

G138K**N-CHANNEL ENHANCEMENT MODE POWER MOSFET**

BVDSS	50V
RDS(ON)	2Ω
ID	640mA

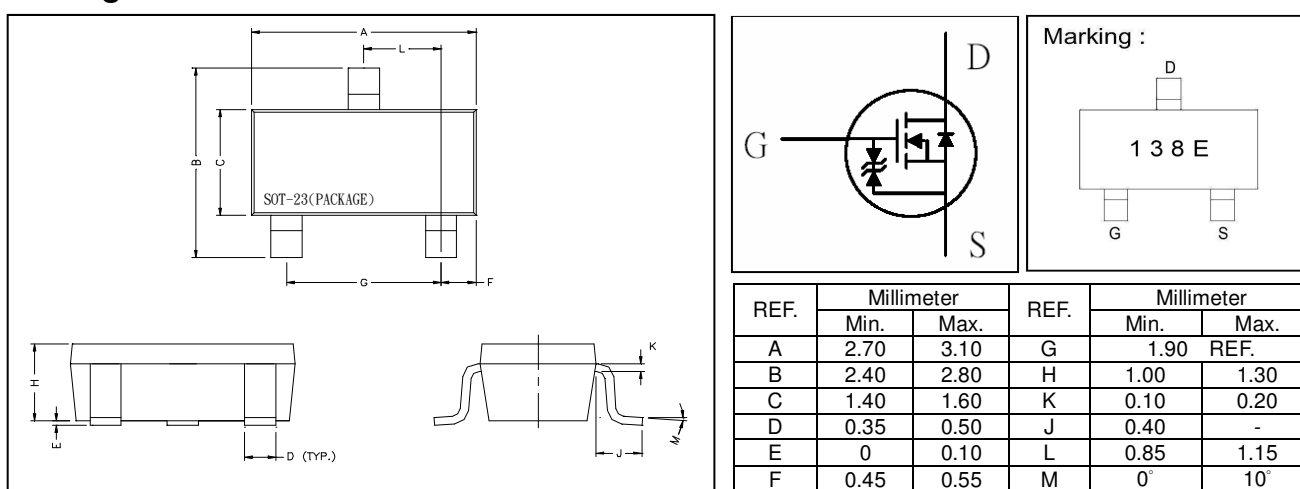
Description

The G138K utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device.

The G138K is universally used for all commercial-industrial applications.

Features

- *Simple Drive Requirement
- *Small Package Outline
- *RoHS Compliant

Package Dimensions**Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ³ , $V_{GS}@10V$	$I_D @TA=25^{\circ}C$	640	mA
Continuous Drain Current ³ , $V_{GS}@10V$	$I_D @TA=70^{\circ}C$	500	mA
Pulsed Drain Current ^{1,2}	I_{DM}	950	mA
Power Dissipation	$P_D @TA=25^{\circ}C$	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55 ~ +150	°C

Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient ³ Max.	R_{thj-a}	90	°C/W

Electrical Characteristics(T_j = 25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV _{DSS}	50	-	-	V	V _{GS} =0, I _D =250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	0.06	-	V/°C	Reference to 25°C, I _D =1mA
Gate Threshold Voltage	V _{GS(th)}	0.5	-	2.0	V	V _{DS} =V _{GS} , I _D =1mA
Forward Transconductance	g _{fs}	-	600	-	mS	V _{DS} =10V, I _D =600mA
Gate-Source Leakage Current	I _{GSS}	-	-	±10	uA	V _{GS} = ±20V
Drain-Source Leakage Current(T _j =25°C)	I _{DSS}	-	-	1	uA	V _{DS} =50V, V _{GS} =0
Drain-Source Leakage Current(T _j =70°C)		-	-	100	uA	V _{DS} =40V, V _{GS} =0
Static Drain-Source On-Resistance	R _{DS(ON)}	-	-	2	Ω	V _{GS} =10V, I _D =500mA
		-	-	4		V _{GS} =4.5V, I _D =400mA
Total Gate Charge ²	Q _g	-	1	1.6	nC	I _D =600mA V _{DS} =50V V _{GS} =4.5V
Gate-Source Charge	Q _{gs}	-	0.5	-		
Gate-Drain ("Miller") Change	Q _{gd}	-	0.5	-		
Turn-on Delay Time ²	T _{d(on)}	-	12	-	ns	V _{DS} =30V I _D =600mA V _{GS} =10V R _G =3.3Ω R _D =52Ω
Rise Time	T _r	-	10	-		
Turn-off Delay Time	T _{d(off)}	-	56	-		
Fall Time	T _f	-	29	-		
Input Capacitance	C _{iss}	-	32	50	pF	V _{GS} =0V V _{DS} =25V f=1.0MHz
Output Capacitance	C _{oss}	-	8	-		
Reverse Transfer Capacitance	C _{rss}	-	6	-		

Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage ²	V _{SD}	-	-	1.2	V	I _S =200mA, V _{GS} =0V

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

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

3. Surface mounted on 1 in² copper pad of FR4 board; 270°C/W when mounted on Min. copper pad.

Characteristics Curve

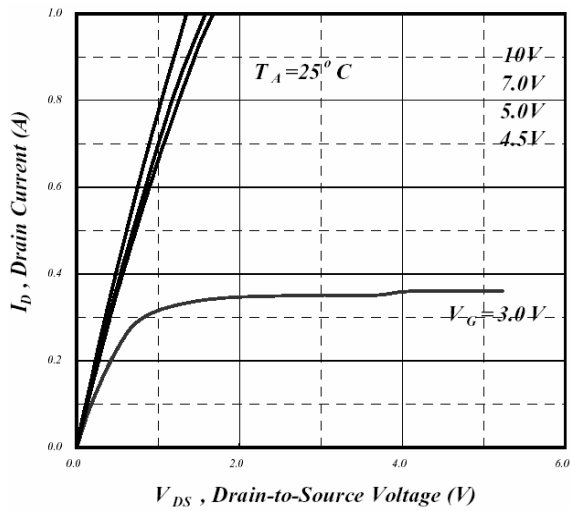


Fig 1. Typical Output Characteristics

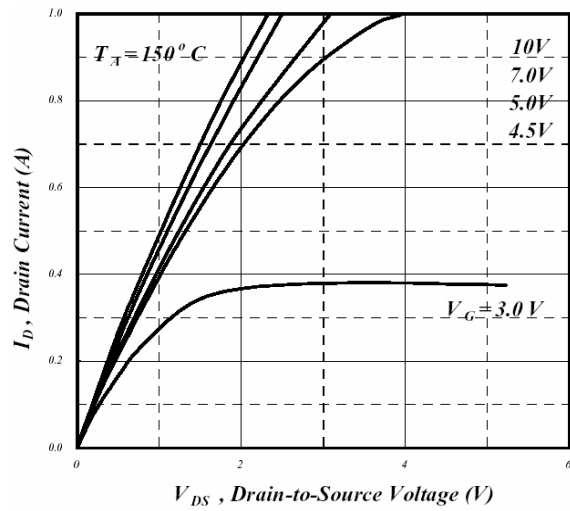


Fig 2. Typical Output Characteristics

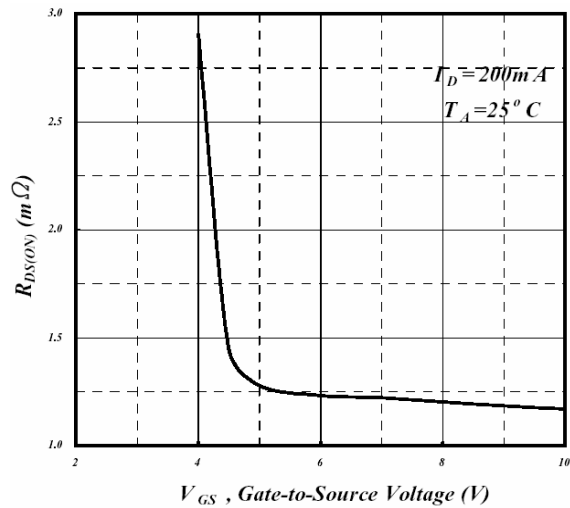


Fig 3. On-Resistance v.s. Gate Voltage

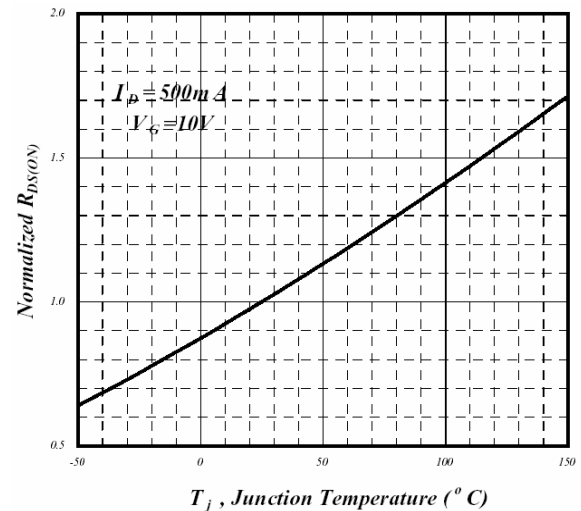


Fig 4. Normalized On-Resistance v.s. Junction Temperature

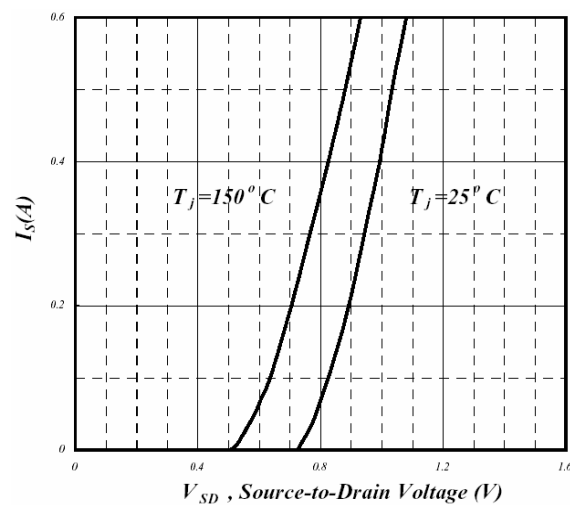


Fig 5. Forward Characteristics of Reverse Diode

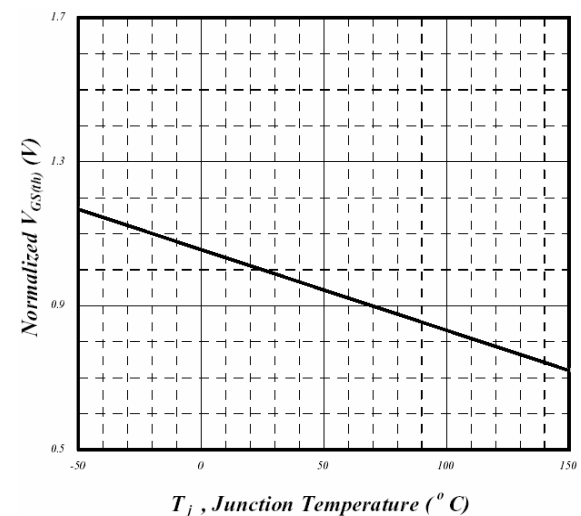


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

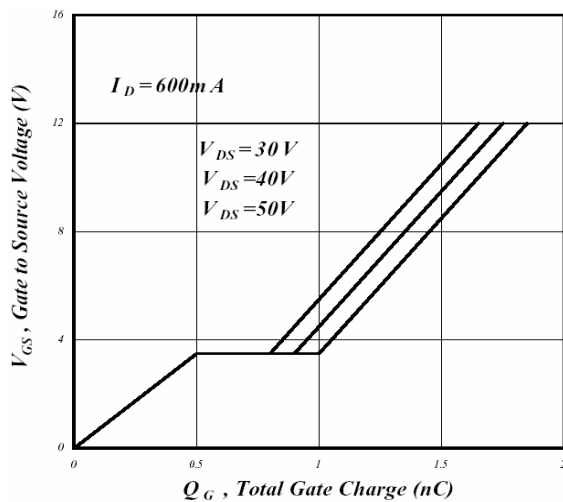


Fig 7. Gate Charge Characteristics

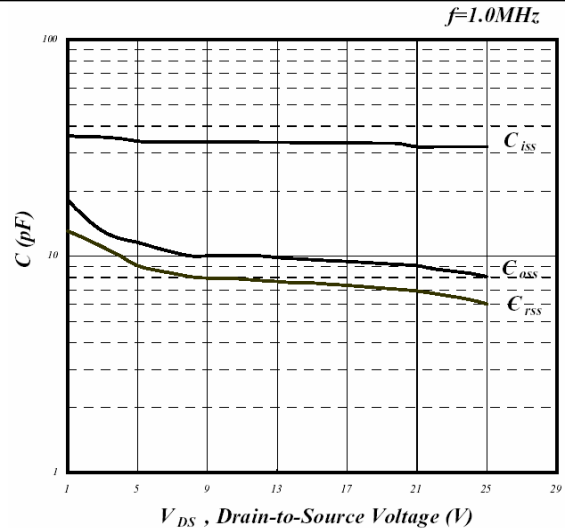


Fig 8. Typical Capacitance Characteristics

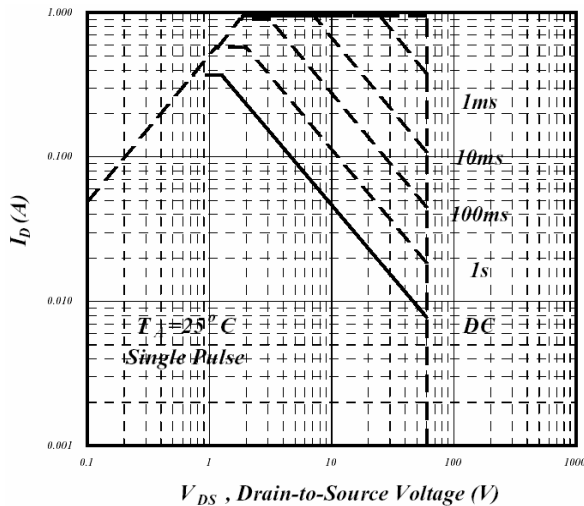


Fig 9. Maximum Safe Operating Area

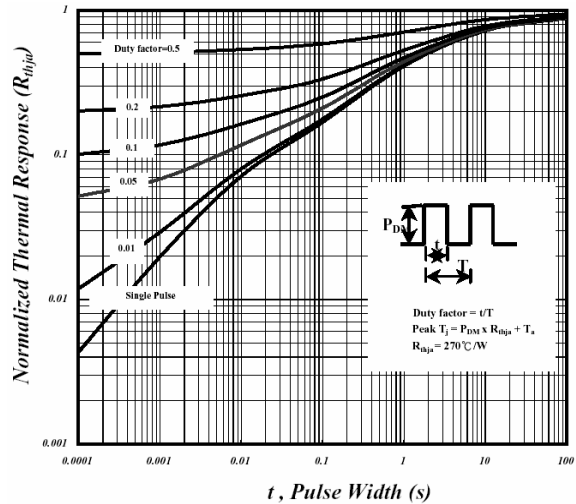


Fig 10. Effective Transient Thermal Impedance

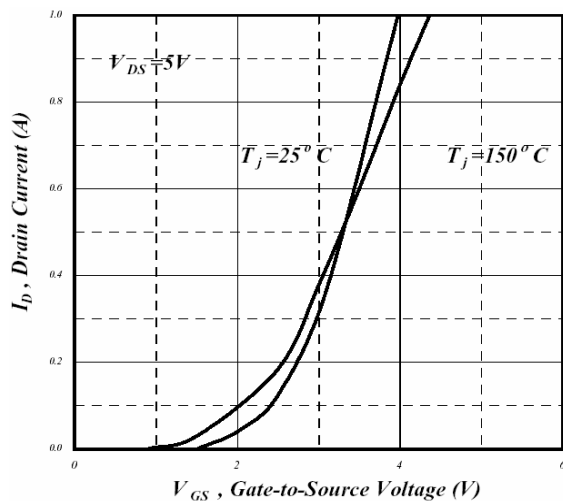


Fig 11. Transfer Characteristics

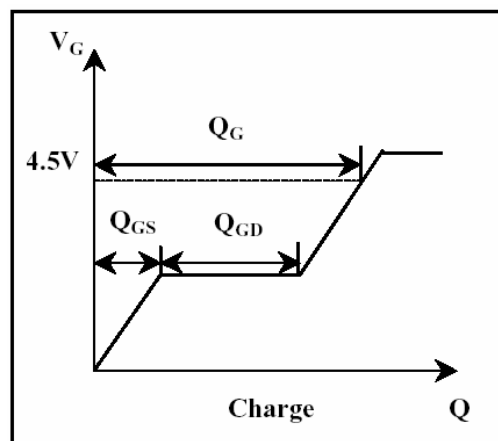


Fig 12. Gate Charge Waveform

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