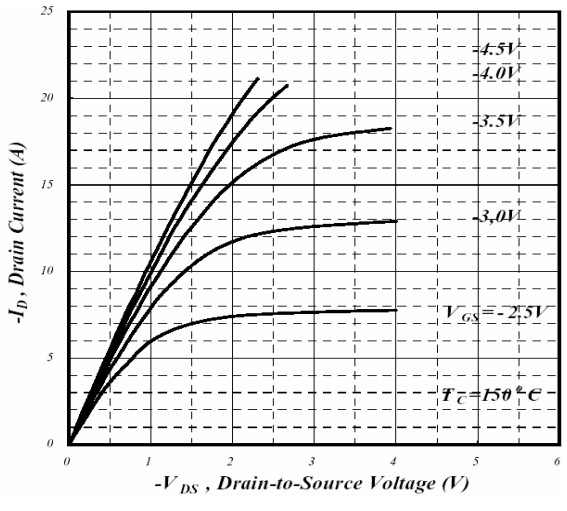


Fig 2. Typical Output Characteristics

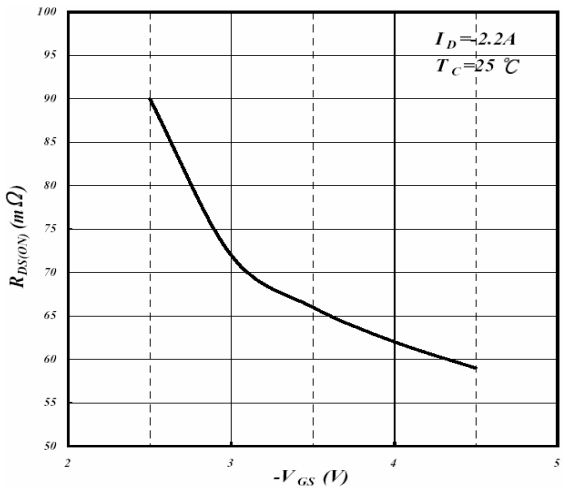


Fig 3. On-Resistance v.s. Gate Voltage

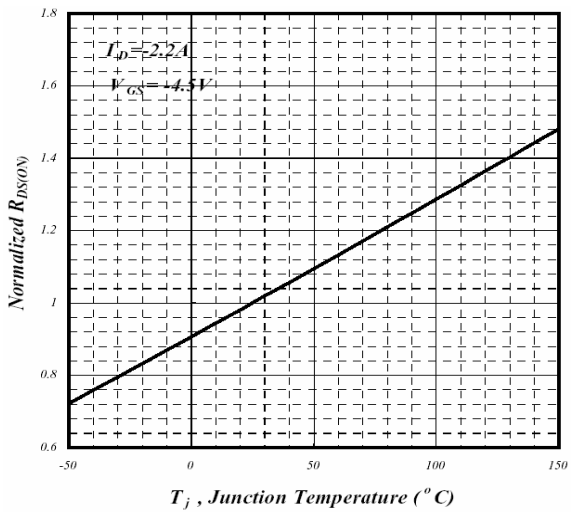


Fig 4. Normalized On-Resistance v.s. Junction Temperature

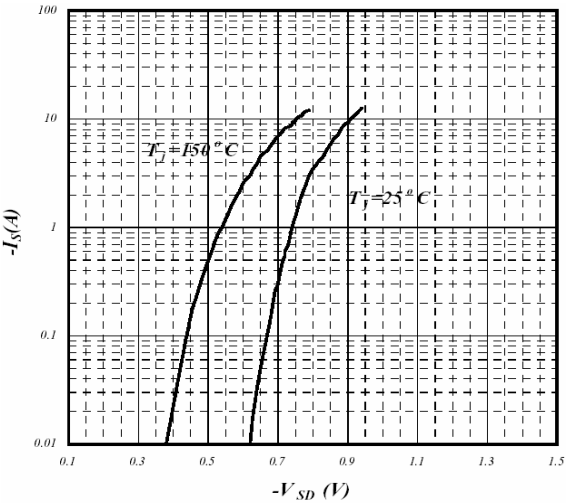


Fig 5. Forward Characteristics of Reverse Diode

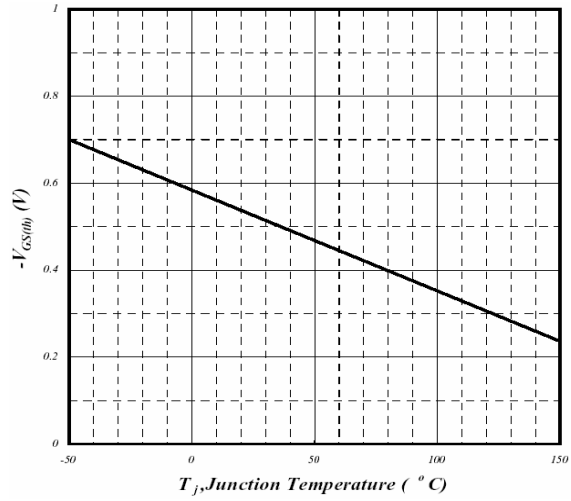


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

P-Channel

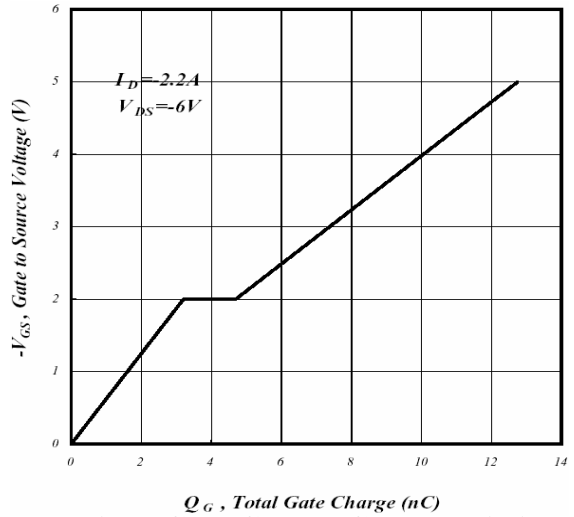


Fig 7. Gate Charge Characteristics

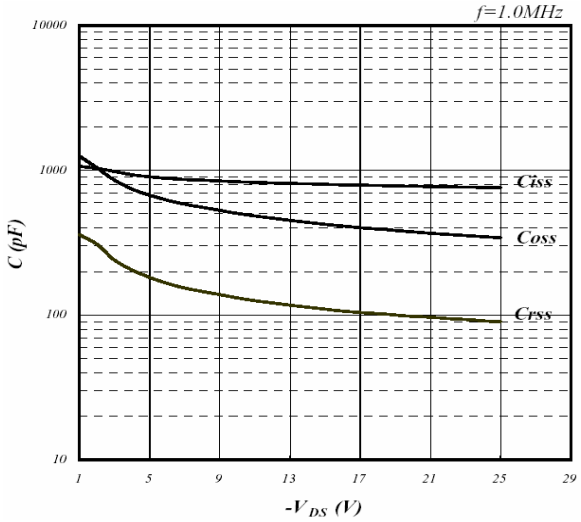


Fig 8. Typical Capacitance Characteristics

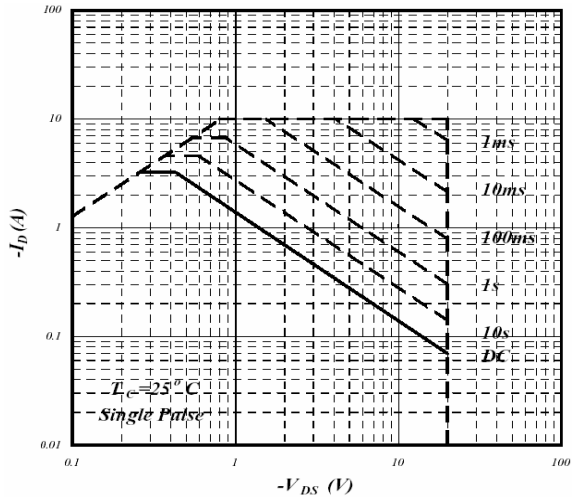


Fig 9. Maximum Safe Operating Area

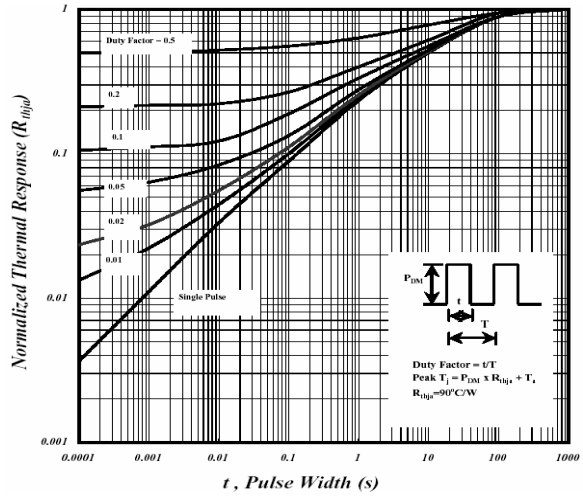


Fig 10. Effective Transient Thermal Impedance

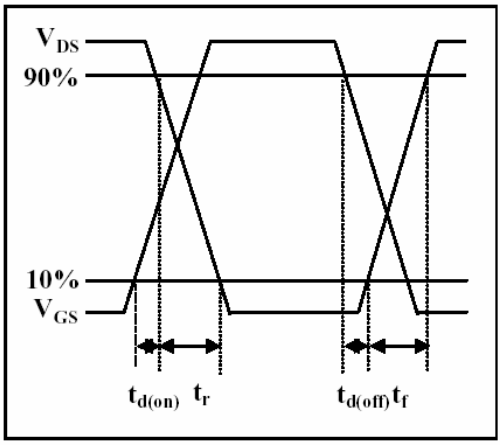


Fig 11. Switching Time Waveform

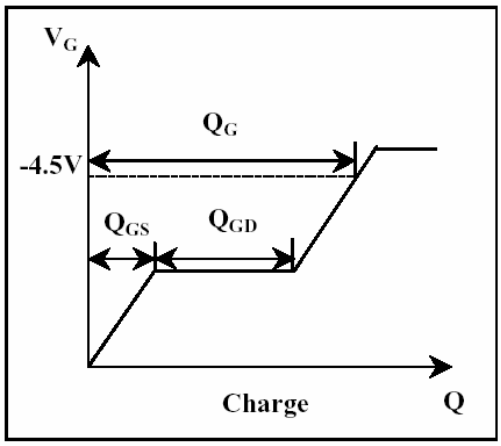


Fig 12. Gate Charge Waveform

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