

N-Channel Enhancement Mode Power MOSFET

Description

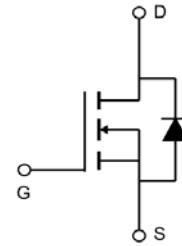
The PE83H5P uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

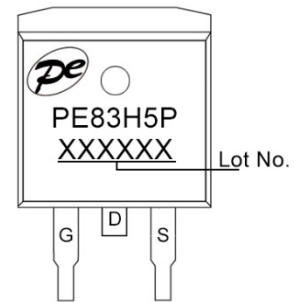
- $V_{DS} = 30V$, $I_D = 150A$
- $R_{DS(ON)} < 2.4m\Omega$ @ $V_{GS}=10V$
- $R_{DS(ON)} < 3.3m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

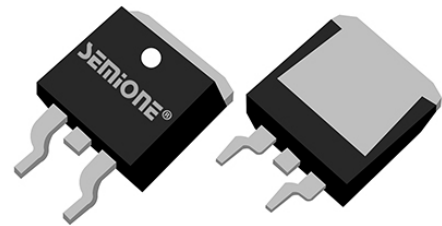
- PWM applications
- Load switch
- Power management
- DC/DC Converter



Schematic diagram



Marking and pin assignment



TO-263

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	150	A
Drain Current-Continuous (TC=100°C)	I_D	105	A
Pulsed Drain Current (Note 1)	I_{DM}	560	A
Maximum Power Dissipation	P_D	176	W
Avalanche Energy (L=0.5mH)	E_{AS}	625	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	0.85	°C/W
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Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.7	2.4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	2	2.4	mΩ
		V _{GS} =4.5V, I _D =15A	-	2.7	3.3	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =10A	-	45	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	6100	-	pF
Output Capacitance	C _{oss}		-	650	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rss}		-	530	-	pF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, R _L =1Ω, V _{GS} =10V, R _G =3Ω	-	26	-	nS
Turn-on Rise Time	t _r		-	24	-	nS
Turn-Off Delay Time	t _{d(off)}		-	91	-	nS
Turn-Off Fall Time	t _f		-	39	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =20A, V _{GS} =10V	-	74	-	nC
Gate-Source Charge	Q _{gs}		-	21	-	nC
Gate-Drain Charge	Q _{gd}		-	27	-	nC
Body Diode Reverse Recovery Time	t _{rr}	I _F =20A, dI/dt=500A/μs	-	21	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	58	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.2	V

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 product.

Typical Electrical and Thermal Characteristics

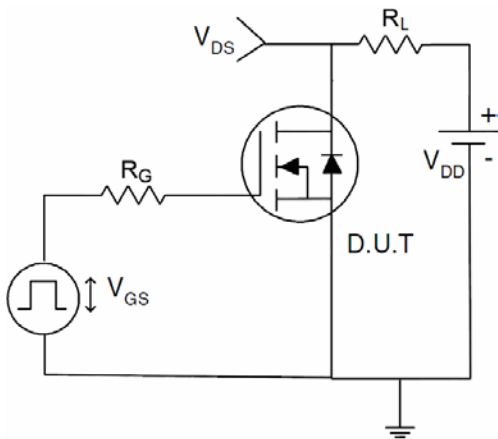


Figure 1 Switching Test Circuit

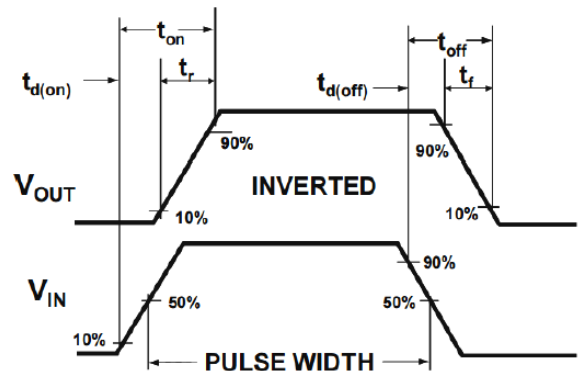
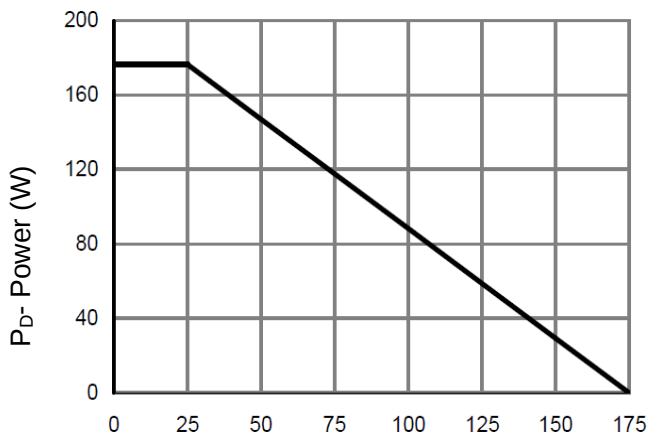
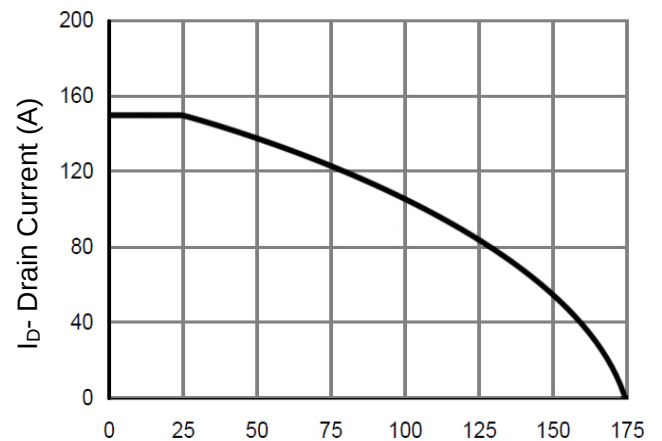


Figure 2 Switching Waveform



T_J -Junction Temperature ($^{\circ}\text{C}$)

Figure 3 Power De-rating



T_J -Junction Temperature ($^{\circ}\text{C}$)

Figure 4 Drain Current

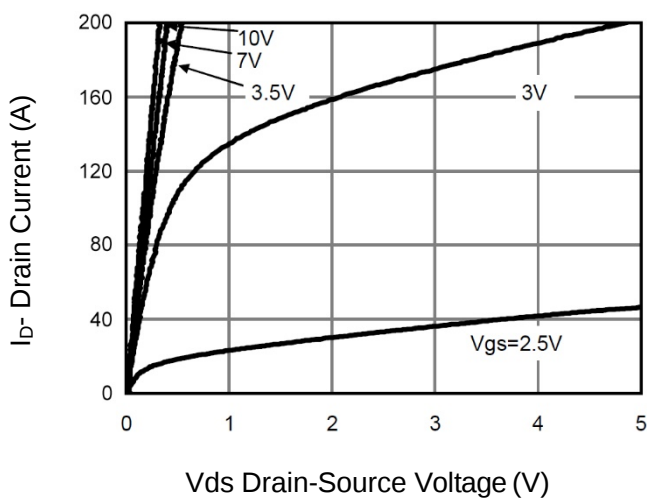


Figure 5 Output Characteristics

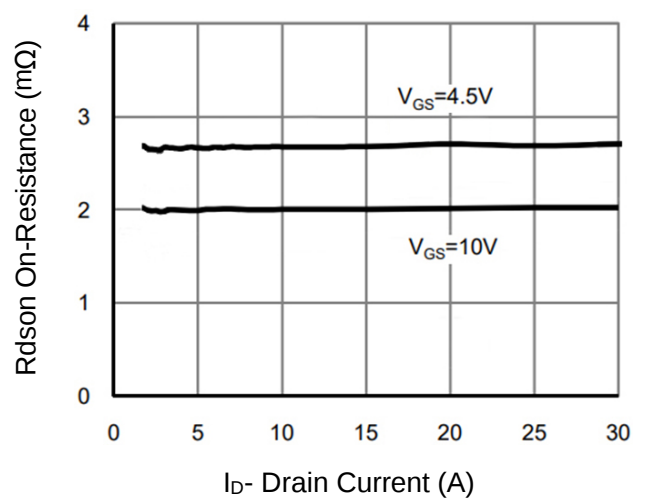


Figure 6 Rdson vs Drain Current

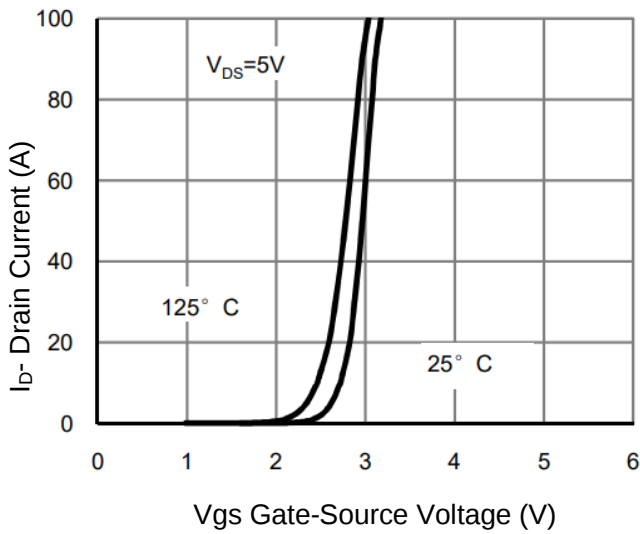


Figure 7 Transfer Characteristics

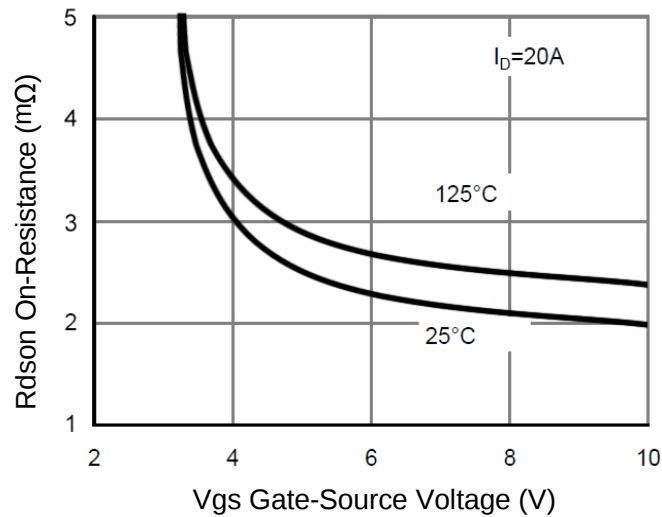


Figure 9 $R_{DS(on)}$ vs V_{GS}

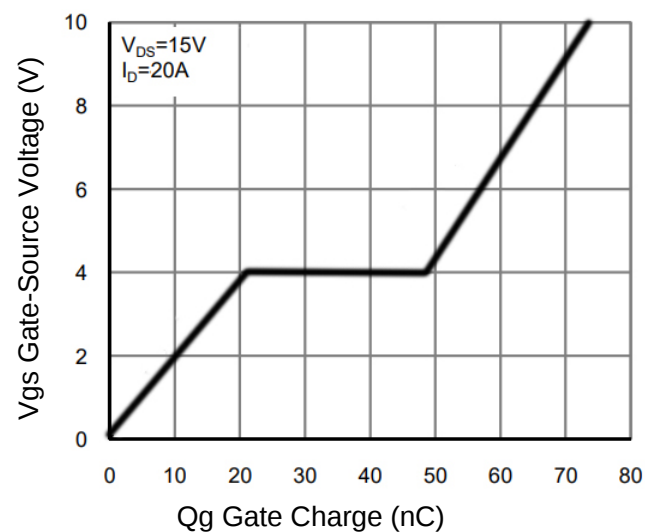


Figure 11 Gate Charge

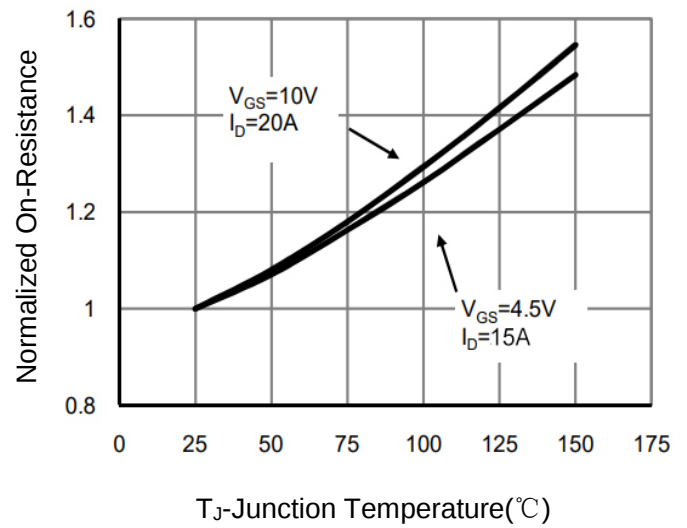


Figure 8 $R_{DS(on)}$ vs Junction Temperature

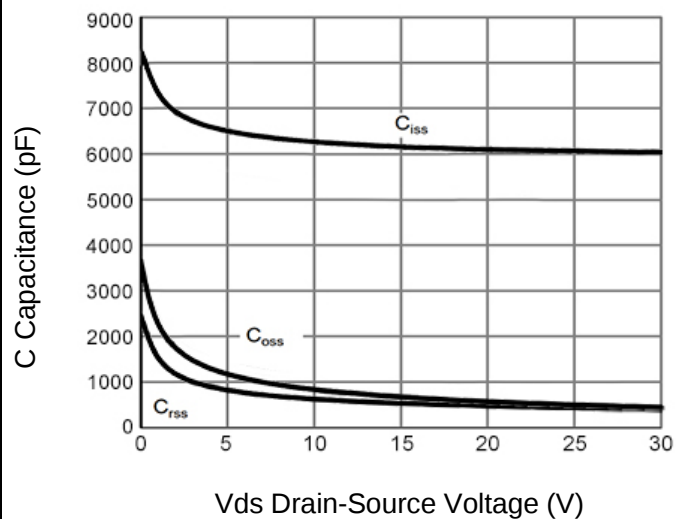


Figure 10 Capacitance vs V_{DS}

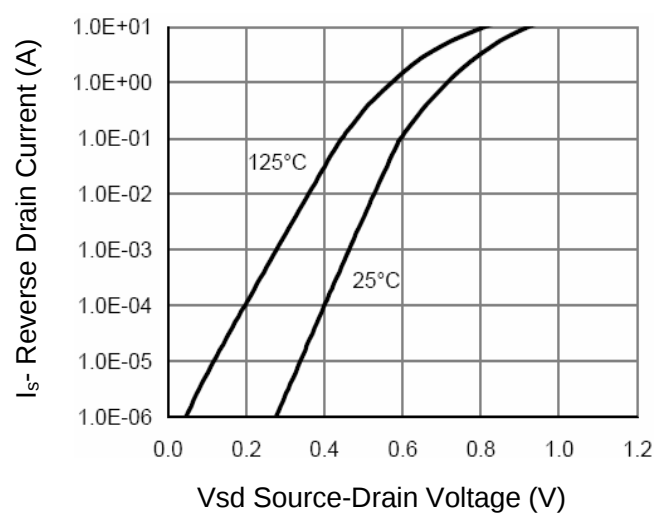


Figure 12 Source- Drain Diode Forward

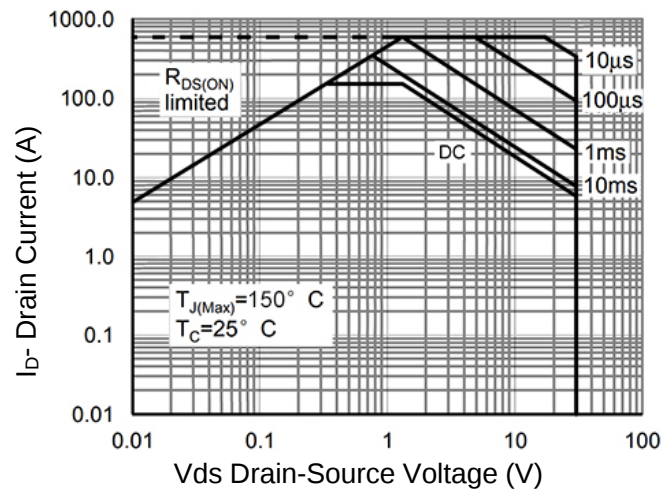


Figure 13 Safe Operation Area

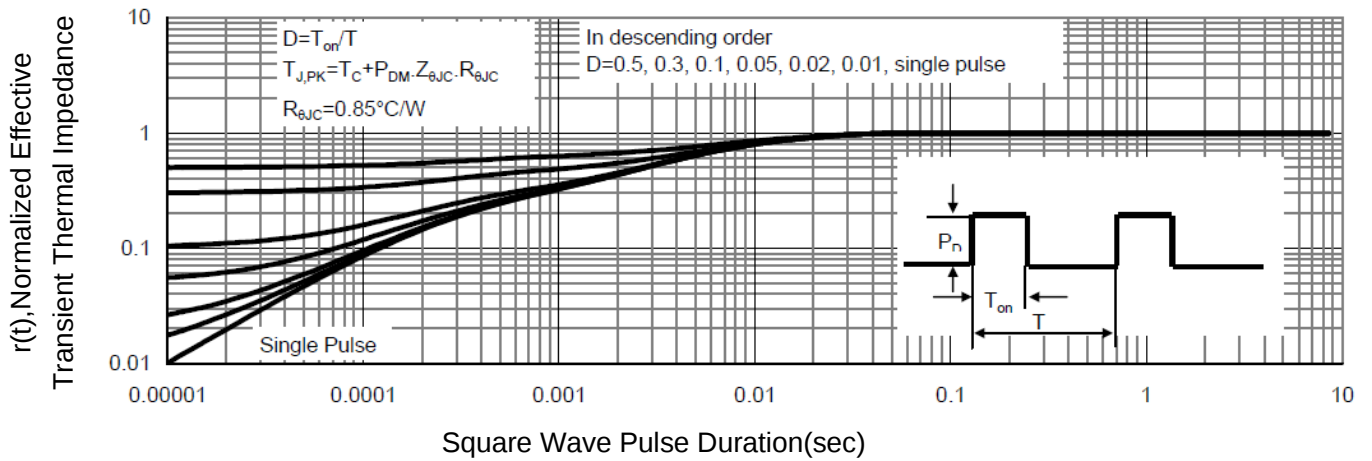
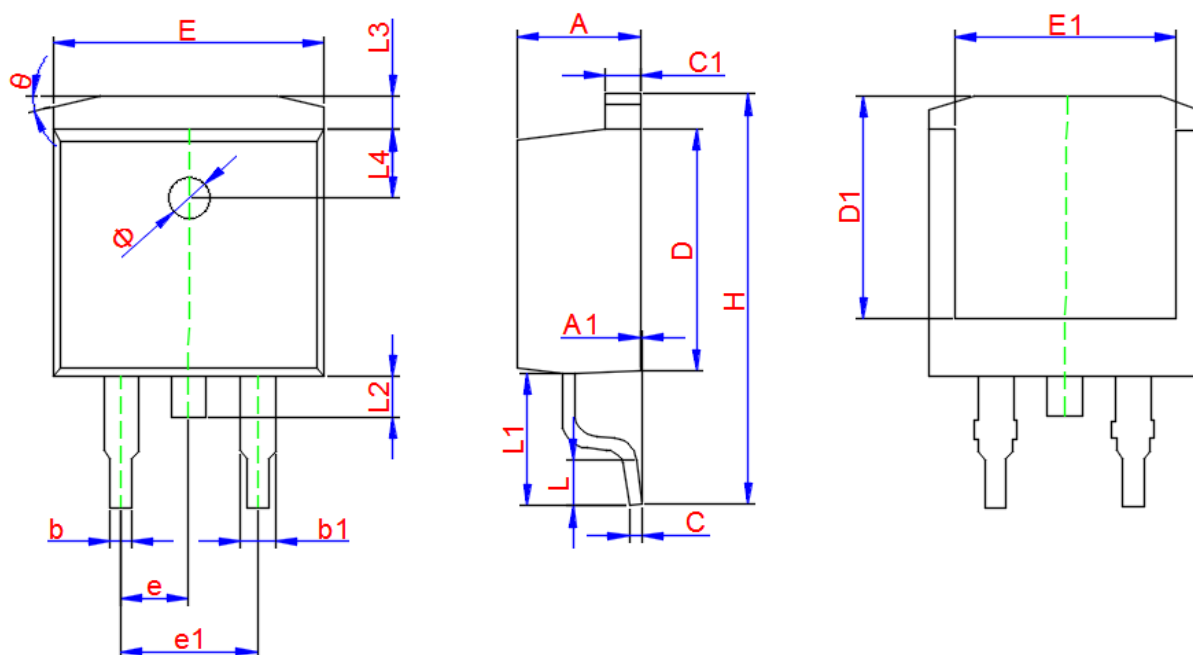


Figure 14 Normalized Maximum Transient Thermal Impedance

TO-263 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	4.300	4.500	4.700
A1	0.000	--	0.250
b	0.700	0.800	0.900
b1	1.200	1.300	1.400
c	0.400	0.470	0.550
c1	1.250	1.300	1.350
D	9.000	9.100	9.200
D1	8.000	8.100	8.200
H	14.90	15.20	15.50
E	9.800	10.00	10.20
E1	7.850	8.000	8.150
e1	4.930	5.080	5.230
L	2.000	2.200	2.450
L1	4.600	4.800	5.000
L2	1.300	1.500	1.700
L3	1.150	1.250	1.350
L4	2.400	2.500	2.600
Φ	1.5TYP.		
e	2.54TYP.		
θ	13° TYP.		