

40V N-Channel MOSFETs

General Description

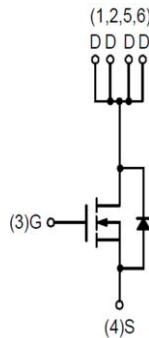
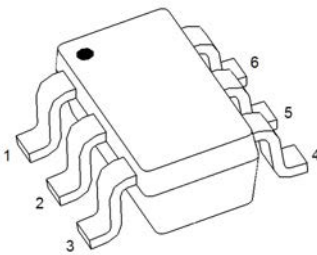
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$ Typ.	I_D
40V	17mΩ	8A

Features

- 40V, 8A, $R_{DS(ON)}$ Typ. = 17mΩ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT23-6 Pin Configuration



Applications

- PowerTools
- Load Switch
- LED applications
- Motor Drive Applications

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$) (Chip Limitation)	8	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$) (Chip Limitation)	5	A
I_{DM}	Drain Current – Pulsed ¹	32	A
E_{AS}	Single Pulse Avalanche Energy ²	31	mJ
I_{AS}	Single Pulse Avalanche Current ²	25	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	1.2	W
T_{STG}	Storage Temperature Range	-50 to 150	°C
T_J	Operating Junction Temperature Range	-50 to 150	°C

Note 1: Exceed these limits to damage to the device.

Note 2: Exposure to absolute maximum rating conditions may affect device reliability.

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	40			V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =40V, V _{GS} =0V, T _J =25°C			1	uA
		V _{DS} =32V, V _{GS} =0V, T _J =125°C			10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =7A		17	22	mΩ
		V _{GS} =4.5V, I _D =6A		22	26	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-5		mV/°C
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =4A		33		S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3,4}	V _{DS} =32V, V _{GS} =4.5V, I _D =7A		9.8		nC
Q _{gs}	Gate-Source Charge ^{3,4}			2.8		
Q _{gd}	Gate-Drain Charge ^{3,4}			3.9		
T _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =20V, V _{GS} =10V, R _G =3.3 Ω I _D =7A		2.8		ns
T _r	Rise Time ^{3,4}			40.4		
T _{d(off)}	Turn-Off Delay Time ^{3,4}			22.8		
T _f	Fall Time ^{3,4}			6.4		
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz		1013		pF
C _{oss}	Output Capacitance			107		
C _{rss}	Reverse Transfer Capacitance			76		
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.2		Ω

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			8	A
I _{SM}	Pulsed Source Current				16	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C			1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=85A., Starting T_J=25°C
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Characteristics

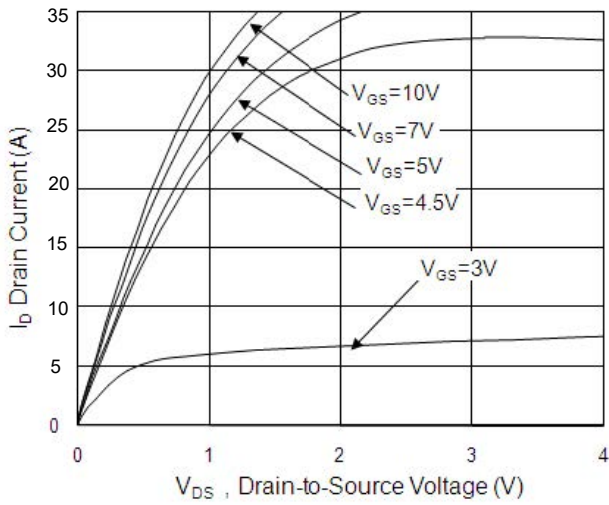


Fig.1 Typical Output Characteristics

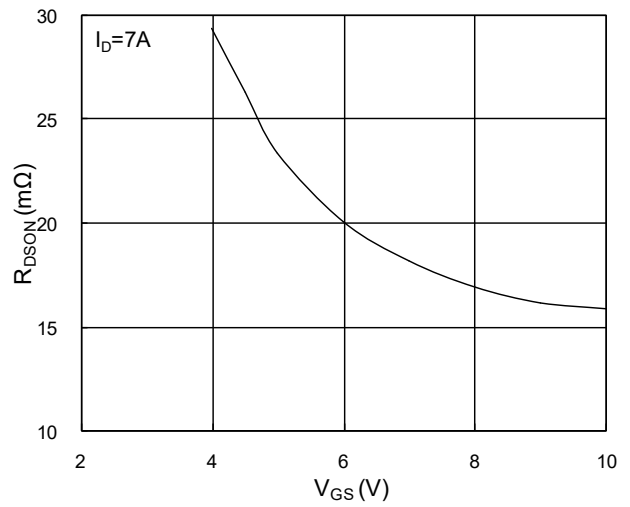


Fig.2 On-Resistance vs. G-S Voltage

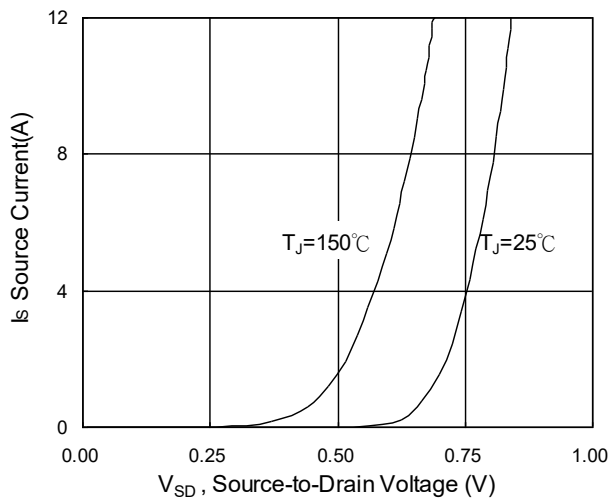


Fig.3 Forward Characteristics of Reverse

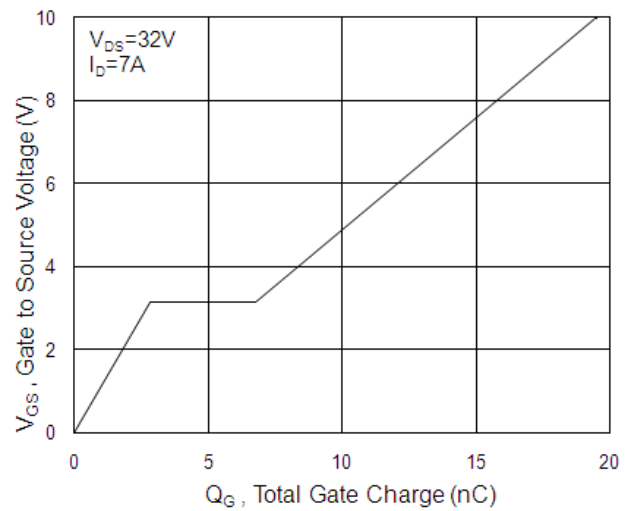


Fig.4 Gate-Charge Characteristics

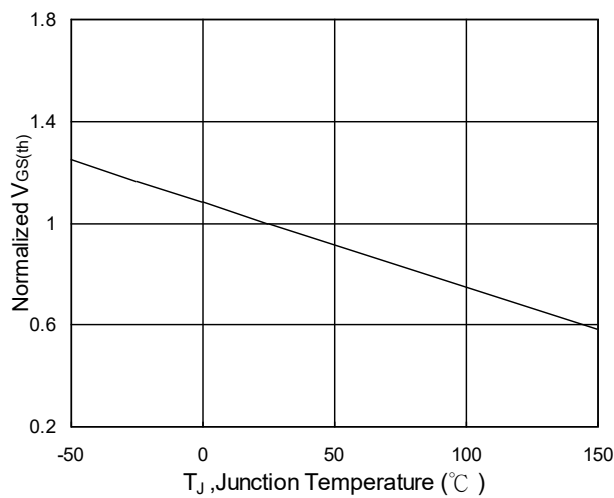


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

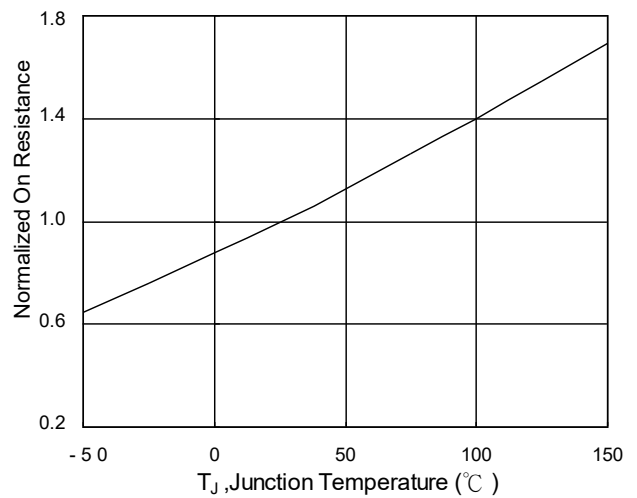


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

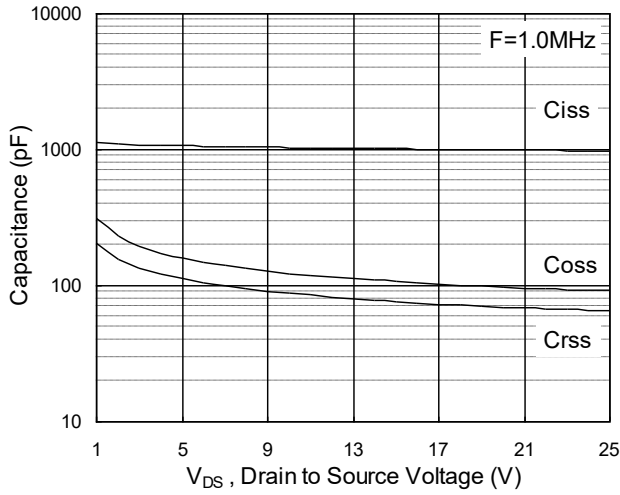


Fig.7 Capacitance

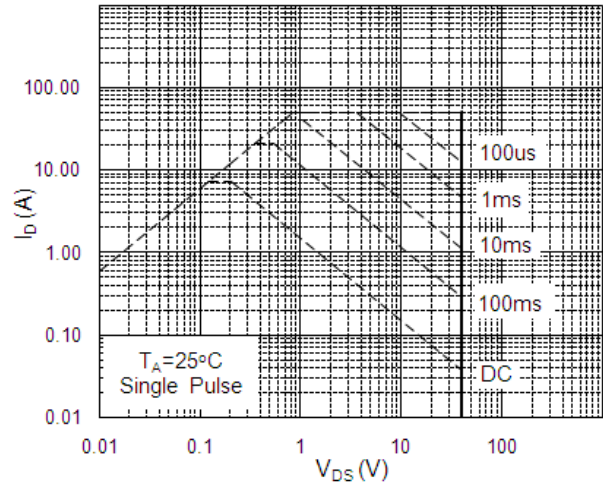


Fig.8 Safe Operating Area

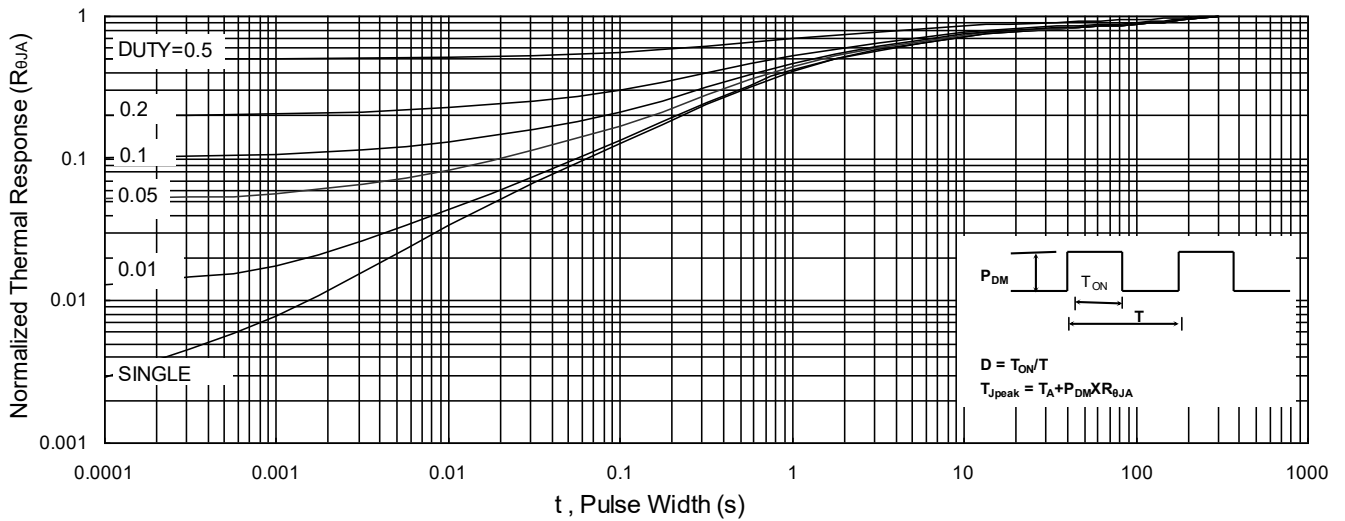
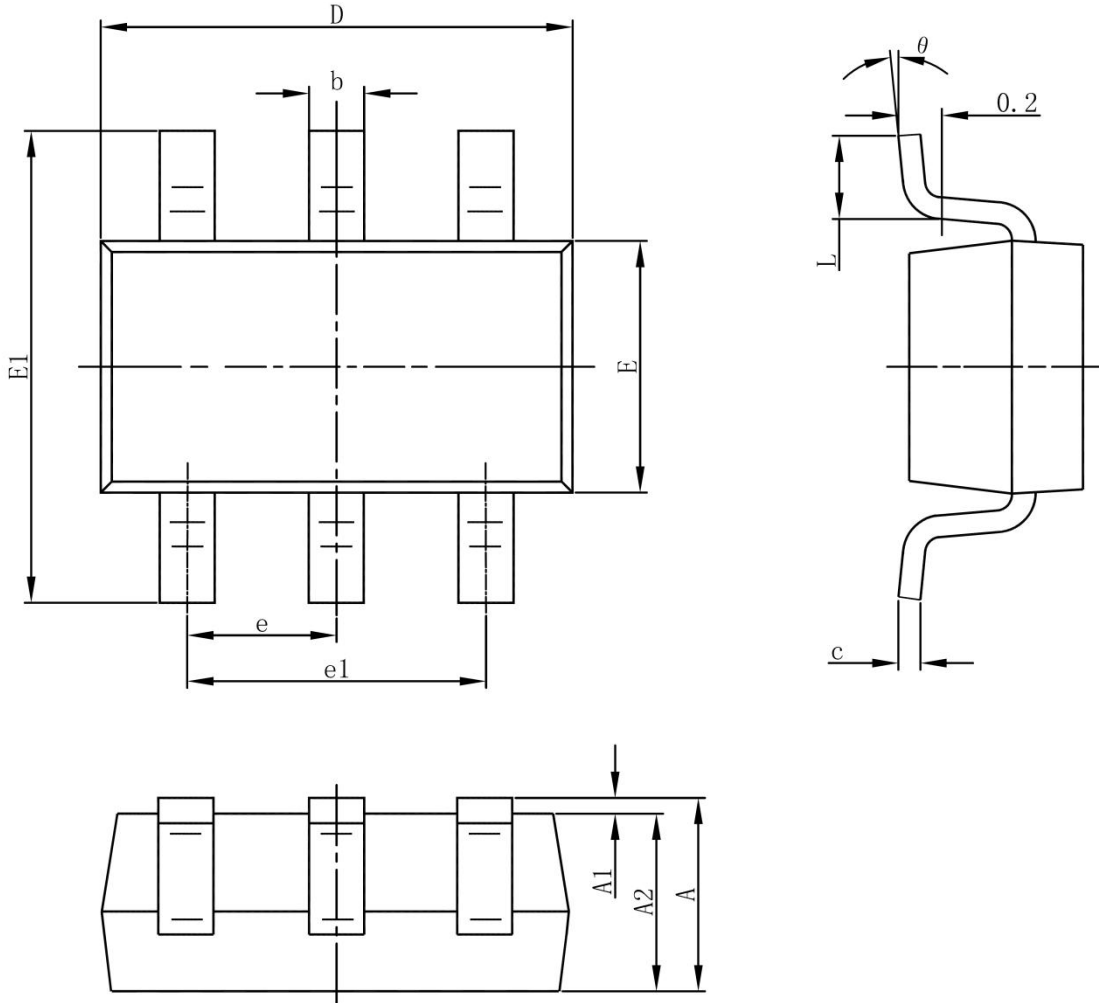


Fig.9 Normalized Maximum Transient Thermal Impedance

SOT23-6 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°