N-Channel Enhancement Mode Power MOSFET

Description

The PE1505 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.
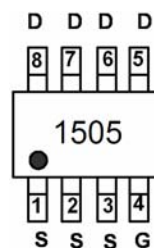
General Features

● V_{DS} =150V, I_D =5.2A

    $R_{DS(ON)}$ < 44mΩ @ V_{GS}=10V　（Typ：31mΩ）

● High density cell design for ultra low Rdson
● Fully characterized avalanche voltage and current
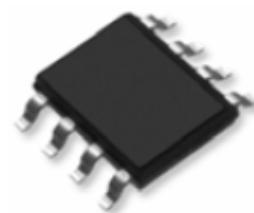● Low gate to drain charge to reduce switching losses

Application

● Power switching application
● Hard switched and high frequency circuits
● Uninterruptible power supply
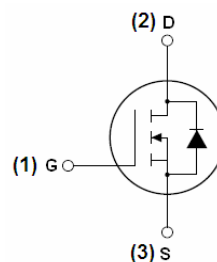
Schematic diagram

Marking and pin assignment

SOP-8 top view

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	5.2	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	3.7	A
Pulsed Drain Current(Note 1)	I_{DM}	42	A
Maximum Power Dissipation	P_D	3.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	35.7	℃/W

Electrical Characteristics (T$_A$=25℃ unless otherwise noted)

| Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$=0V I$_D$=250µA	150	170	-	V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$=150V,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	2.5	3.2	4.5	V
Drain-Source On-State Resistance	R$_{DS(ON)}$	V$_{GS}$=10V, I$_D$=5.2A	-	31	44	mΩ
Forward Transconductance	g$_{FS}$	V$_{DS}$=50V,I$_D$=5.2A	12	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C$_{Iss}$	V$_{DS}$=25V,V$_{GS}$=0V, F=1.0MHz	-	1700	-	PF
Output Capacitance	C$_{oss}$		-	190	-	PF
Reverse Transfer Capacitance	C$_{rss}$		-	90	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t$_{d(on)}$	V$_{DD}$=75V,I$_D$=3.1A V$_{GS}$=10V,R$_{GEN}$=6.5Ω	-	15	-	nS
Turn-on Rise Time	t$_r$		-	13	-	nS
Turn-Off Delay Time	t$_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t$_f$		-	14	-	nS
Total Gate Charge	Q$_g$	V$_{DS}$=75V,I$_D$=3.1A, V$_{GS}$=10V	-	35.8	-	nC
Gate-Source Charge	Q$_{gs}$		-	7.5	-	nC
Gate-Drain Charge	Q$_{gd}$		-	13	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V$_{SD}$	V$_{GS}$=0V,I$_S$=3.1A	-	-	1.2	V
Diode Forward Current (Note 2)	I$_S$		-	-	2.7	A
Reverse Recovery Time	trr	T$_J$ = 25°C, I$_F$ = 3.1A, V$_{DD}$ = 25V,di/dt = 100A/µs	-	50	-	nS
Reverse Recovery Charge	Qrr		-	140	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

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

4. Guaranteed by design, not subject to production.

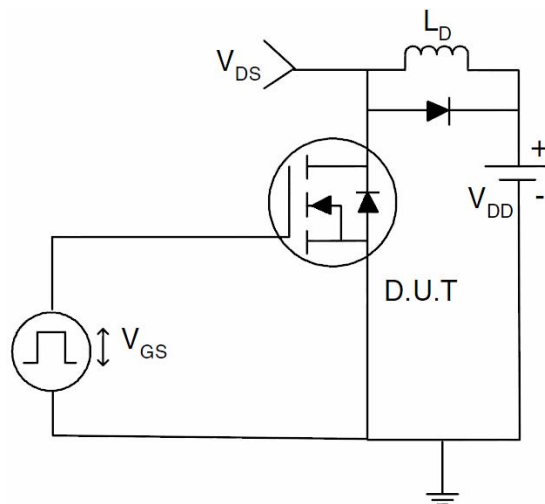## Test Circuit

1) E_{AS} test Circuits
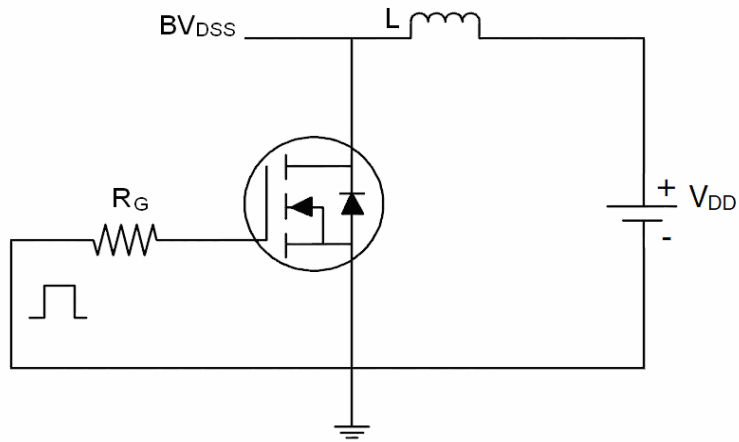
2) Gate charge test Circuit
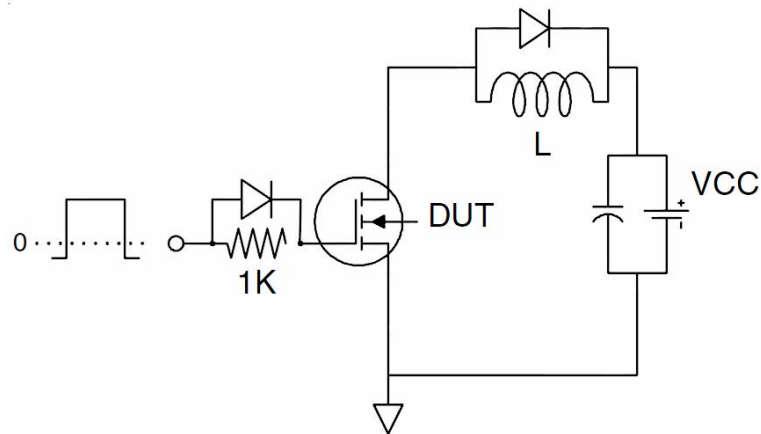
3) Switch Time Test Circuit
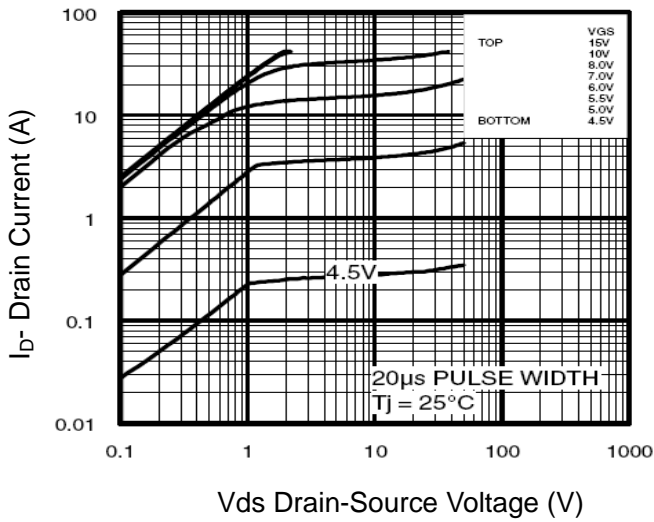
Typical Electrical and Thermal Characteristics (Curves)
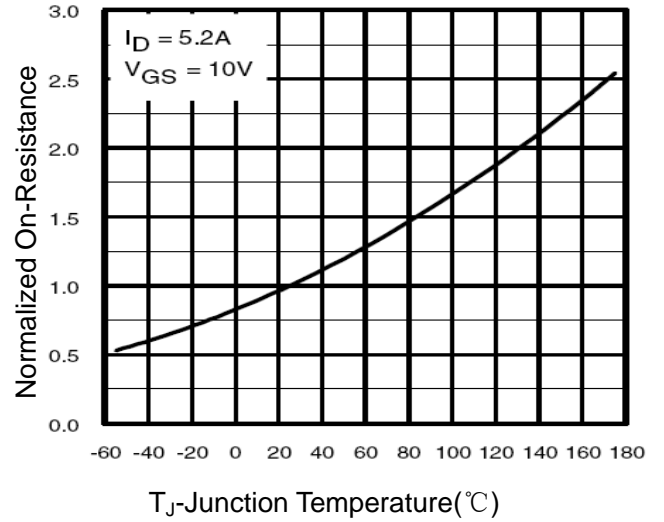
Figure 1 Output Characteristics

Figure 2 Transfer Characteristics
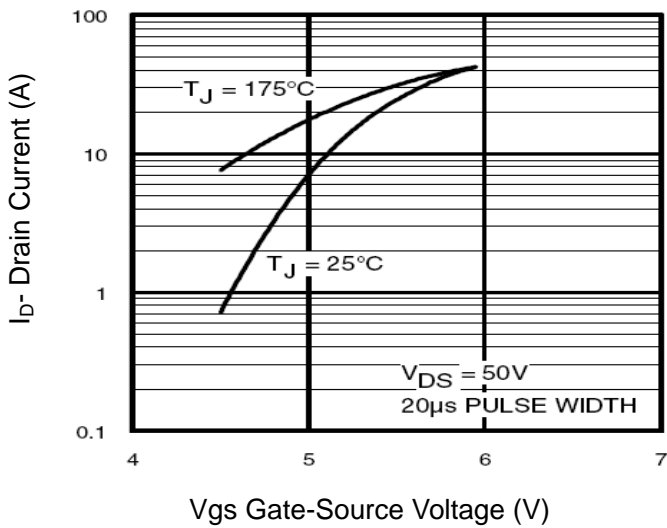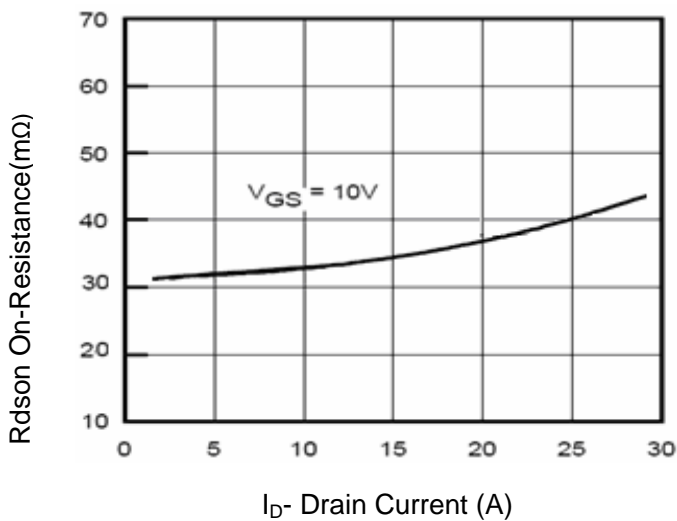
Figure 3 Rdson- Drain Current

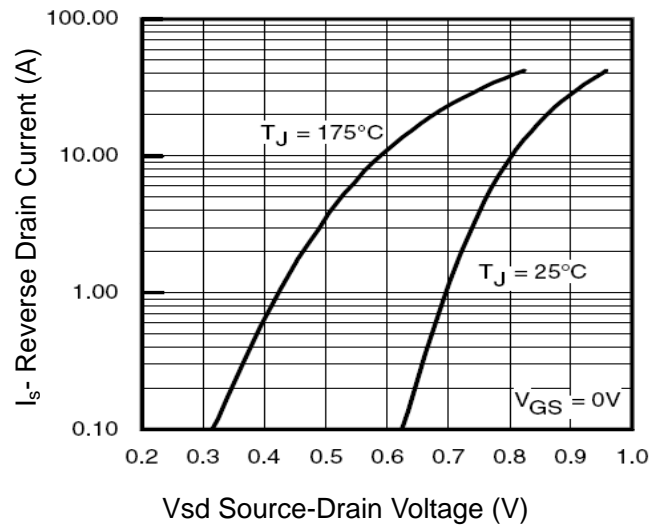**Figure 4 Rdson-JunctionTemperature**

Figure 5 Gate Charge
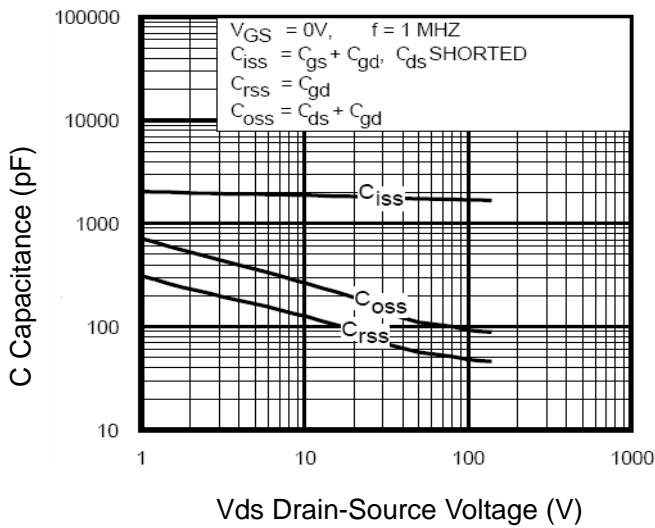
Figure 6 Source- Drain Diode Forward
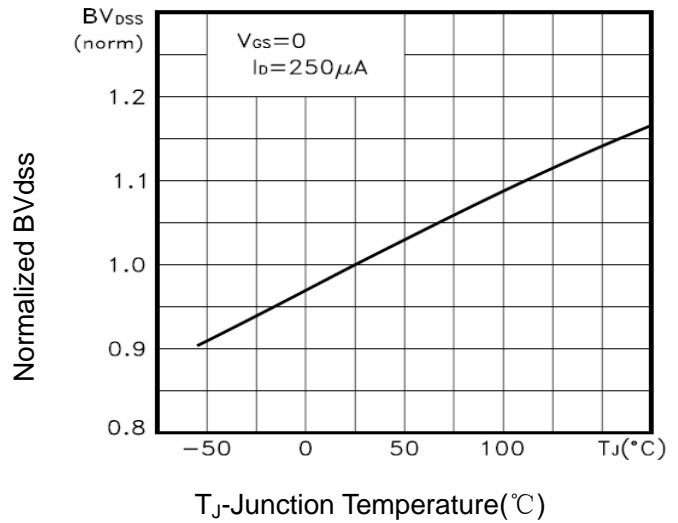
Figure 7 Capacitance vs Vds

Figure 9   BV_DSS vs Junction Temperature
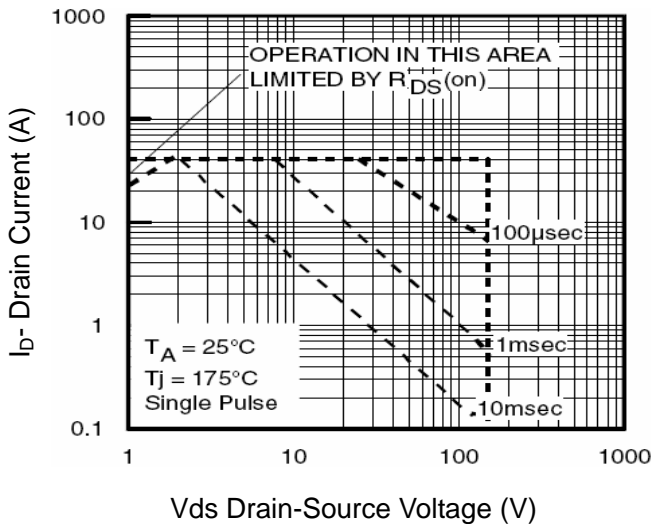

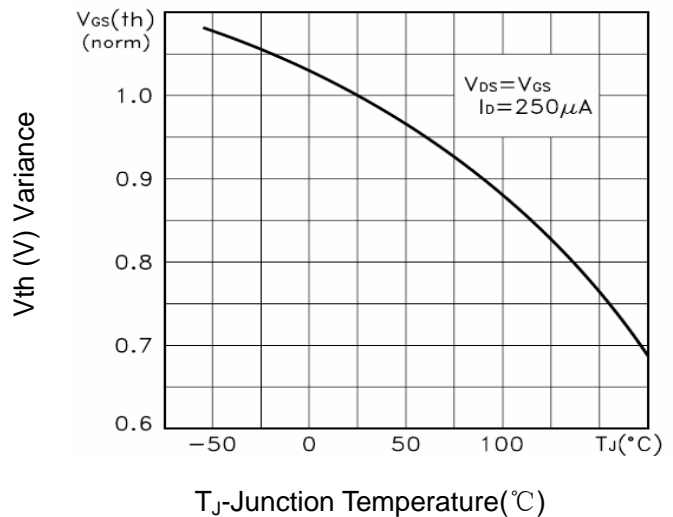Figure 8   Safe Operation Area

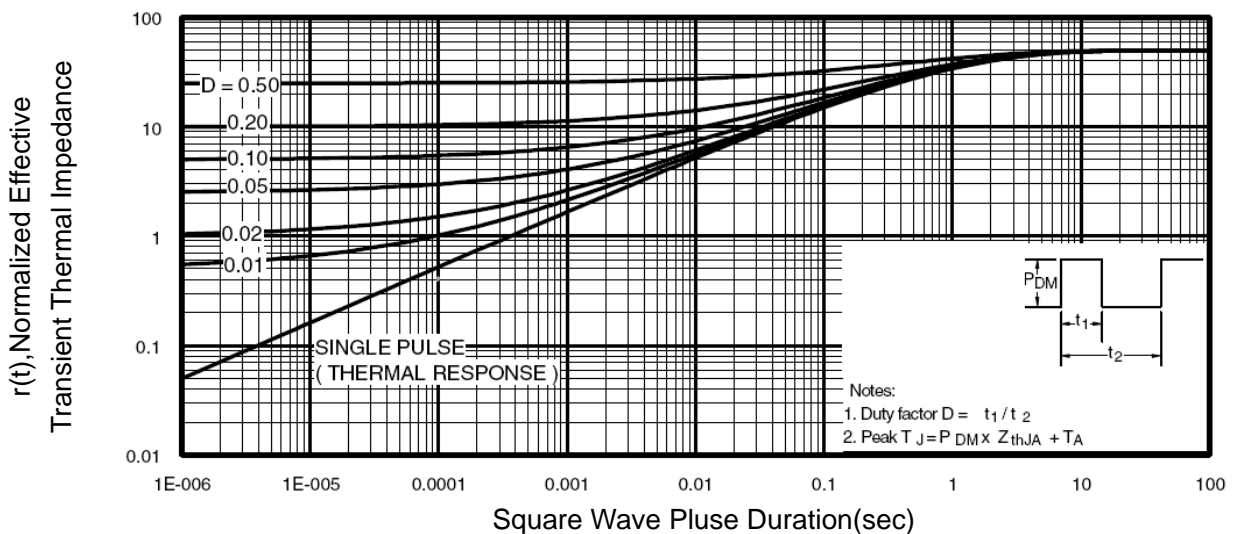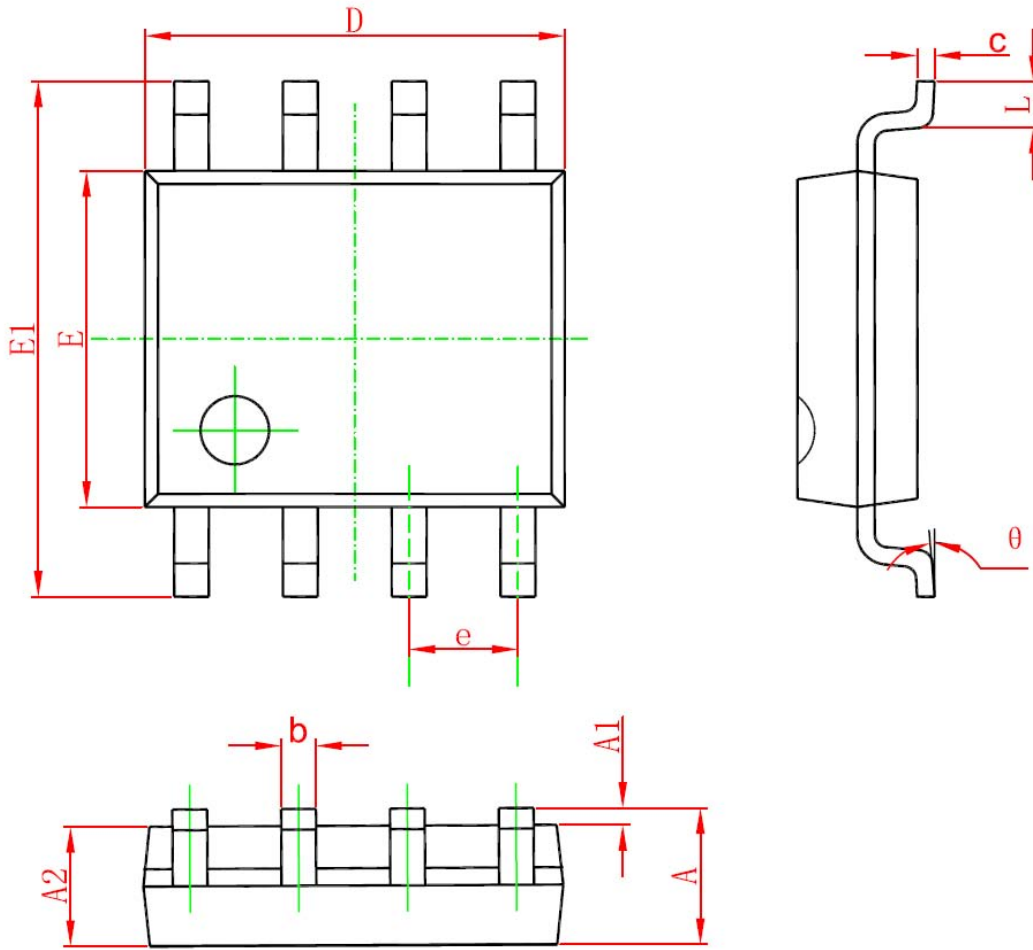Figure 10   V_GS(th) vs Junction Temperatur

Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°