WANSEMI
万芯半导体

WX022D02S6

Enhancement Mode N+P-Channel Power MOSFET

SOT23-6/N+P/NMOS/20V/±12V/0.7V/4A/24mΩ

PMOS/-20V/±12V/-0.75V/-4.2A/29mΩ

Rev0.1

20V, N+P-Channel MOSFET

1.Features

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package
- 100% RG Tested
- 100% UIS Tested

◆ N-Channel

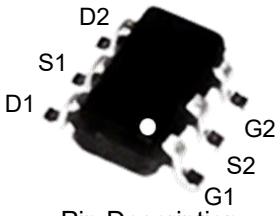
V_{DS} Typ.	$R_{DS(on)}$ Typ.	I_D Max.
20V	24mΩ @ 4.5V	4A
	30mΩ @ 2.5V	

◆ P-Channel

V_{DS} Typ.	$R_{DS(on)}$ Typ.	I_D Max.
-20V	29mΩ @-4.5V	-4.2A
	36mΩ @ -2.5V	

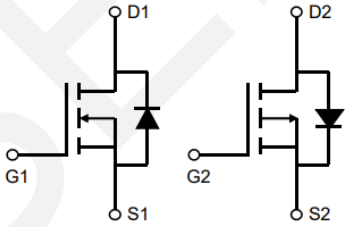
2.Applications

- Battery Protection
- Battery Powered Systems
- Power Management in Notebook Computer
- Portable Equipment



Pin Description

SOT23-6



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WX022D02S6	022D02	SOT23-6	3,000	180,000

4.Absolute Max Ratings at Ta=25℃ (Note1)

Parameter	Symbol	Maximum		Units
Drain to Source Voltage	V_{DSS}	20	-20	V
Gate to Source Voltage	V_{GSS}	±12	±12	V
Drain Current-Continuous	I_D	4	-4.2	A
Drain Current (Pulse)	I_{DM}	16	-16.8	A
Avalanche Energy, Single Pulsed	E_{AS}	10.5	7.8	mJ
Maximum Power Dissipation	P_D	1.5		W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125		℃/W

Parameter	Symbol	Maximum	Units
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55 to +150	℃

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.

5.Electrical Characteristics at Ta=25℃ (Note 2)

N-Channel

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	20	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V, V_{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	0.4	0.7	1.1	V
Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = 3A, V_{GS} =4.5V	-	24	28	mΩ
		I_D = 2A, V_{GS} =2.5V	-	30	40	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, Frequency=1.0MHz	-	550	-	pF
Output Capacitance	C_{oss}		-	110	-	pF
Reverse Transfer Capacitance	C_{rss}		-	85	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = 10V, I_D=4A, V_{GS} = 4.5V, R_{GEN}= 6Ω	-	8	-	ns
Turn-ON Rise Time	t_r		-	9	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	15	-	ns
Turn-ON Fall Time	t_f		-	4	-	ns
Total Gate Charge	Q_g	V_{DS} = 10V, V_{GS} = 4.5V, I_D = 4A	-	6	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	1.6	-	nC
Diode Forward Voltage	V_{SD}	I_S = 3A, V_{GS} = 0V	0.4	-	1.2	V

Note 2: 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.

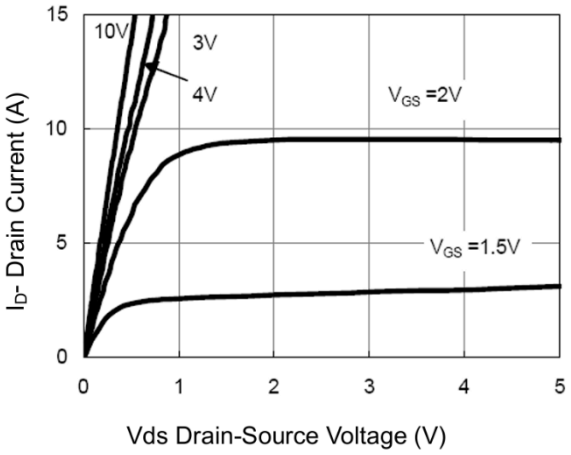
P-Channel

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = -250μA, V_{GS} = 0V	-20	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V, V_{GS} = 0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V, V_{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-0.5	-0.75	-1.1	V
Drain to Source On-State Resistance	$R_{DS(on)}$	I_D =-4A, V_{GS} =-4.5V	-	29	35	mΩ
		I_D =-3A, V_{GS} =-2.5V	-	36	42	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, Frequency=1.0MHz	-	667	-	pF
Output Capacitance	C_{oss}		-	121	-	pF
Reverse Transfer Capacitance	C_{rss}		-	111	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} =-10V, I_D =-4A, R_G = 6Ω, V_{GS}=-4.5V	-	7	-	ns
Turn-ON Rise Time	t_r		-	28	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	38	-	ns
Turn-ON Fall Time	t_f		-	20	-	ns
Total Gate Charge	Q_g	V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A	-	8.3	-	nC
Gate-Source Charge	Q_{gs}		-	1	-	nC
Gate-Drain Charge	Q_{gd}		-	2.1	-	nC
Diode Forward Voltage	V_{SD}	I_S = -4A, V_{GS} = 0	-0.5	-	-1.2	V

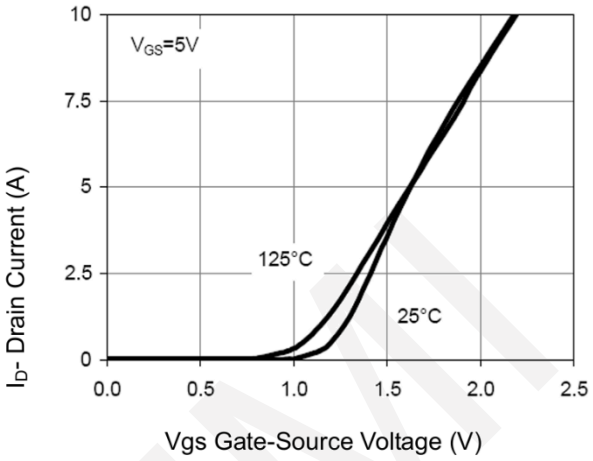
Note 2: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

6.Typical electrical and thermal characteristics

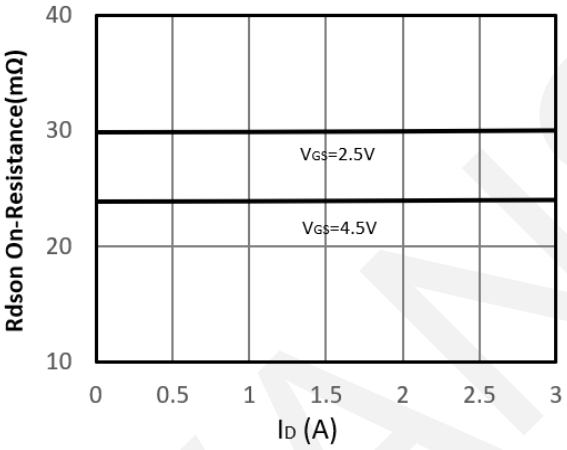
N-Channel



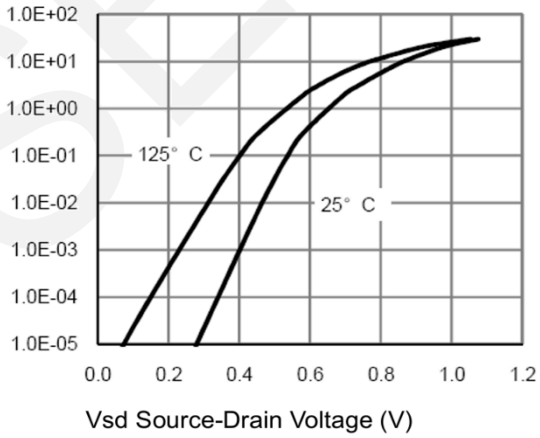
Output Characteristics



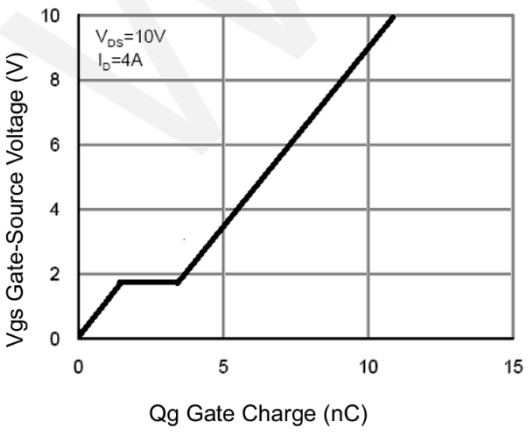
Typical Transfer Characteristics



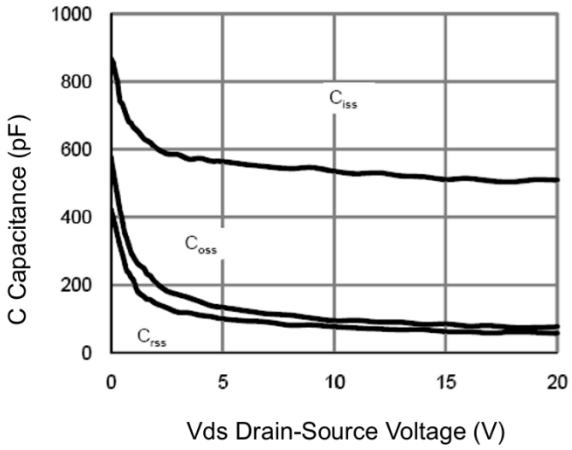
On-resistance vs. Drain Current



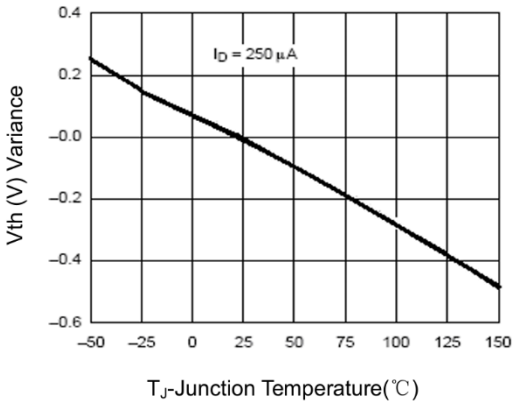
Body Diode Characteristics



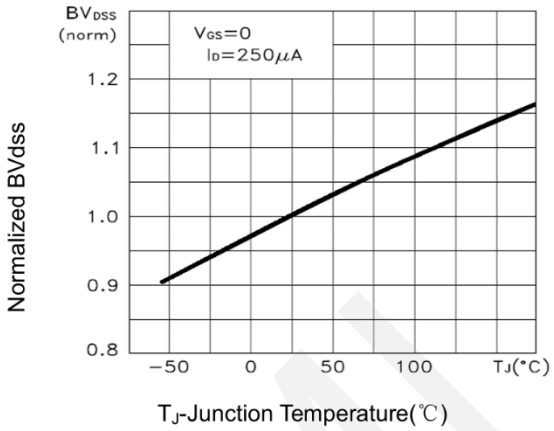
Gate Charge Characteristics



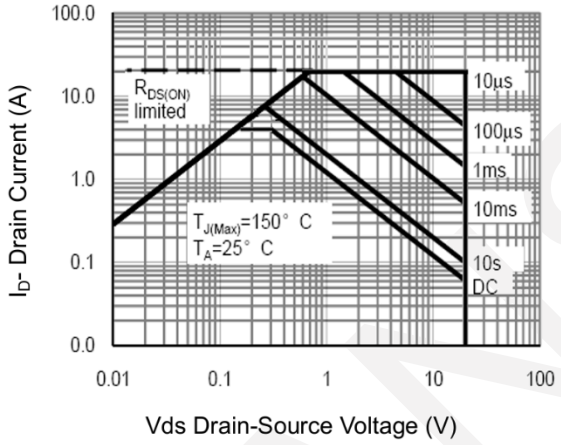
Capacitance Characteristics



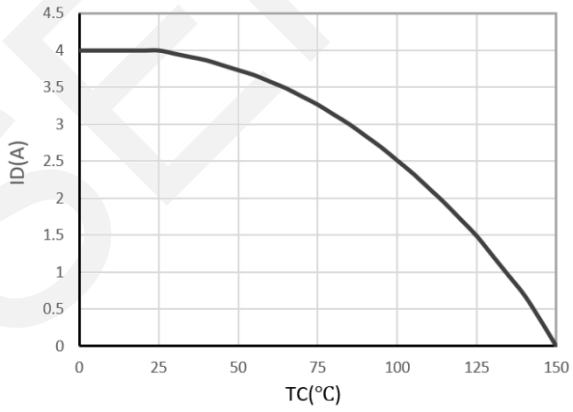
VGS(th) vs Junction Temperature



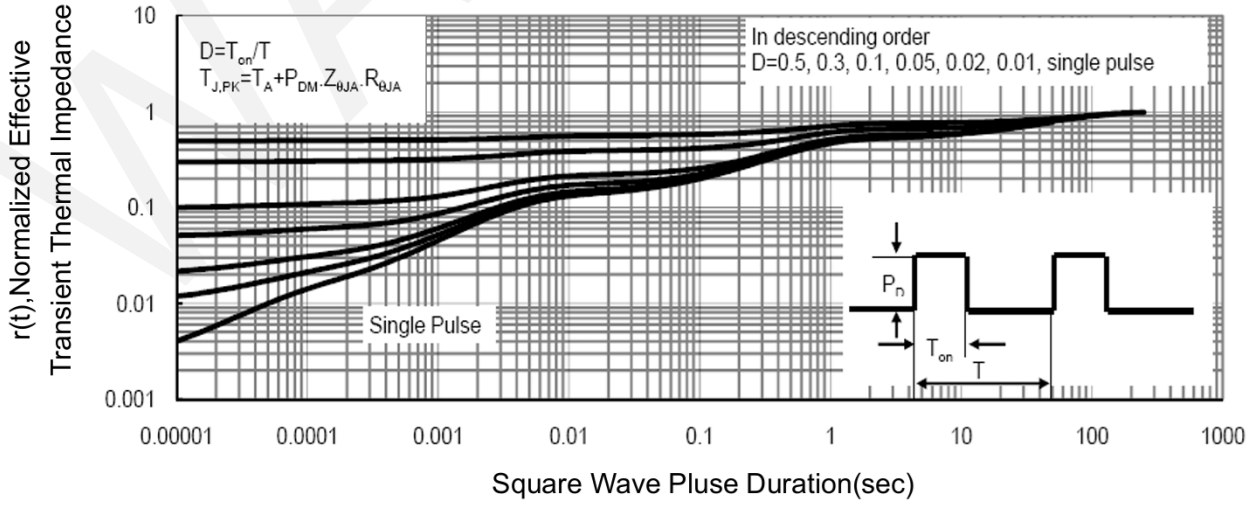
Normalized on Resistance vs.Junction Temperature



Maximum Safe Operating Area

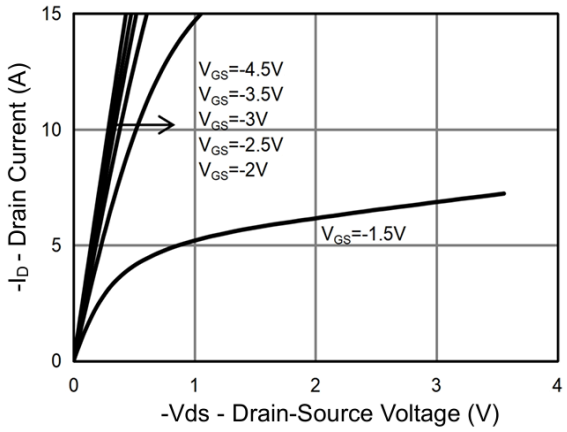


Maximum Continuous Drain Current vs. Ambient Temperature

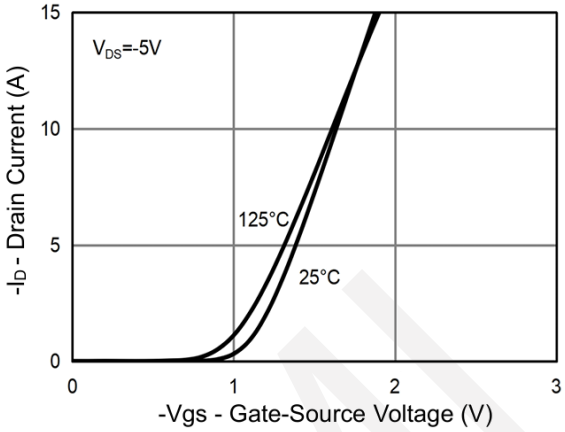


Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

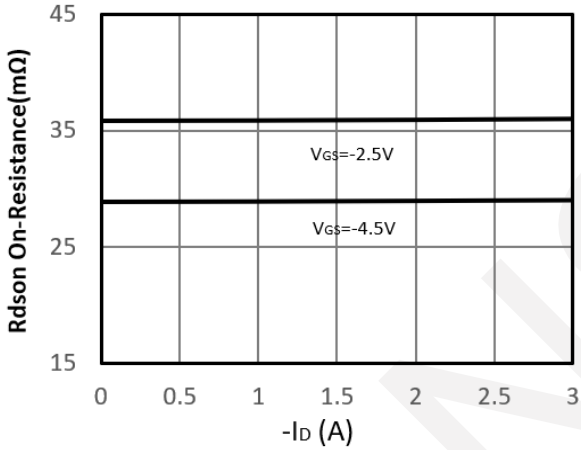
P-Channel



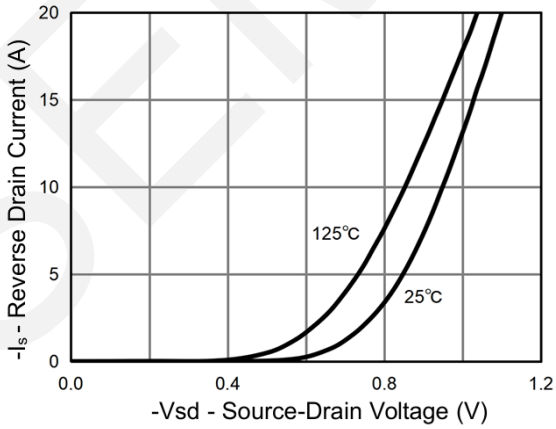
Output Characteristics



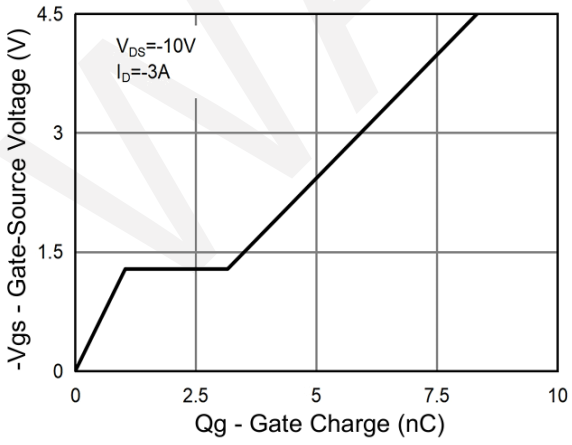
Typical Transfer Characteristics



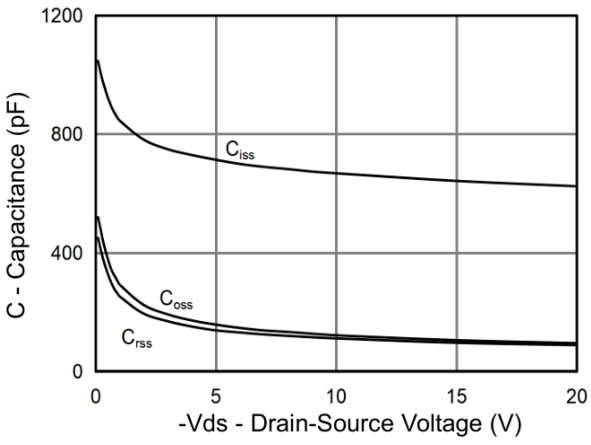
On-resistance vs. Drain Current



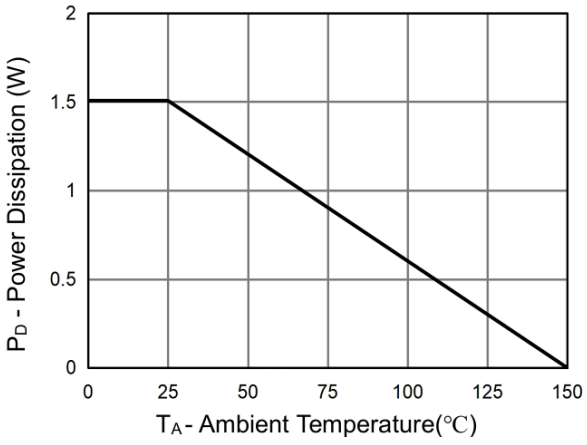
Body Diode Characteristics



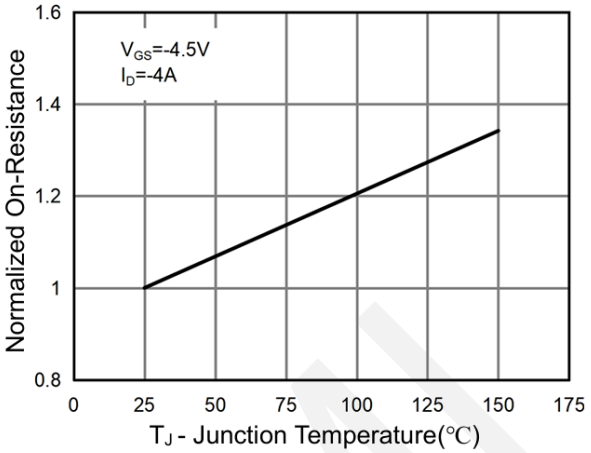
Gate Charge Characteristics



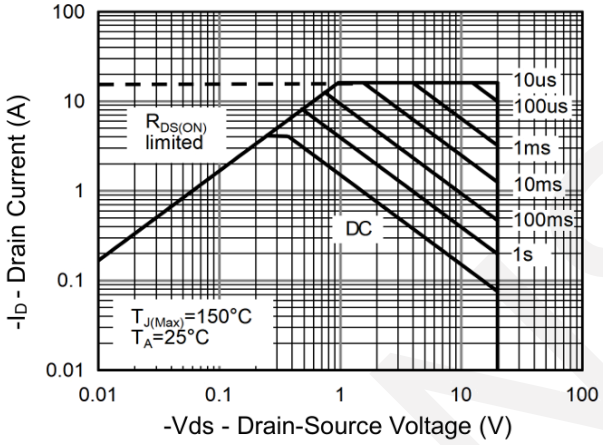
Capacitance Characteristics



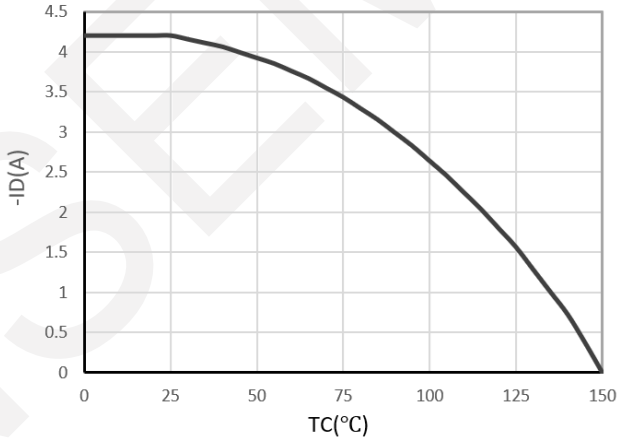
Power De-rating



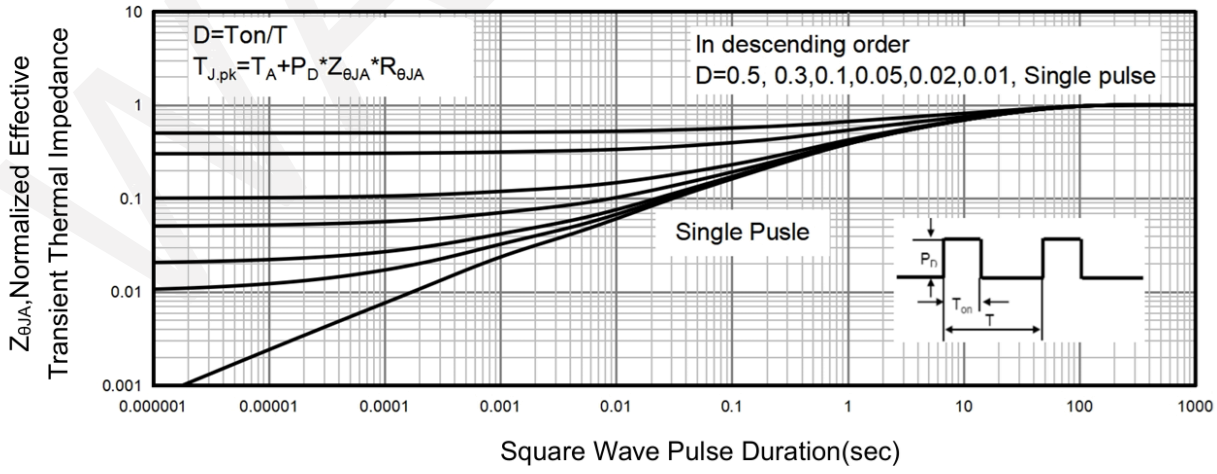
Normalized on Resistance vs.Junction Temperature



Maximum Safe Operating Area



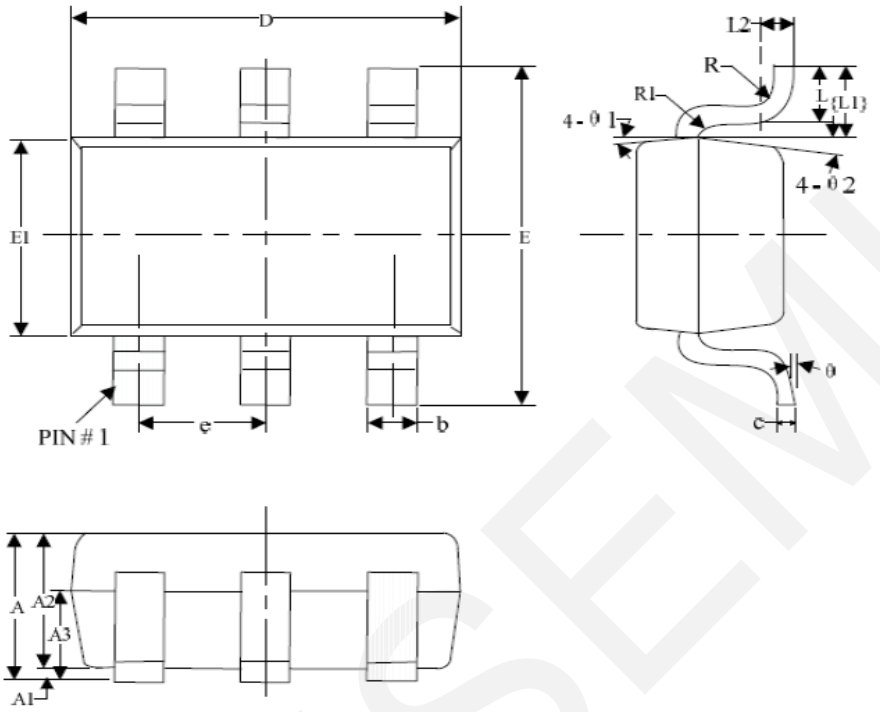
Maximum Continuous Drain Current vs. Ambient Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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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