



# PJX8838

## 50V N-Channel Enhancement Mode MOSFET– ESD Protected

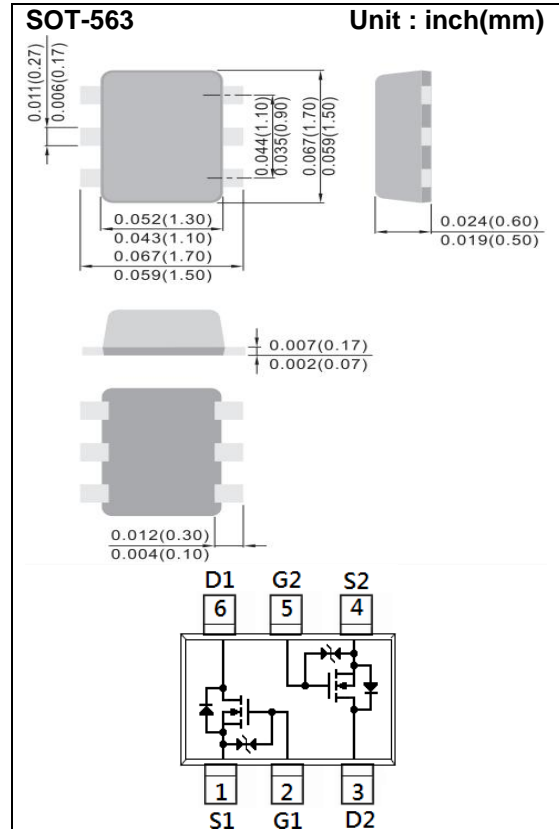
**Voltage** 50 V **Current** 360mA

### Features

- RDS(ON) , VGS@10V, ID@500mA<1.45Ω
- RDS(ON) , VGS@4.5V, ID@200mA<1.95Ω
- RDS(ON) , VGS@2.5V, ID@100mA<4.0Ω
- RDS(ON) , VGS@1.8V, ID@10mA<6.0Ω
- Advanced Trench Process Technology
- ESD Protected 2KV HBM
- Specially Designed for Relay driver, Speed line drive, etc.
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case: SOT-563 Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.00009 ounces, 0.0026 grams
- Marking: X38



### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25 °C unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNITS
Drain-Source Voltage	V <sub>DS</sub>	50	V
Gate-Source Voltage	V <sub>GS</sub>	+20	V
Continuous Drain Current	I <sub>D</sub>	360	mA
Pulsed Drain Current	I <sub>DM</sub>	1200	mA
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C	300
		Derate above 25°C	2.4
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C
Typical Thermal resistance	R <sub>θJA</sub>	417	°C/W
- Junction to Ambient (Note 3)			



# PJX8838

## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	50	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.86	1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=500mA$	-	1.2	1.45	$\Omega$
		$V_{GS}=4.5V, I_D=200mA$	-	1.3	1.95	
		$V_{GS}=2.5V, I_D=100mA$	-	1.7	4.0	
		$V_{GS}=1.8V, I_D=10mA$	-	4.0	6.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=50V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$Q_g$	$V_{DS}=25V, I_D=500mA,$ $V_{GS}=4.5V$	-	0.95	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.34	-	
Gate-Drain Charge	$Q_{gd}$		-	0.32	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	36	-	pF
Output Capacitance	$C_{oss}$		-	11	-	
Reverse Transfer Capacitance	$C_{rss}$		-	6.6	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=25V, I_D=500mA,$ $V_{GS}=10V,$ $R_G=6\Omega$ (Note 1,2)	-	2.3	-	ns
Turn-On Rise Time	$t_r$		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	7	-	
Turn-Off Fall Time	$t_f$		-	20	-	
<b>Drain-Source Diode</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$	---	-	-	500	mA
Diode Forward Voltage	$V_{SD}$	$I_S=500mA, V_{GS}=0V$	-	0.9	1.5	V

**NOTES :**

1. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics.
3.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. mounted on a 1 inch square pad of copper
4. Guaranteed by design, not subject to production testing.



# PJX8838

## TYPICAL CHARACTERISTIC CURVES

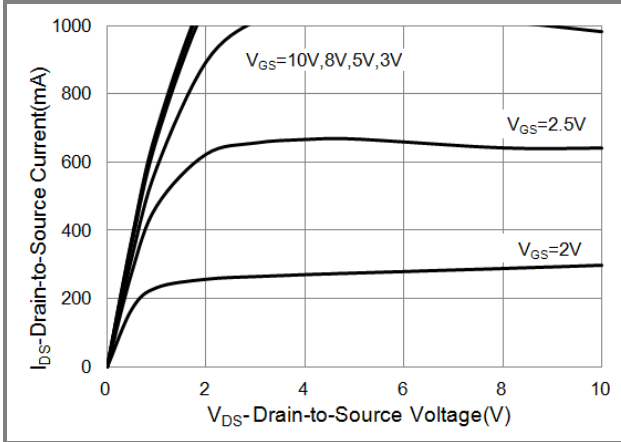


Fig.1 On-Region Characteristics

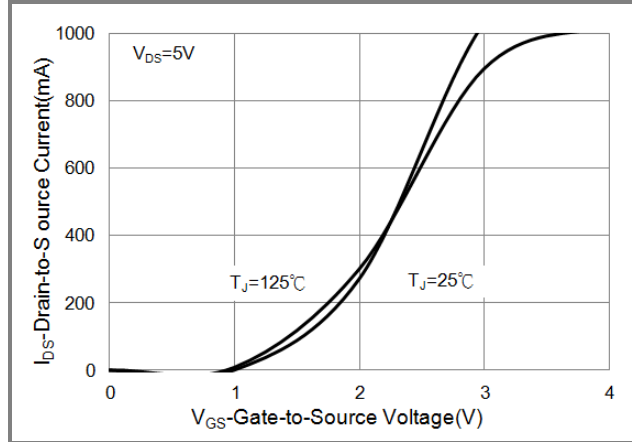


Fig.2 Transfer Characteristics

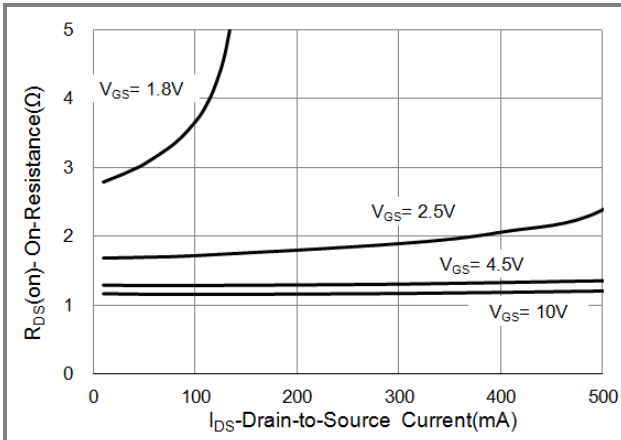


Fig.3 On-Resistance vs. Drain Current

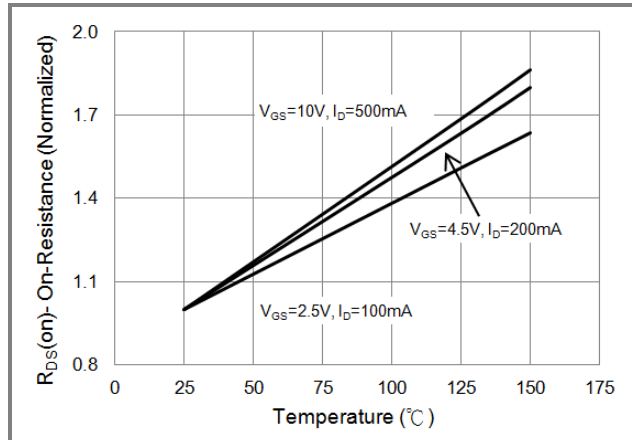


Fig.4 On-Resistance vs. Junction temperature

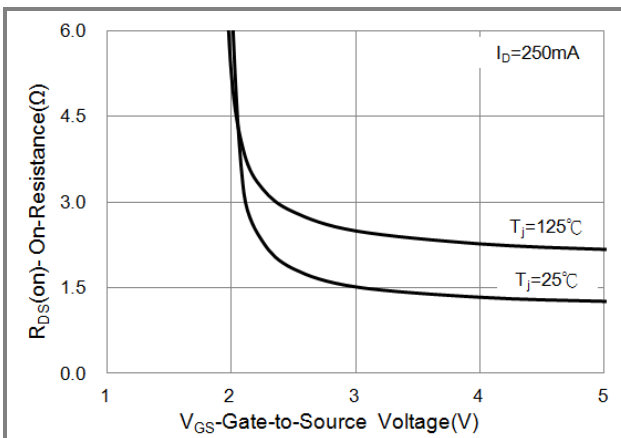


Fig.5 On-Resistance Variation with VGS.

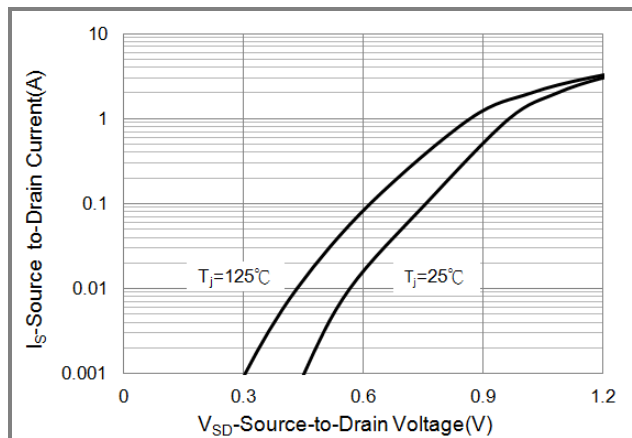


Fig.6 Body Diode Characteristics



# PJX8838

## TYPICAL CHARACTERISTIC CURVES

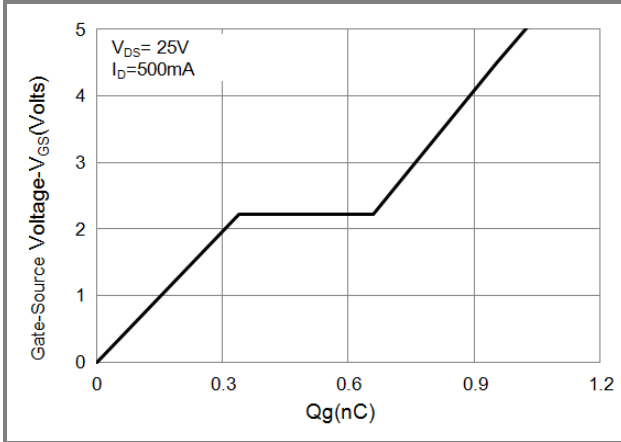


Fig.7 Gate-Charge Characteristics

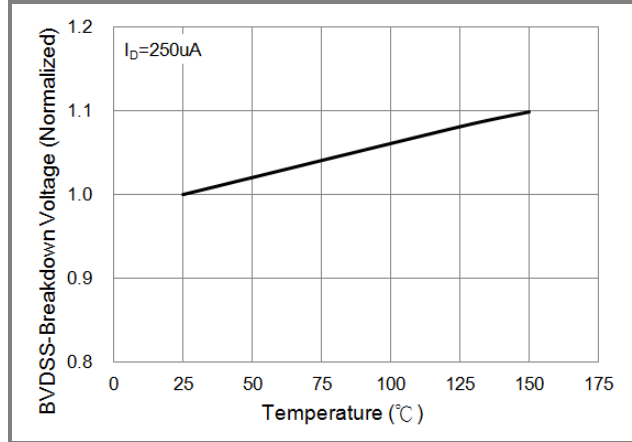


Fig.8 Breakdown Voltage Variation vs. Temperature

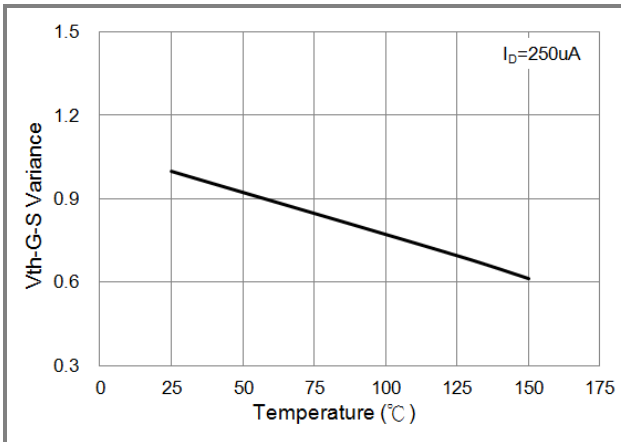


Fig.9 Threshold Voltage Variation with Temperature.

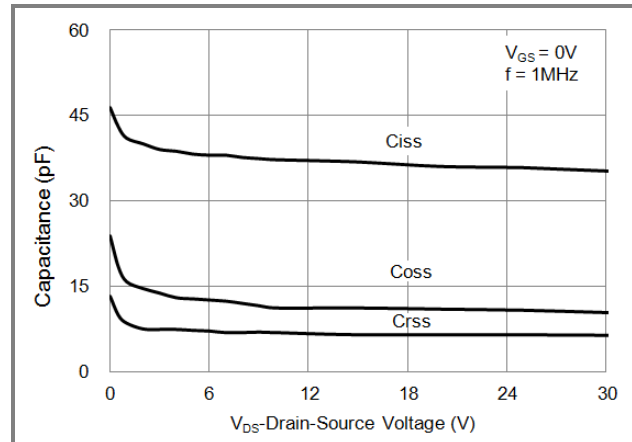


Fig.10 Capacitance vs. Drain-Source Voltage.

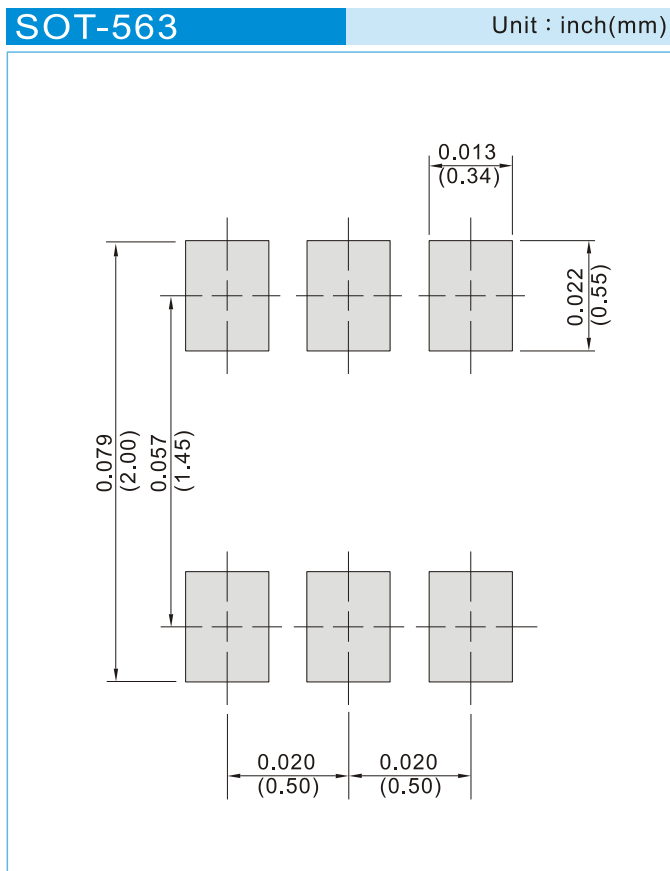


# PJX8838

## PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
PJX8838_R1_00001	SOT-563	4K pcs / 7" reel	X38	Halogen free
PJX8838_R2_00001	SOT-563	10K pcs / 13" reel	X38	Halogen free

## MOUNTING PAD LAYOUT





## PJX8838

### Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Panjit International Inc..
- Panjit International Inc. reserves the rights to make changes of the content herein the document anytime without notification. Please refer to our website for the latest document.
- Panjit International Inc. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Panjit International Inc. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Panjit International Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panjit International Inc. for any damages resulting from such improper use or sale.
- Since Panjit uses lot number as the tracking base, please provide the lot number for tracking when complaining.