



Description

The HXY4G03LI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 30V$ $I_D = 4A$

$R_{DS(ON)} < 38m\Omega$ @ $V_{GS}=10V$

$V_{DS} = -30V$ $I_D = -4A$

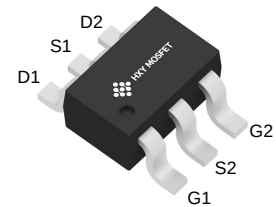
$R_{DS(ON)} < 65 m\Omega$ @ $V_{GS}=-10V$

Application

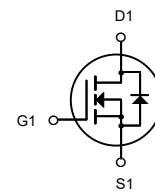
Wireless charging

Boost driver

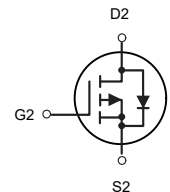
Brushless motor



SOT-23-6L



N-Channel MOSFET



P-Channel MOSFET

Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXY4G03LI	SOT-23-6L	4G03	3000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
VDS	Drain-Source Voltage	30	-30	V
VGS	Gate-Source Voltage	± 20	± 20	V
$I_{D@T_A=25^{\circ}C}$	Continuous Drain Current, V_{GS} @ 10V ¹	4	-4	A
$I_{D@T_A=70^{\circ}C}$	Continuous Drain Current, V_{GS} @ 10V ¹	2	-2.5	A
IDM	Pulsed Drain Current ²	20	-22	A
EAS	Single Pulse Avalanche Energy ³	72	79	mJ
IAS	Avalanche Current	21	-21	A
$P_{D@T_A=25^{\circ}C}$	Total Power Dissipation ⁴	1.5	2.08	W
TSTG	Storage Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
TJ	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^{\circ}C$
R θ JA	Thermal Resistance Junction-Ambient ¹	85		$^{\circ}C/W$
R θ JC	Thermal Resistance Junction-Case ¹	6		$^{\circ}C/W$



N-Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =10V, I _D =4A	-	29	38	mΩ
		V _{GS} =4.5V, I _D =3A	-	45	65	
Dynamic Characteristics						
C _{iSS}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	233	-	pF
C _{oSS}	Output Capacitance		-	44	-	pF
C _{rSS}	Reverse Transfer Capacitance		-	33	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =2A, V _{GS} =10V	-	3	-	nC
Q _{gs}	Gate-Source Charge		-	0.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	0.8	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =15V, I _D =4A, R _{GEN} =3Ω, V _{GS} =10V	-	4	-	ns
t _r	Turn-on Rise Time		-	2.1	-	ns
t _{d(off)}	Turn-off Delay Time		-	15	-	ns
t _f	Turn-off Fall Time		-	3.2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	4.0	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	16	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =4A	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



P-Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} =0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.0	-1.5	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} = -4.5V, I _D = -3A	-	53	65	mΩ
		V _{GS} = -2.5V, I _D = -2A	-	75	93	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -10V, V _{GS} =0V, f=1.0MHz	-	393	-	pF
C _{oss}	Output Capacitance		-	47	-	pF
C _{rss}	Reverse Transfer Capacitance		-	38	-	pF
Q _g	Total Gate Charge	V _{DS} = -10V, I _D = -2A, V _{GS} = -4.5V	-	7.1	-	nC
Q _{gs}	Gate-Source Charge		-	1.2	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	1.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -10V, I _D = -3A, R _G =1Ω, V _{GEN} = -4.5V, R _L =1.2Ω	-	9	-	ns
t _r	Turn-on Rise Time		-	2.88	-	ns
t _{d(off)}	Turn-off Delay Time		-	22.3	-	ns
t _f	Turn-off Fall Time		-	3.9	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-12	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -3A	-	-	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycles≤2%



N-Typical Performance Characteristics

Figure1: Output Characteristics

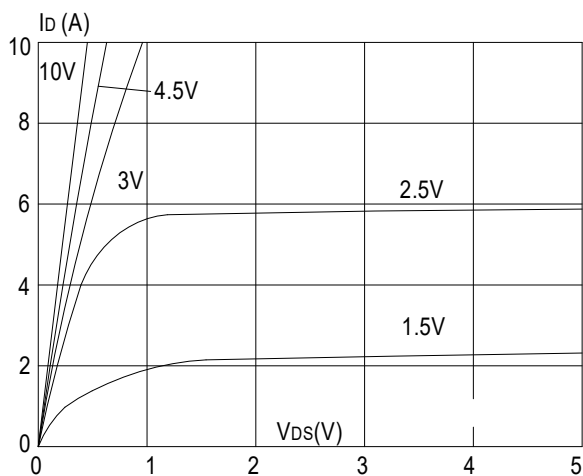


Figure 2: Typical Transfer Characteristics

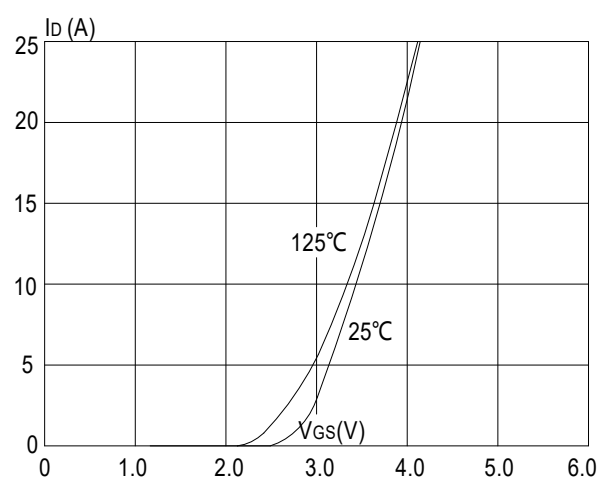


Figure 3: On-resistance vs. Drain Current

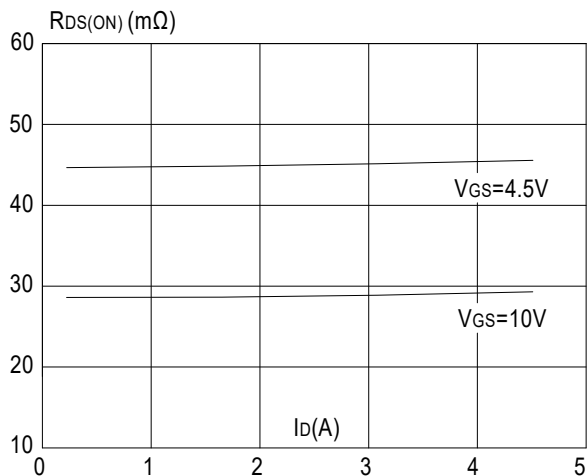


Figure 4: Body Diode Characteristics

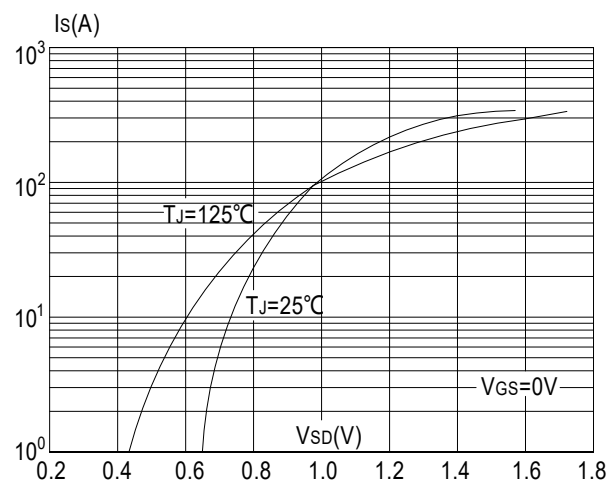


Figure 5: Gate Charge Characteristics

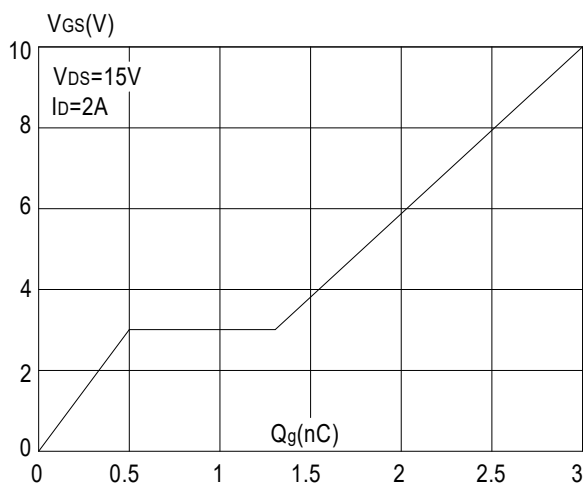


Figure 6: Capacitance Characteristics

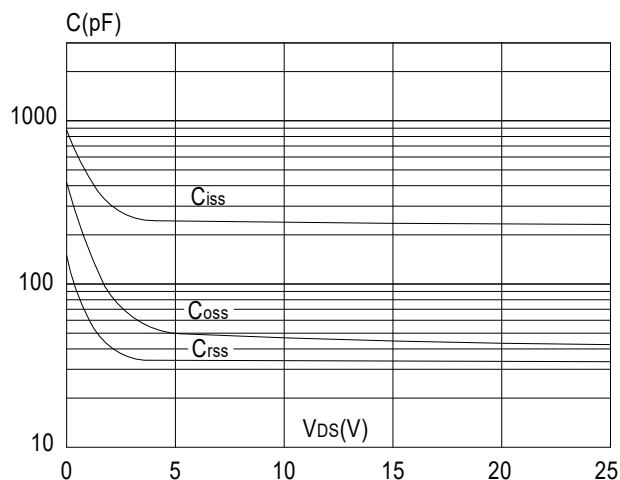




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

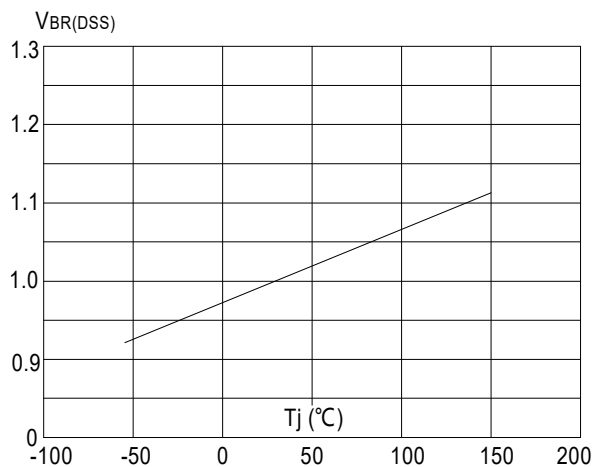


Figure 8: Normalized on Resistance vs. Junction Temperature

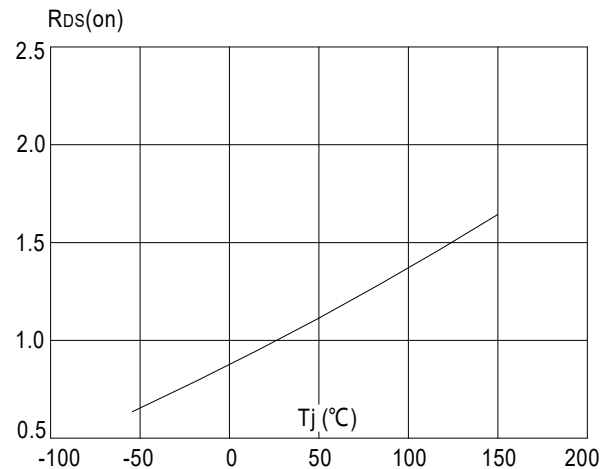


Figure 9: Maximum Safe Operating Area

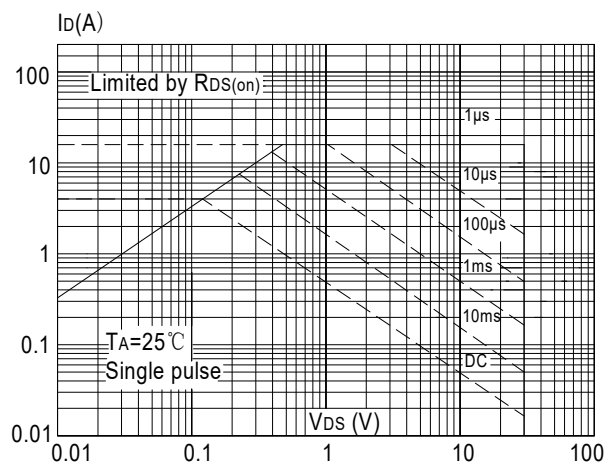


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

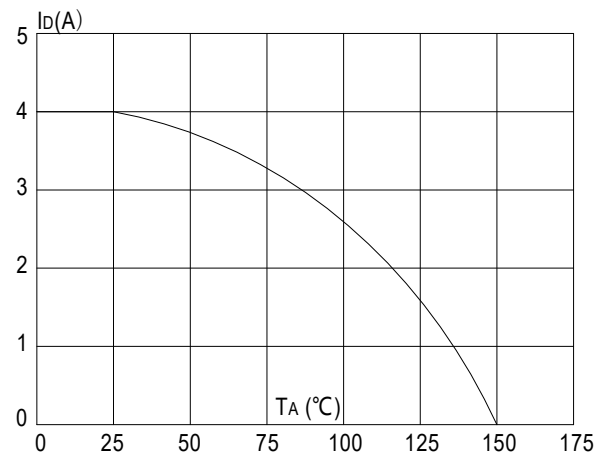
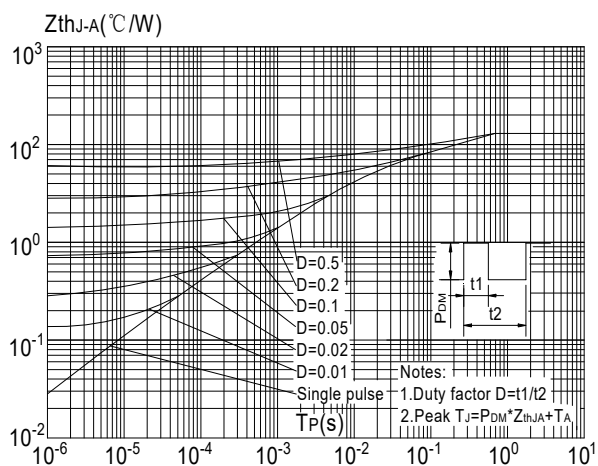


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





P-Typical Performance Characteristics

Fig 1: Output Characteristics

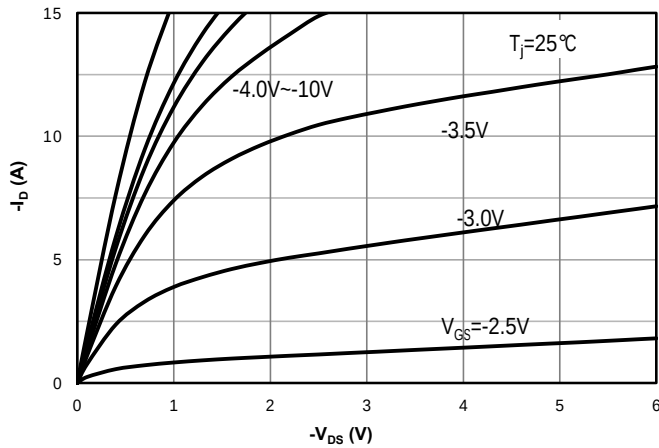


Fig 2: Transfer Characteristics

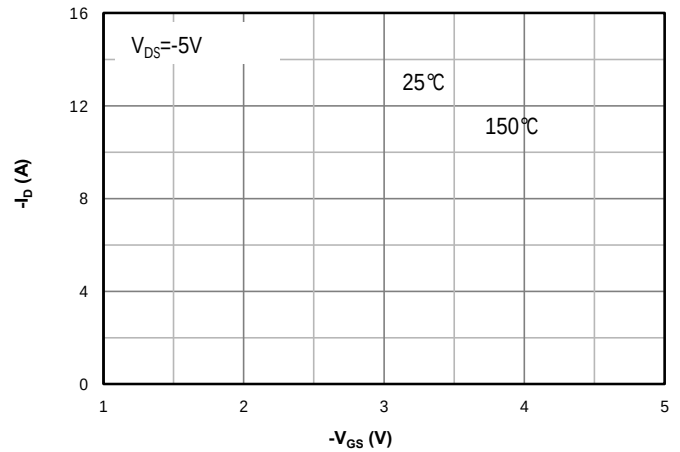


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

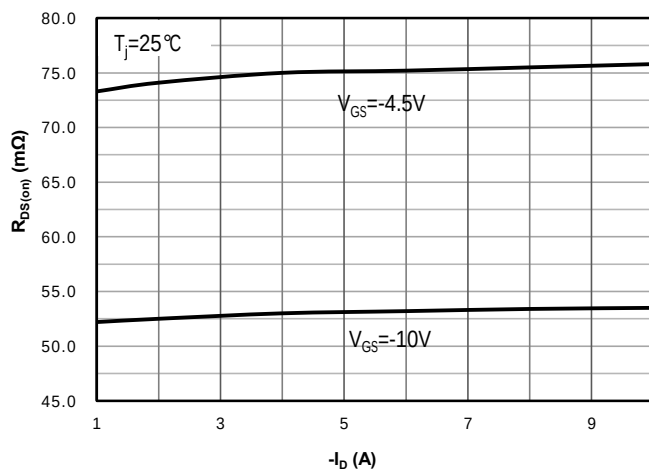


Fig 4: $R_{DS(on)}$ vs Gate Voltage

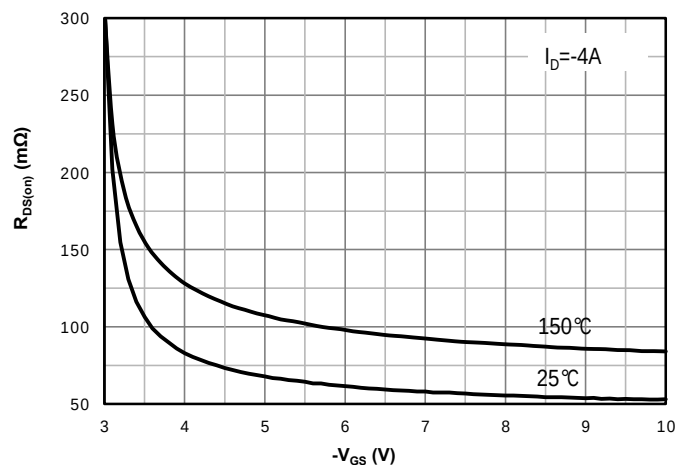


Fig 5: $R_{DS(on)}$ vs. Temperature

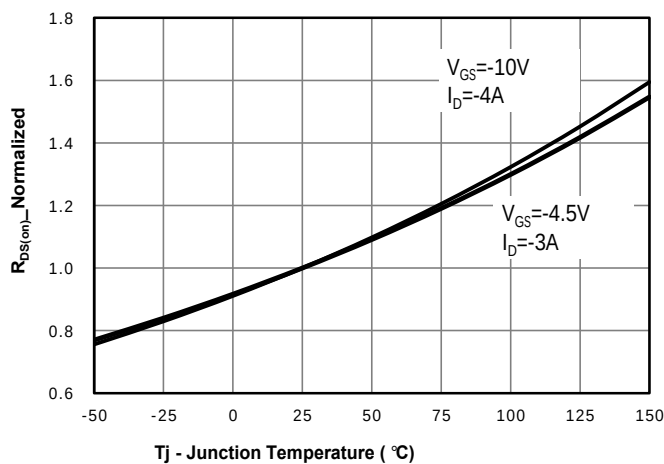


Fig 6: $V_{GS(th)}$ vs. Temperature

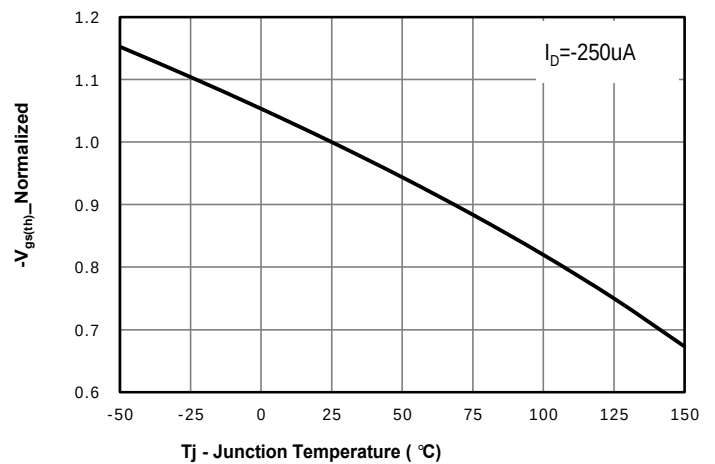




Fig 7: BV_{DSS} vs. Temperature

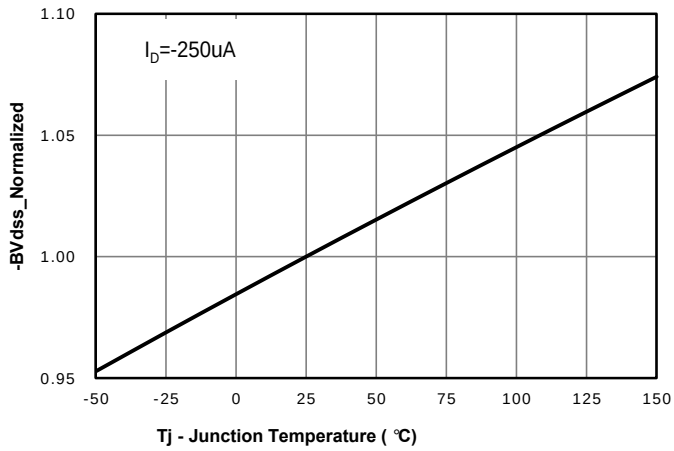


Fig 8: Body-diode Forward Characteristics

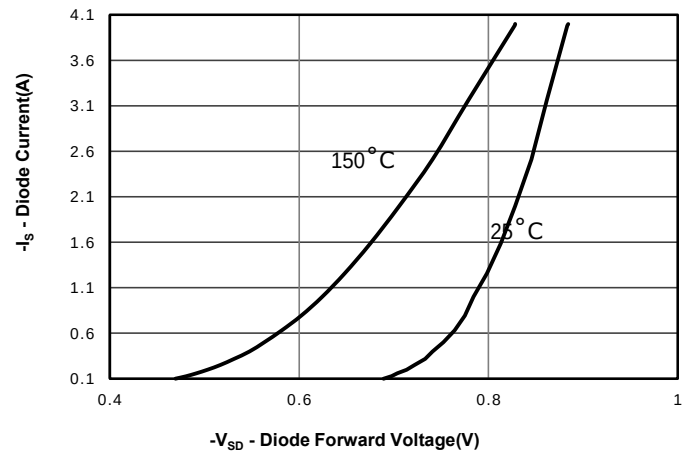


Fig 9: Gate Charge Characteristics

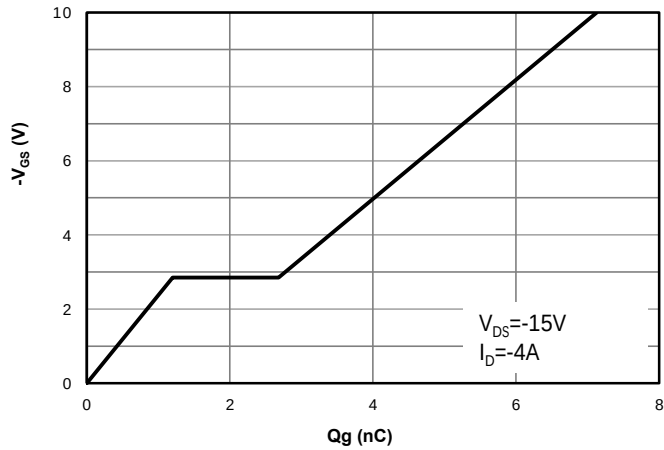


Fig 10: Capacitance Characteristics

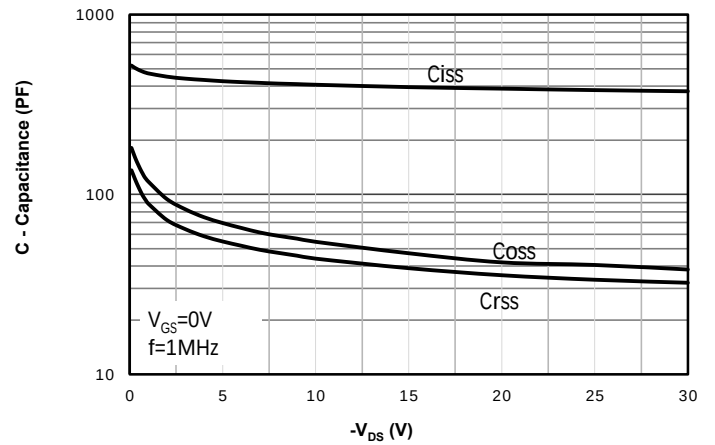


Fig 11: Drain Current Derating

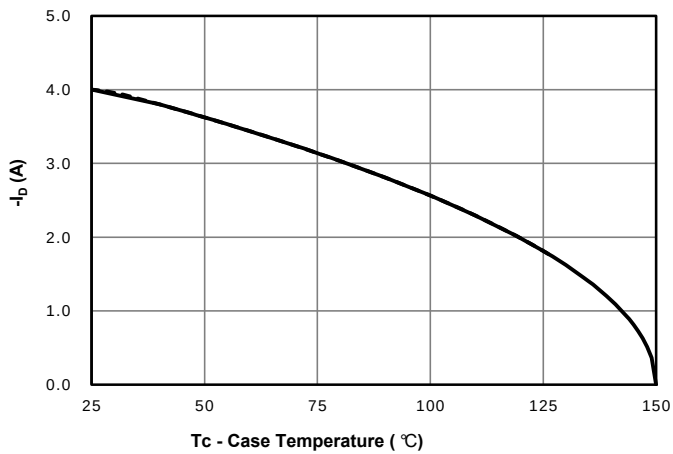


Fig 12: Power Dissipation

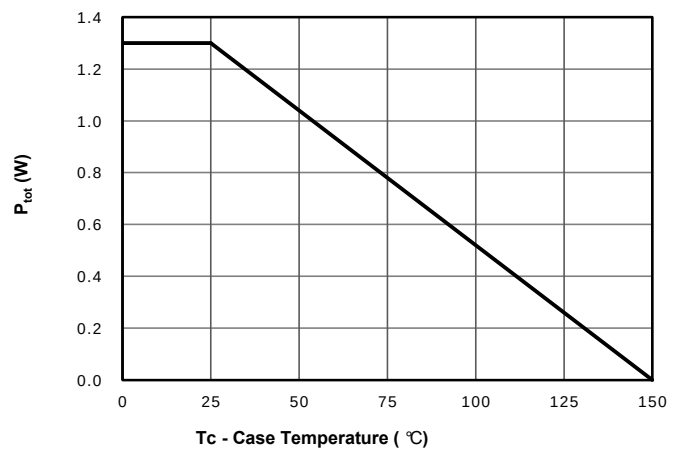




Fig 13: Safe Operating Area

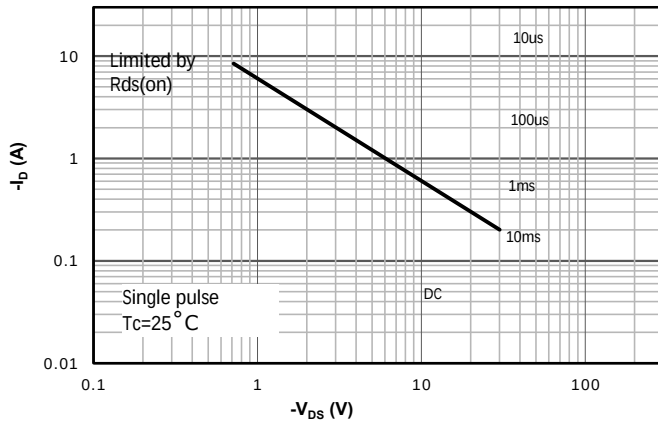
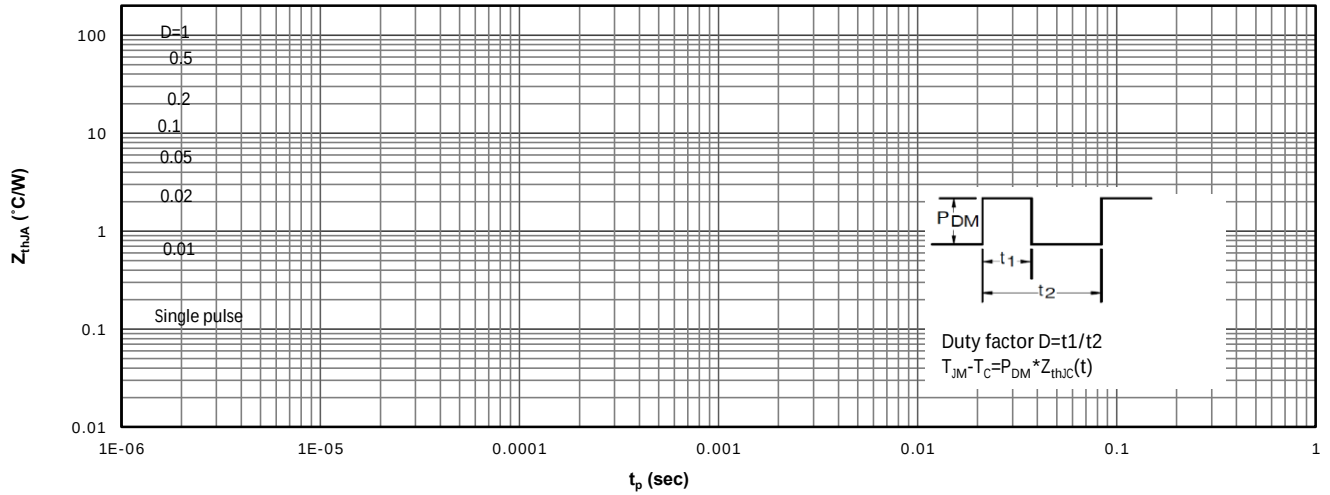
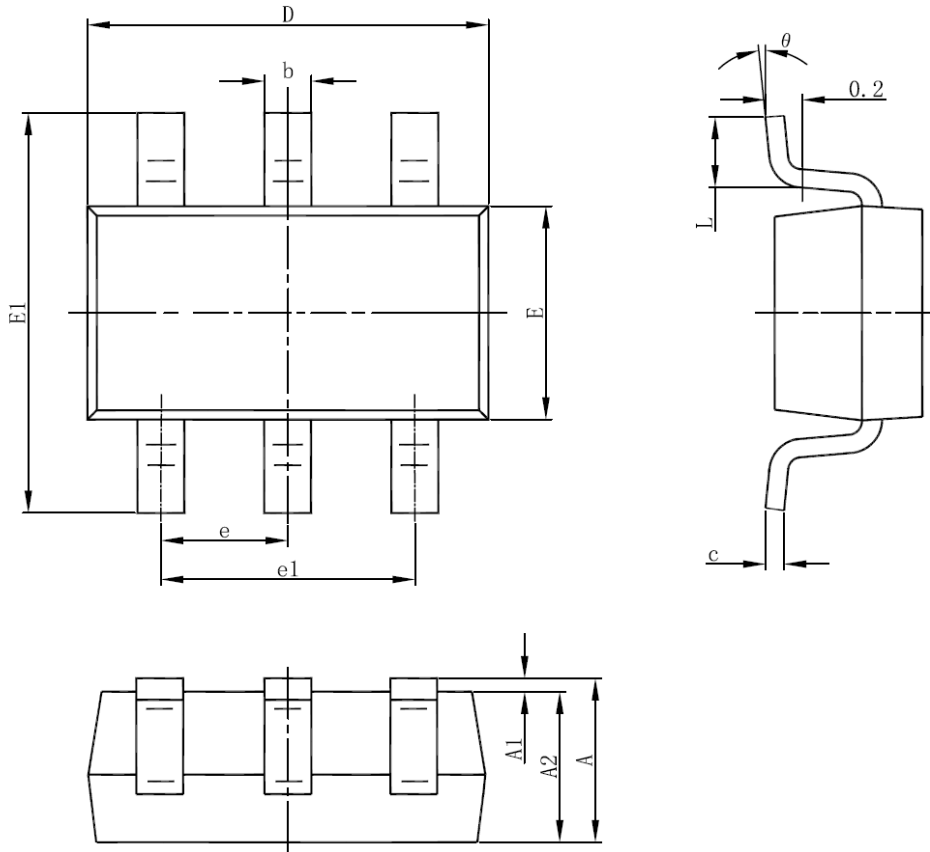


Fig 14: Max. Transient Thermal Impedance





SOT-23-6L Package Information



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°



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