

N-Channel Enhancement Mode Power MOSFET

Description

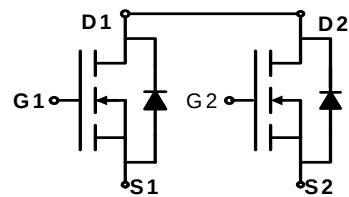
The PE2012 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications .

General Features

- $V_{DS} = 20V, I_D = 12A$
 $R_{DS(ON)} < 13m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 15m\Omega @ V_{GS}=2.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- Uni-directional load switch
- Bi-directional load switch



Schematic diagram



Marking and pin assignment



TSSOP-8 top view

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	12	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	45	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
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	μA

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	0.5	0.7	1.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =5A	-	8	13	mΩ
		V _{GS} =2.5V, I _D =4A	-	10	15	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =8A	-	15	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =10V,V _{GS} =0V, F=1.0MHz	-	1800	-	PF
Output Capacitance	C _{OSS}		-	230	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	200	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V,R _L =1.2Ω V _{GS} =10V,R _{GEN} =3Ω	-	2.5		nS
Turn-on Rise Time	t _r		-	7.2		nS
Turn-Off Delay Time	t _{d(off)}		-	49		nS
Turn-Off Fall Time	t _f		-	10.8		nS
Total Gate Charge	Q _g	V _{DS} =10V,I _D =8A, V _{GS} =4.5V	-	17.9		nC
Gate-Source Charge	Q _{gs}		-	1.5	-	nC
Gate-Drain Charge	Q _{gd}		-	4.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =1A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	12	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

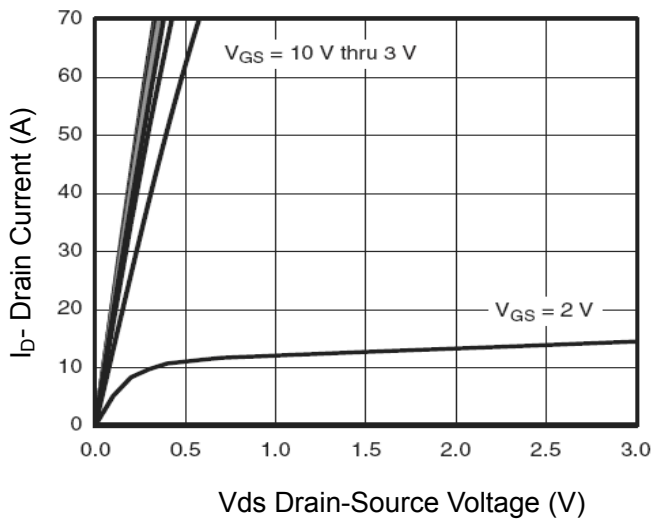


Figure 1 Output Characteristics

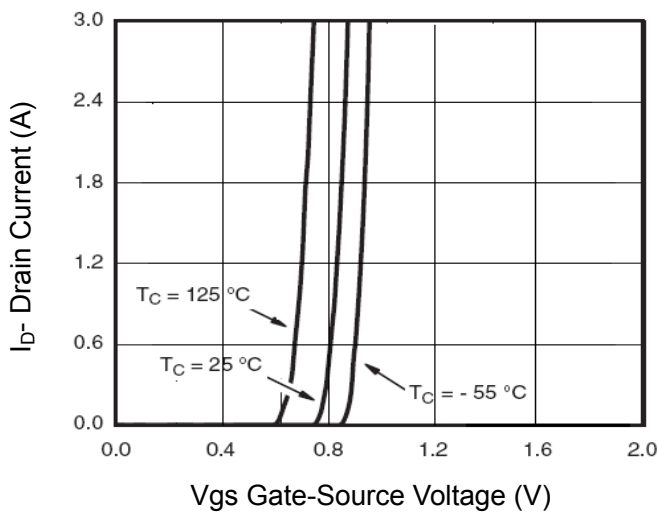


Figure 3 Transfer Characteristics

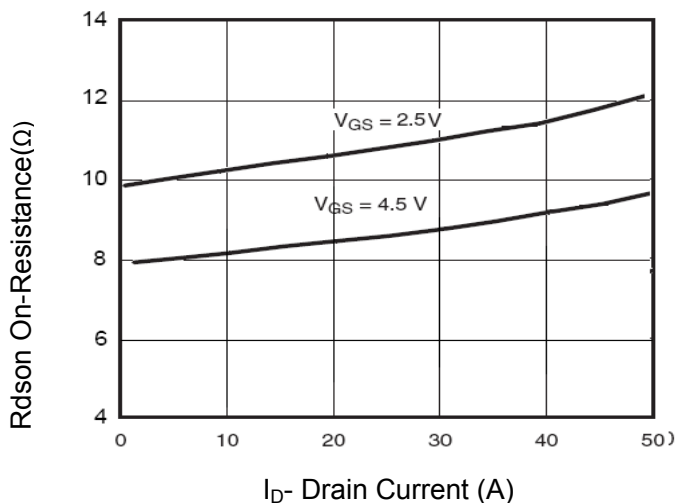


Figure 5 $R_{DS(on)}$ - Drain Current

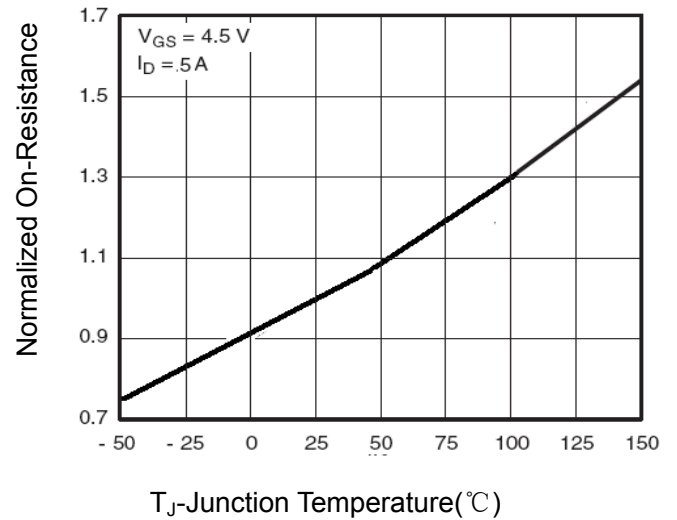


Figure 2 $R_{DS(on)}$ -Junction Temperature

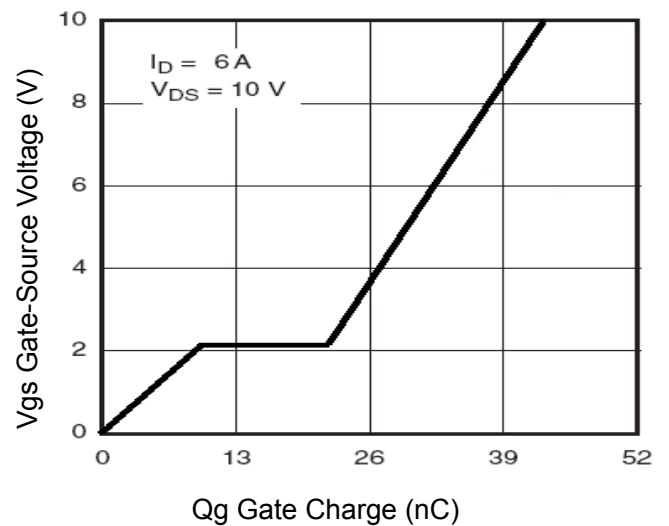


Figure 4 Gate Charge

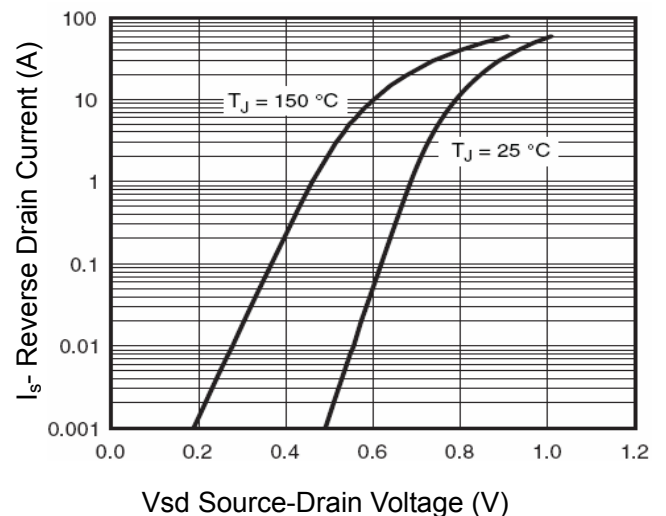


Figure 6 Source- Drain Diode Forward

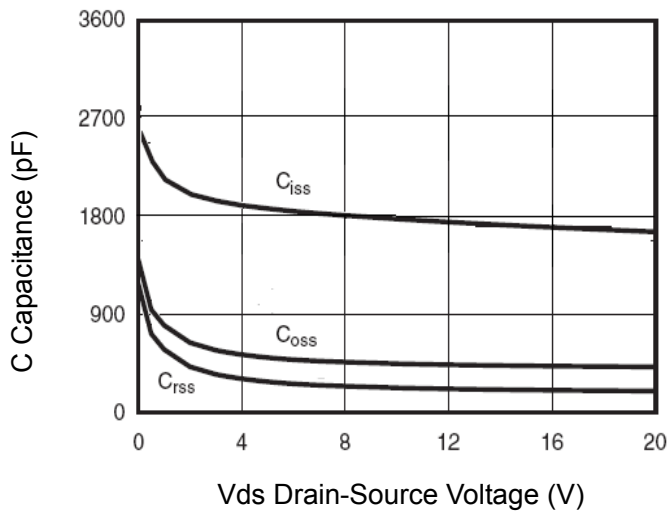


Figure 7 Capacitance vs V_{DS}

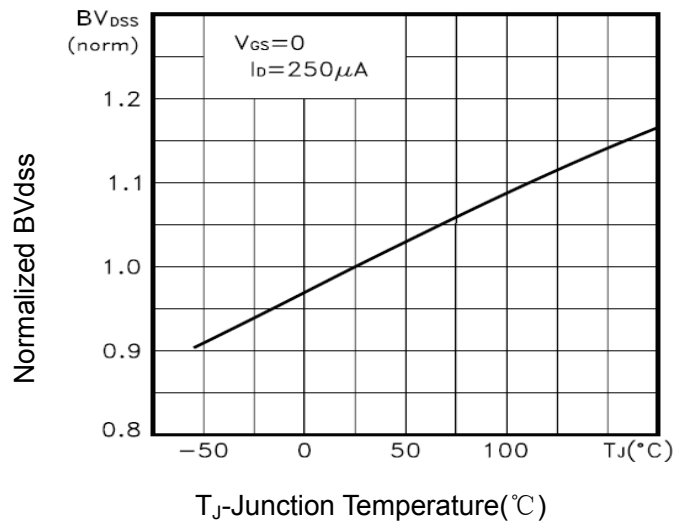


Figure 8 BV_{DSS} vs Junction Temperature

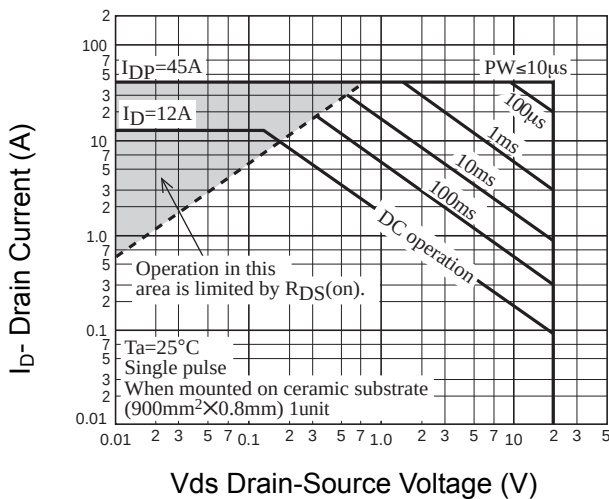


Figure 9 Safe Operation Area

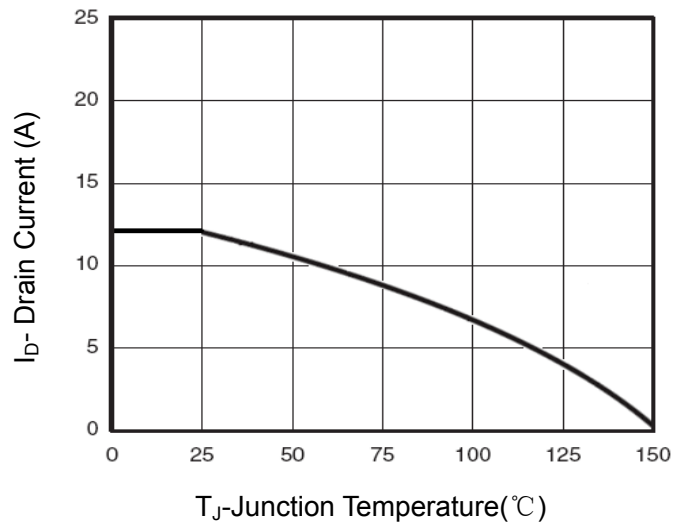


Figure 10 Current vs Junction Temperature

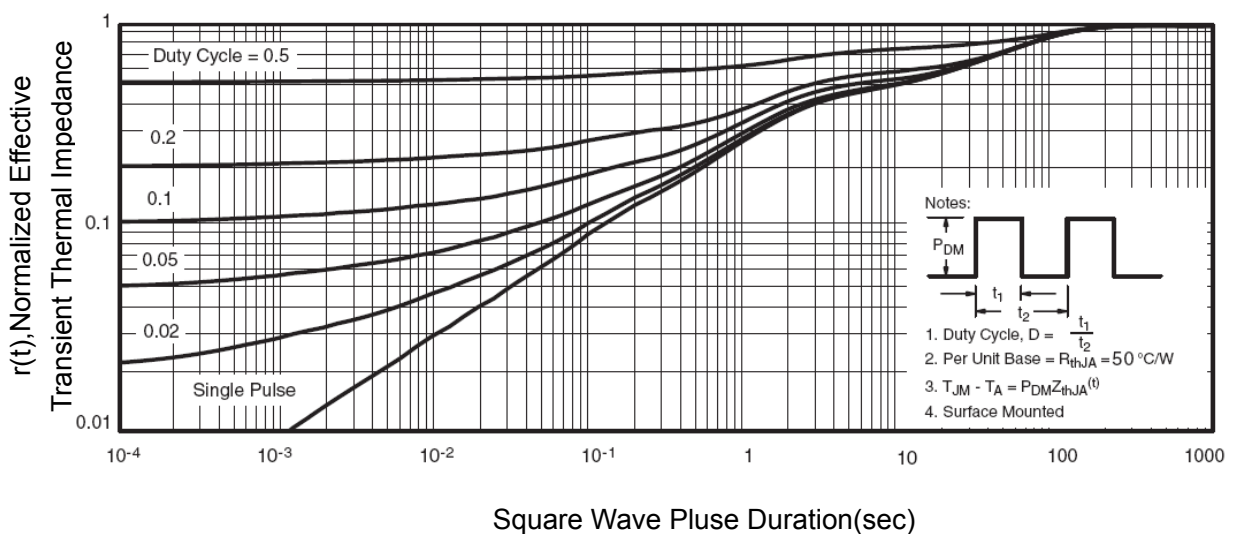
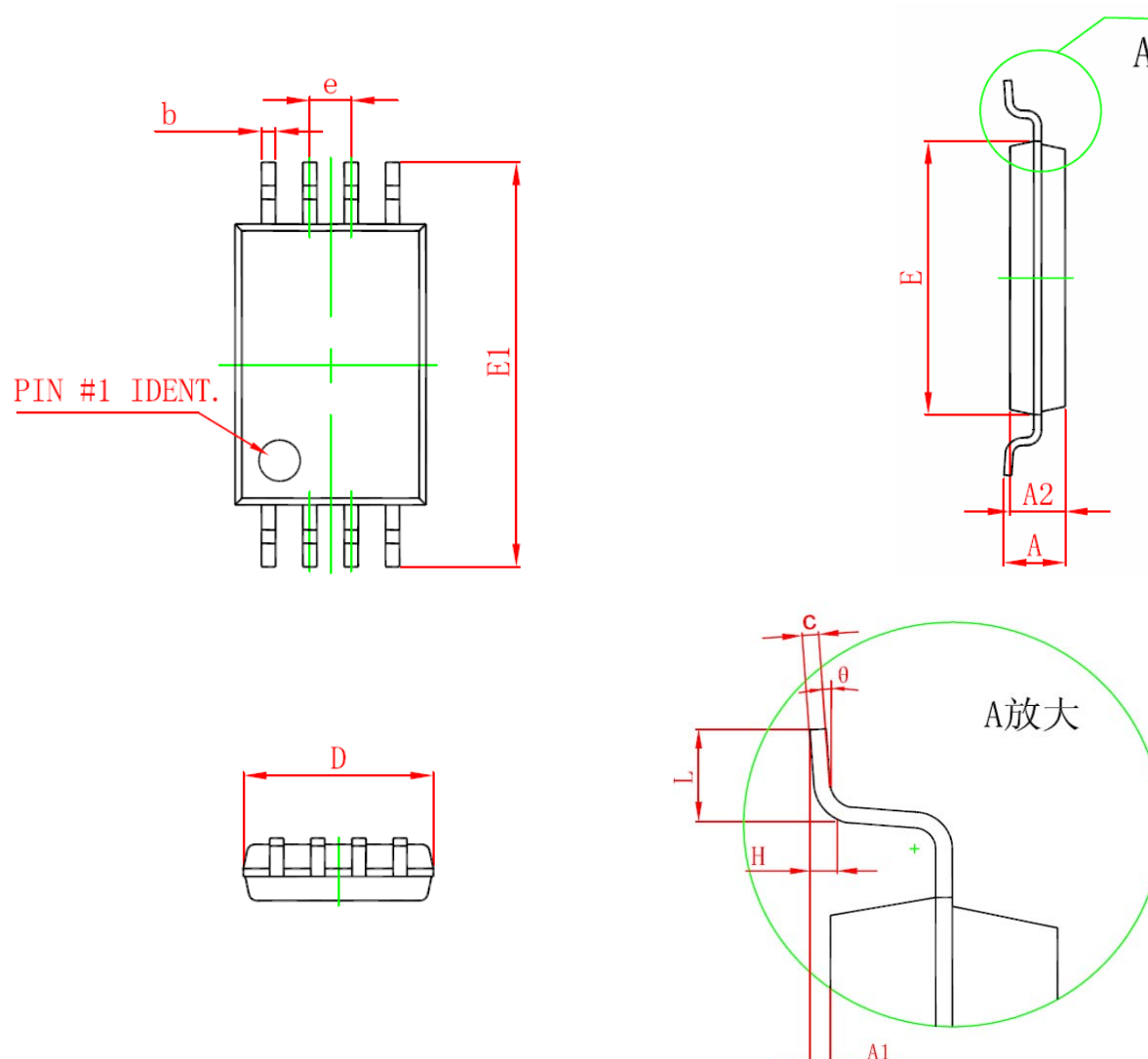


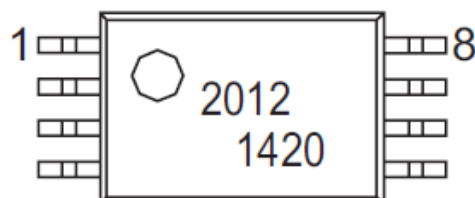
Figure 11 Normalized Maximum Transient Thermal Impedance

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)	
θ	1°	7°

Marking Contents



2012: Model NO.

1420: Date Code