



30V P-Channel MOSFETs

General Description

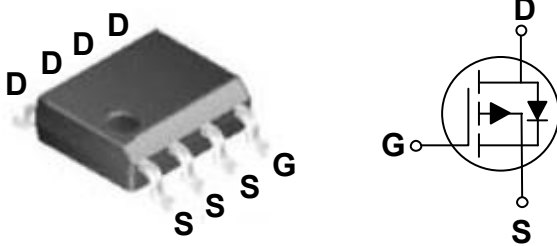
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
-30 V	30 m Ω	-7 A

Features

- $R_{DS(ON)} \leq 30m\Omega @ V_{GS} = -10V$
- Fast Switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOP-8 Pin Configuration



Applications

- Notebook
- Battery Protection
- Load Switch
- Hand-Held Instruments

Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous	-7	A
I_{DM}	Drain Current - Pulsed	-30	A
P_D	Power Dissipation ($T_A=25^\circ C$)	2	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		ER3909	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V , I _D = -250uA	-30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -24V , V _{GS} = 0V , T _J =25°C	---	---	-1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V , V _{DS} = 0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = -10V , I _D = -4A	---	---	30	mΩ
		V _{GS} = -4.5V , I _D = -2A	---	---	55	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-1.0	---	-2.5	V
g _{fs}	Forward Transconductance	V _{DS} = -5V , I _D = -7A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -20V , V _{GS} = -4.5V , I _D = -7A (NOTE 2)	---	9.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.2	---	
Q _{gd}	Gate-Drain Charge		---	3.4	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} = -24V , V _{GS} = -10V , R _G =3.3Ω , I _D = -1A (NOTE 2)	---	16.4	---	nS
T _r	Rise Time		---	20.2	---	
T _{d(off)}	Turn-Off Delay Time		---	55	---	
T _f	Fall Time		---	10	---	
C _{iss}	Input Capacitance	V _{DS} = -15V , V _{GS} = 0V , F= 1MHz	---	930	---	pF
C _{oss}	Output Capacitance		---	148	---	
C _{rss}	Reverse Transfer Capacitance		---	115	---	
R _g	Gate resistance	V _{GS} = 0V , V _{DS} = 0V , F= 1MHz	---	15	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G = V _D = 0V , Force Current	---	---	-7	A
I _{SM}	Pulsed Source Current (NOTE 3)		---	---	-14	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0V , I _S = -2.3A	---	---	-1.2	V

NOTES :

1. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulse width limited by maximum junction temperature.



Characteristics Curves

Fig. 1 - Typical Output Characteristics

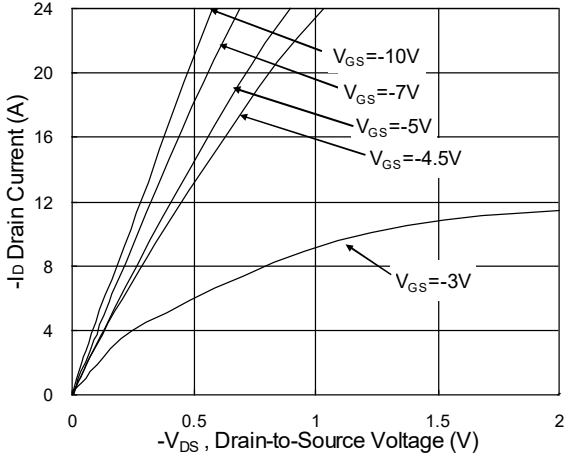


Fig. 2 - Typical Output Characteristics

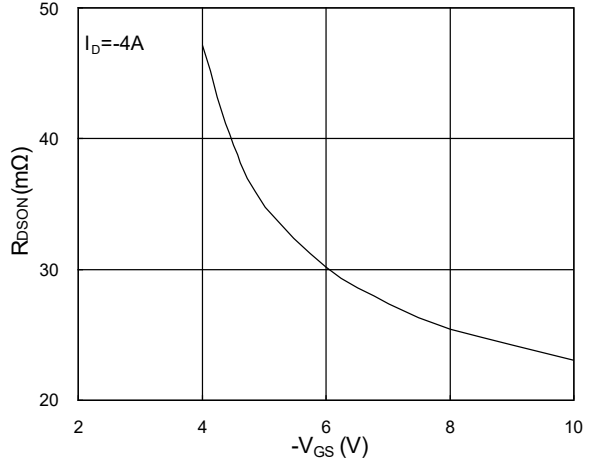


Fig. 3 - Forward Characteristics of Reverse

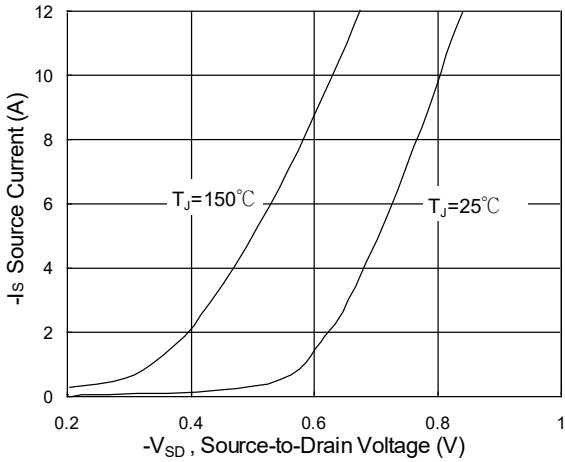


Fig. 4 - Gate-Charge Characteristics

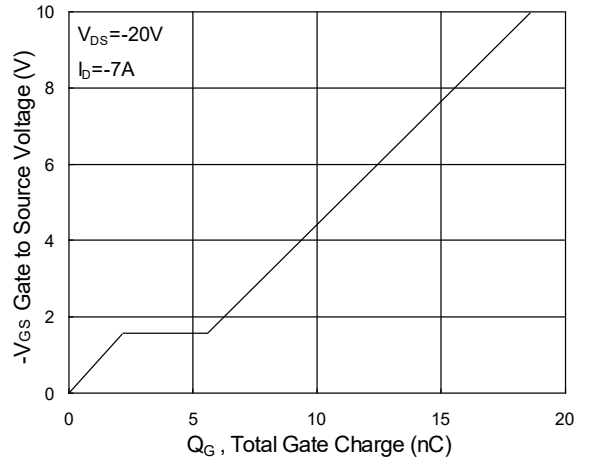


Fig. 5 - Normalized $V_{GS(th)}$ v.s T_J

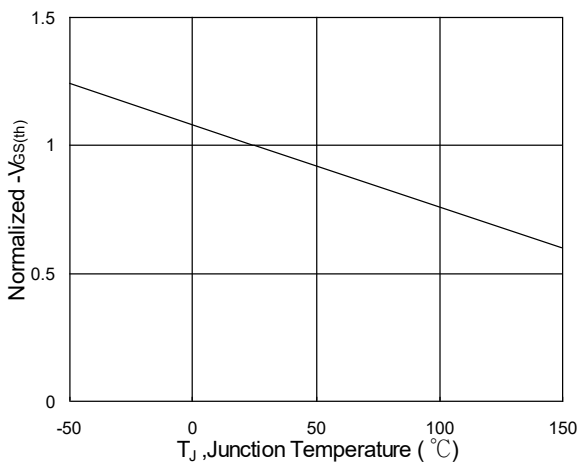
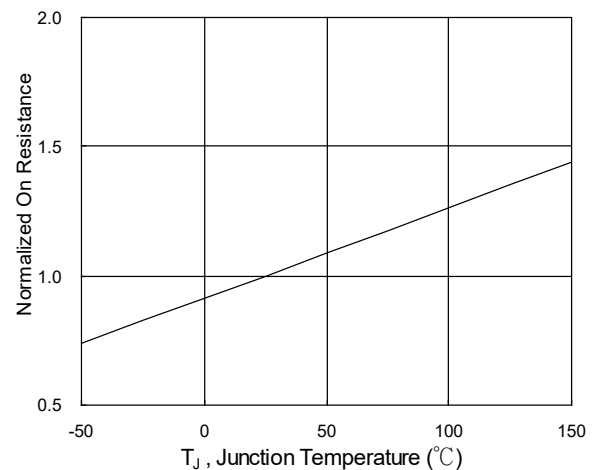


Fig. 6 - Normalized $R_{DS(on)}$ v.s T_J





Characteristics Curves

Fig. 7 - Capacitance

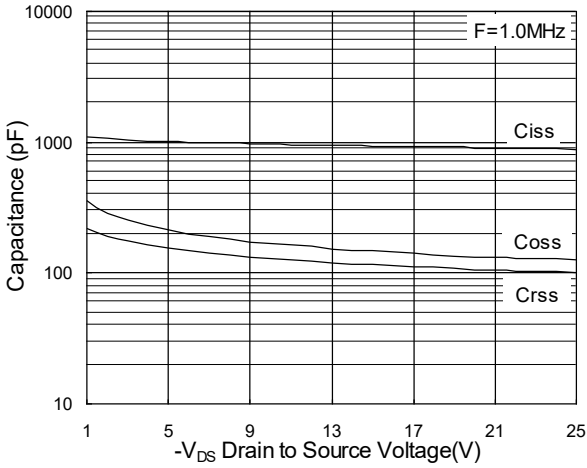


Fig. 8 - Safe Operating Area

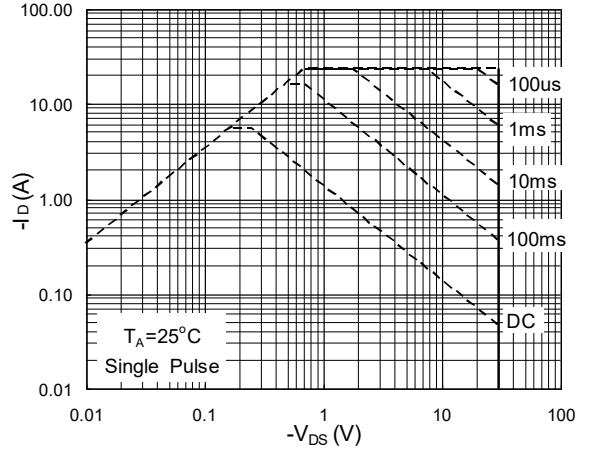


Fig. 9 - Normalized Maximum Transient Thermal Impedance

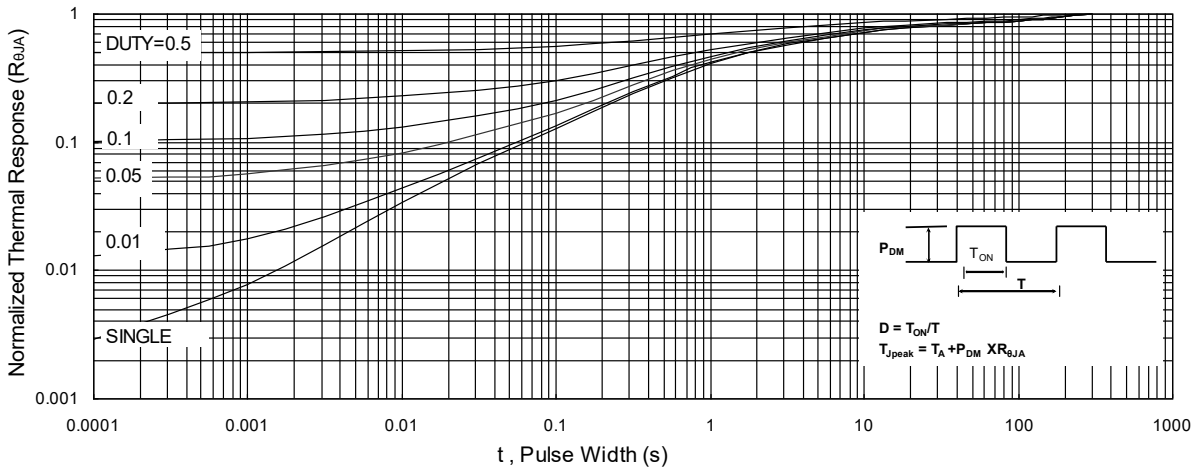
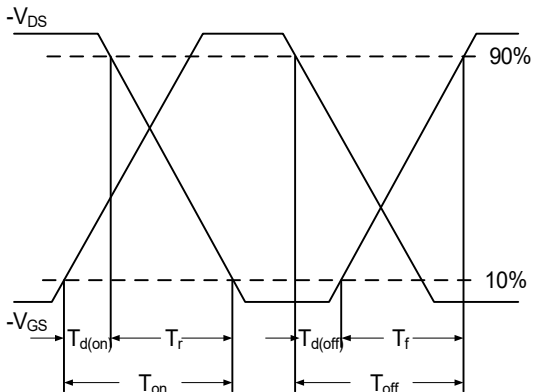
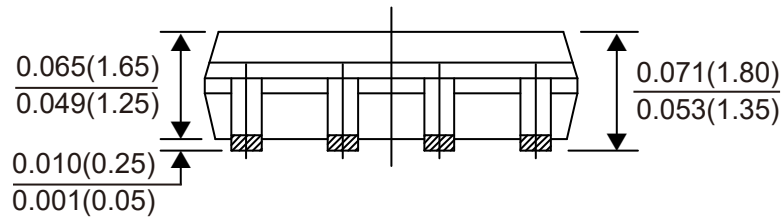
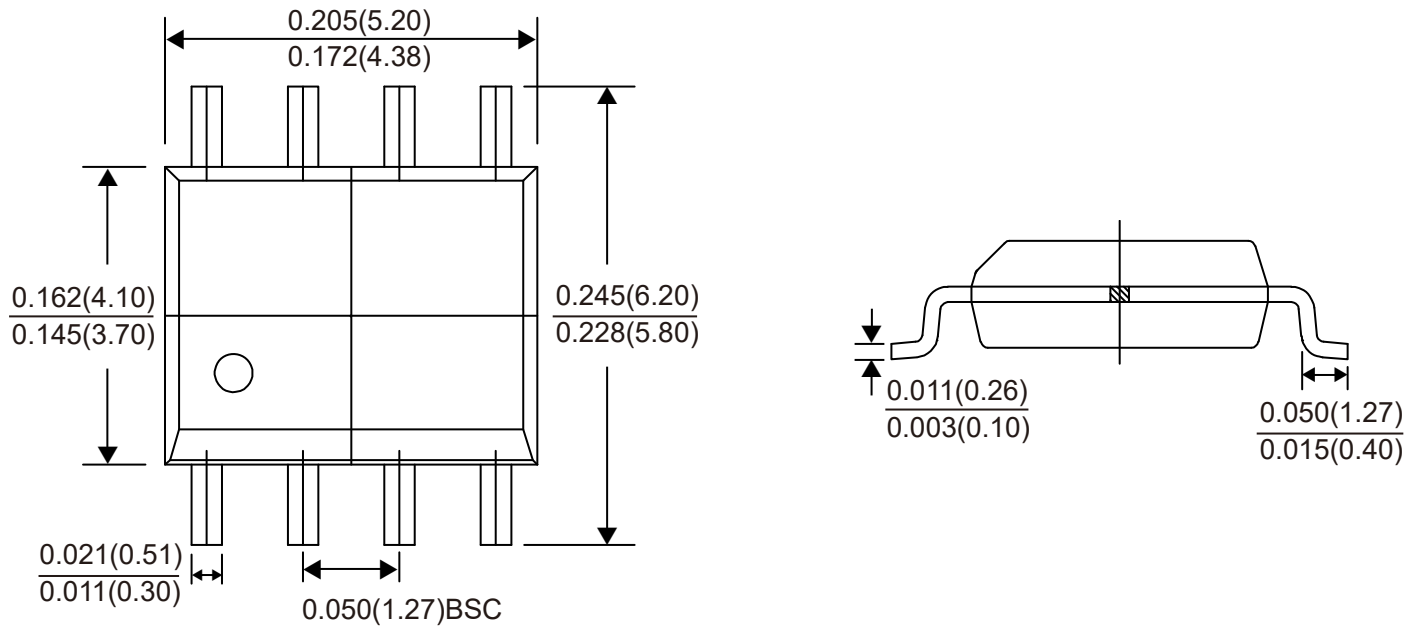


Fig. 10 - Switching Time Waveform





Package Outline Dimensions



SOP-8

Dimensions in inches and (millimeters)



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