

General Description

These N-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.

Features

30V, 200mA, $R_{DS(ON)} = 5\Omega @ V_{GS} = 10V$

Improved dv/dt capability

Fast switching

Green Device Available

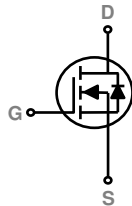
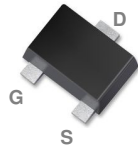
Applications

Notebook

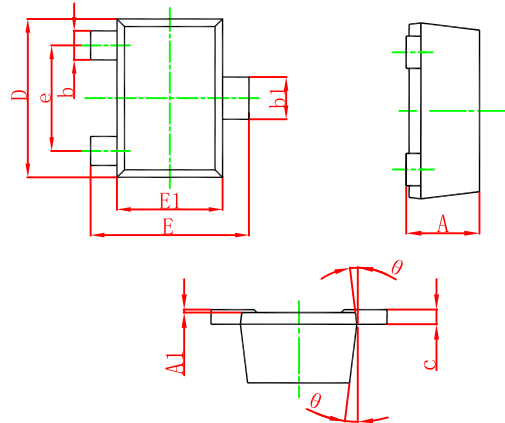
Load Switch

Battery Protection

Hand-held Instruments



SOT-723 Package Outline Dimensions



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
theta	7° REF.		7° REF.	

BVDSS	RDSON	ID
30V	5Ω	200mA

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ 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 ($T_A=25^\circ\text{C}$)	200	mA
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	180	mA
I_{DM}	Drain Current – Pulsed ¹	1.2	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	313	mW
	Power Dissipation – Derate above 25°C	2.5	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	800	$^\circ\text{C/W}$

2SK3541

Electrical Characteristics (T_J=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
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.05	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V , V _{GS} =0V , T _J =50°C	---	---	100	nA
		V _{DS} =25V , V _{GS} =0V , T _J =85°C	---	---	400	nA
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 20V , V _{DS} =0V	---	---	±6	uA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4V , I _D =10mA	---	5.0	7.5	Ω
		V _{GS} =2.5V , I _D =1mA	---	6.0	12	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	---	---	1.6	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C

Dynamic and switching Characteristics

C _{iss}	Input Capacitance	V _{DS} =30V , V _{GS} =0V , F=1MHz	---	15	---	pF
C _{oss}	Output Capacitance		---	10	---	
C _{rss}	Reverse Transfer Capacitance		---	3	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	200	mA
I _{SM}	Pulsed Source Current		---	---	500	mA
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =0.2A , T _J =25°C	---	---	1.4	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES (2SK3541)

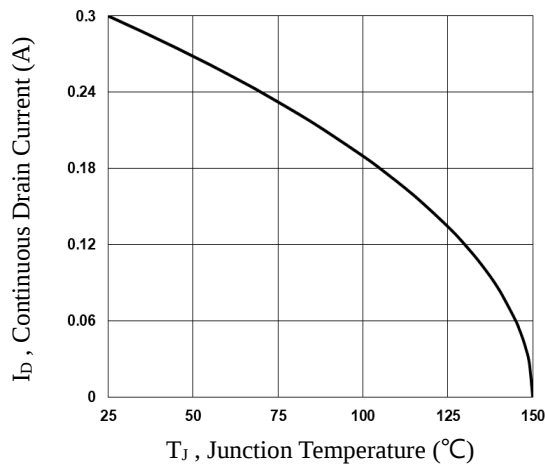


Fig.1 Continuous Drain Current vs. T_J

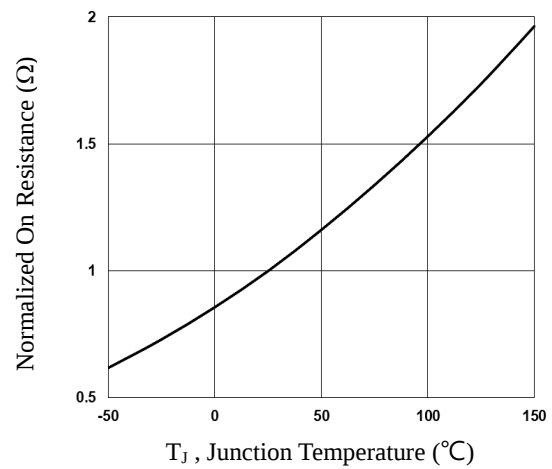


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

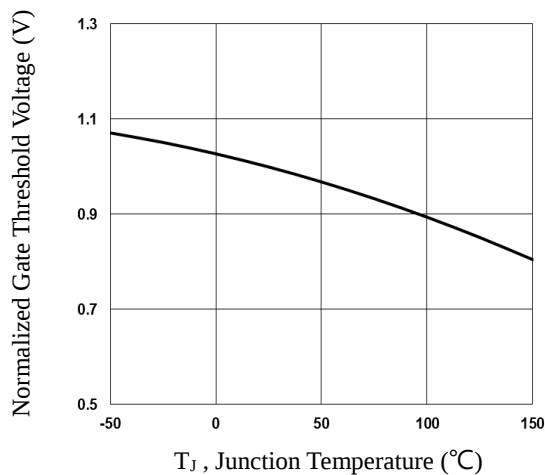


Fig.3 Normalized V_{th} vs. T_J

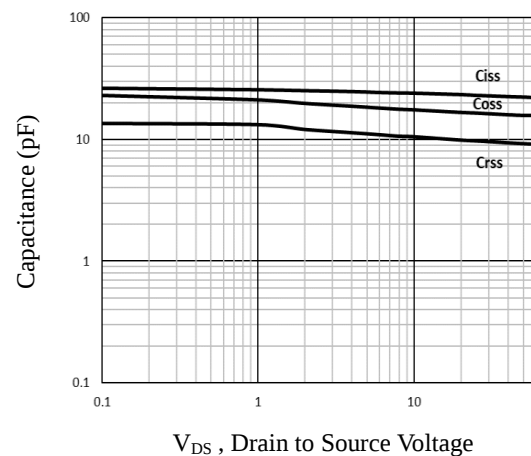


Fig.4 Capacitance Characteristics

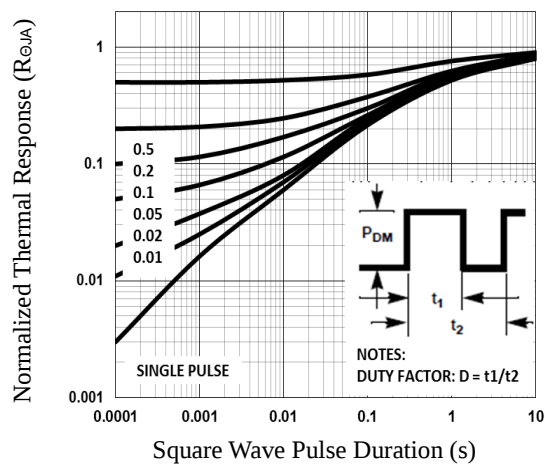


Fig.5 Normalized Transient Response

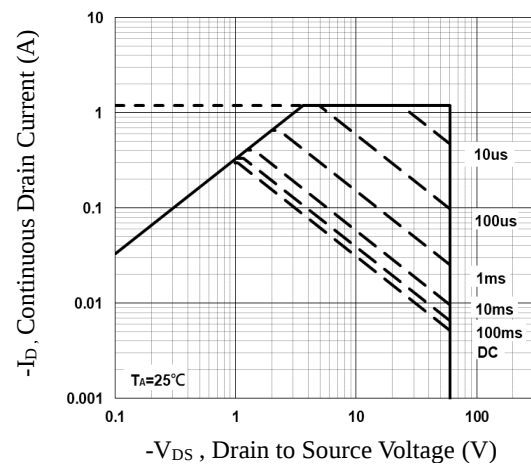


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES (2SK3541)

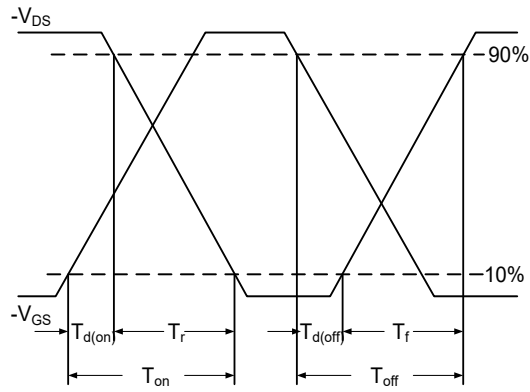


Fig.7 Switching Time Waveform

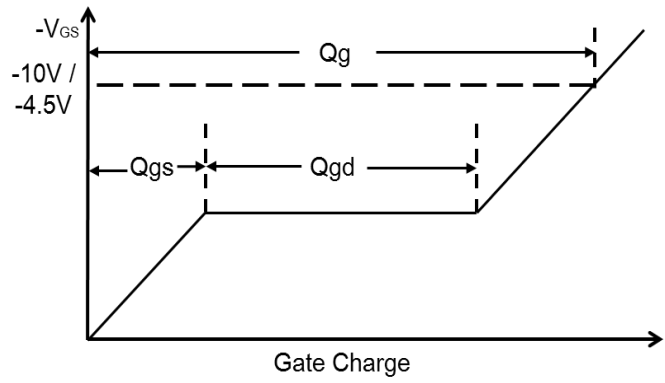


Fig.8 Gate Charge Waveform