

# GT6924E

## N-CHANNEL MOSFET WITH SCHOTTKY DIODE

BV <sub>DSS</sub>	20V
R <sub>DS(ON)</sub>	600mΩ
I <sub>D</sub>	1A

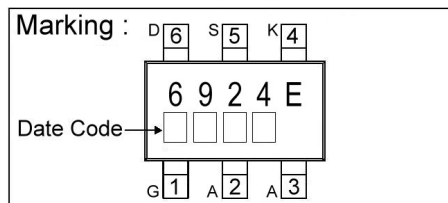
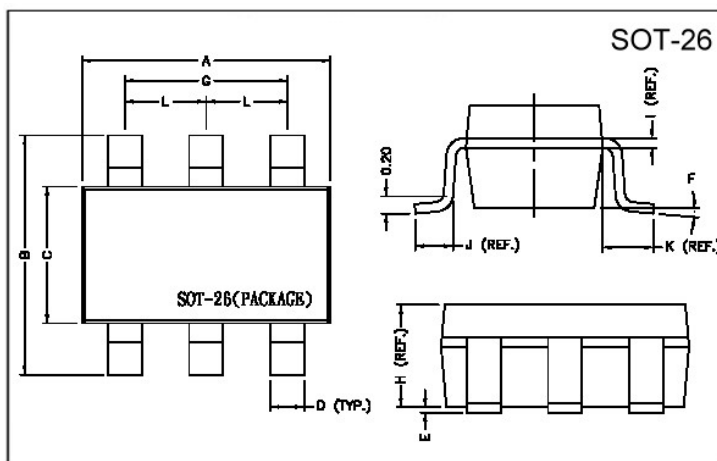
### Description

The GM2306 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

### Features

- \*Lower on-resistance
- \*Fast Switching Characteristic
- \*Included Schottky Diode

### Package Dimensions



REF.	Millimeter		REF.	Dimensions	
	Min.	Max.		Millimeter	
A	2.70	3.10	G	1.90 REF.	
B	2.60	3.00	H	1.20 REF.	
C	1.40	1.80	I	0.12 REF.	
D	0.30	0.55	J	0.37 REF.	
E	0	0.10	K	0.60 REF.	
F	0°	10°	L	0.95 REF.	

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage (MOSFET)	V <sub>DS</sub>	20	V
Gate-Source Voltage (MOSFET)	V <sub>GS</sub>	± 6	V
Continuous Drain Current <sup>3</sup> (MOSFET)	I <sub>D</sub> @TA=25°C	1.0	A
Continuous Drain Current <sup>3</sup> (MOSFET)	I <sub>D</sub> @TA=70°C	0.8	A
Pulsed Drain Current <sup>1</sup> (MOSFET)	I <sub>DM</sub>	8	A
Reverse Voltage (Schottky)	V <sub>KA</sub>	20	V
Average Forward Current (Schottky)	I <sub>F</sub>	0.5	A
Pulsed Forward Current <sup>1</sup> (Schottky)	I <sub>FM</sub>	2.0	A
Total Power Dissipation (MOSFET)	P <sub>D</sub> @TA=25°C	0.9	W
Total Power Dissipation (Schottky)		0.9	W
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +125	°C

### Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient <sup>3</sup> (MOSFET) MAX.	R <sub>thj-a</sub>	110	°C/W
Thermal Resistance Junction-ambient <sup>3</sup> (Schottky) MAX.		110	°C/W

## Electrical Characteristics (Tj = 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	$\Delta BV_{DSS} / \Delta T_j$	-	0.02	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.5	-	1.2	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Forward Transconductance	g <sub>fs</sub>	-	1	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =600mA
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±10	uA	V <sub>GS</sub> = ± 6V
Drain-Source Leakage Current(Tj=25°C)	I <sub>DSS</sub>	-	-	1	uA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0
Drain-Source Leakage Current(Tj=70°C)		-	-	10	uA	V <sub>DS</sub> =16V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	600	mΩ	V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A
		-	-	850		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.5A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	1.3	2	nC	I <sub>D</sub> =600mA V <sub>DS</sub> =16V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	0.3	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	0.5	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	21	-	Ns	V <sub>DS</sub> =10V I <sub>D</sub> =600mA V <sub>GS</sub> =5V R <sub>G</sub> =3.3Ω R <sub>D</sub> =16.7Ω
Rise Time	T <sub>r</sub>	-	53	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	100	-		
Fall Time	T <sub>f</sub>	-	125	-		
Input Capacitance	C <sub>iss</sub>	-	38	60	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =10V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	17	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	12	-		

## 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> =750mA, V <sub>GS</sub> =0V

## Schottky Characteristics (Tj = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward Voltage Drop	V <sub>F</sub>	-	-	0.5	V	I <sub>F</sub> =500mA
Maximum Reverse Leakage Current	I <sub>RM</sub>	-	-	100	uA	V <sub>R</sub> =20V
Junction Capacitance	C <sub>T</sub>	-	21	-	pF	V <sub>R</sub> =10V

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, t ≤ 5sec; 180°C/W when mounted on Min. copper pad.

## MOSFET Characteristics Curve

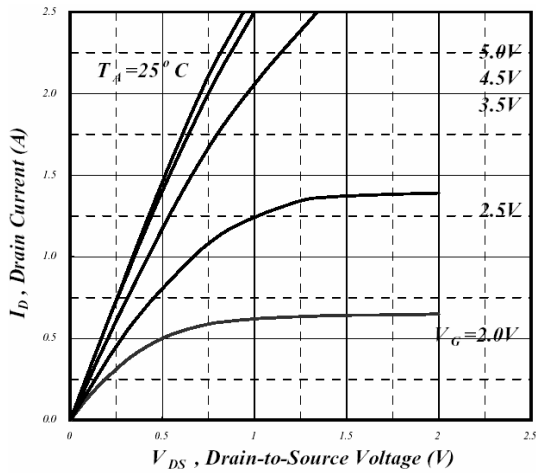


Fig 1. Typical Output Characteristics

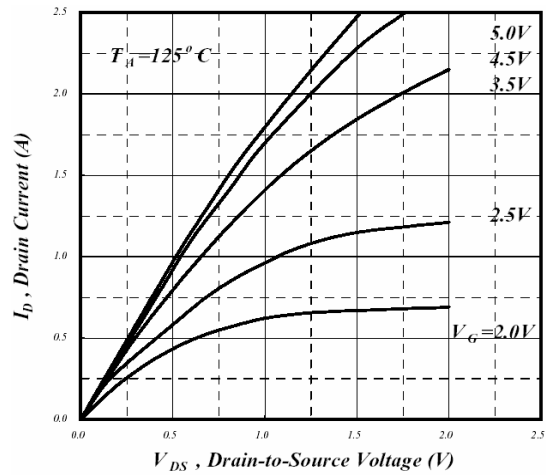


Fig 2. Typical Output Characteristics

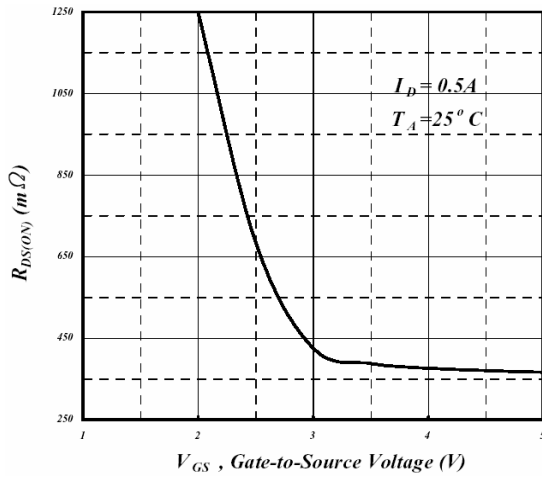


Fig 3. On-Resistance v.s. Gate Voltage

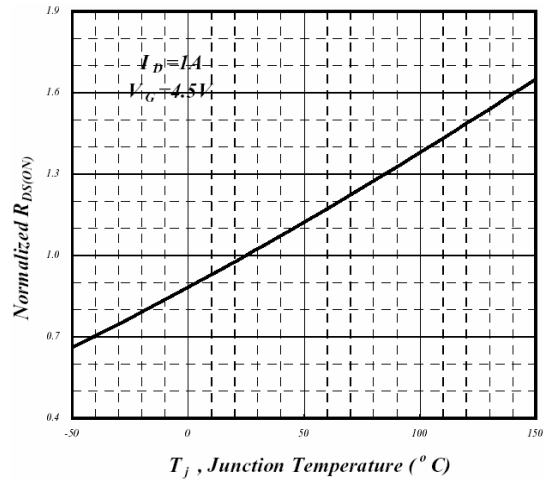


Fig 4. Normalized On-Resistance v.s. Junction Temperature

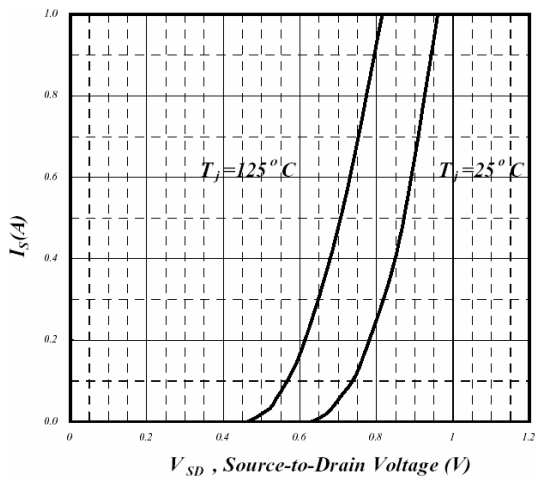


Fig 5. Forward Characteristics of Reverse Diode

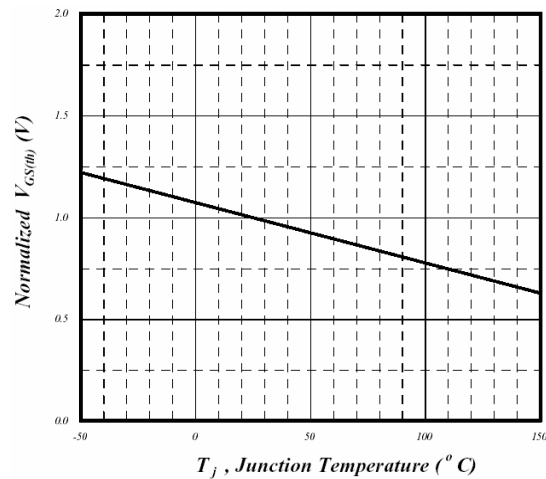
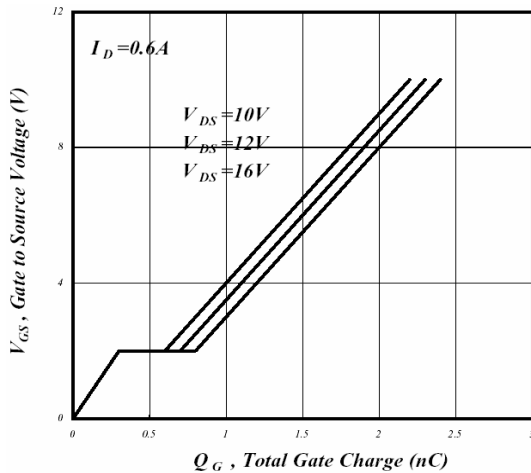
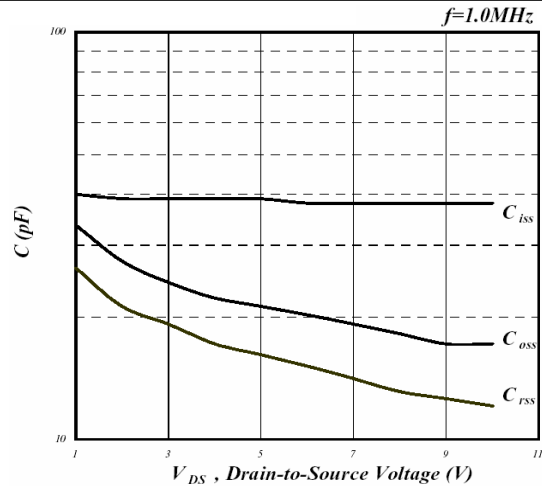


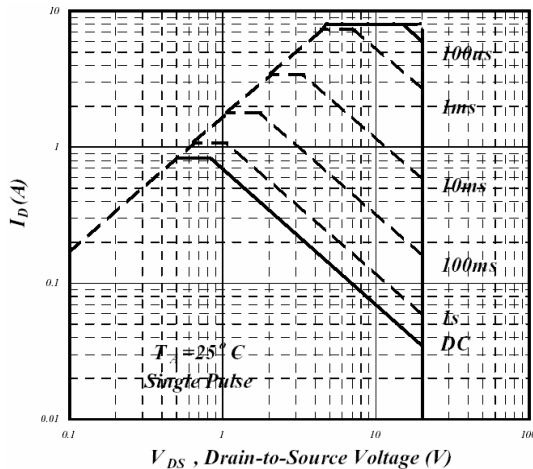
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



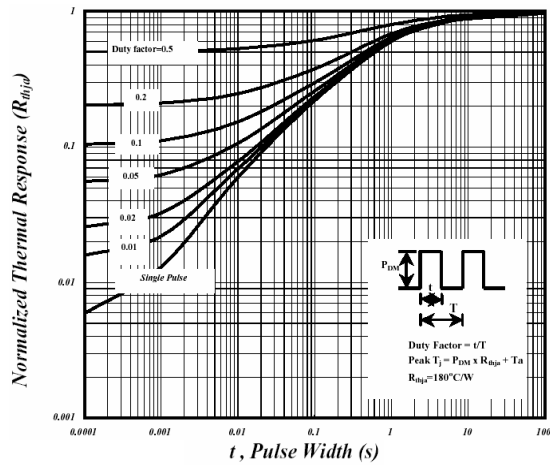
**Fig 7. Gate Charge Characteristics**



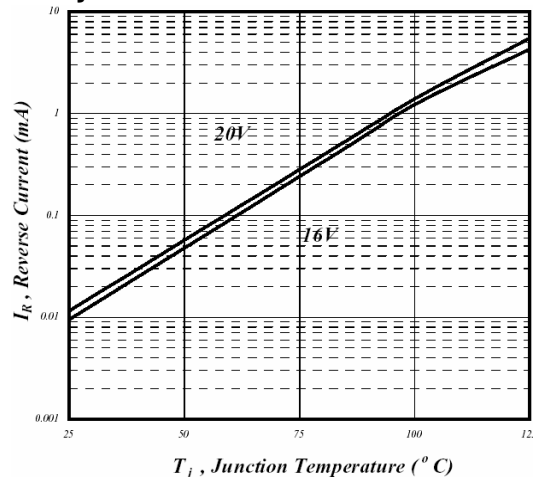
**Fig 8. Typical Capacitance Characteristics**



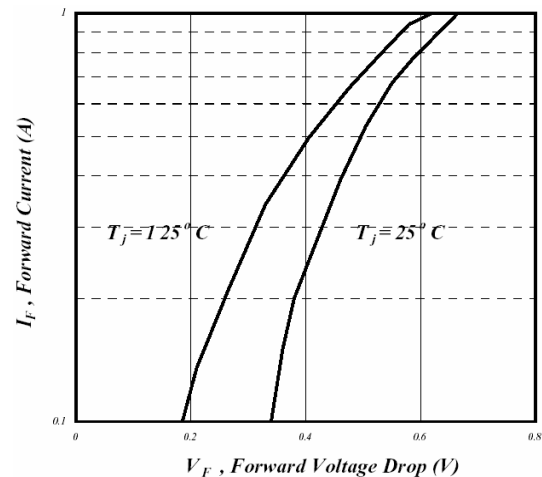
**Fig 9. Maximum Safe Operating Area Schottky Diode Characteristics Curve**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Reverse Leakage Current v.s. Junction Temperature**



**Fig 12. Forward Voltage Drop**

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