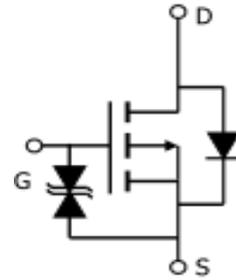


P-Channel Trench Power MOSFET

General Description

The PM3415 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch applications

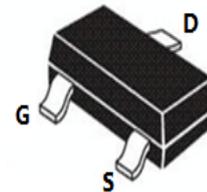


Features

- $V_{DS}=-20V$; $I_D=-4A$;
 $R_{DS(ON)}<50m\Omega$ @ $V_{GS}=-4.5V$
 $R_{DS(ON)}<70m\Omega$ @ $V_{GS}=-2.5V$
- High Power and current handing capability
- Lead free product is acquired
- ESD Rating 2000V HBM

Application

- PWM applications
- Load switch
- Power management



Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
R15	PM3415	SOT-23	3000units

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	-20	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 10	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$	-4	A
$I_{DM(pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	-30	A
P_D	Maximum Power Dissipation($T_c=25^\circ C$)	1.5	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$

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

Table 2. Thermal Characteristic

Symbol	Parameter	Value	Max	Unit
$R_{\theta JA}$	Thermal Resistance,Junction-to- Ambient	---	90	$^\circ C/W$

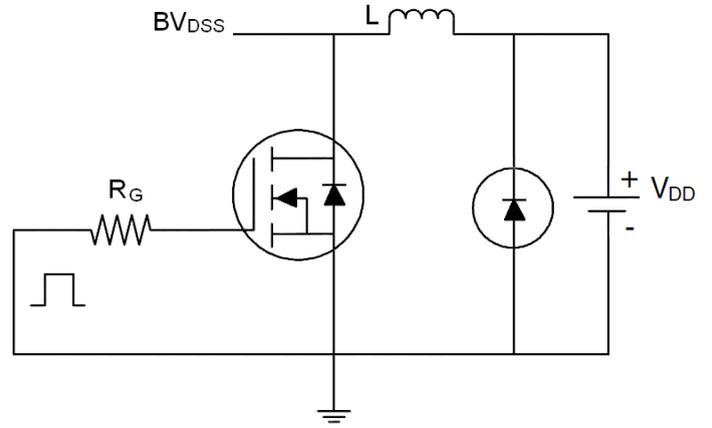
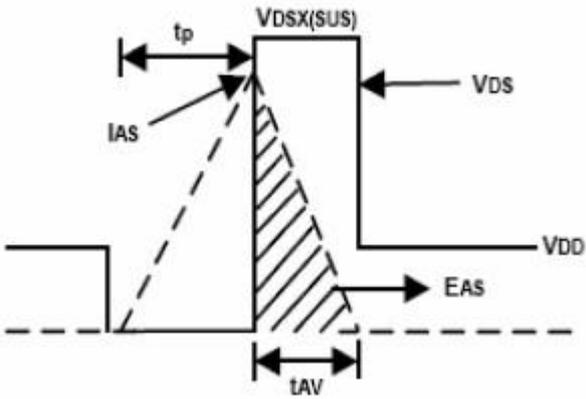
Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
B _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-20			V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =-20V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±10V, V _{DS} =0V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.7	-0.9	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-4A		38	50	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-2.5V, I _D =-4A		50	70	mΩ
Dynamic Characteristics						
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-4A		20		S
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1.0MHz		751		pF
C _{oss}	Output Capacitance			115		pF
C _{rss}	Reverse Transfer Capacitance			80		pF
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-4A, V _{GS} =-4.5V		9.3		nC
Q _{gs}	Gate-Source Charge			1		nC
Q _{gd}	Gate-Drain Charge			2.2		nC
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-4.5V, V _{DS} =-10V R _L =2.5Ω, R _G =3Ω		13		nS
t _r	Turn-on Rise Time			9		nS
t _{d(off)}	Turn-Off Delay Time			19		nS
t _f	Turn-Off Fall Time			29		nS
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				-4	A
V _{SD}	Forward On Voltage ^(Note 1)	T _J =25°C, I _{SD} =-4A, V _{GS} =0V	-0.5		-1.2	V

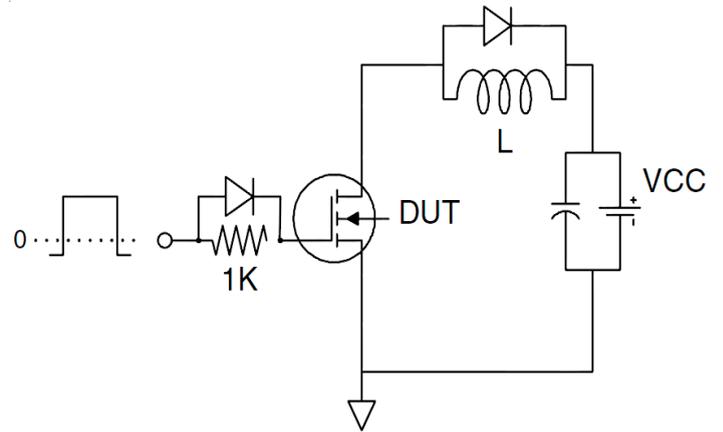
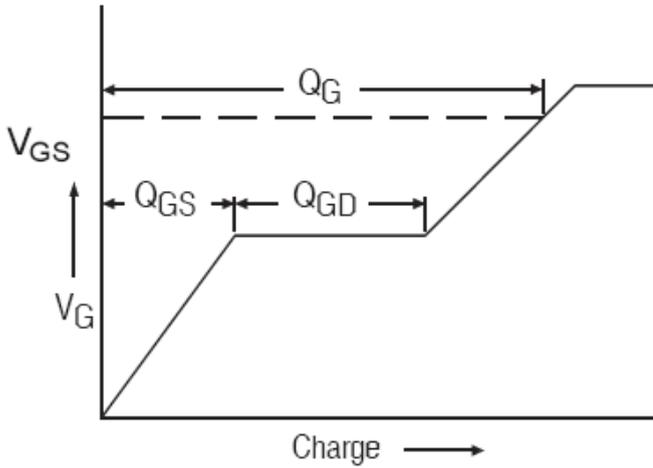
Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R_G=25Ω, Starting T_J=25°C

Test Circuit

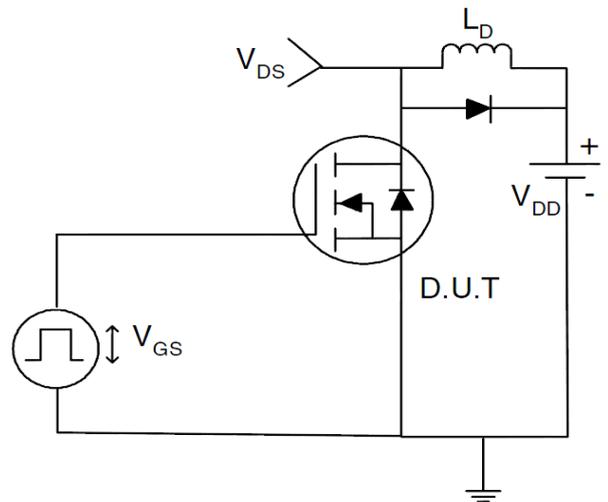
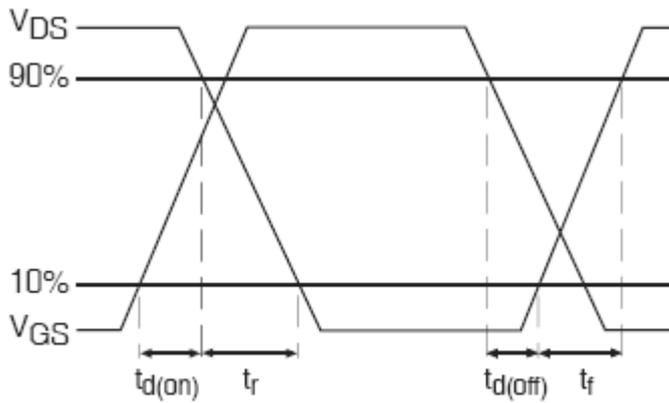
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Output Characteristics

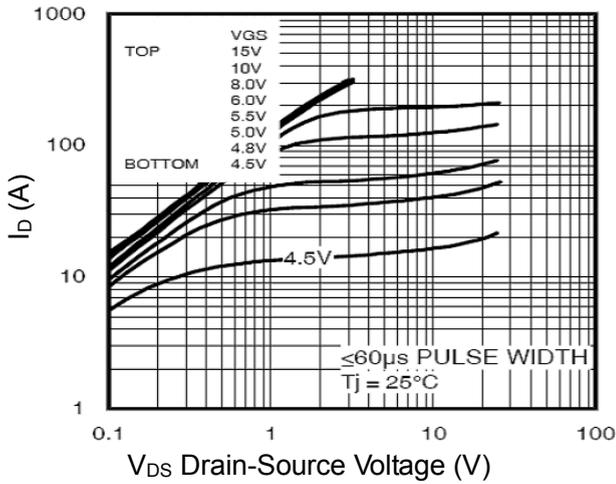


Figure2. Transfer Characteristics

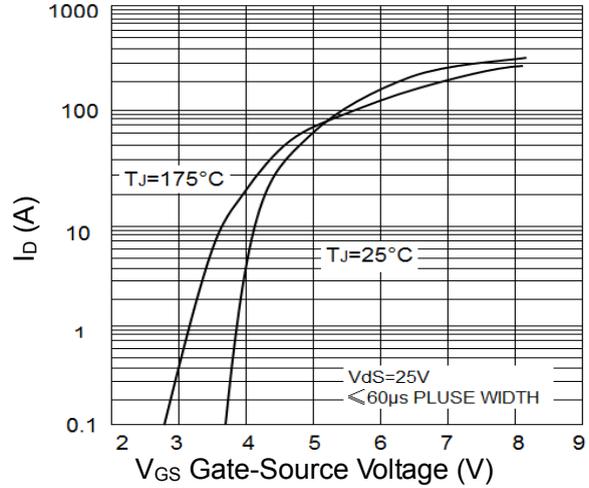


Figure3. BVDSS vs Junction Temperature

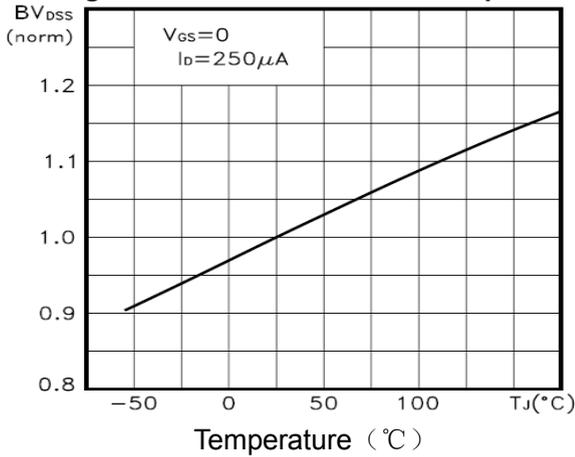


Figure4. Power Dissipation

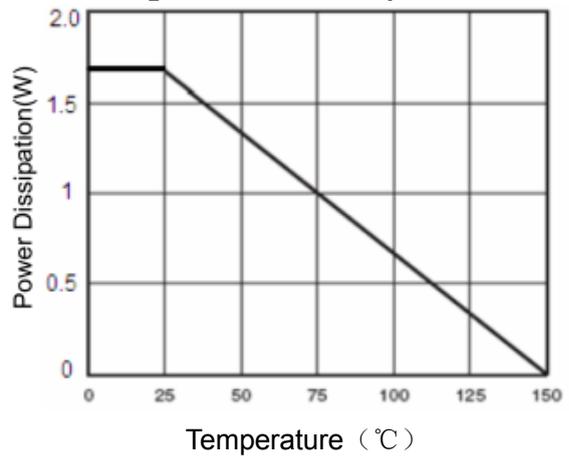


Figure7. BV_{DSS} vs Junction Temperature

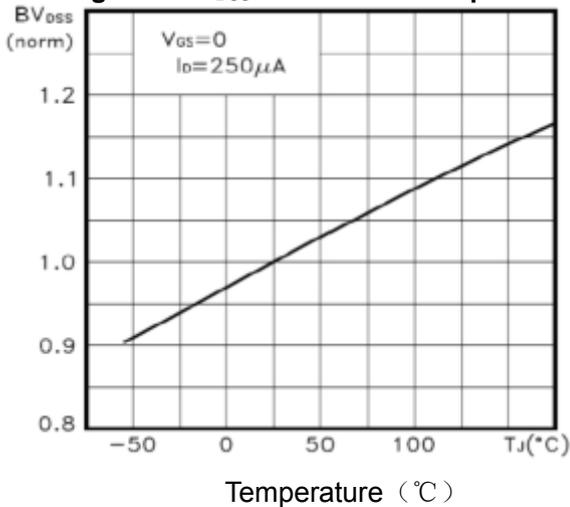


Figure8. V_{GS(th)} vs Junction Temperature

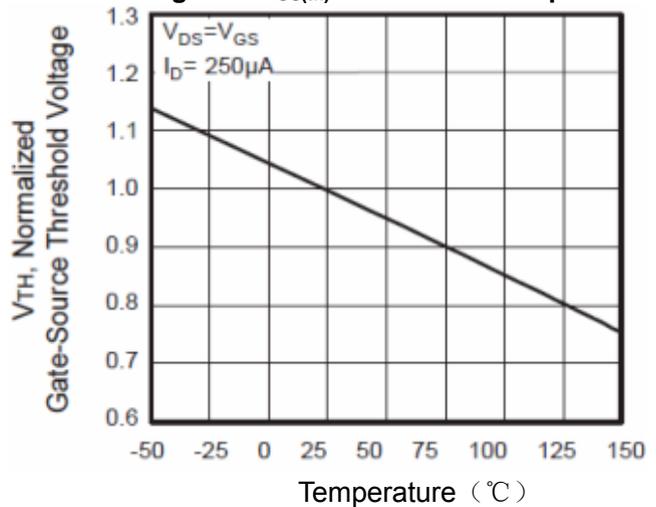


Figure7. Gate Charge

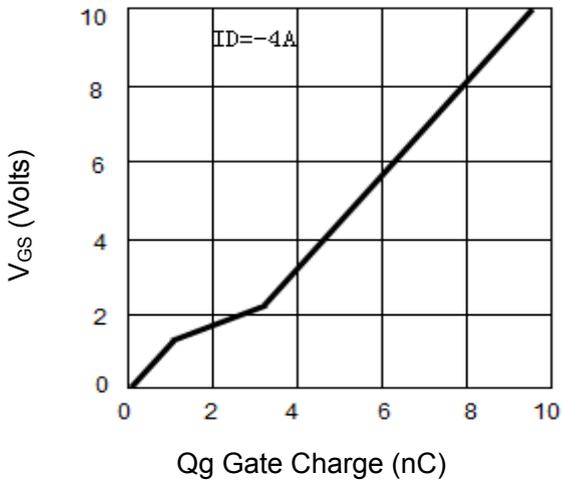


Figure9. Source- Drain Diode Forward

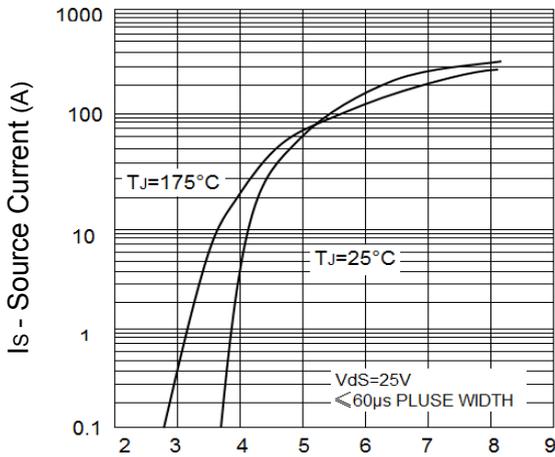


Figure8. Capacitance vs Vds

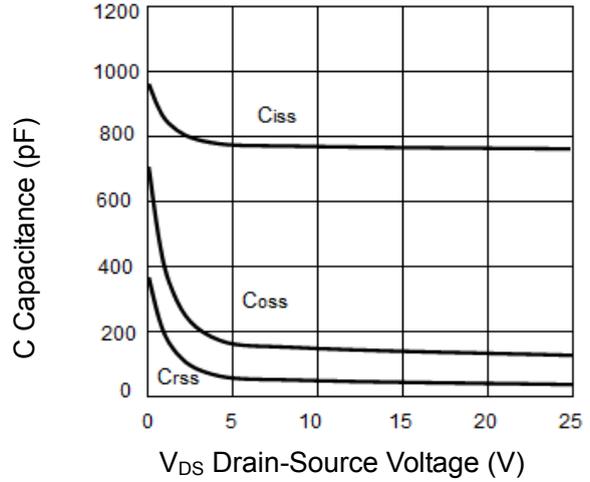


Figure10. Safe Operation Area

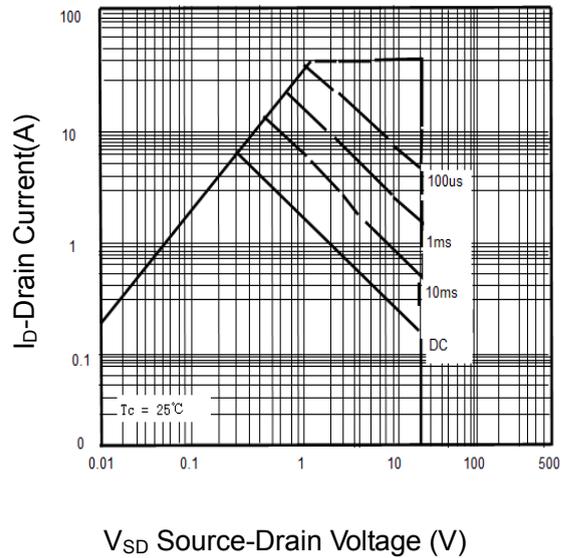
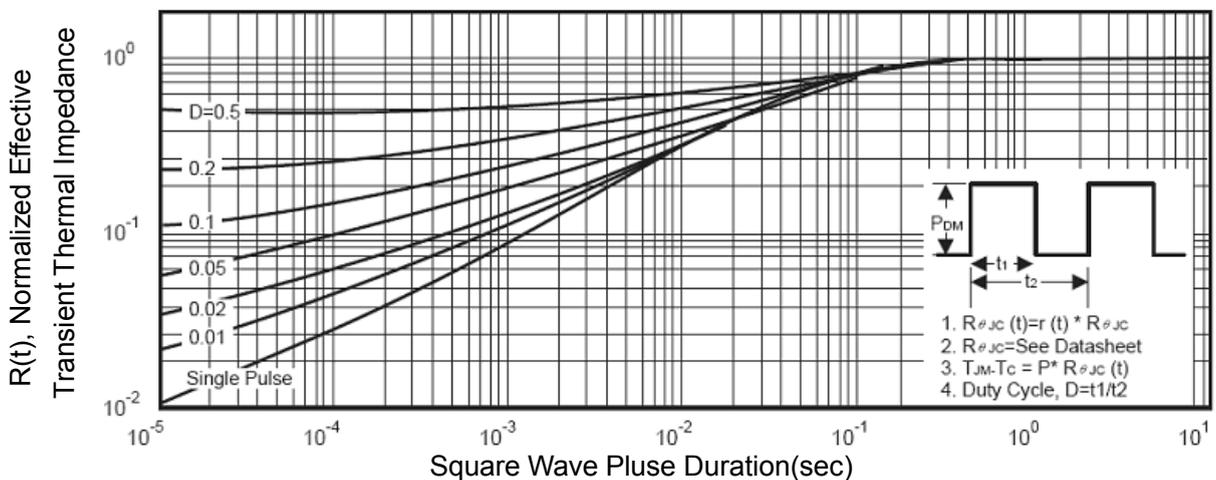
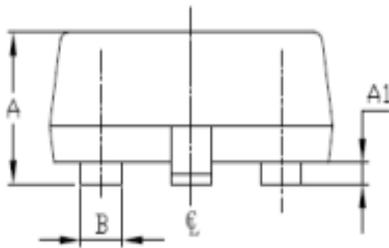
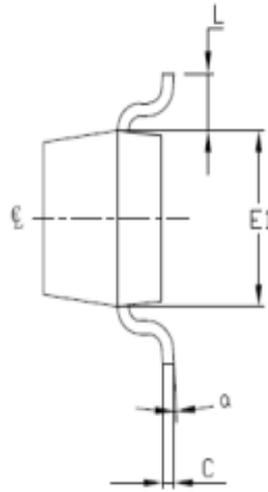
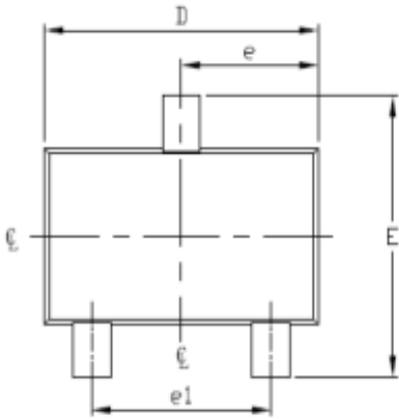


Figure11. Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information



COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	0.9	1.0	1.1
A1	0.00	0.06	0.1
B	0.3	0.4	0.5
C	0.07	0.09	0.18
D	2.8	2.9	3.04
E	2.1	2.33	2.64
E1	1.2	1.3	1.4
e	1.4	1.45	1.5
e1	1.80	1.90	2.00
L	0.45	0.54	0.63
a	0°	2.5°	7°