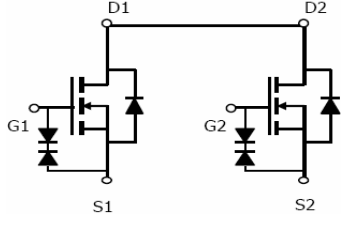




## N-Channel Enhancement Mode Power MOSFET

<p><b>Description</b></p> <p>The PE6968 uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS} = 20V, I_D = 6A</math></li> <li>● <math>R_{DS(ON)} &lt; 30m\Omega @ V_{GS} = 2.5V</math></li> <li>● <math>R_{DS(ON)} &lt; 24m\Omega @ V_{GS} = 4.5V</math></li> <li>● ESD Rating: 2000V HBM</li> <li>● High power and current handling capability</li> <li>● Lead free product is acquired</li> <li>● Surface mount package</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● PWM application</li> <li>● Load switch</li> </ul>	 <p style="text-align: center;"><b>Schematic diagram</b></p>  <p style="text-align: center;"><b>Marking and pin assignment</b></p>  <p style="text-align: center;"><b>TSSOP-8 top view</b></p>
---	---

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	6	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	30	A
Maximum Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	83.3	$^\circ C/W$
---	-----------------	------	--------------

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1	$\mu A$

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>On Characteristics</b> <sup>(Note 3)</sup>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=6A$	-	17	24	m $\Omega$
		$V_{GS}=2.5V, I_D=5A$	-	22	30	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=6A$	-	20	-	S
<b>Dynamic Characteristics</b> <sup>(Note4)</sup>						
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	650	-	PF
Output Capacitance	$C_{oss}$		-	140	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	60	-	PF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.5\Omega$ $V_{GS}=5V, R_{GEN}=3\Omega$	-	0.5		nS
Turn-on Rise Time	$t_r$		-	1		nS
Turn-Off Delay Time	$t_{d(off)}$		-	12		nS
Turn-Off Fall Time	$t_f$		-	4		nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=6A,$ $V_{GS}=4.5V$	-	8		nC
Gate-Source Charge	$Q_{gs}$		-	2.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	6	A

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

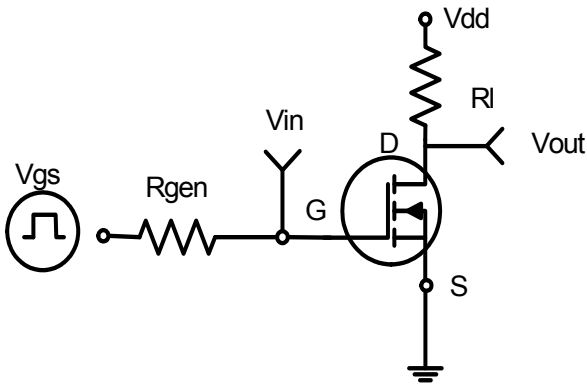


Figure 1: Switching Test Circuit

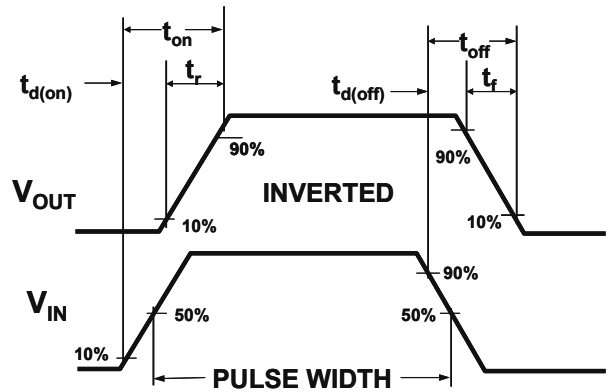


Figure 2: Switching Waveforms

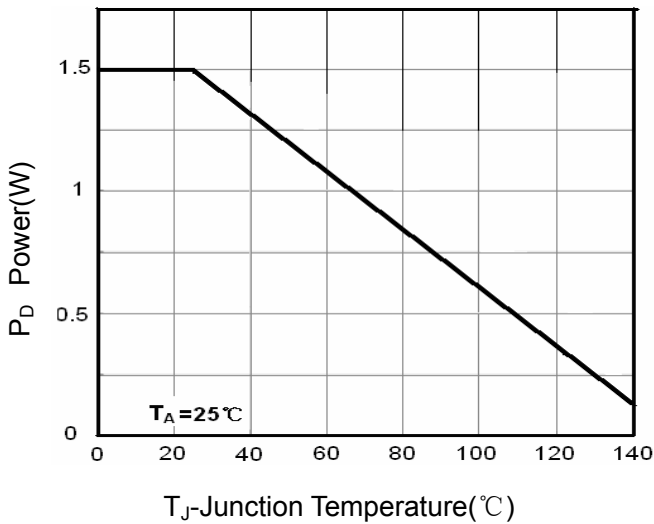


Figure 3 Power Dissipation

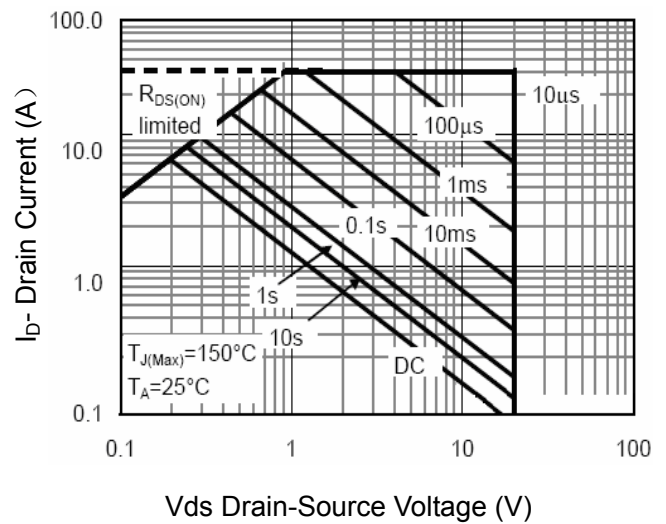


Figure 4 Safe Operation Area

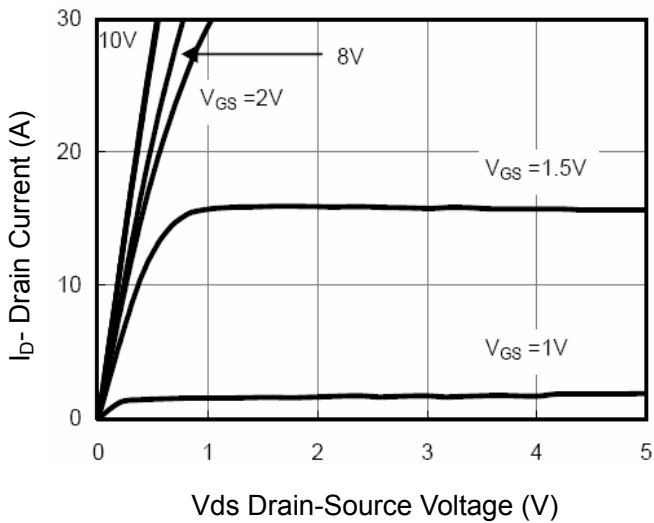


Figure 5 Output Characteristics

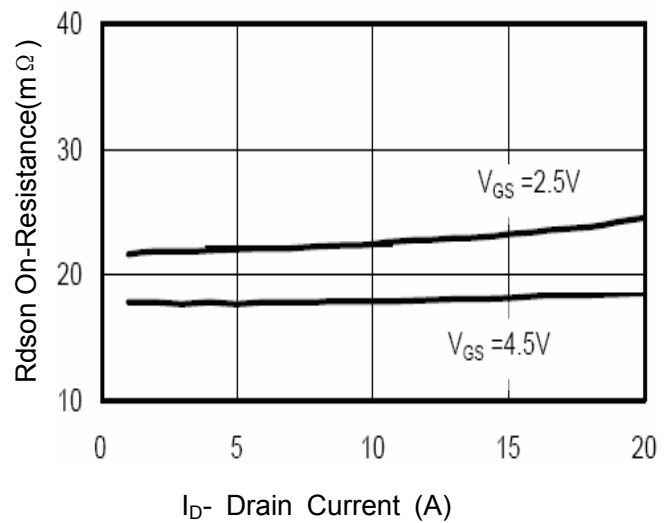


Figure 6 Drain-Source On-Resistance

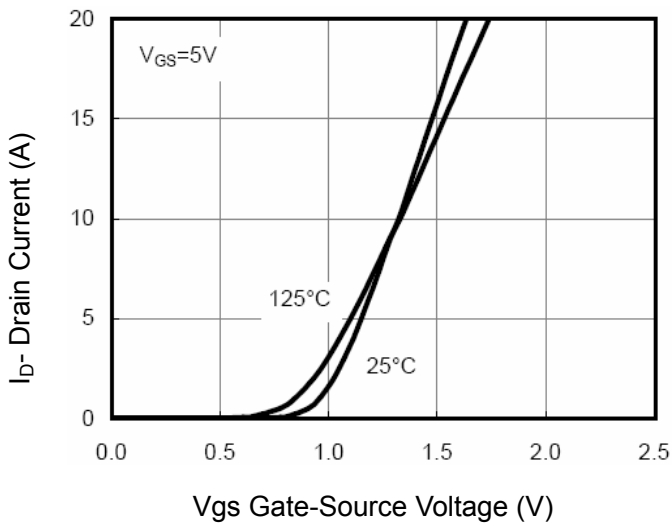


Figure 7 Transfer Characteristics

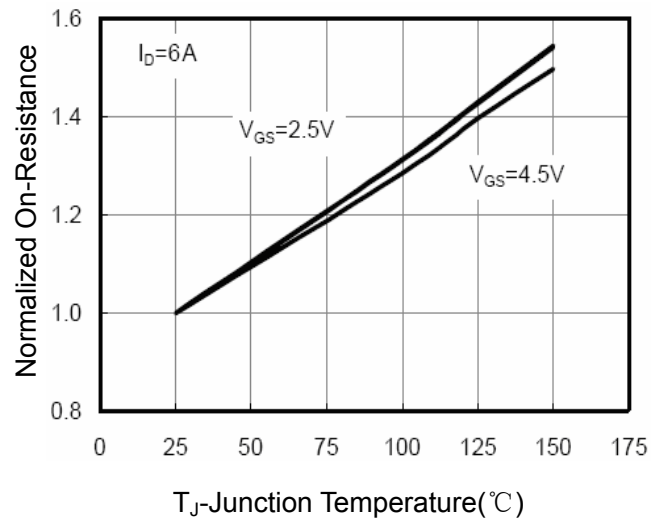


Figure 8 Drain-Source On-Resistance

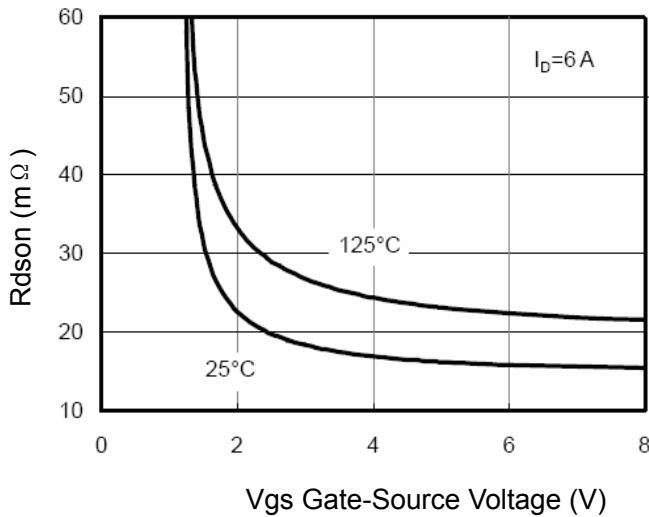


Figure 9 Rdson vs Vgs

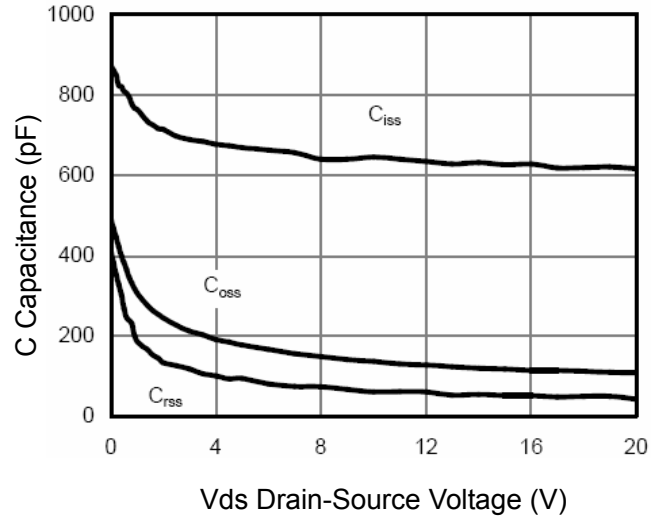


Figure 10 Capacitance vs Vds

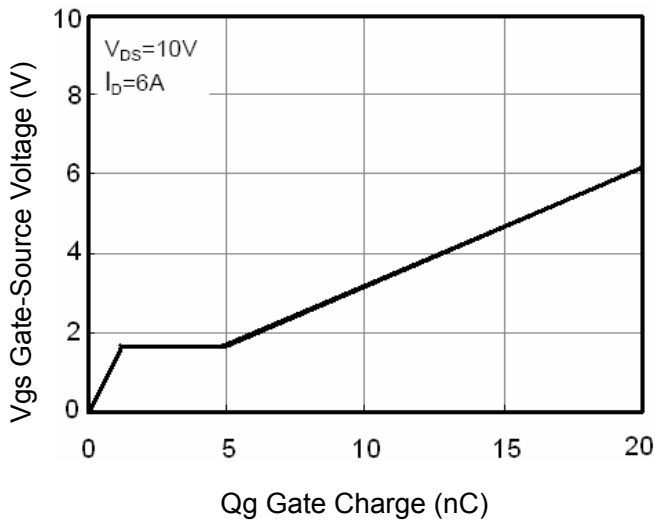


Figure 11 Gate Charge

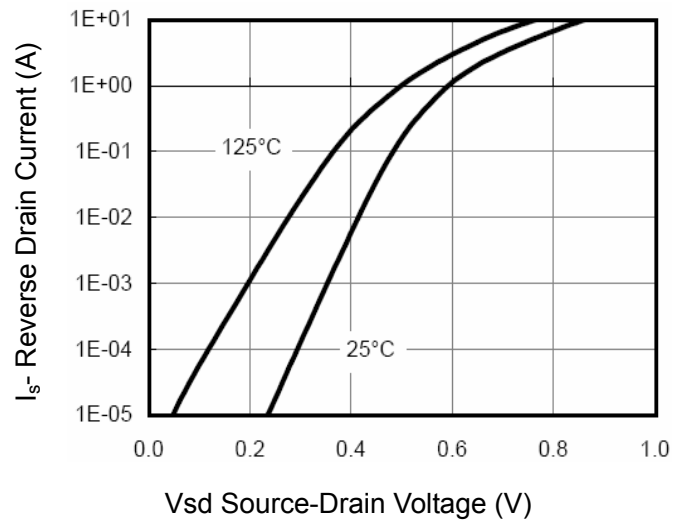
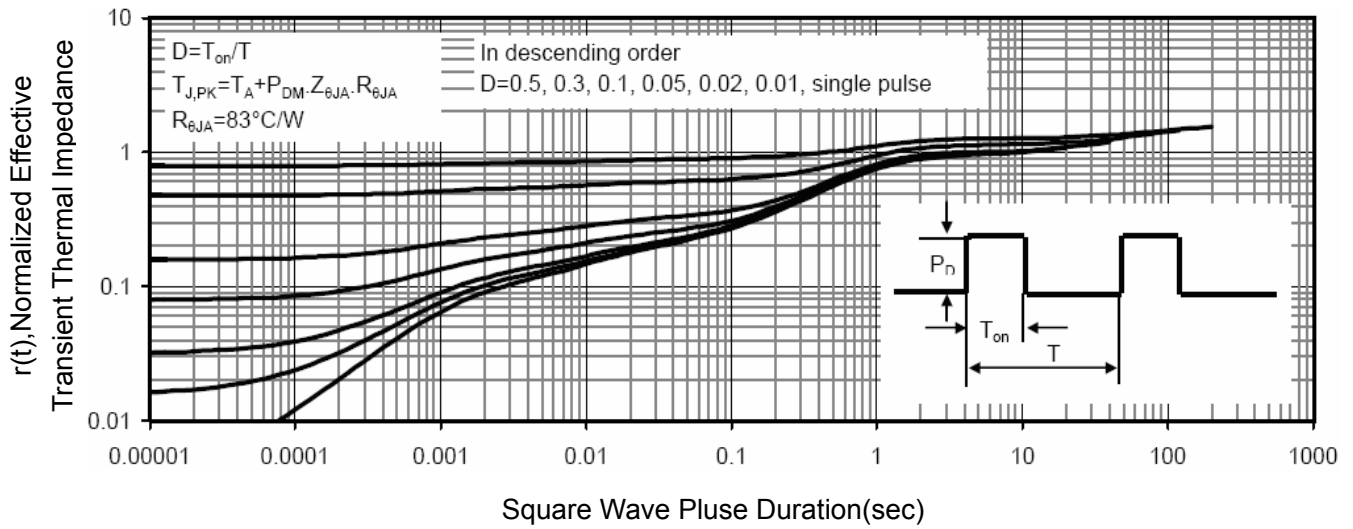
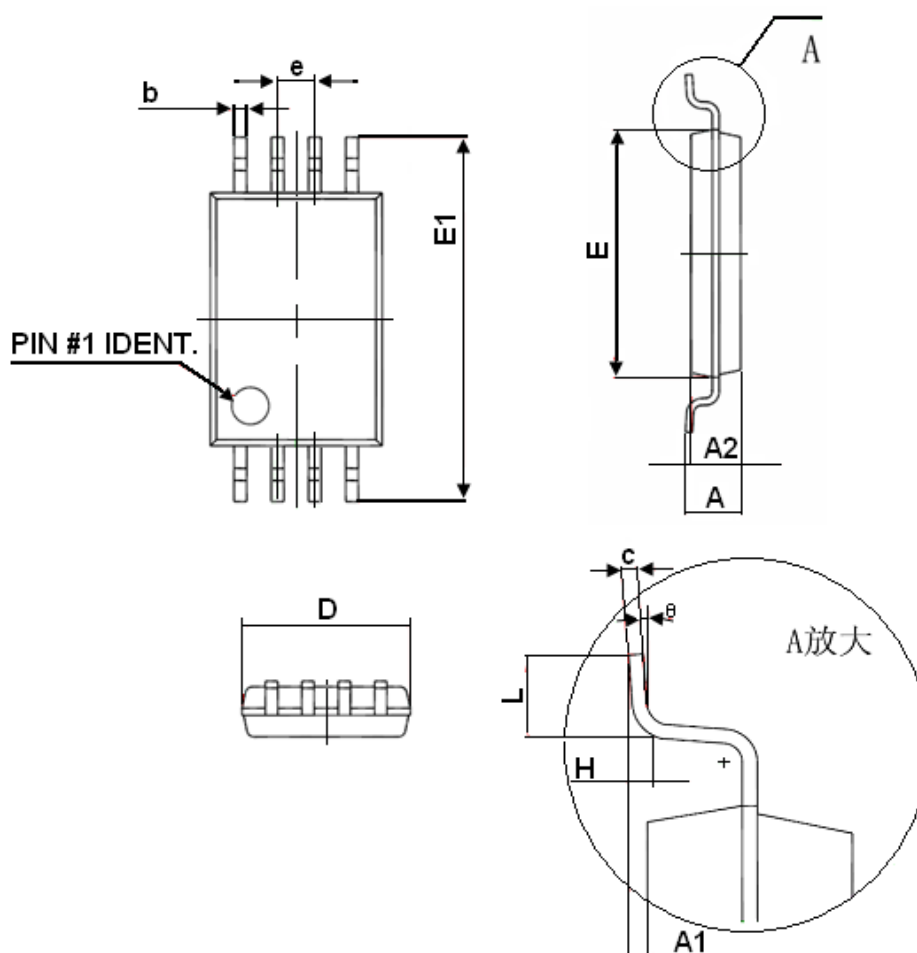


Figure 12 Source- Drain Diode Forward



**Figure 13 Normalized Maximum Transient Thermal Impedance**

Tssop-8 Package Information



Symbol	Dimensions In Millimeters	
	Min	Max
D	2.900	3.100
E	4.300	4.500
b	0.190	0.300
c	0.090	0.200
E1	6.250	6.550
A		1.100
A2	0.800	1.000
A1	0.020	0.150
e	0.65(BSC)	
L	0.500	0.700
H	0.25(TYP)	
$\theta$	1°	7°