

## 20V, 16.5mΩ, 7A, N-Channel Enhancement Mode Power MOSFET

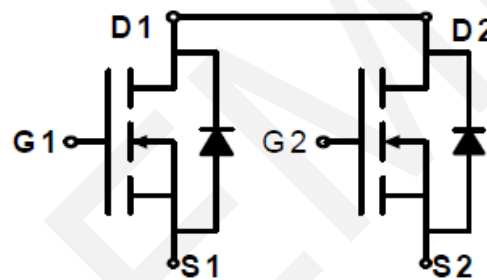
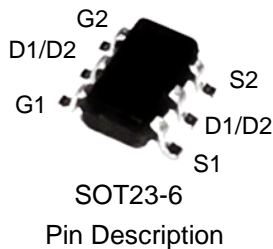
### 1.Features

- ◆ High Power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface Mount Package

V <sub>DS</sub> Typ	R <sub>DS(on)</sub> Typ.	I <sub>D</sub> Max.
20V	23mΩ @ 2.5V	7A
	16.5mΩ @ 4.5V	
	14.5mΩ @ 7.4V	

### 2.Applications

- ◆ Battery protection
- ◆ Load Switch
- ◆ Power management



Schematic Diagram

### 3.Absolute Max Ratings at Ta=25°C (Note1)

Parameter	Symbol	Maximum	Units
Drain to Source Voltage	V <sub>DSS</sub>	20	V
Gate to Source Voltage	V <sub>GSS</sub>	±12	V
Drain Current-Continuous	I <sub>D</sub>	7	A
Drain Current (Pulse)	I <sub>DM</sub>	38	A
Maximum Power Dissipation	P <sub>D</sub>	1.5	W
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 to +150	°C

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### 4.Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (Note 2)	R <sub>θJA</sub>	64	°C/W

Note 2: When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

**5. Electrical Characteristics at Ta=25°C (Note 3)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 18V, V_{GS} = 0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			$\pm 10$	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.45	0.7	1.1	V
Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 4A, V_{GS} = 2.5V$		23	33	m $\Omega$
		$I_D = 7A, V_{GS} = 4.5V$		16.5	19.9	m $\Omega$
		$I_D = 7A, V_{GS} = 7.4V$		14.5	18	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=7A$		50		S
Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0$		0.6	1	V
Diode Forward Current	$I_S$				2	A
Input Capacitance	$C_{iss}$	$V_{GS}=0V,$ $V_{DS}=10V,$ Frequency=1.0MHz		600		pF
Output Capacitance	$C_{oss}$			100		pF
Reverse Transfer Capacitance	$C_{rss}$			80		pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{DS} = 10V,$ $V_{GS} = 4.5V,$ $R_{GEN} = 3\Omega,$ $R_L=1.43\Omega$		7		ns
Turn-ON Rise Time	$t_r$			10		ns
Turn-OFF Delay Time	$t_{d(off)}$			32		ns
Turn-ON Fall Time	$t_f$			11		ns
Total Gate Charge	$Q_g$	$V_{DS} = 10V,$ $V_{GS} = 4.5V,$ $I_D = 7A$		7	14	nC
Gate-Source Charge	$Q_{gs}$			1		nC
Gate-Drain Charge	$Q_{gd}$			2		nC

Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



### 6. Typical electrical and thermal characteristics

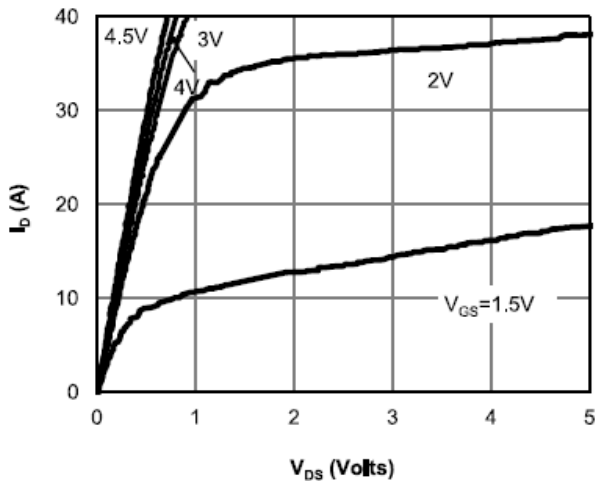


Figure 1 On-Region Characteristics

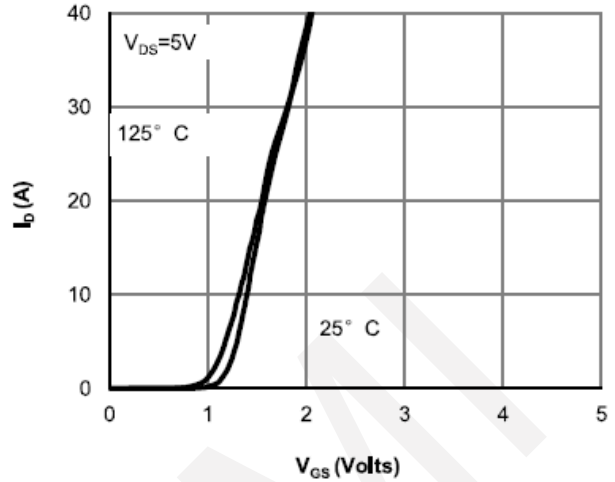


Figure 2 Transfer Characteristics

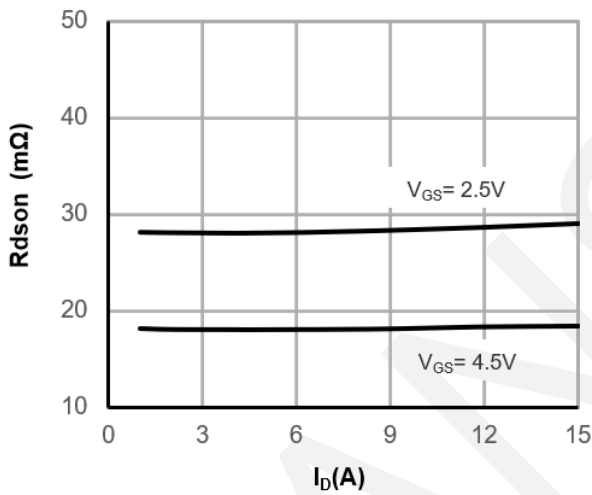


Figure 3 On-Resistance vs. Drain Current and Gate Voltage

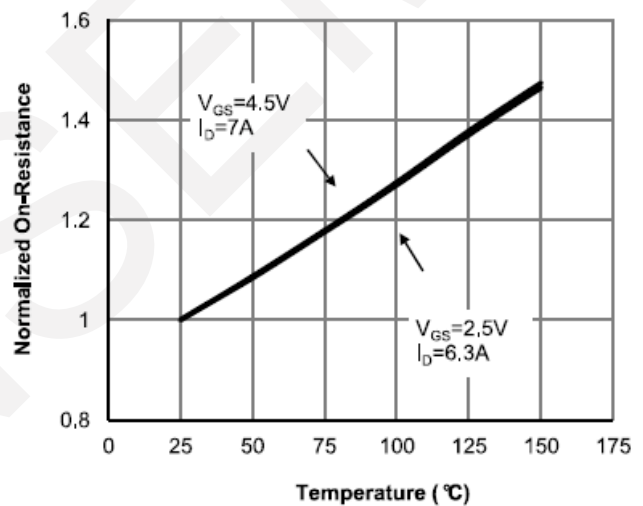


Figure 4 On-Resistance vs. Junction Temperature

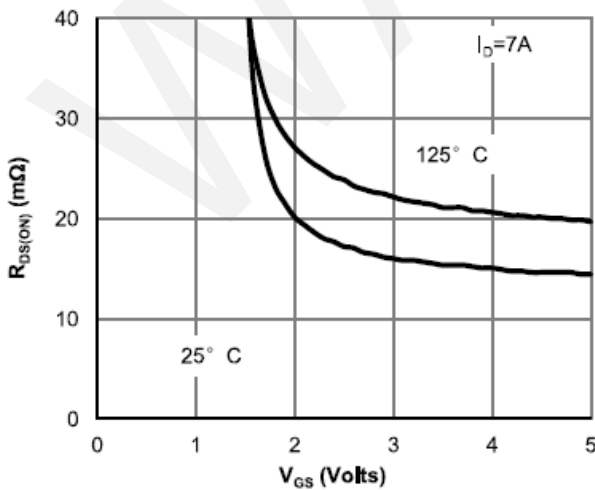


Figure 5 On-Resistance vs. Gate-Source Voltage

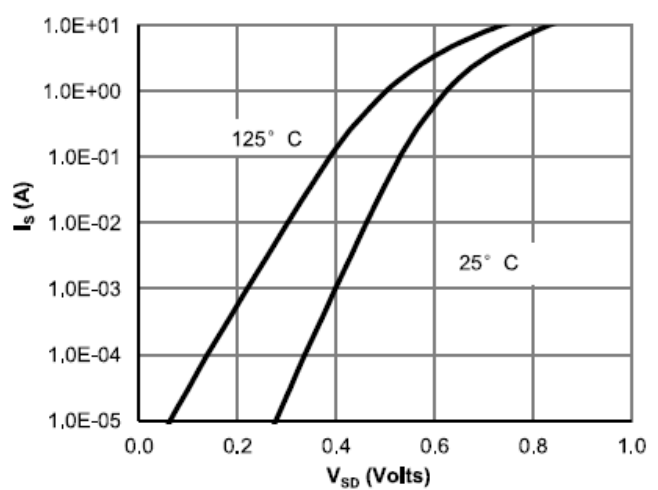


Figure 6 Body-Diode Characteristics

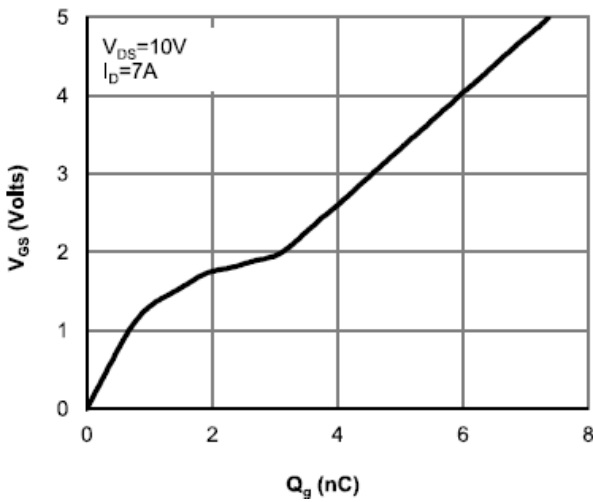


Figure 7 Gate Charge Characteristics

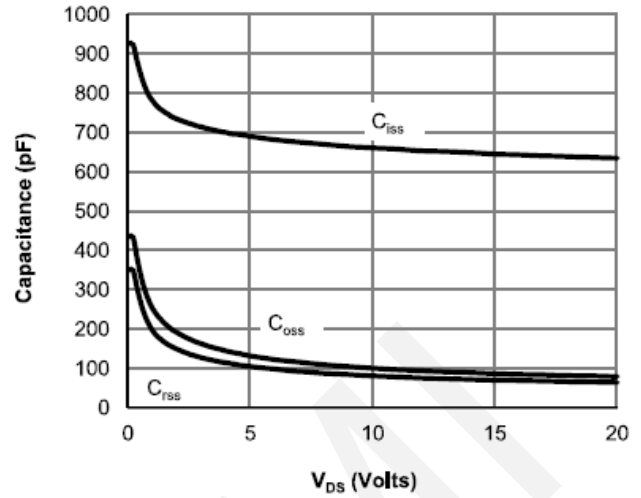


Figure 8 Capacitance Characteristics

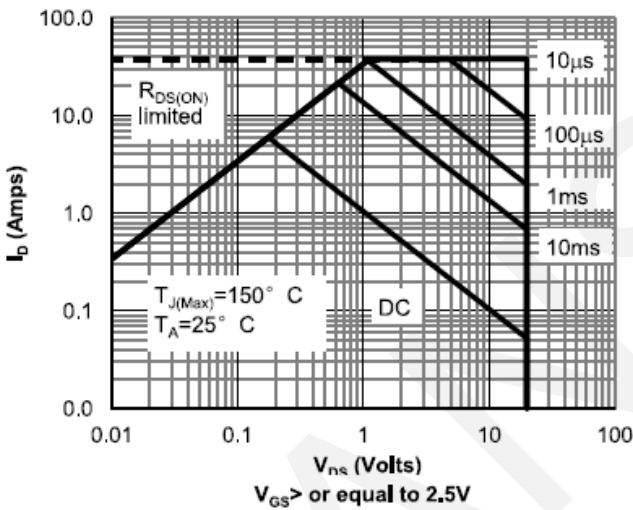


Figure 9 Maximum Forward Biased Safe Operating Area

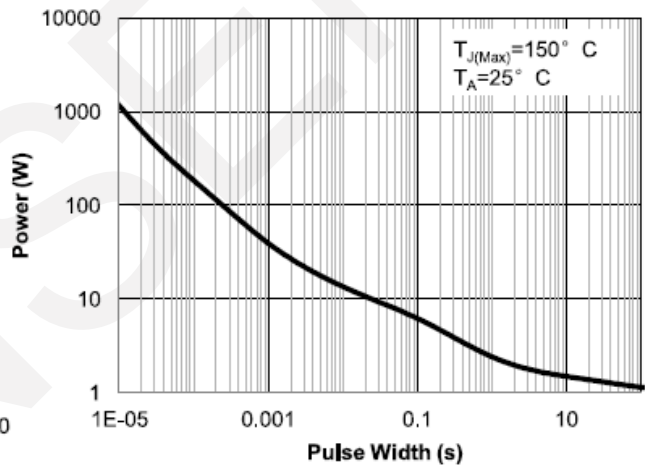


Figure 10 Single Pulse Power Rating Junction-To-Ambient

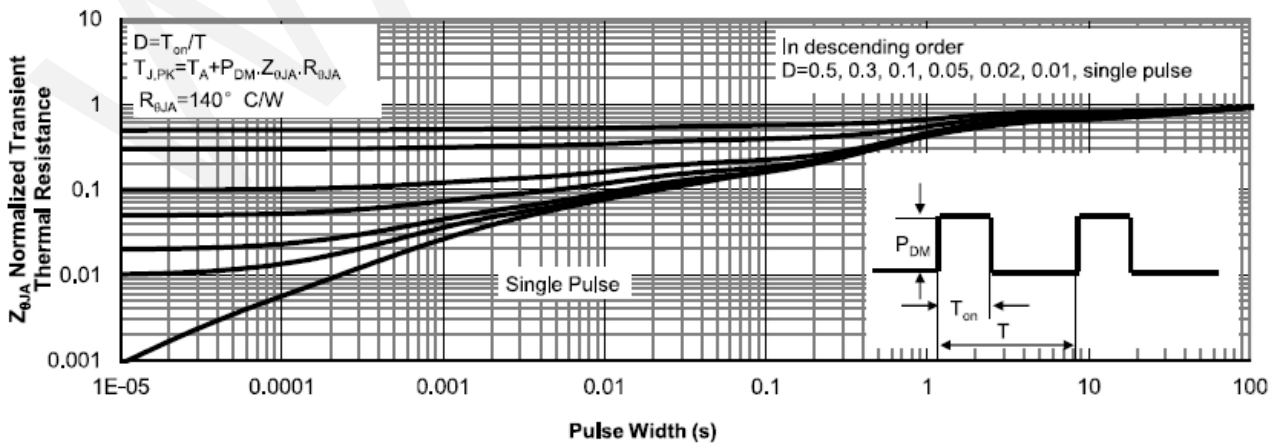
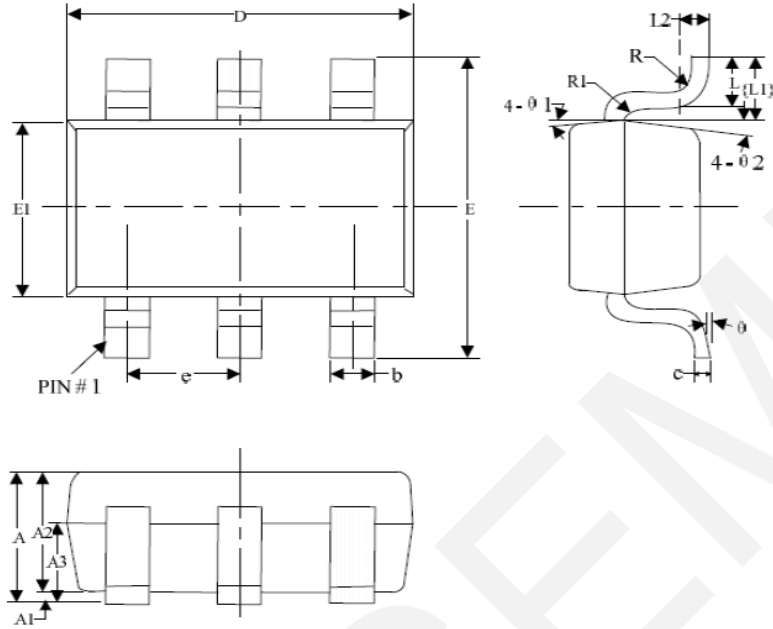


Figure 11 Normalized Maximum Transient Thermal Impedance



**7.Package Dimensions**

**SOT23-6**



**Dimensions (unit: mm)**

SYMBOL	MIN	NOM	MAX	SYMBOL	MIN	NOM	MAX
A	-	-	1.30	e	0.85	0.95	1.05
A1	0	-	0.15	L	0.35	0.45	0.60
A2	0.90	1.10	1.30	L1	0.59REF		
A3	0.60	0.65	0.70	L2	0.25BSC		
b	0.39	-	0.49	R	0.05	-	-
c	0.12	-	0.19	R1	0.05	-	0.02
D	2.85	2.95	3.15	θ	0°	-	8°
E	2.60	2.80	3.00	θ1	3°	5°	7°
E1	1.55	1.65	1.75	θ2	6°	8°	10°

## 8. Important Notice

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