

# GTM CORPORATION

ISSUED DATE :2005/03/02  
REVISED DATE :

## GP4435

### P-CHANNEL ENHANCEMENT MODE POWER MOSFET

BVDSS	-30V
RDS(ON)	20mΩ
Id	-9A

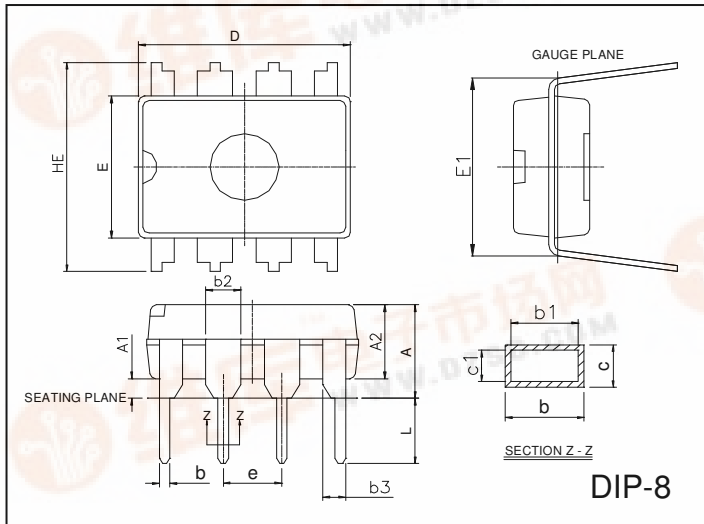
### Description

The GP4435 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

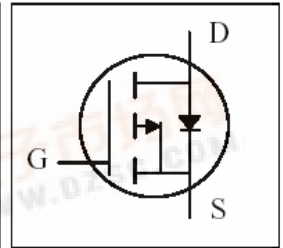
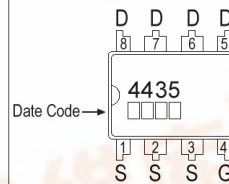
### Features

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

### Package Dimensions



### Marking :



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
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D @ TA=25^\circ C$	-9	A
Continuous Drain Current	$I_D @ TA=70^\circ C$	-5.8	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-50	A
Total Power Dissipation	$P_D @ TA=25^\circ C$	2.5	W
Linear Derating Factor		0.02	W/ $^\circ C$
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	$^\circ C$

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient <sup>3</sup> Max.	$R_{thj-amb}$	50	$^\circ C/W$

**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>	-30	-	-	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>	-1.0	-	-3.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA
Forward Transconductance	g <sub>fs</sub>	-	8.2	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-9A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =70°C)		-	-	-25	uA	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	20	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-9A
		-	-	35		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	26	42	nC	I <sub>D</sub> =-9A V <sub>DS</sub> =-24V V <sub>GS</sub> =-4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	6	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	16	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	14	-	ns	V <sub>DS</sub> =-15V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =15Ω
Rise Time	T <sub>r</sub>	-	13	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	70	-		
Fall Time	T <sub>f</sub>	-	48	-		
Input Capacitance	C <sub>iss</sub>	-	1330	2100	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	580	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	160	-		

**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> =-9A, V <sub>GS</sub> =0V
Reverse Recovery Time	T <sub>rr</sub>	-	44	-	ns	I <sub>S</sub> =-9A, V <sub>GS</sub> =0V dI/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	-	70	-	nC	

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

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

3. Mounted on Min. copper pad, t ≤ 10sec.

## Characteristics Curve

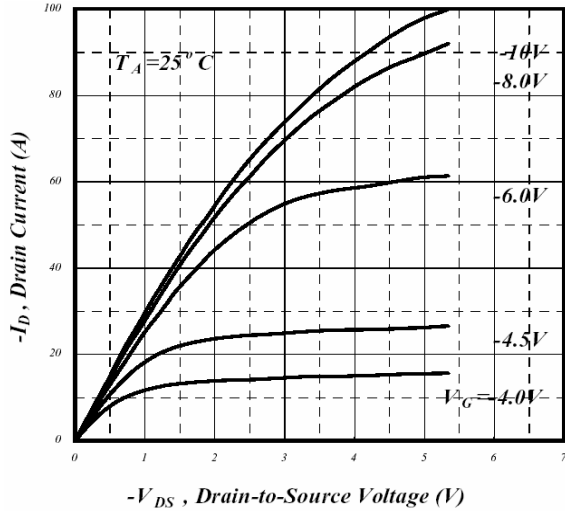


Fig 1. Typical Output Characteristics

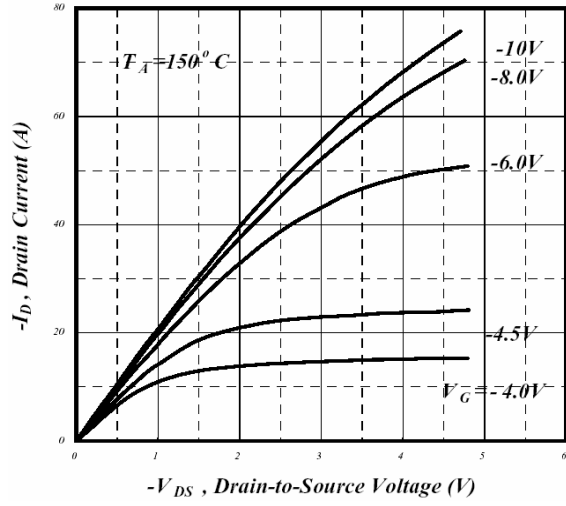


Fig 2. Typical Output Characteristics

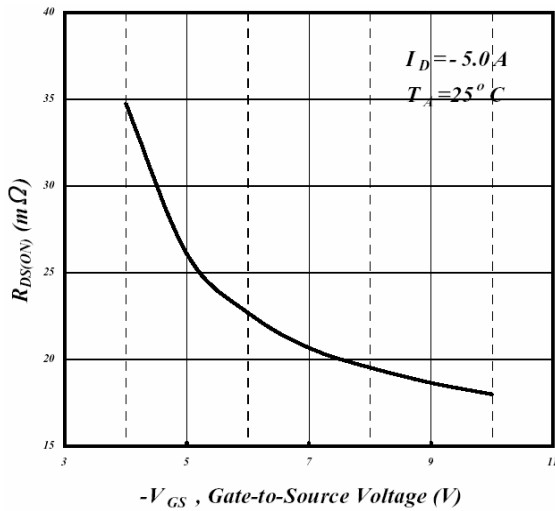


Fig 3. On-Resistance v.s. Gate Voltage

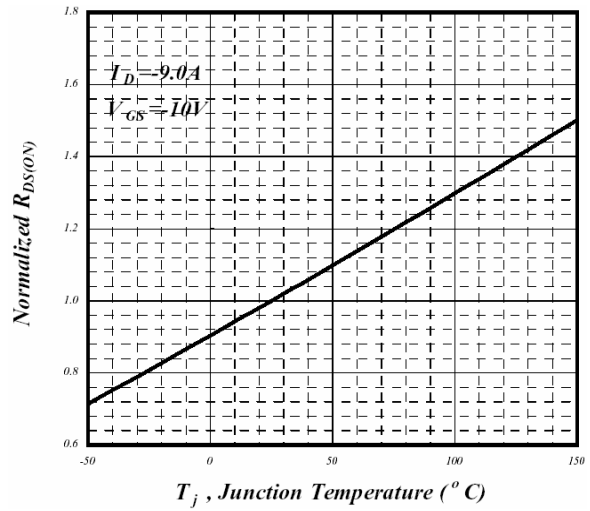


Fig 4. Normalized On-Resistance v.s. Junction Temperature

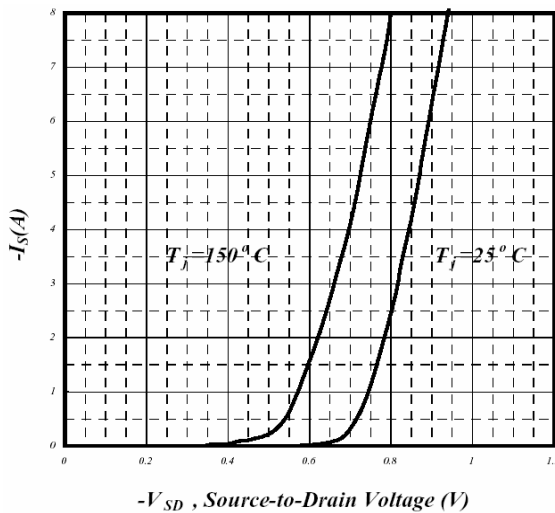


Fig 5. Forward Characteristics of Reverse Diode

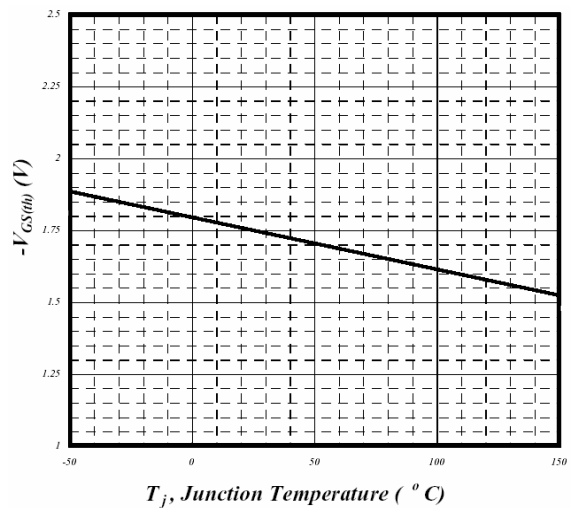
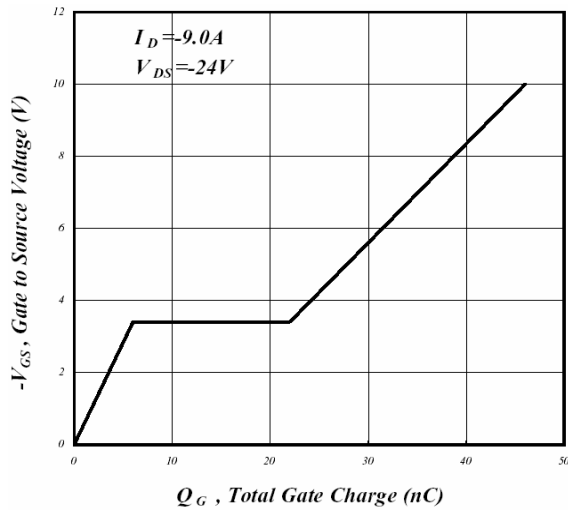
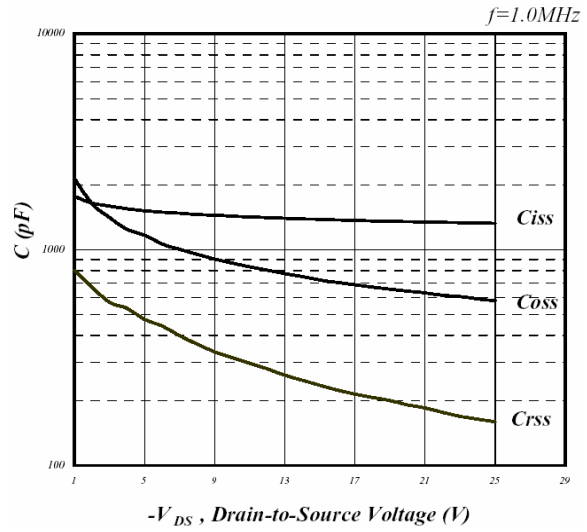


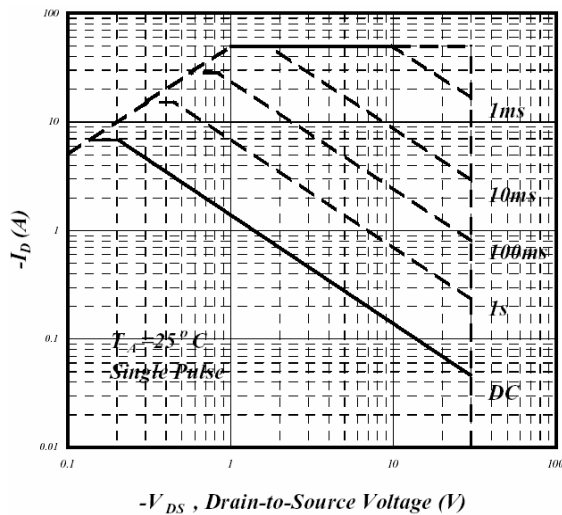
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



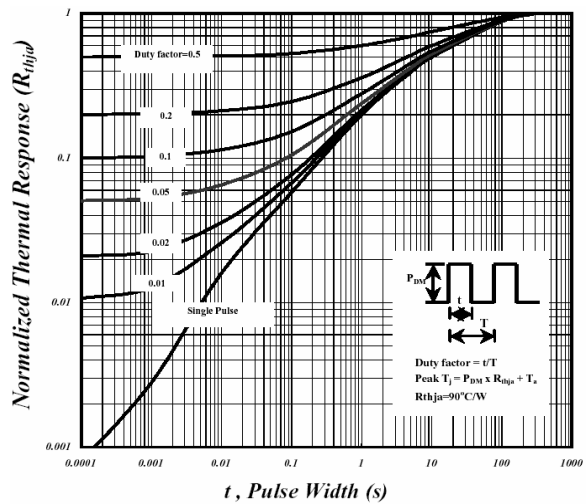
**Fig 7. Gate Charge Characteristics**



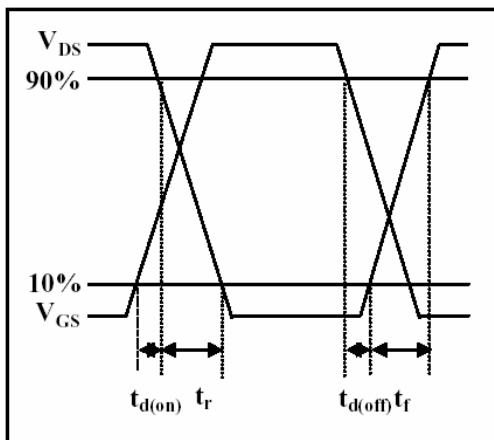
**Fig 8. Typical Capacitance Characteristics**



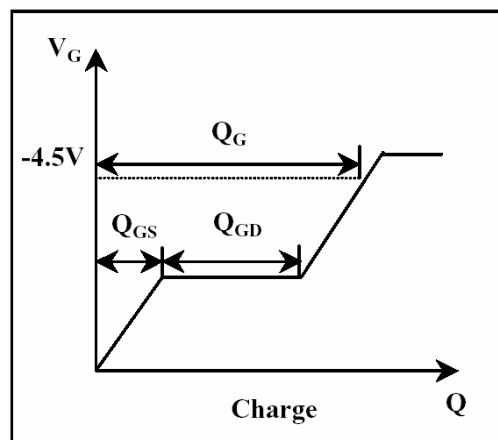
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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