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WP0406

Enhancement Mode N+P-Channel Power MOSFET

SOT23-6/N+PMOS/40V/±20V/1.5V/4A/45.8mΩ

-40V/±20V/-1.75V/-4A/98.8mΩ

Rev0.5

40V N+P-Channel MOSFET

1.Features

- High power and current handing capability
- Lead free product is acquired
- Fast switching
- Surface mount package

- N-Channel

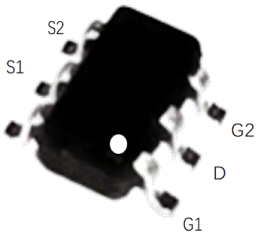
V_{DS}	$R_{DS(on)}$ Typ.	I_D
40V	45.8mΩ @ 10V	4A
	61.5mΩ @ 4.5V	

- P-Channel

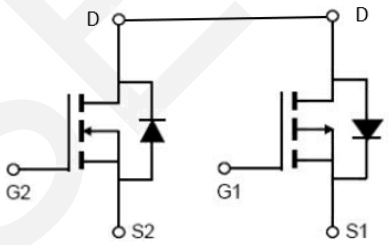
V_{DS}	$R_{DS(on)}$ Typ.	I_D
-40V	98.8mΩ @ -10V	-4A
	138.5mΩ @ -4.5V	

2.Applications

- Power Switching Application
- Load Switching



SOT23-06
Pin Description



N-Channel P-Channel

Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WP0406	0406	SOT23-6	3,000	180,000

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

Parameter		Symbol	N-chanel	P-chanel	Units
Drain to Source Voltage		V_{DSS}	40	-40	V
Gate to Source Voltage		V_{GSS}	±20	±20	V
Drain Current (DC),	TA=25 °C	I_D	4	-4	A
	TA=70 °C	I_D	2.8	-2.8	A
Drain Current (Pulse), PW≤300μs		I_{DM}	16	-16	A
Avalanche Energy, Single Pulsed		E_{AS}	6.7	10.3	mJ
Total Dissipation	TA=25 °C	P_D	0.6	0.6	W
Junction Temperature		T_j	150	150	℃

Parameter	Symbol	N-chanel	P-chanel	Units
Storage Temperature	T_{stg}	-55 to +150	-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.Thermal Resistance Ratings (Note 2)

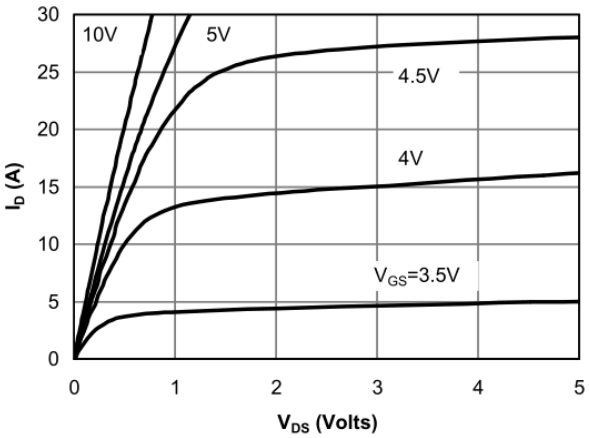
Parameter	Symbol	Value	Unit
Maximum Junction-to-Ambient	$R_{\theta JA}$	192	℃/W

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.

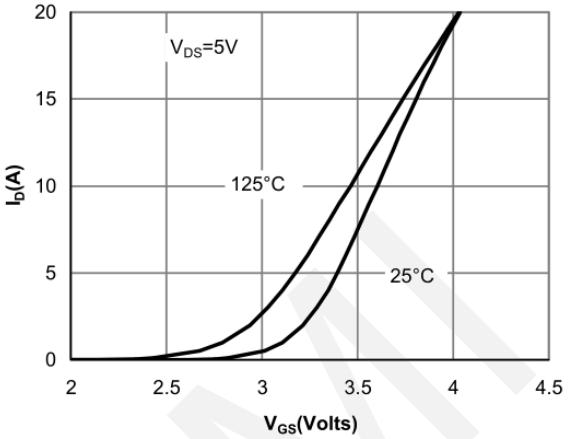
6.NMOS Electrical Characteristics at Ta=25℃ (Note 3)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	40	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1.0	1.5	2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = 3A, V_{GS} = 10V	-	45.8	60	mΩ
		I_D = 3A, V_{GS} = 4.5V	-	61.5	81	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	371	-	pF
Output Capacitance	C_{oss}		-	170	-	pF
Reverse Transfer Capacitance	C_{rss}		-	58	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = 20V V_{GS} = 10V R_{GEN} = 2.5Ω I_D = 4A	-	6.8	-	ns
Rise Time	t_r		-	40.6	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	13.4	-	ns
Fall Time	t_f		-	2.7	-	ns
Total Gate Charge	Q_g	V_{DS} = 20V, V_{GS} = 10V, I_D = 4A	-	5.1	-	nC
	Q_{gs}		-	1.3	-	nC
	Q_{gd}		-	1.5	-	nC
Diode Forward Voltage	V_{FSD}	I_S = 4A, V_{GS} = 0V	-	0.85	1.2	V

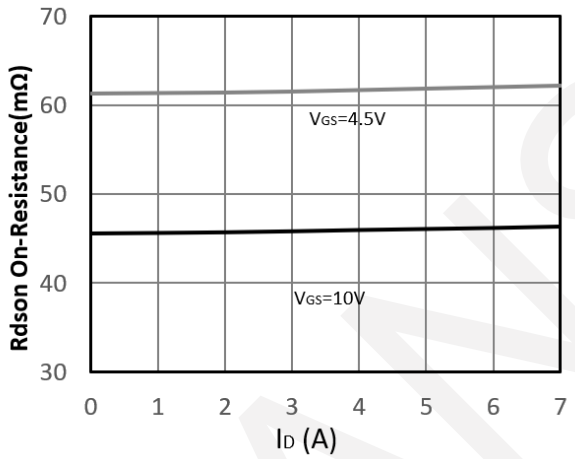
NMOS Typical electrical and thermal characteristics



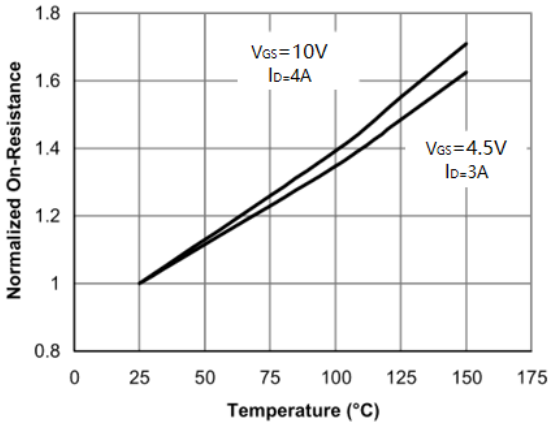
Output Characteristics



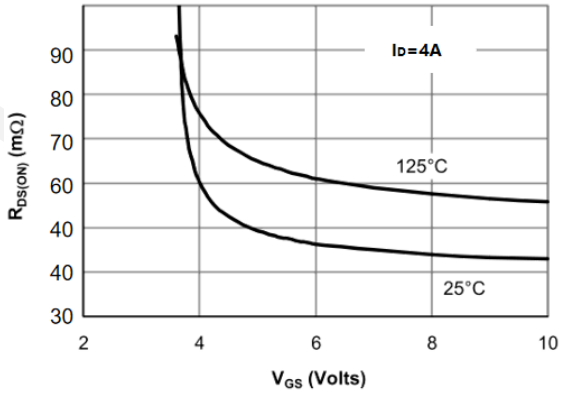
Transfer Characteristics



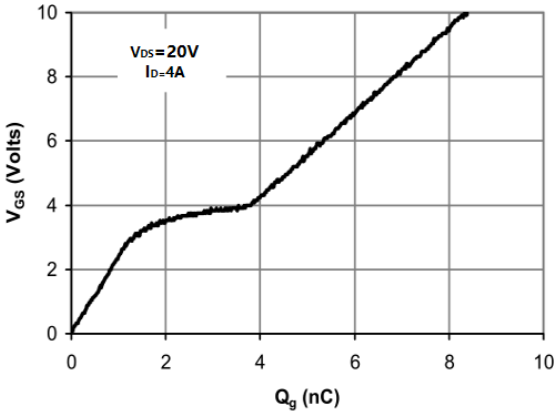
Drain-Source On-Resistance



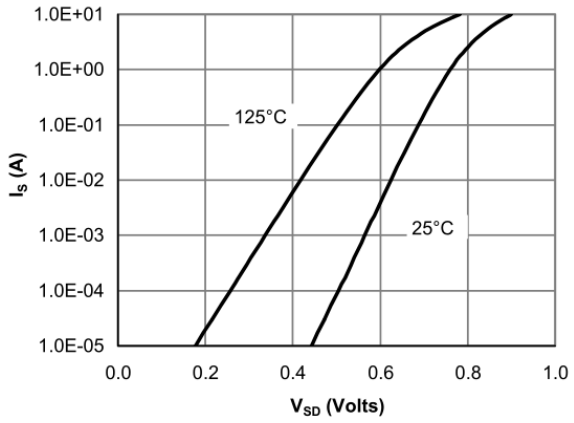
Drain-Source On-Resistance



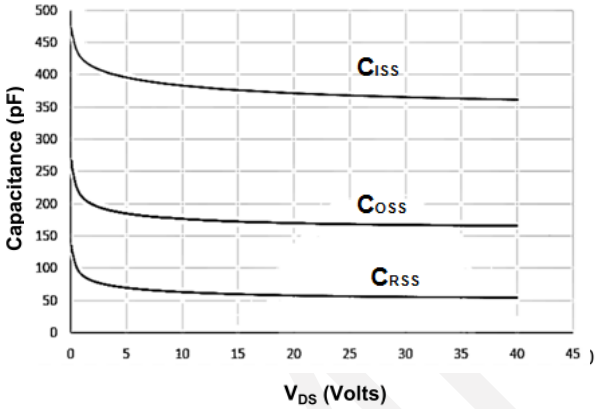
Rdson vs Vgs



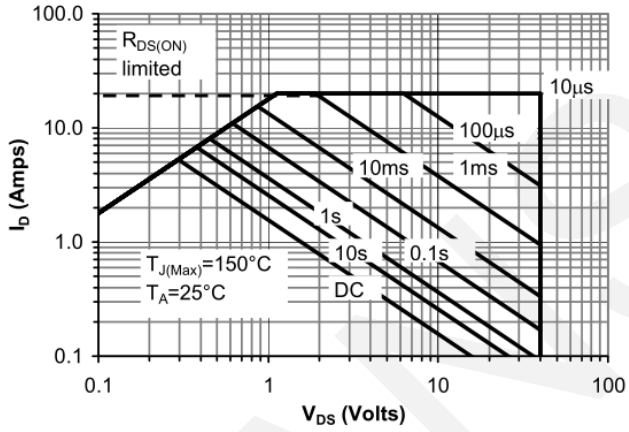
Gate Charge



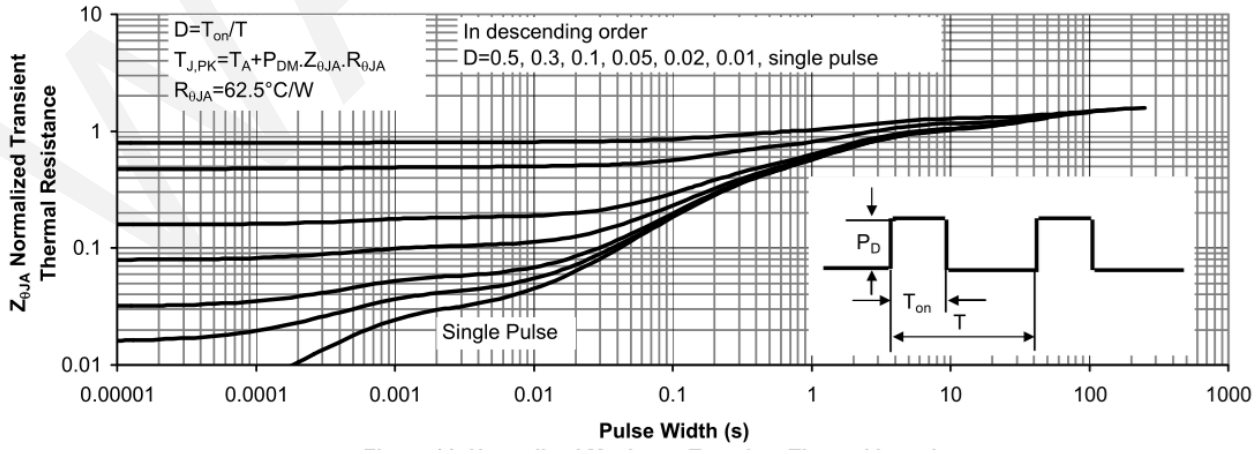
Source- Drain Diode Forward



Capacitance vs Vds



Safe Operating Area



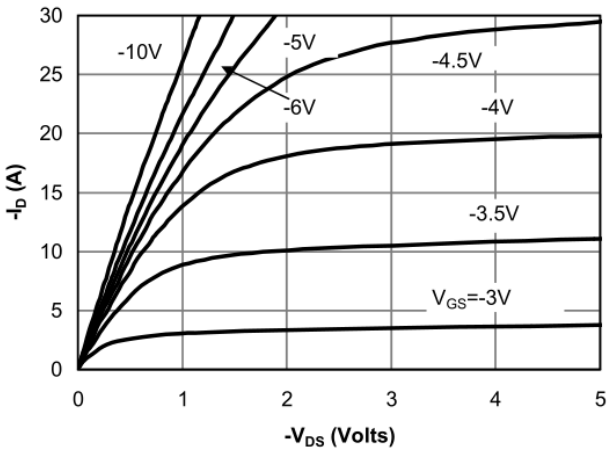
Normalized Maximum Transient Thermal Impedance

7.PMOS Electrical Characteristics at Ta=25℃(Note 3)

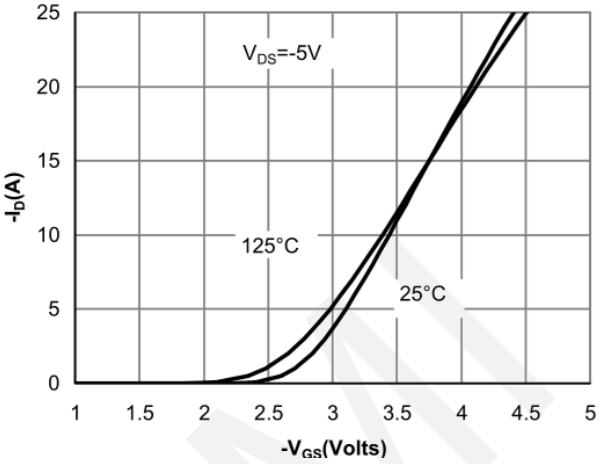
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = -250μA, V_{GS} = 0V	-40			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=-250μA	-1.0	-1.75	-2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = -3A, V_{GS} = -10V		98.8	125	mΩ
		I_D = -3A, V_{GS} =-4.5V		138.5	170	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz		647	-	pF
Output Capacitance	C_{oss}			433	-	pF
Reverse Transfer Capacitance	C_{rss}			280	-	pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = -20V, I_D = -4A, V_{GS} = -10V, R_{GEN} =2.5Ω		6.5	-	ns
Rise Time	t_r			14	-	ns
Turn-OFF Delay Time	$t_{d(off)}$			34	-	ns
Fall Time	t_f			18	-	ns
Total Gate Charge	Q_g	V_{DS} = -20V, V_{GS} = -10V, I_D = -4A		13.5		nC
	Q_{gs}			1.5		nC
	Q_{gd}			1.8		nC
Diode Forward Voltage	V_{FSD}	I_S = -4A, V_{GS} = 0V		-0.9	-1.2	V

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 condit

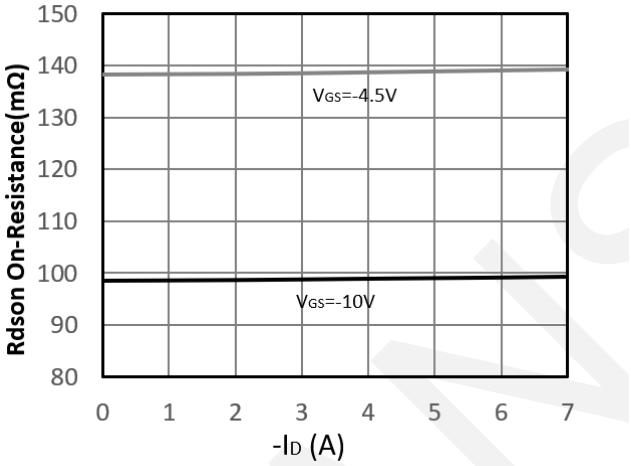
PMOS Typical electrical and thermal characteristics



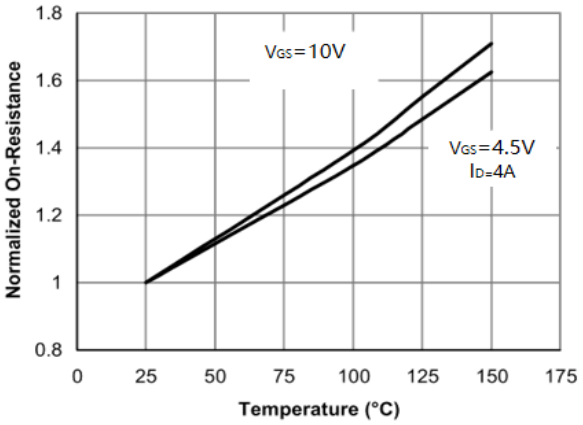
Output Characteristics



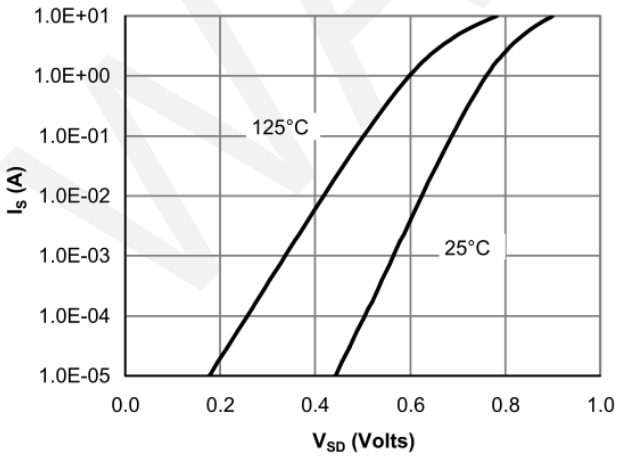
Transfer Characteristics



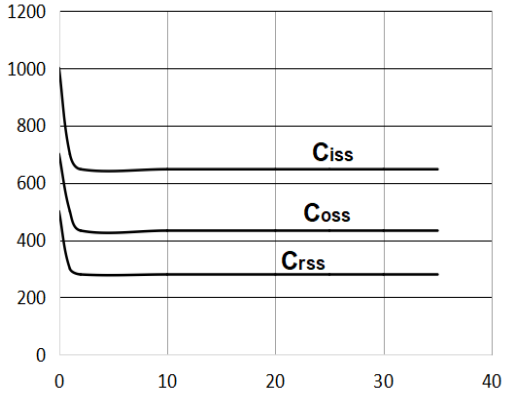
Rdson- Drain Current



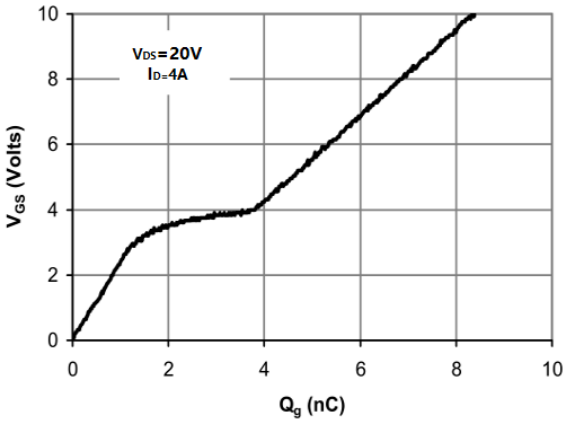
Rdson-Junction Temperature



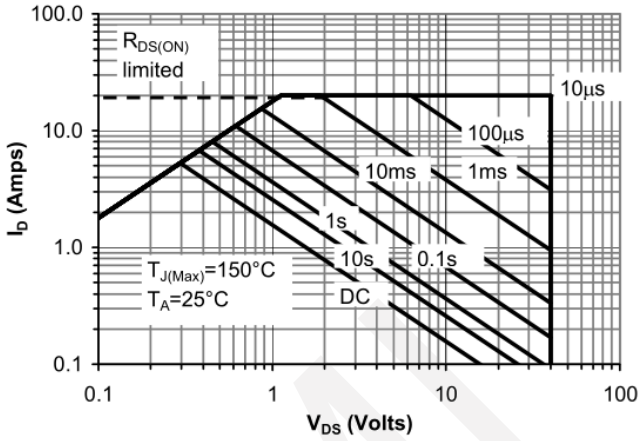
Source- Drain Diode Forward



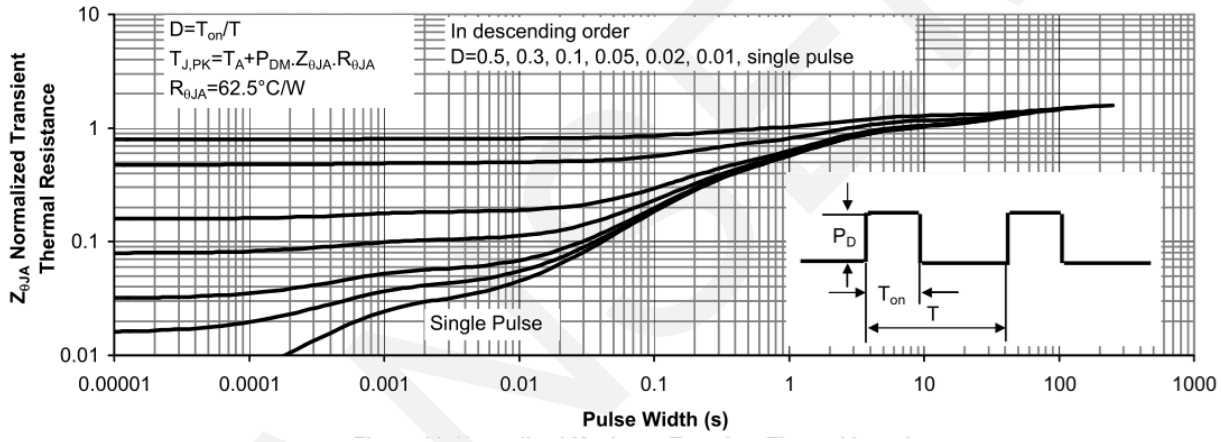
Capacitance vs Vds



Gate-Charge



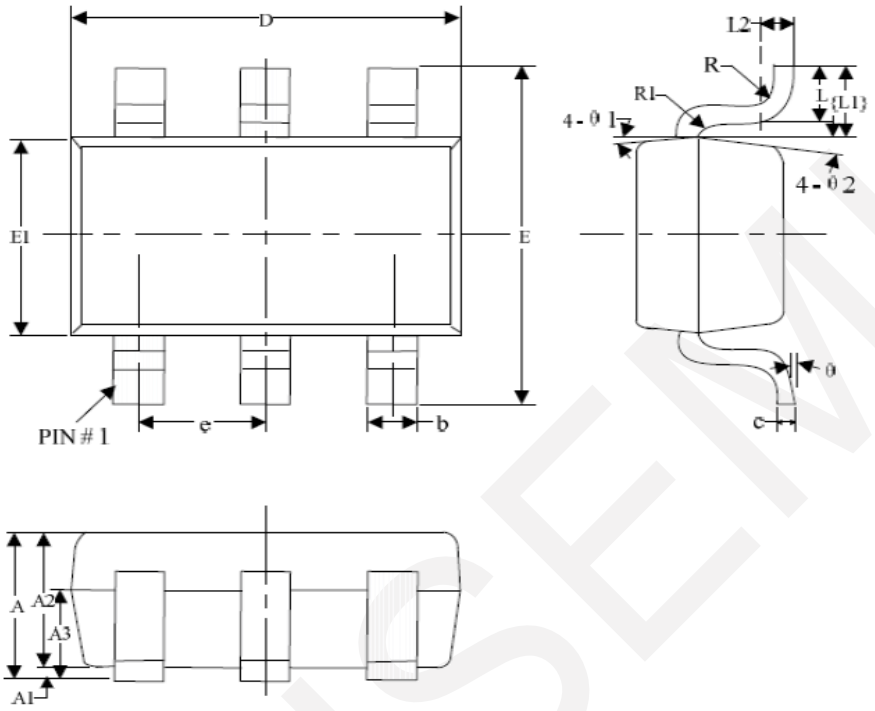
Safe Operation Area



Normalized Maximum Transient Thermal Impedance

8.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°

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