



20V P-Channel MOSFETs

General Description

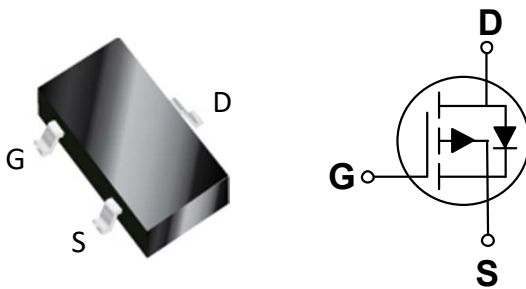
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-20V	78m Ω	-3A

Features

- -20V, -3A, $R_{DS(ON)} \leq 78m\Omega @ V_{GS} = -10V$
- Fast switching
- High power and current handling capability
- Lead free product is acquired

SOT-23 Pin Configuration



Applications

- PWM applications
- Load Switch
- Power management

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current - Continuous	-3	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-10	A
P_D	Maximum Power Dissipation	1	W
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (NOTE 2)	---	125	$^\circ\text{C}/\text{W}$



Electrical Characteristics (TA=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	-20	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -20V , V _{GS} = 0V	---	---	-1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±12V , V _{DS} = 0V	---	---	±100	nA

On Characteristics (NOTE 3)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = -2.5V , I _D = -2A	---	---	120	mΩ
		V _{GS} = -4.5V , I _D = -3A	---	71	85	
		V _{GS} = -10V , I _D = -2A	---	60	78	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-0.4	-0.7	-1.0	V

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} = -10V , V _{GS} = -2.5V , I _D = -3A	---	3.3	12	nC
Q _{gs}	Gate-Source Charge		---	0.7	---	
Q _{gd}	Gate-Drain Charge		---	1.3	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -10V , V _{GS} = -4.5V , R _{GEN} = 10Ω , I _D = -1A	---	11	---	ns
T _r	Rise Time		---	35	---	
T _{d(off)}	Turn-Off Delay Time		---	30	---	
T _f	Fall Time		---	10	---	
C _{ISS}	Input Capacitance	V _{DS} = -10V , V _{GS} = 0V , F= 1MHz	---	395	---	pF
C _{OSS}	Output Capacitance		---	72	---	
C _{rSS}	Reverse Transfer Capacitance		---	53	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Diode Forward Current (NOTE 2)		---	---	-3	A
V _{SD}	Diode Forward Voltage (NOTE 3)	V _{GS} = 0V , I _S = -1.3A	---	---	-1.2	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Surface mounted on FR4 board, t ≤ 10 sec.
3. Pulse test : Pulse width ≤ 300us , duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production.



Characteristics Curves

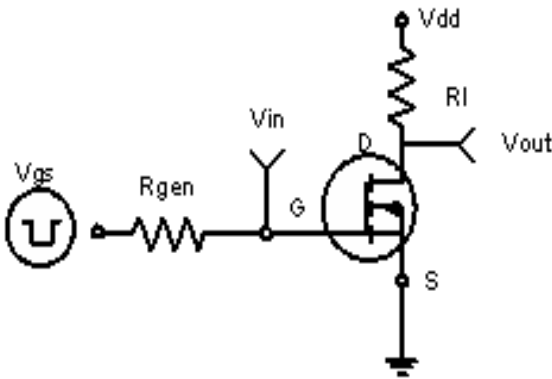


Fig.1 Switching Test Circuit

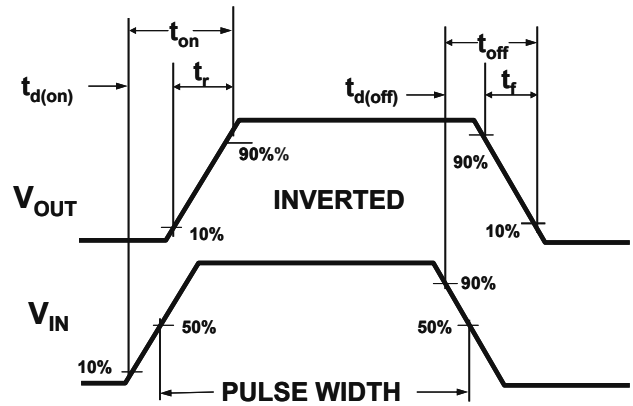


Fig.2 Switching Waveforms

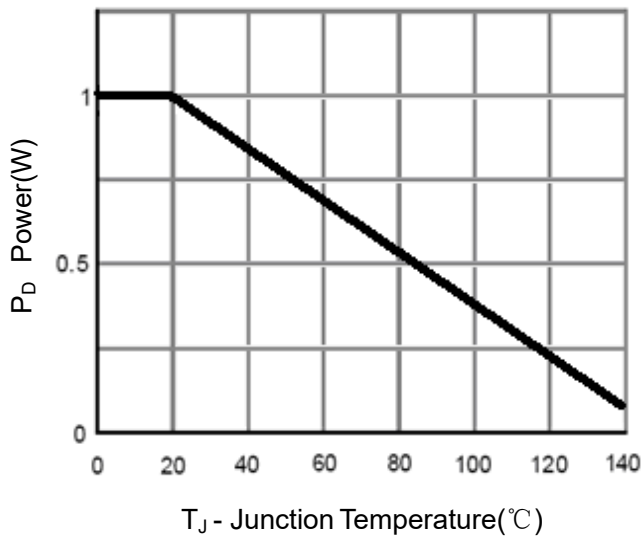


Fig.3 Power Dissipation

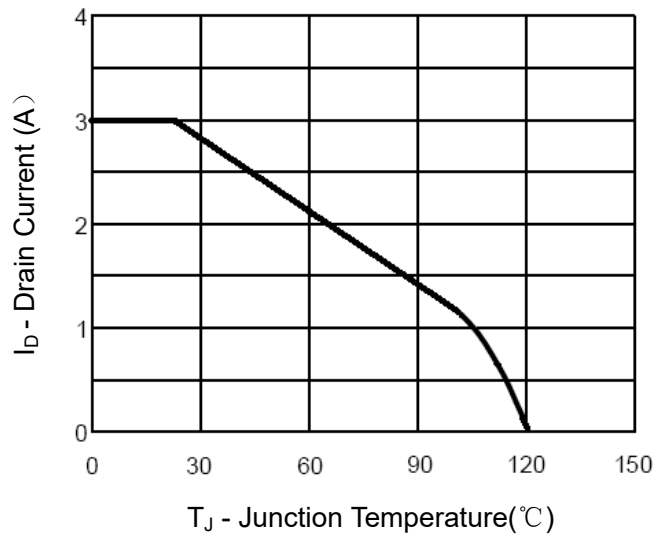


Fig.4 Drain Current

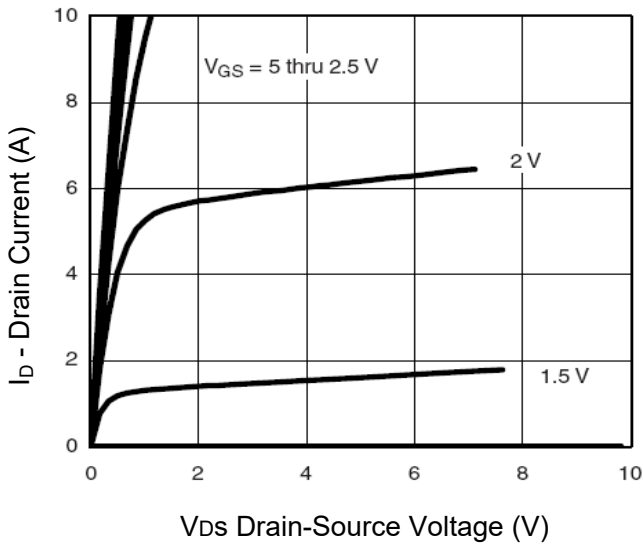


Fig.5 Output Characteristics

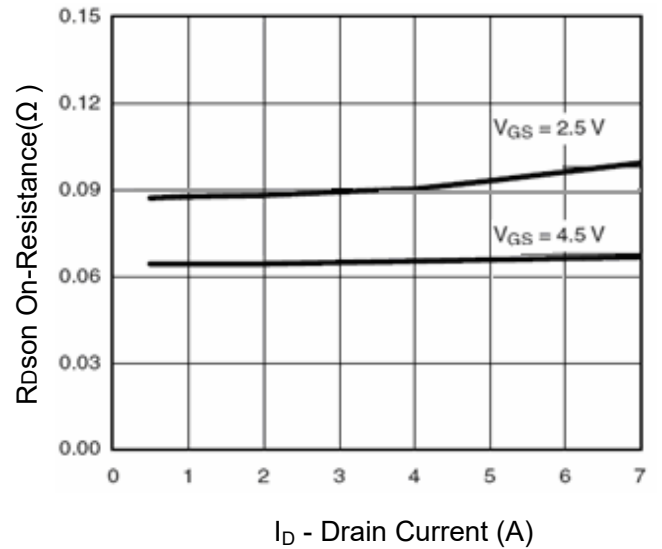


Fig.6 Drain-Source On-Resistance



Characteristics Curves

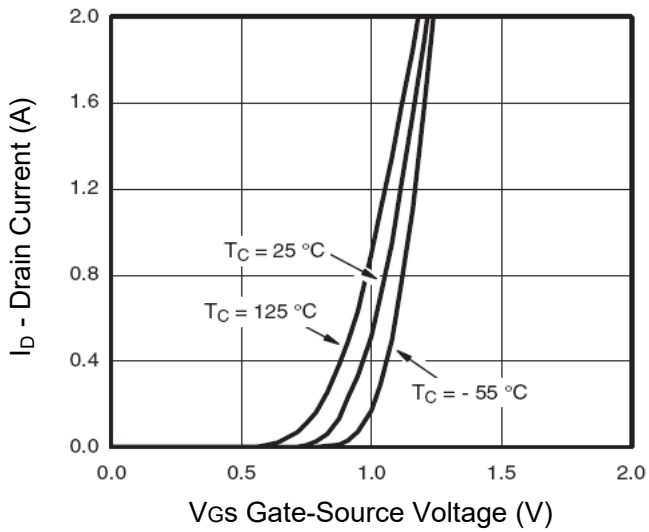


Fig.7 Transfer Characteristics

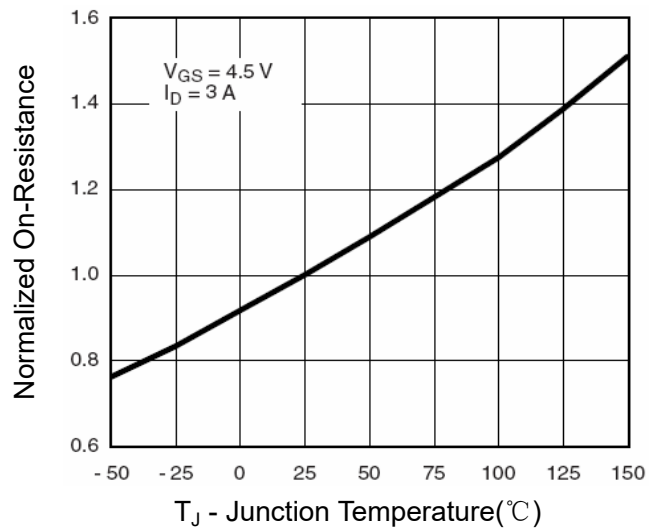


Fig.8 Normalized On-Resistance vs. T_J

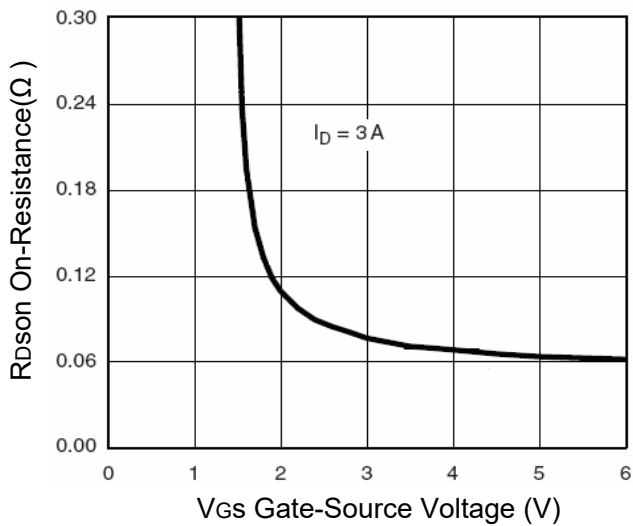


Fig.9 R_{Dson} vs. V_{GS}

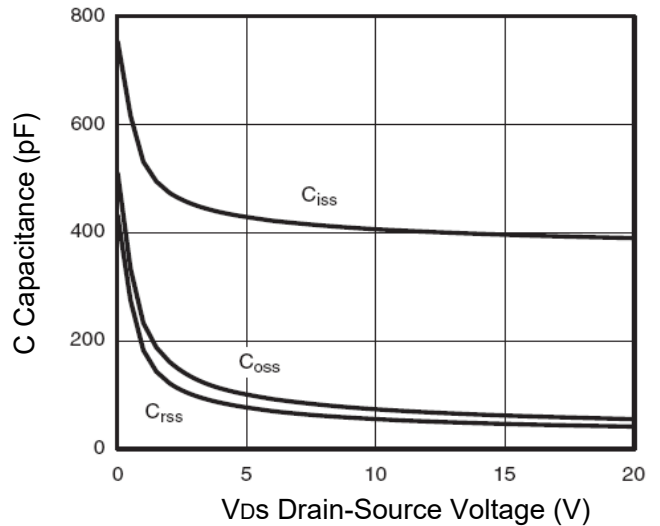


Fig.10 Capacitance vs. V_{GS}

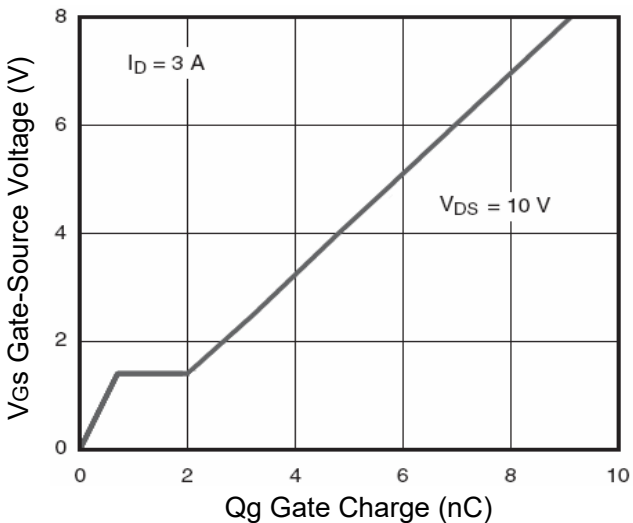


Fig.11 Gate Charge

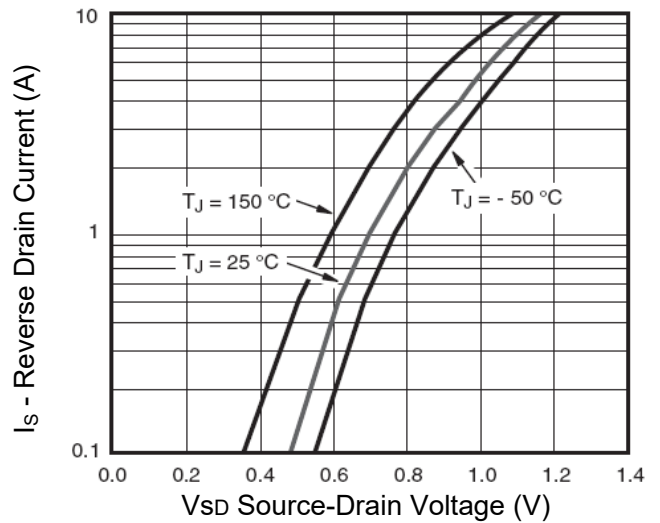


Fig.12 Source-Drain Diode Forward



Characteristics Curves

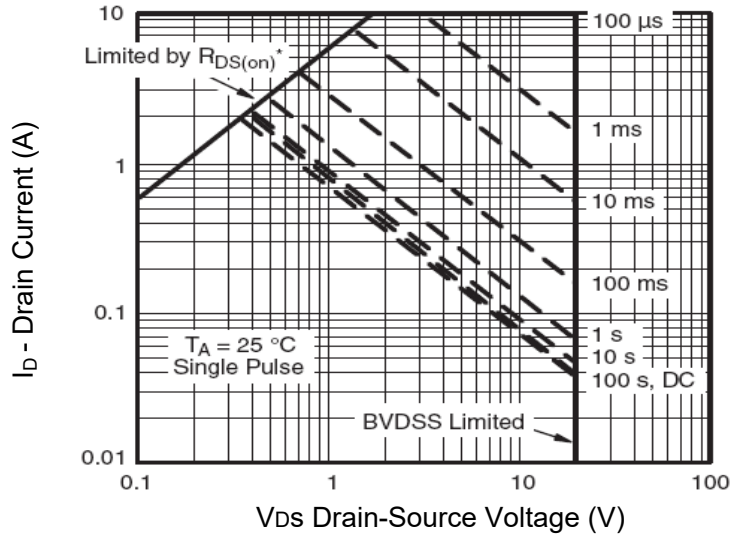


Fig.13 Safe Operation Area

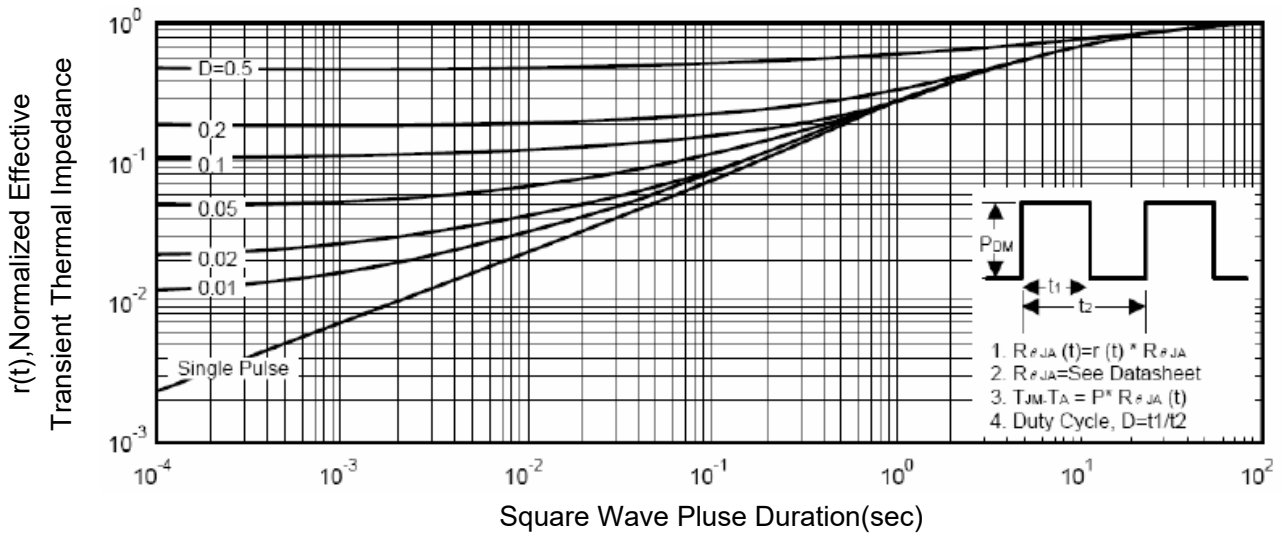
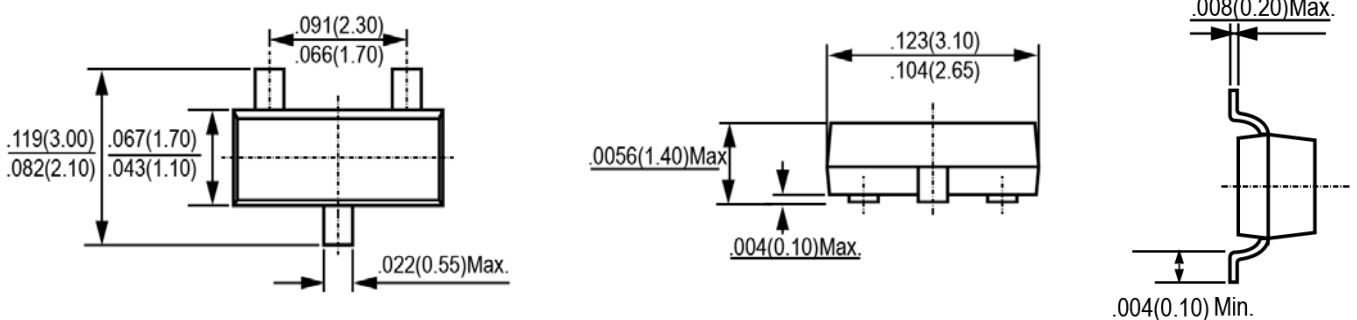


Fig.14 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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