

N-Channel Enhancement Mode MOSFET

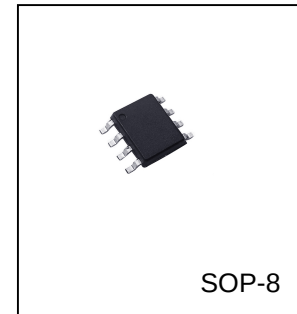
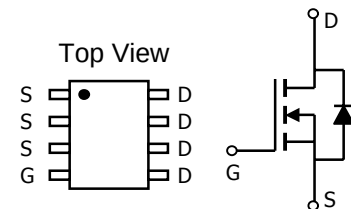
FEATURES

- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Lead free product is acquired

- VDS (V) = 30V ID = 12A
- RDS(ON) < 14mΩ (VGS = 10V)
- RDS(ON) < 16mΩ (VGS = 4.5V)
- RDS(ON) < 22mΩ (VGS = 2.5V)

4402

N-Channel MOSFET



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

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current ^A	$T_A=25^{\circ}\text{C}$	I	12	A
	$T_A=70^{\circ}\text{C}$		10	
Pulsed Drain Current ^B		I_{DM}	80	
Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	3	W
	$T_A=70^{\circ}\text{C}$		2.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient ^A	$t \leq 10\text{s}$	$R_{\theta JA}$	23	40	°C/W
Maximum Junction-to-Ambient ^A	Steady-State		48	65	°C/W
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	12	16	°C/W

Electrical Characteristics (TA=25°C, unless otherwise noted)
4402

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu A$, $V_{GS}=0V$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24V$, $V_{GS}=0V$ $T_J=55^\circ C$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0V$, $V_{GS}=\pm 12V$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu A$	0.6	0.8	1.2	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5V$, $V_{DS}=5V$	60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=12A$ $T_J=125^\circ C$		11.1 16	14 19.2	$m\Omega$
		$V_{GS}=4.5V$, $I_D=10A$		13.1	16	$m\Omega$
		$V_{GS}=2.5V$, $I_D=8A$		21	26	$m\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5V$, $I_D=5A$	25	50		S
V_{SD}	Diode Forward Voltage	$I_S=10A$, $V_{GS}=0V$		0.8	1	V
I_S	Maximum Body-Diode Continuous Current				4.5	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0V$, $V_{DS}=15V$, $f=1MHz$		1630		pF
C_{oss}	Output Capacitance			201		pF
C_{rss}	Reverse Transfer Capacitance			142		pF
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $f=1MHz$		0.8		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5V$, $V_{DS}=15V$, $I_D=12A$		19		nC
Q_{gs}	Gate Source Charge			3.3		nC
Q_{gd}	Gate Drain Charge			5.2		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10V$, $V_{DS}=15V$, $R_L=1.2\Omega$, $R_{GEN}=3\Omega$		3		ns
t_r	Turn-On Rise Time			4.7		ns
$t_{D(off)}$	Turn-Off DelayTime			33.5		ns
t_f	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=10A$, $dI/dt=100A/\mu s$		21		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=10A$, $dI/dt=100A/\mu s$		11		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ C$. The value in any a given application depends on the user's specific board design. The current rating is based on the $t \leq 10s$ thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using 80 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ C$. The SOA curve provides a single pulse rating.

4402 Typical Characteristics

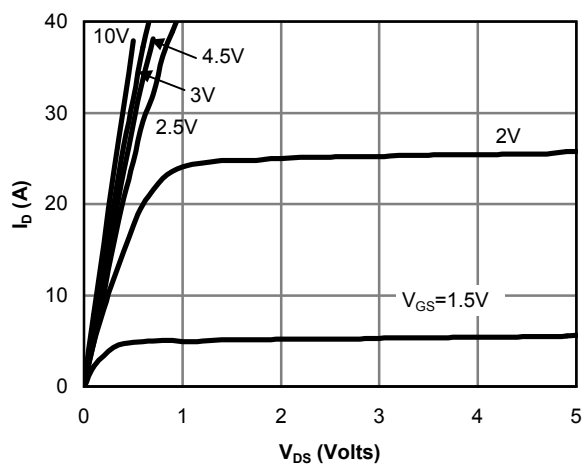


Fig 1: On-Region Characteristics

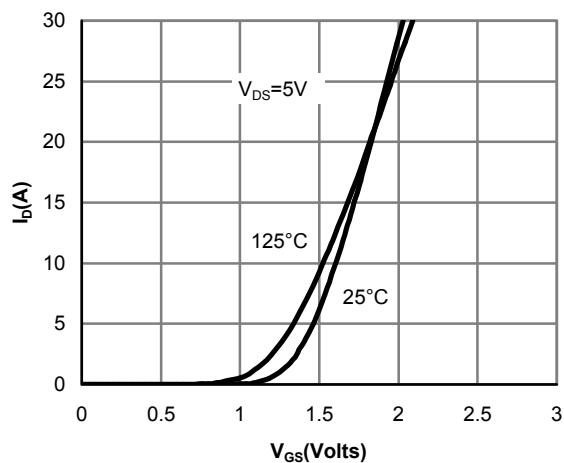


Figure 2: Transfer Characteristics

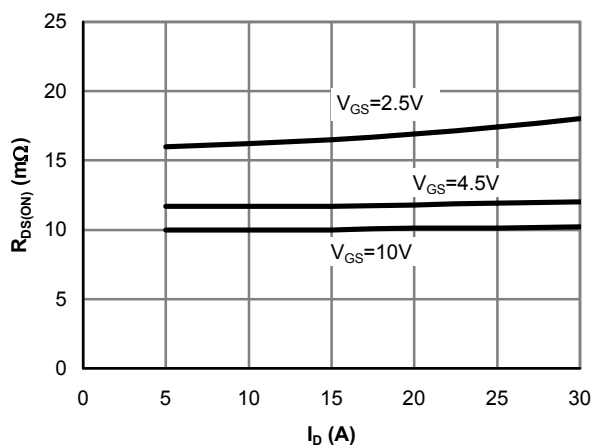


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

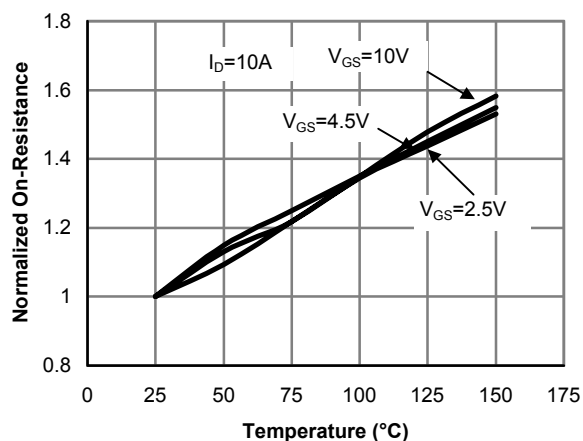


Figure 4: On-Resistance vs. Junction Temperature

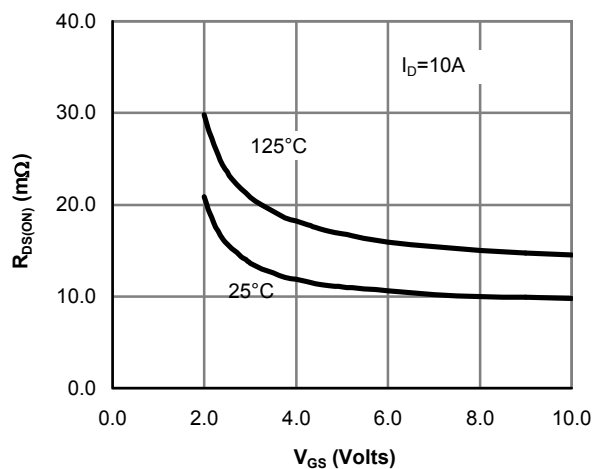


Figure 5: On-Resistance vs. Gate-Source Voltage

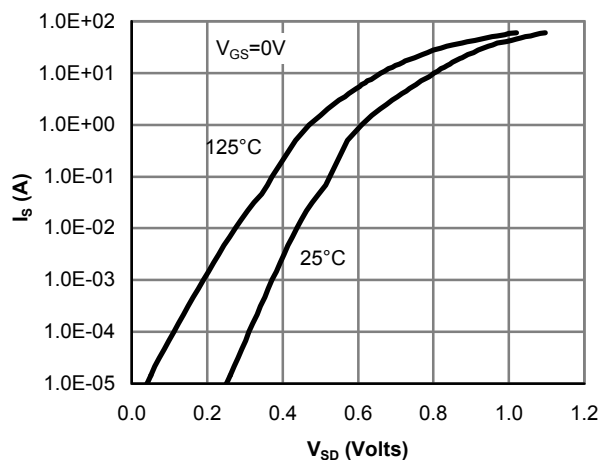


Figure 6: Body-Diode Characteristics

4402 Typical Characteristics

