

20V P-Channel Enhancement Mode MOSFET

Description

The NP3417BEMR 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

- ◆ $V_{DS} = -20V$, $I_D = -3A$
 $R_{DS(ON)}(Typ.) = 51.8m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)}(Typ.) = 72.7m\Omega$ @ $V_{GS} = -2.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package
- ◆ ESD Rating: 2500V HBM

Application

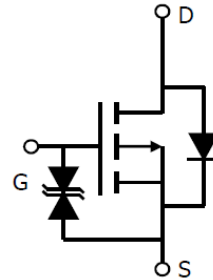
- ◆ PWM applications
- ◆ Load switch

Package

- ◆ SOT-23-3L

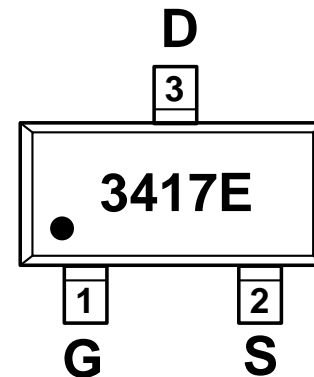


Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP3417BEMR-G	-55°C to +150°C	SOT-23-3L	3000

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

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	-20	V
Gate-source voltage	V_{GS}	±8	V
Continuous Drain Current ($T_J = 150^\circ C$)	I_D	$T_C = 25^\circ C$	-3
		$T_C = 70^\circ C$	-2
Continuous Source-Drain Diode Current	I_S	-2.1	A
Pulsed Drain Current ($t = 300 \mu s$)	I_{DM}	-12	
Maximum power dissipation	P_D	$T_C = 25^\circ C$	1.6
		$T_C = 70^\circ C$	1.1
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55—150	°C

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-body leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 8V$	-	-	± 10	μA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.7	-0.95	V
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-3A$	-	51.8	60	m Ω
		$V_{GS}=-2.5V, I_D=-3A$	-	72.7	83	
Forward transconductance	g_{fs}	$V_{GS}=-5V, I_D=-3A$	8	-	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	$V_{DS}=-10V, V_{GS}=0V$ $f=1.0MHz$	-	526	-	pF
Output capacitance	C_{OSS}		-	79.1	-	
Reverse transfer capacitance	C_{RSS}		-	58.6	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	$V_{DD}=-10V$ $I_D=-2.8A$ $V_{GEN}=-4.5V$ $R_L=5\Omega$ $R_{GEN}=3\Omega$	-	8	-	ns
Rise time	t_r		-	4	-	
Turn-off delay time	$t_{D(OFF)}$		-	13.5	-	
Fall time	t_f		-	4	-	
Total gate charge	Q_g	$V_{DS}=-10V, I_D=-3A$ $V_{GS}=-4.5V$	-	11	-	nC
Gate-source charge	Q_{gs}		-	1.3	-	
Gate-drain charge	Q_{gd}		-	1.4	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_S=-1.25A$	-	-0.81	-1.2	V

Thermal Characteristics

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	$t \leq 5 s$ $R_{\theta JA}$	100	130	°C/W
Maximum Junction-to-Foot (Drain)	Steady State $R_{\theta JF}$	60	75	

Typical Performance Characteristics

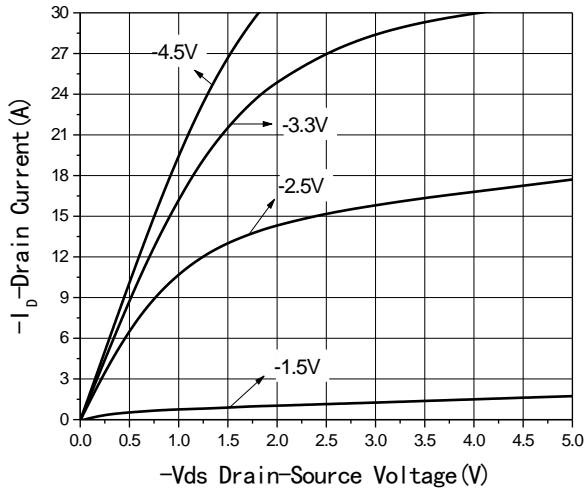


Fig1 Output Characteristics

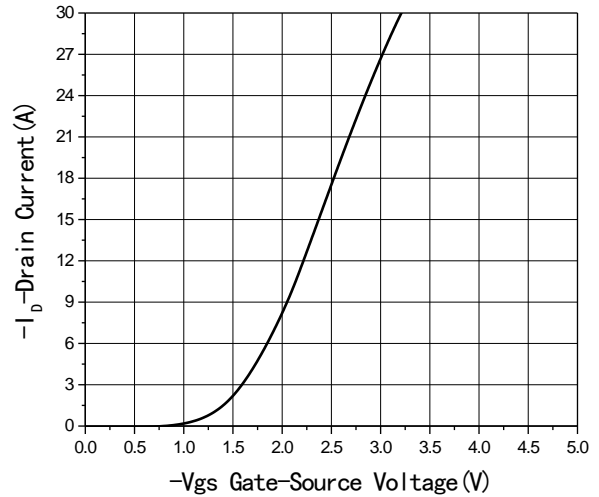


Fig2 Transfer Characteristics

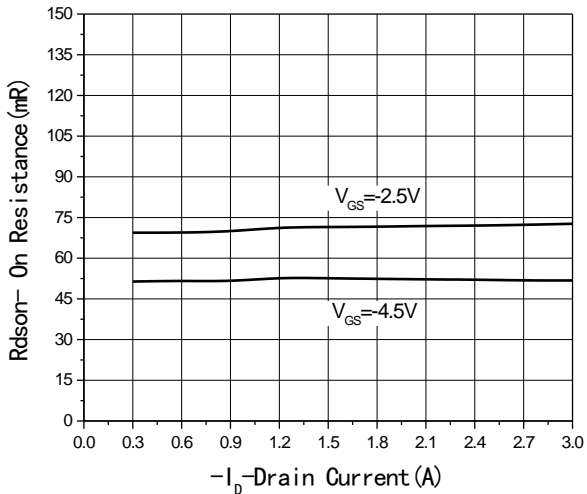


Fig3 R_{dson} -Drain current

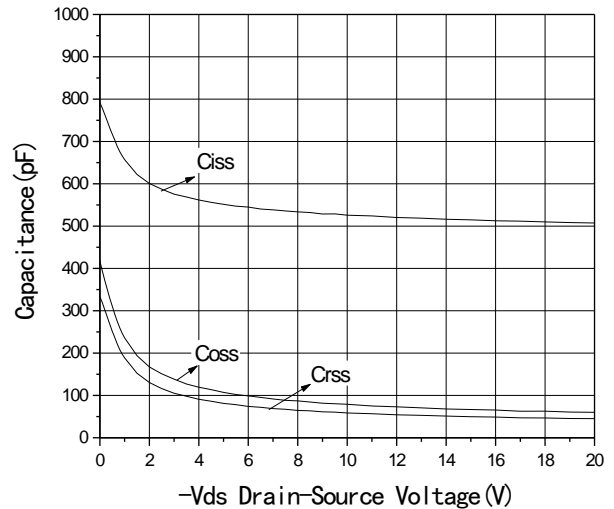


Fig4 Capacitance vs V_{DS}

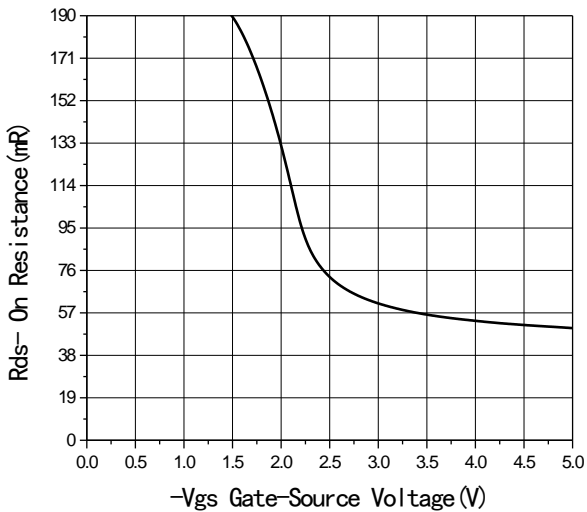


Fig5 R_{dson} -Gate Drain voltage

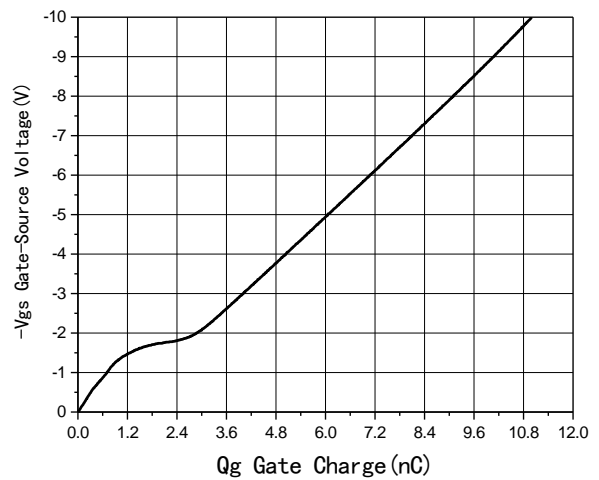


Fig6 Gate Charge

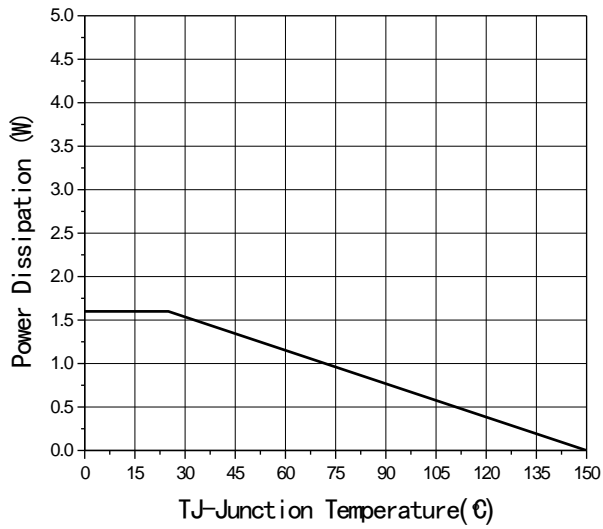


Fig7 Power De-rating

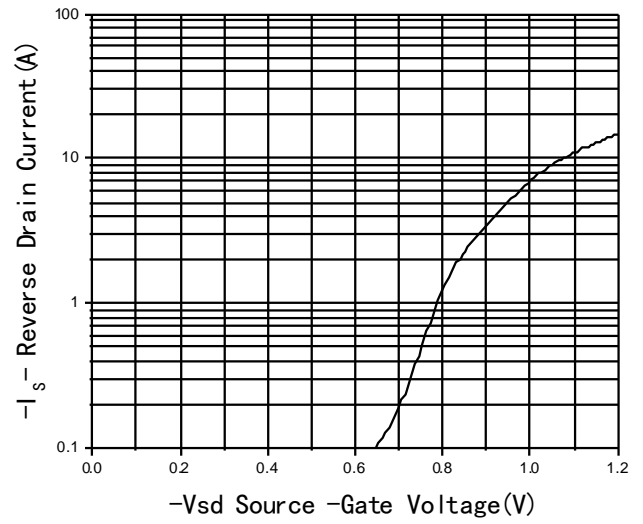
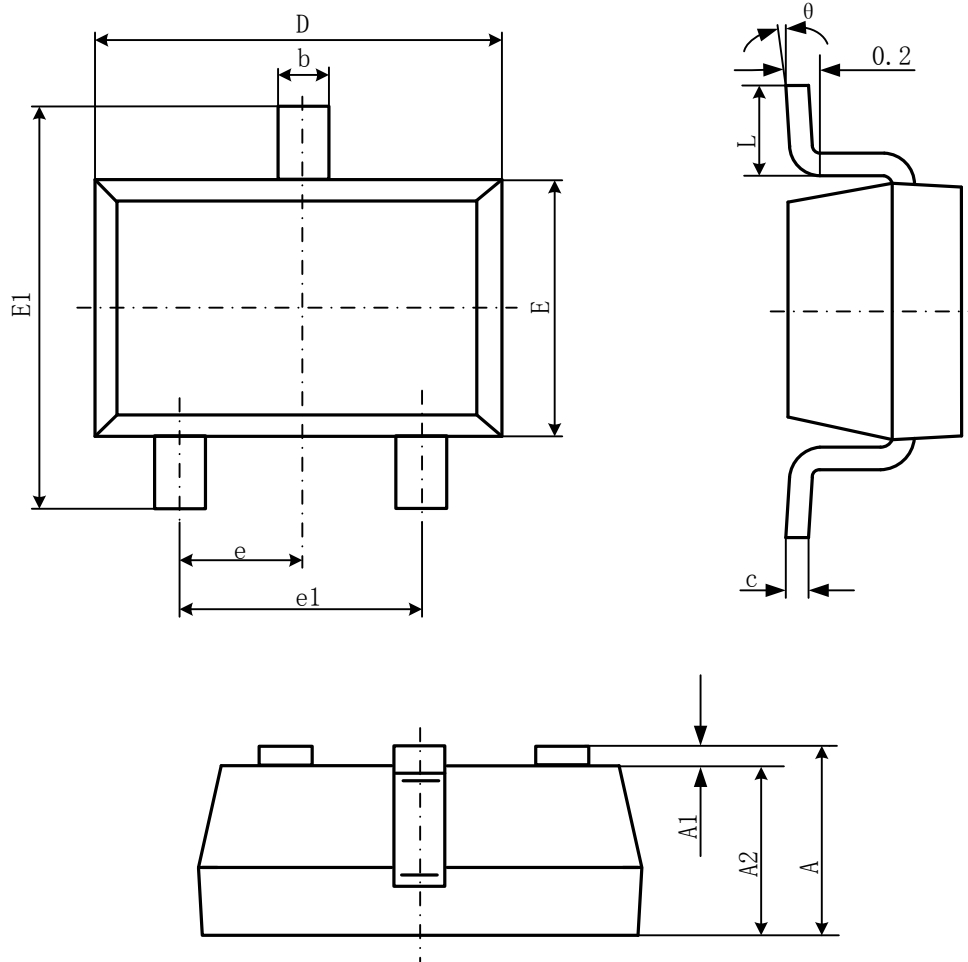


Fig8 Source-Drain Diode Forward

Package Information

- SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°