

## Description

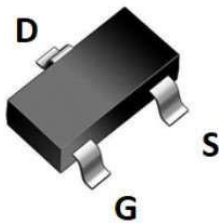
### PECJ N-channel Enhancement Mode Power MOSFET

#### Features

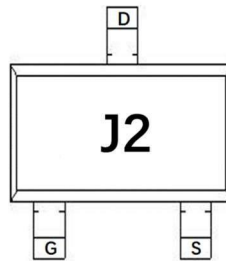
- $V_{DS}=50V$ ,  $I_D=0.22A$   
 $R_{DS(ON)} < 3\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 4\Omega @ V_{GS} = 4.5V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package
- ESD Protected:1500V

#### Application

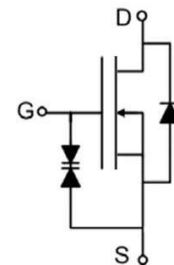
- Battery Protection
- Load Switch
- Power Management



SOT-23 top view



Marking and pin Assignment



Schematic diagram

## Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
J2	PECJ139K	TAPING	SOT-23	13inch	4000	40000

## Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	50	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ C$	220
		$T_A = 100^\circ C$	143
$I_{DM}$	Pulsed Drain Current <small>note1</small>	880	mA
$P_D$	Power Dissipation	$T_A = 25^\circ C$	0.3
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	417	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

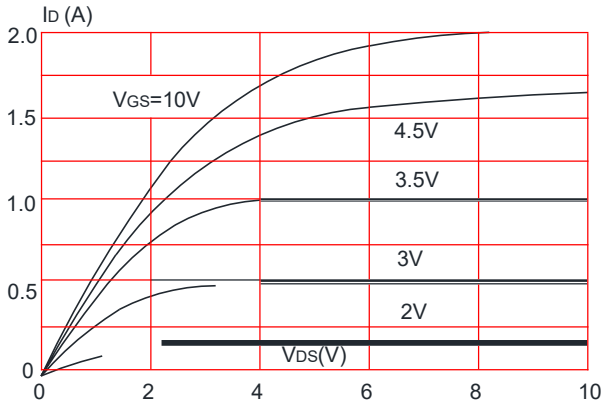
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	50	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V,	-	-	1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±5	uA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.8	1	1.45	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note2</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A	-	1.5	3	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.2A	-	1.8	4	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	-	23	-	pF
C <sub>oss</sub>	Output Capacitance		-	3.5	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	2.9	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =25V, I <sub>D</sub> =0.2A, V <sub>GS</sub> =10V	-	3	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	0.6	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	0.1	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, I <sub>D</sub> =0.2A,	-	3.8	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>GEN</sub> =10Ω, V <sub>GS</sub> =10V,	-	19	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.22	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	0.88	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> =0.2A	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

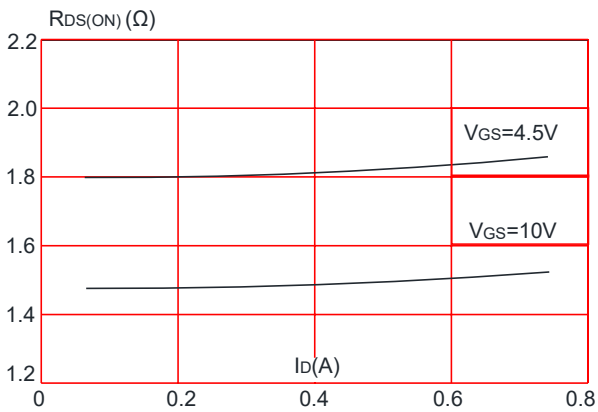
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

## Typical Performance Characteristics

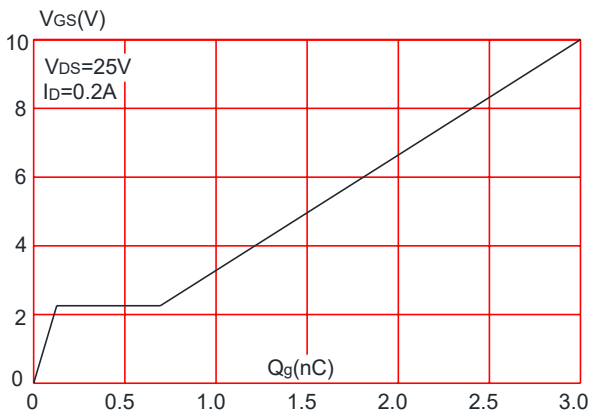
**Figure 1: Output Characteristics**



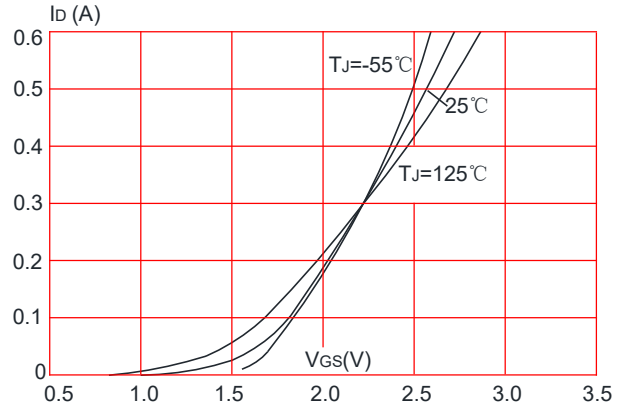
**Figure 3: On-resistance vs. Drain Current**



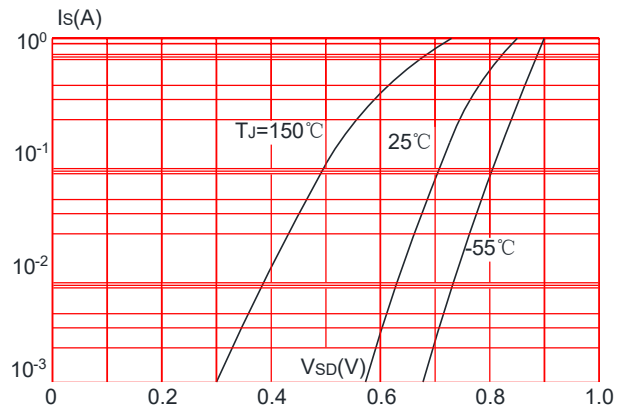
**Figure 5: Gate Charge Characteristics**



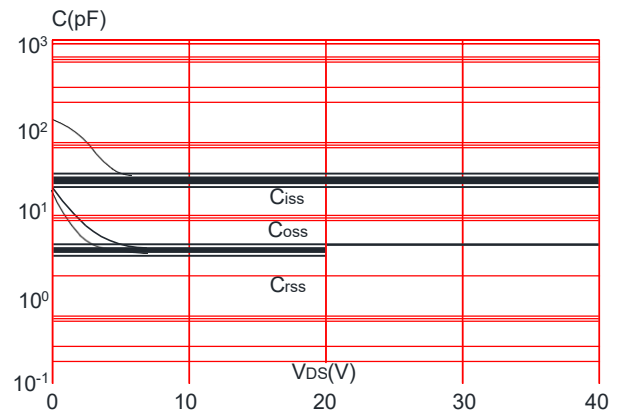
**Figure 2: Typical Transfer Characteristics**



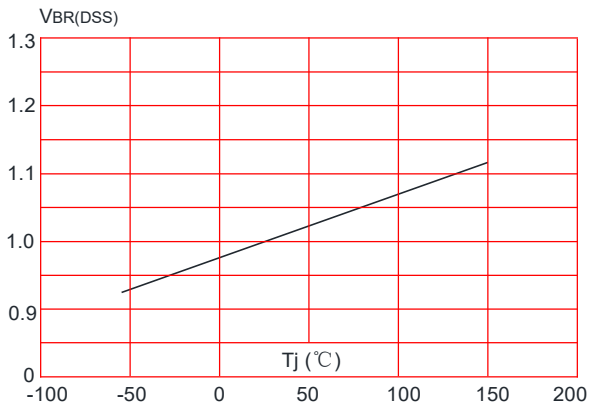
**Figure 4: Body Diode Characteristics**



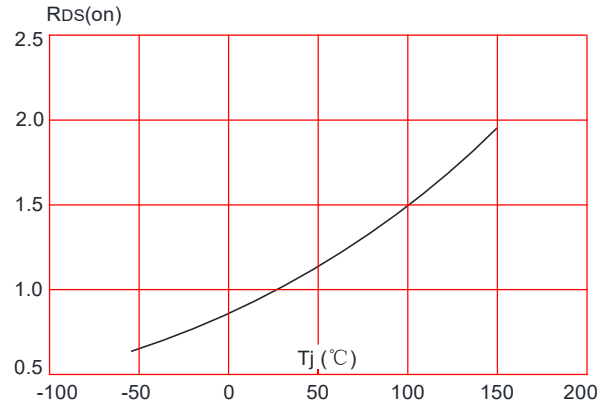
**Figure 6: Capacitance Characteristics**



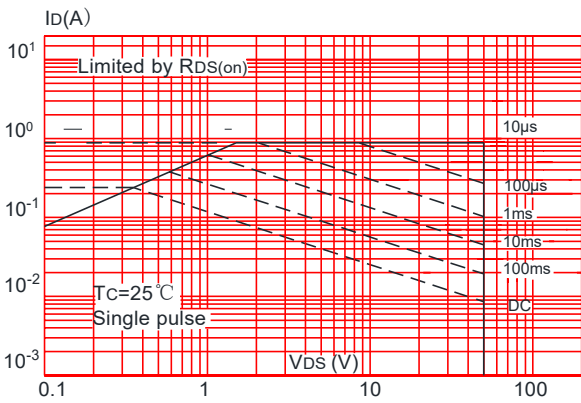
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



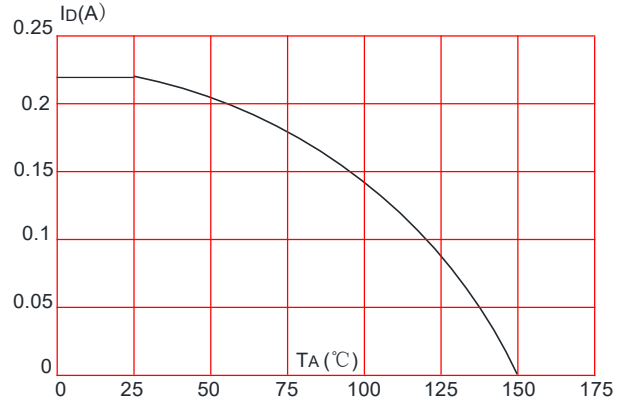
**Figure 8:** Normalized on Resistance vs. Junction Temperature



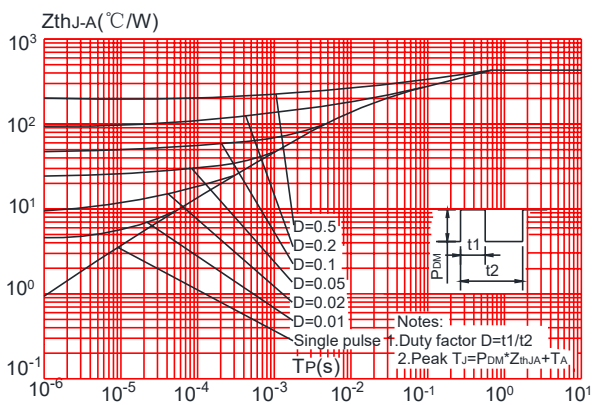
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Test Circuit

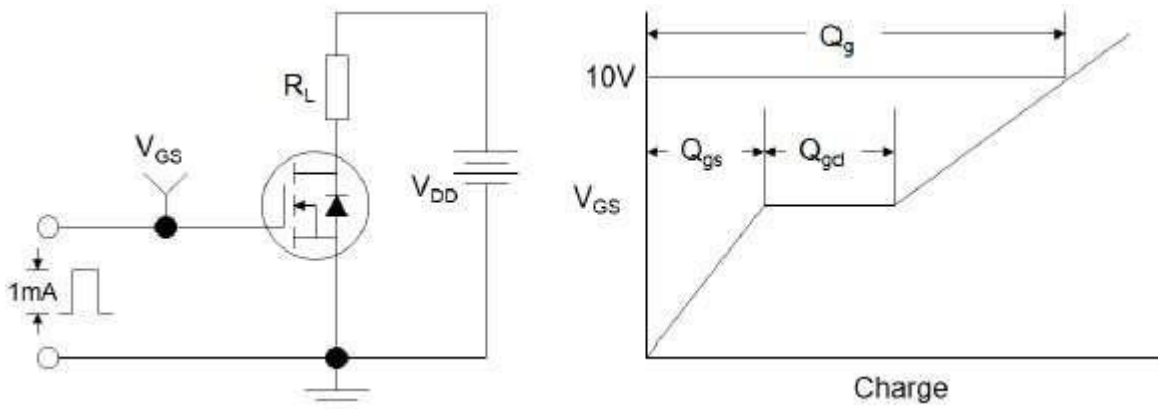


Figure1:Gate Charge Test Circuit & Waveform

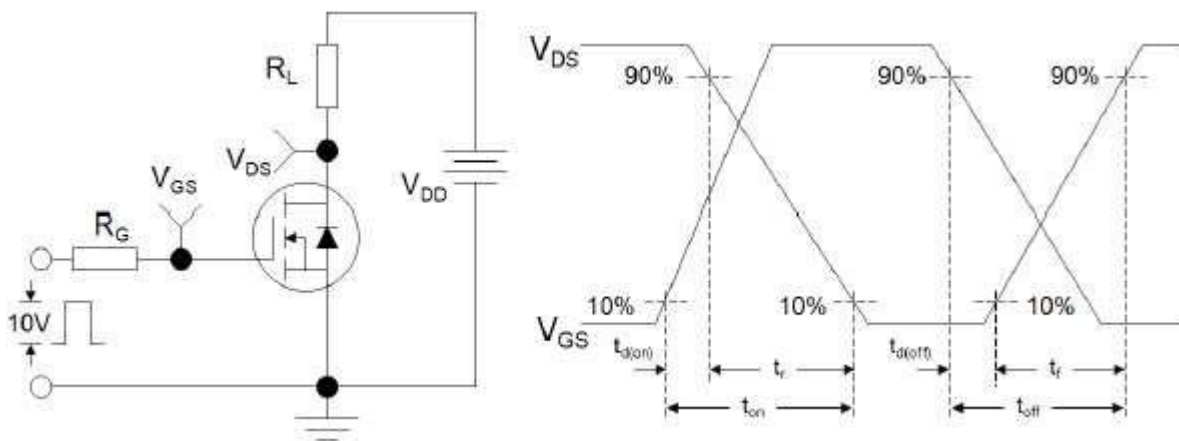


Figure 2: Resistive Switching Test Circuit & Waveforms

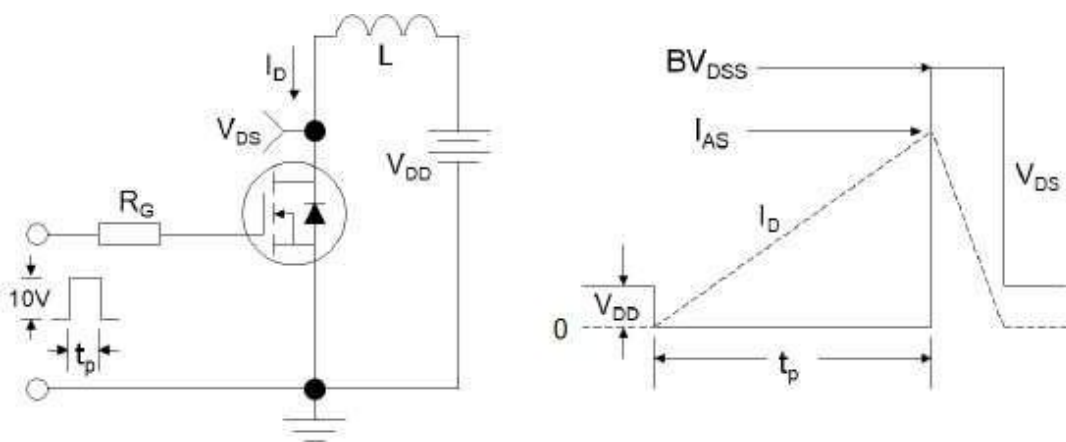
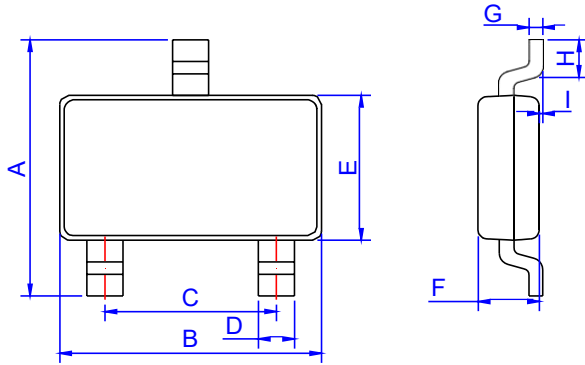


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

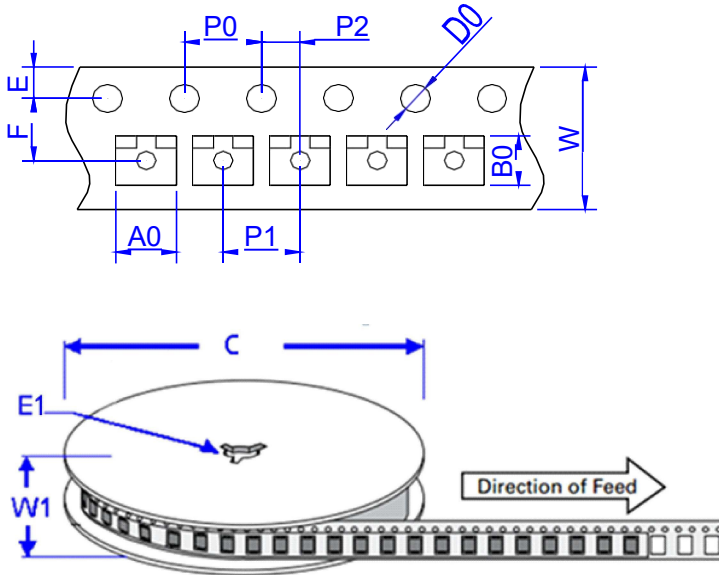
## Package Mechanical Data-SOT-23



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

## Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50 ± 0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3 ± 0.3	0.524 ± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5 ± 1.0	0.453 ± 0.039