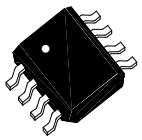
4410

N-Channel Enhancement-Mode MOSFET (30V, 10A)

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
30V	10A	13.5 @ V_{GS} = 10V ,ID=10A
		20 @ V_{GS} = 4.5V,ID=5A

Features

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



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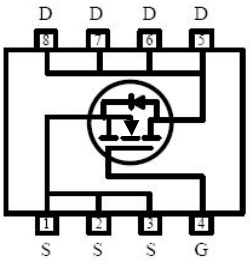

Pin 1 / 2 / 3: Source
Pin 4: Gate
Pin 5 / 6 / 7 / 8: Drain

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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current @T_A=25°C	10	A
I_{DM}	Drain Current (Pulsed) [a]	50	A
P_D	Total Power Dissipation @T_A=25°C	2.5	W
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	50	°C/W

a: Repetitive Rating: Pulse width limited by the maximum junction temperation.
b: 1-in^2 2oz Cu PCB board

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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	50	nA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• On Characteristics[c]						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1	-	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=10A	-	-	13.5	mΩ
		V_{GS}=4.5V, I_D=5A	-	-	20	
g_{FS}	Forward Transconductance	V_{DS}=10V, I_D=9A	-	9	-	S
• Dynamic Characteristics [d]						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	-	710	1350	pF
C_{oss}	Output Capacitance		-	155	-	
C_{rss}	Reverse Transfer Capacitance		-	145	-	
R_g	Gate resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz	-	2	3	Ω
• Switching Characteristics[d]						
Q_g	Total Gate Charge	V_{DS}=20V, I_D=9A, V_{GS}=4.5V	-	8		nC
Q_{gs}	Gate-Source Charge		-	3.3	-	
Q_{gd}	Gate-Drain Charge		-	2.7	-	
$t_{d(on)}$	Turn-on Delay Time	V_{GS}= 10V, V_{DS}= 15V, I_D=9A,R_L=15Ω, R_{GEN}=3.3Ω	-	7	-	nS
t_r	Turn-on Rise Time		-	7	-	
$t_{d(off)}$	Turn-off Delay Time		-	22	-	
t_f	Turn-off Fall Time		-	7	-	
t_{rr}	Body Diode Reverse Recovery Time	I_F=9A, dI/dt=100A/uS	-	24	-	nS
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=9A, dI/dt=100A/uS	-	14	-	nC
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=2.1A	-	-	1.2	V

Note: Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%

Characteristics Curve

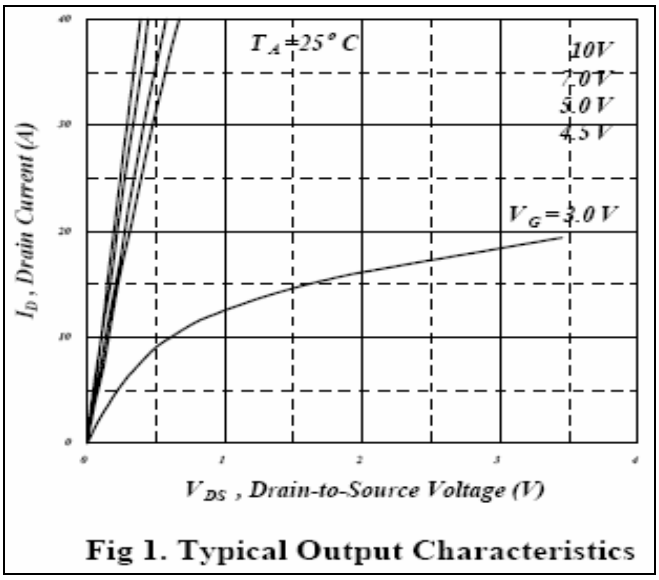

Fig 1. Typical Output Characteristics

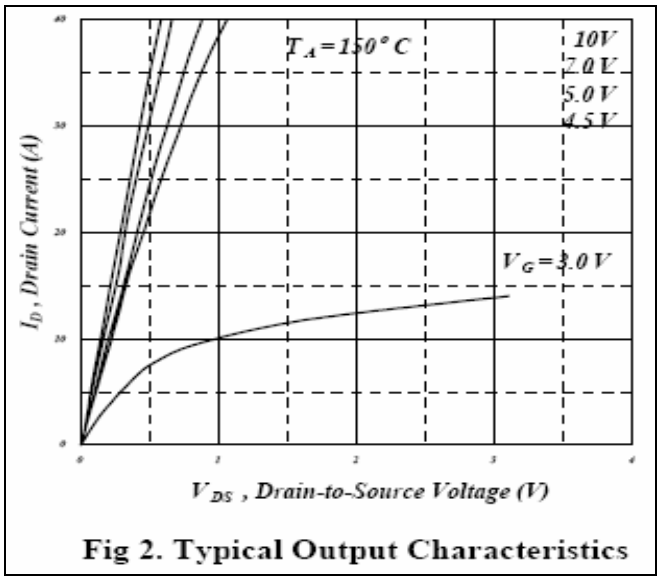

Fig 2. Typical Output Characteristics

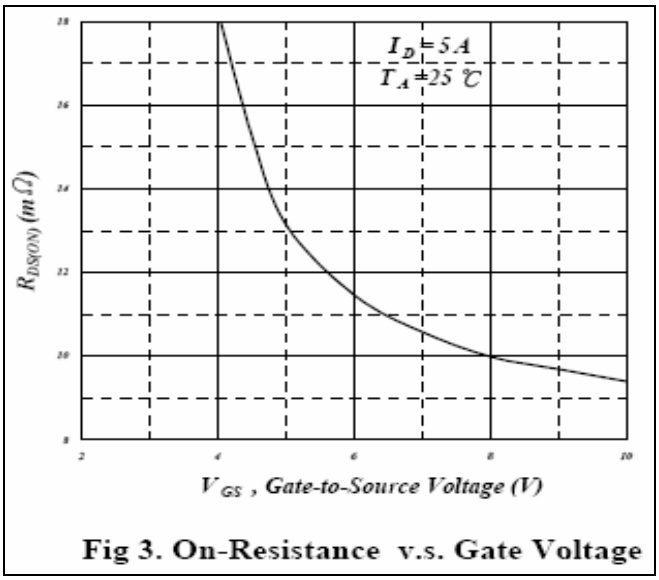

Fig 3. On-Resistance v.s. Gate Voltage

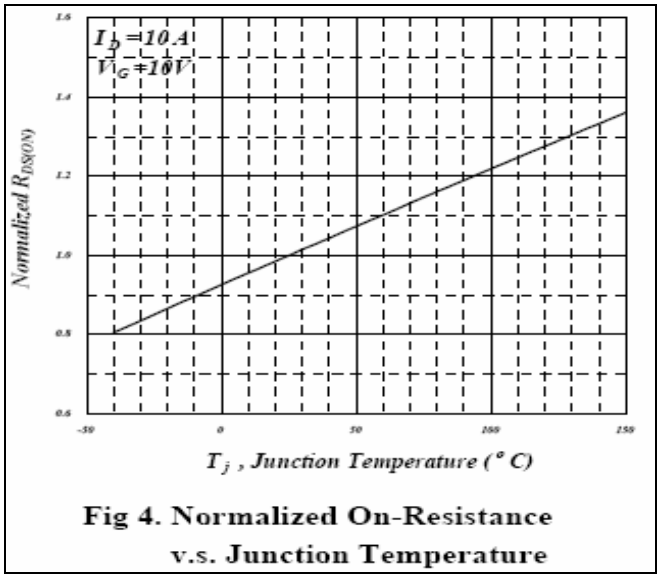

Fig 4. Normalized On-Resistance v.s. Junction Temperature

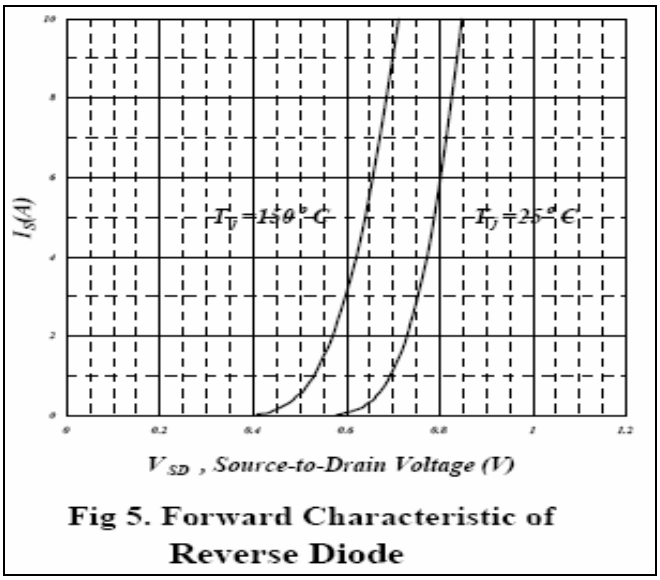

Fig 5. Forward Characteristic of Reverse Diode

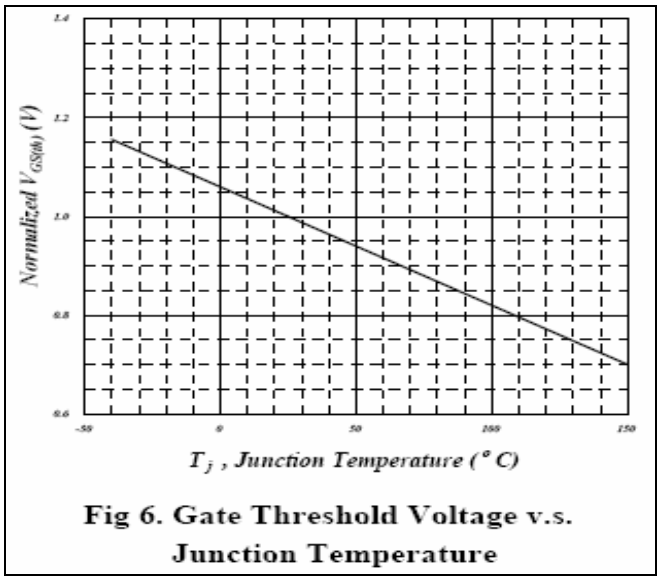

Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Characteristics Curve

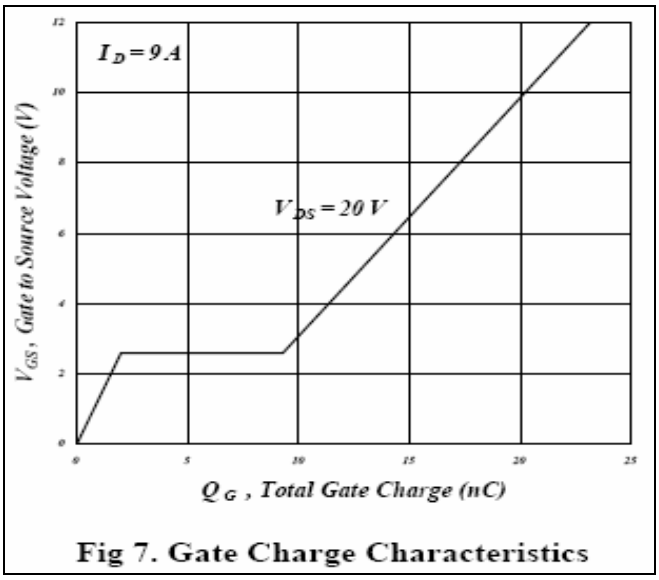

Fig 7. Gate Charge Characteristics

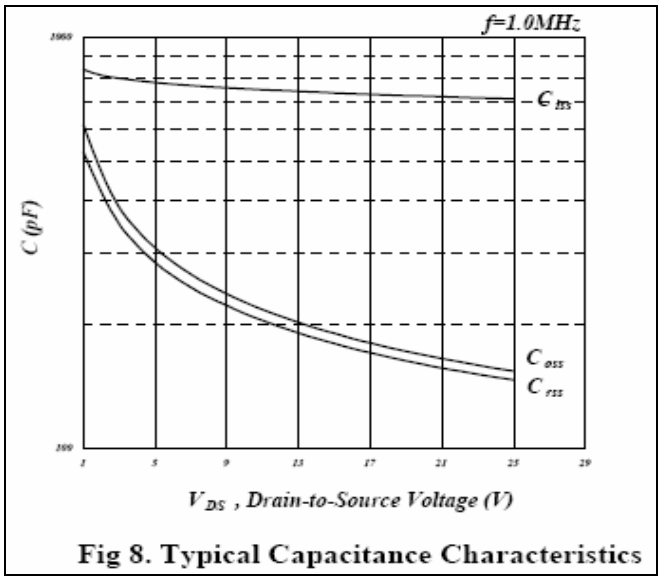

Fig 8. Typical Capacitance Characteristics

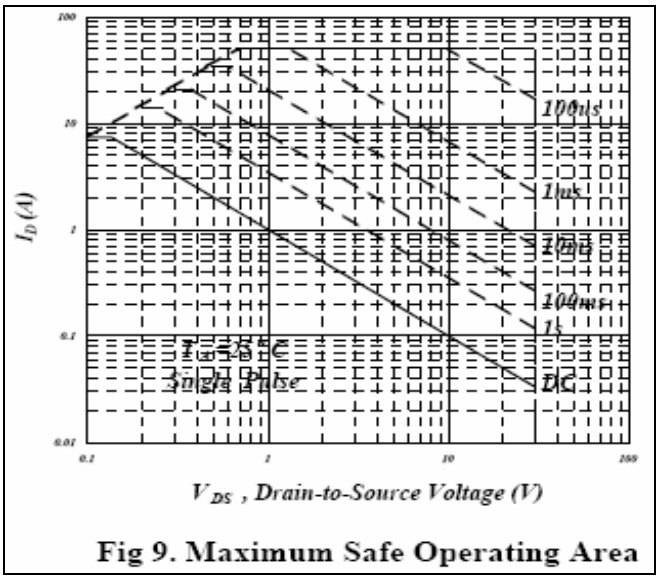

Fig 9. Maximum Safe Operating Area

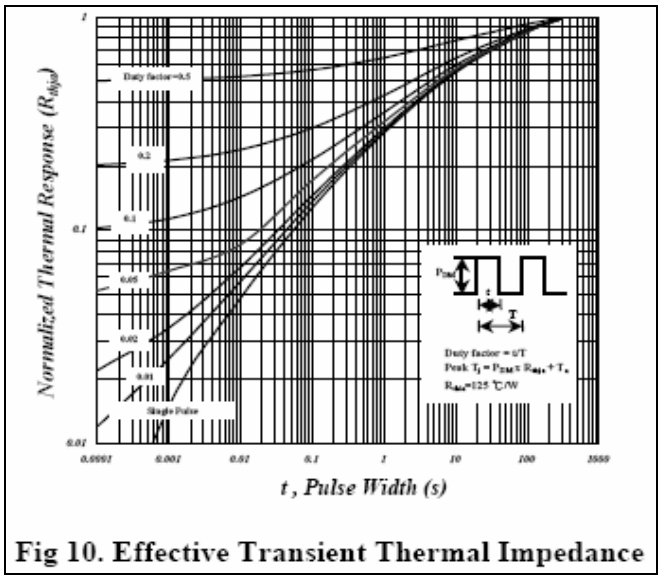

Fig 10. Effective Transient Thermal Impedance

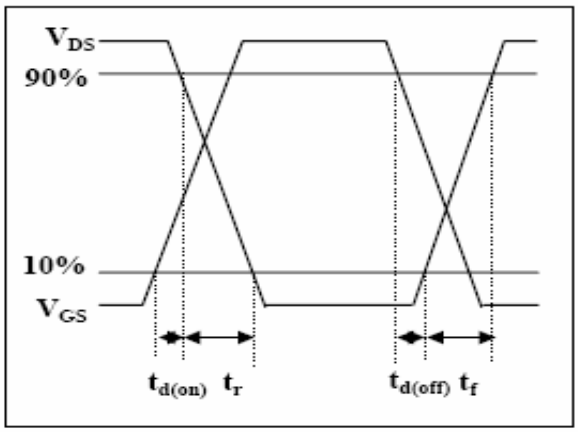

Fig 11. Switching Time Waveform

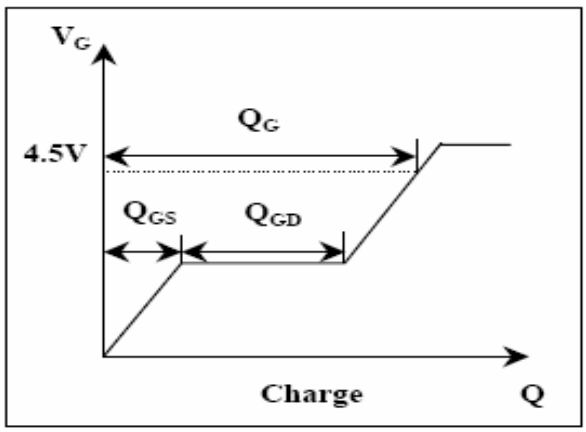

Fig 12. Gate Charge Waveform