

N and P Channel Enhancement Mode Power MOSFET

Description

This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

● NMOS

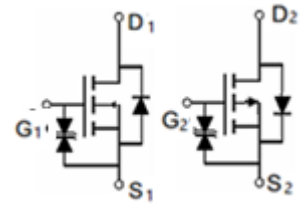
- V_{DS} 20V
- I_D (at $V_{GS} = 10V$) 1.36A
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 375m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 2.5V$) < 450m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 1.8V$) < 800m Ω

● PMOS

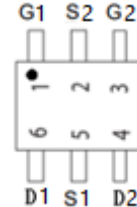
- V_{DS} -20V
- I_D (at $V_{GS} = -10V$) -1.15A
- $R_{DS(ON)}$ (at $V_{GS} = -4.5V$) < 520m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -2.5V$) < 700m Ω
- $R_{DS(ON)}$ (at $V_{GS} = -1.8V$) < 1000m Ω
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM)>2.0KV

Application

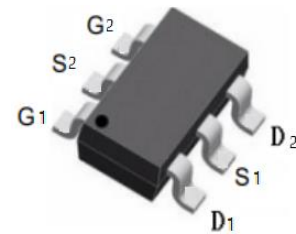
- Power switch
- DC/DC converters



Schematic diagram



Marking and pin assignment



SOT-23-6L

Device	Package	Marking	Packaging
G1NP02ELL	SOT-23-6	G1NP02	3000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted				
Parameter	Symbol	NMOS	PMOS	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Continuous Drain Current	I_D	1.36	-1.15	A
Pulsed Drain Current (note1)	I_{DM}	5.4	-3.4	A
Gate-Source Voltage	V_{GS}	± 10	± 10	V
Power Dissipation	P_D	1.12	1.12	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	-55 To 150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	111	$^\circ\text{C/W}$

NMOS Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±10V	--	--	±10	uA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.35	0.55	1	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 4.5V, I _D = 0.65A	--	159	370	mΩ
		V _{GS} = 2.5V, I _D = 0.55A	--	209	450	
		V _{GS} = 1.8V, I _D = 0.45A	--	290	800	
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =0.5A	--	1.6	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 10V, f = 1.0MHz	--	60	--	pF
Output Capacitance	C _{oss}		--	15	--	
Reverse Transfer Capacitance	C _{rss}		--	5	--	
Total Gate Charge	Q _g	V _{DD} = 10V, I _D = 250mA, V _{GS} = 4.5V	--	750	--	pC
Gate-Source Charge	Q _{gs}		--	75	--	
Gate-Drain Charge	Q _{gd}		--	225	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10V, I _D = 0.5A, R _G = 10Ω	--	6.7	--	ns
Turn-on Rise Time	t _r		--	4.8	--	
Turn-off Delay Time	t _{d(off)}		--	17.3	--	
Turn-off Fall Time	t _f		--	7.4	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	1.36	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 0.5A, V _{GS} = 0V	--	--	1.2	V

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

NMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

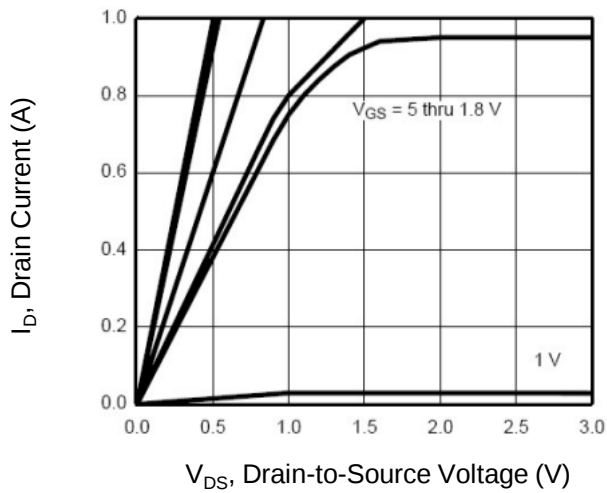


Figure 2. Transfer Characteristics

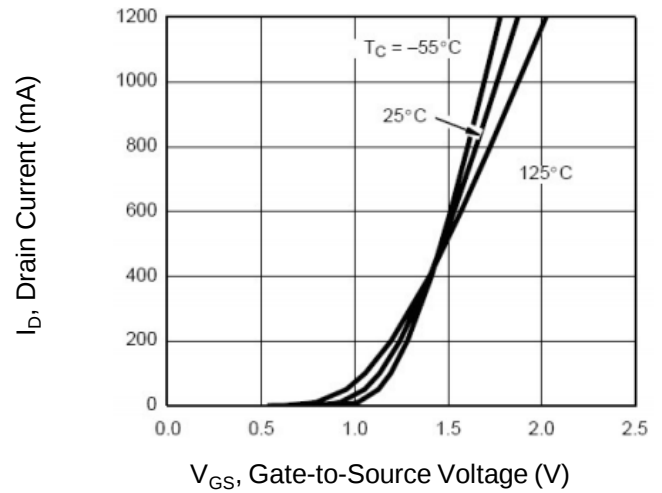


Figure 3. Drain-Source On-Resistance

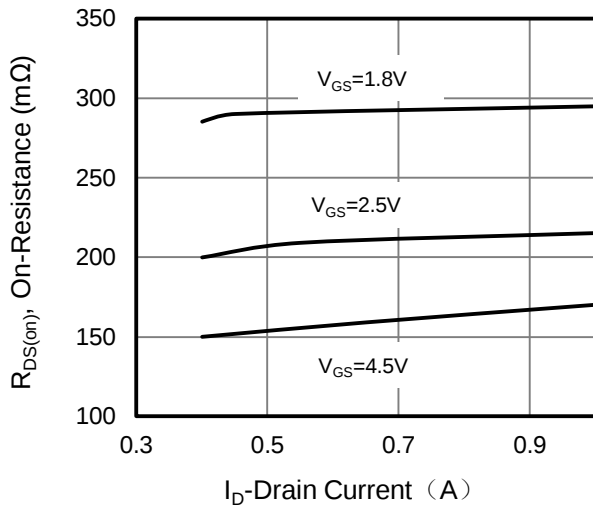


Figure 4. Gate Charge

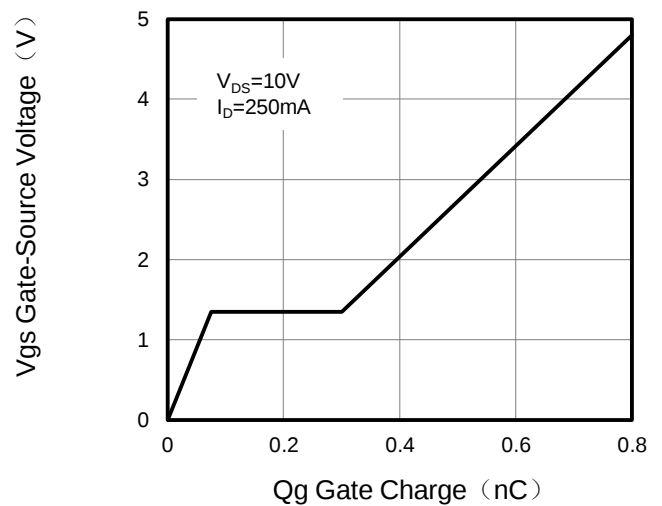


Figure 5. Capacitance

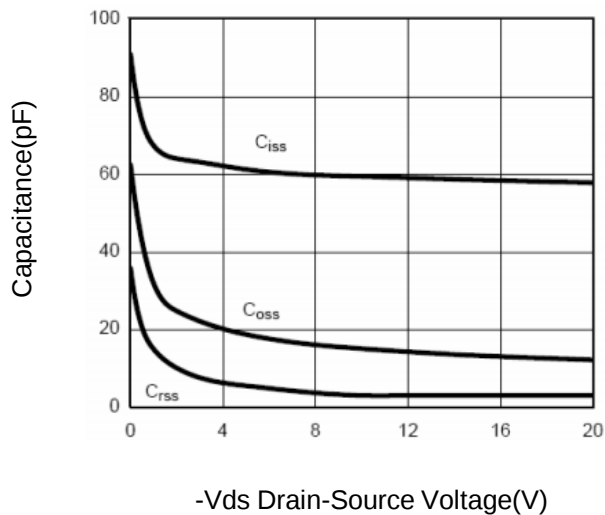
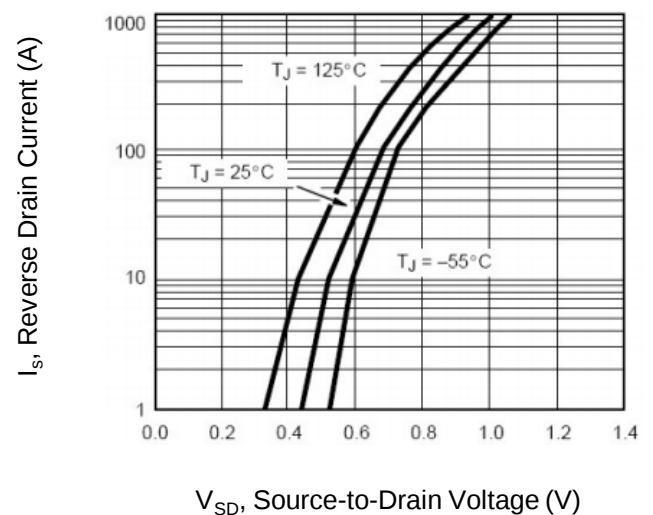
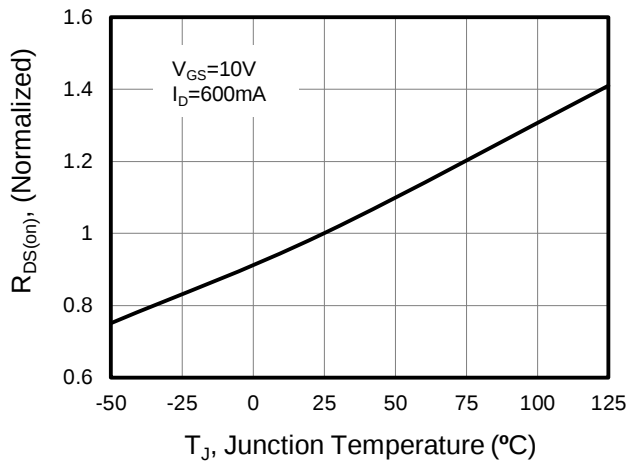
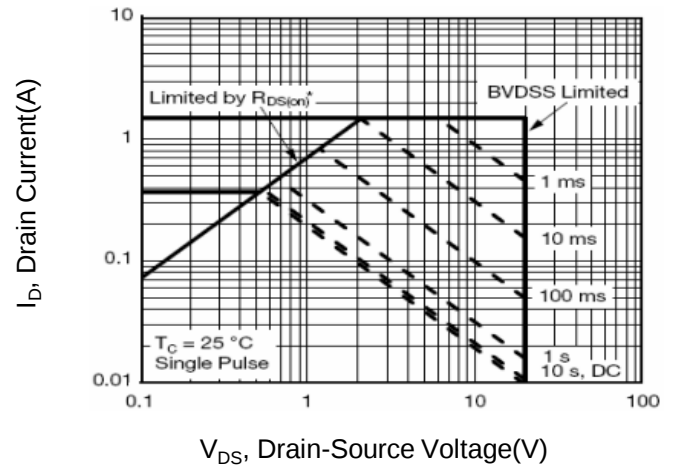
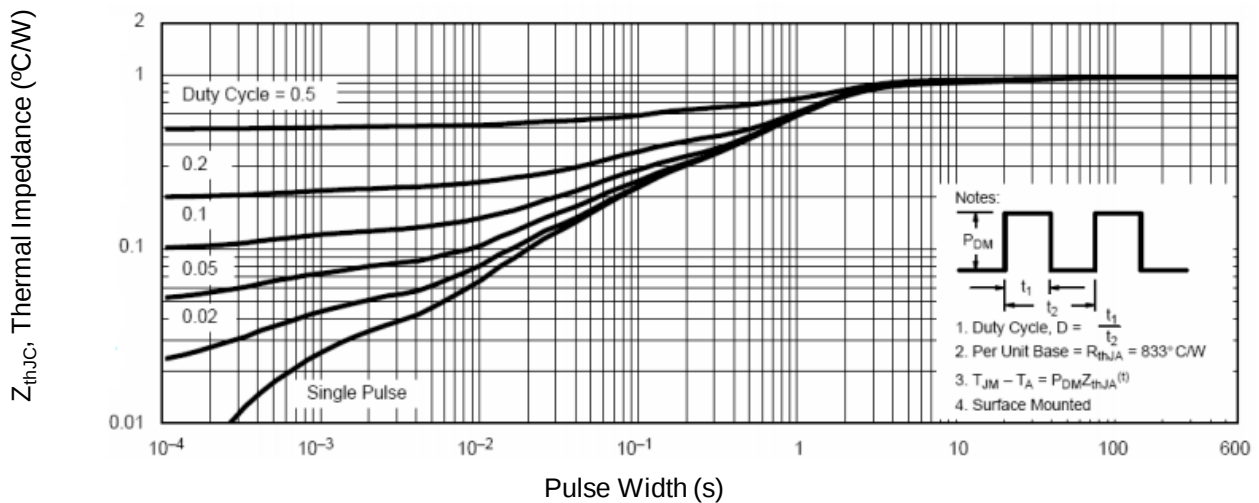


Figure 6. Source-Drain Diode Forward



NMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

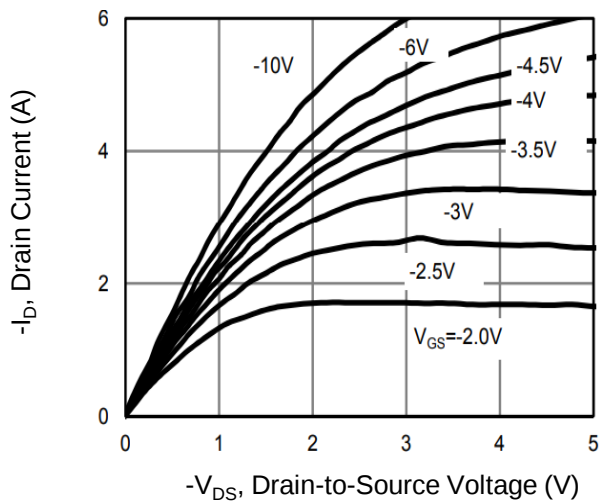
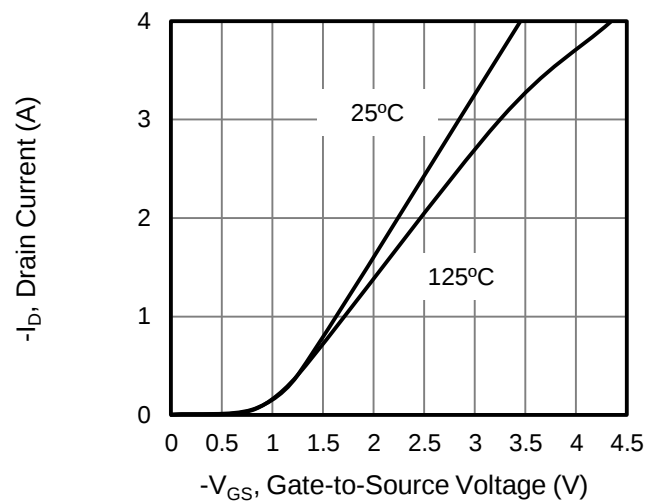
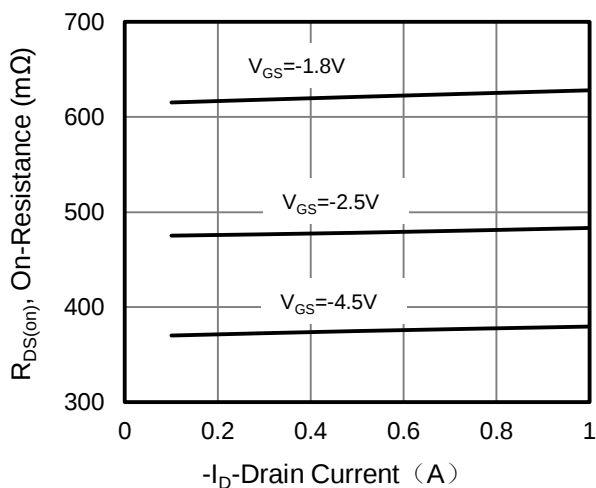
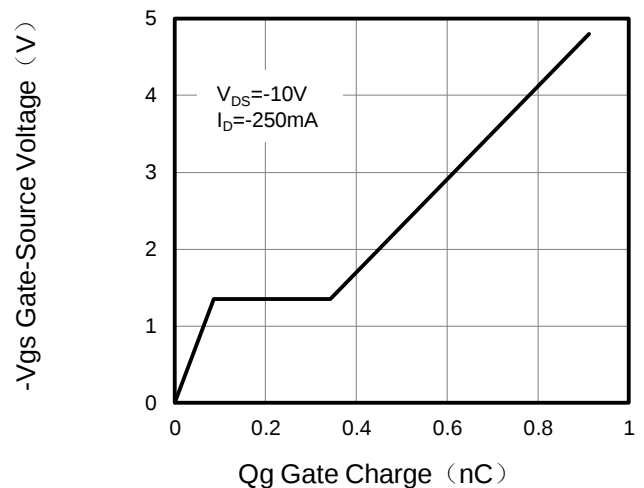
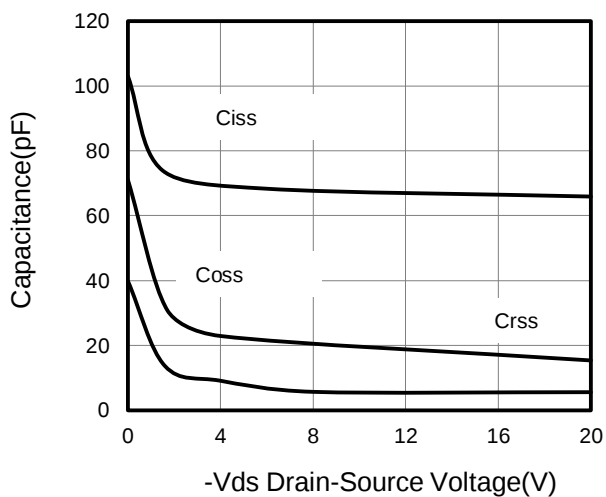
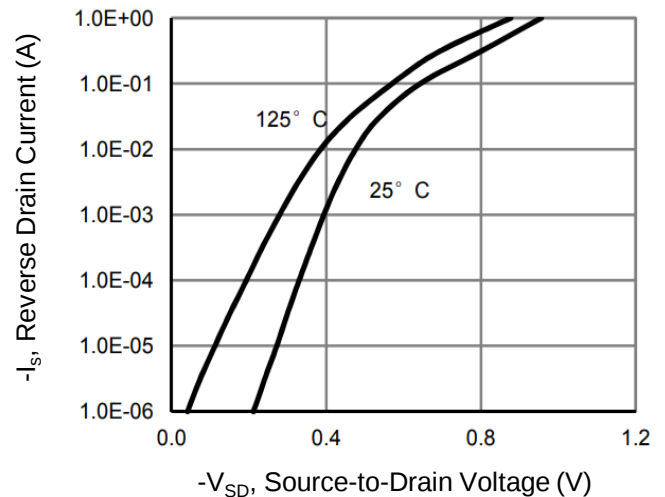
Figure 7. Drain-Source On-Resistance

Figure 8. Safe Operation Area

Figure 9. Normalized Maximum Transient Thermal Impedance


PMOS Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-20	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V	--	--	-1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±10V	--	--	±10	uA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.35	-0.55	-0.8	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -0.5A	--	375	520	mΩ
		V _{GS} = -2.5V, I _D = -0.5A	--	478	700	
		V _{GS} = -1.8V, I _D = -0.5A	--	621	1000	
Forward Transconductance	g _{FS}	V _{DS} =-5V,I _D =-0.6A	--	1.7	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = -10V, f = 1.0MHz	--	68.4	--	pF
Output Capacitance	C _{oss}		--	17	--	
Reverse Transfer Capacitance	C _{rss}		--	5.7	--	
Total Gate Charge	Q _g	V _{DD} = -10V, I _D = -250mA, V _{GS} = -4.5V	--	855	--	pC
Gate-Source Charge	Q _{gs}		--	85.5	--	
Gate-Drain Charge	Q _{gd}		--	256.5	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10V, I _D = -0.6A, R _G = 3Ω	--	6.5	--	ns
Turn-on Rise Time	t _r		--	6.5	--	
Turn-off Delay Time	t _{d(off)}		--	18.2	--	
Turn-off Fall Time	t _f		--	5.5	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	-1.15	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = -0.5A, V _{GS} = 0V	--	--	-1	V

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

PMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. $R_{DS(on)}$ -Drain Current

Figure 4. Gate Charge

Figure 5. Capacitance

Figure 6. Source-Drain Diode Forward


PMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

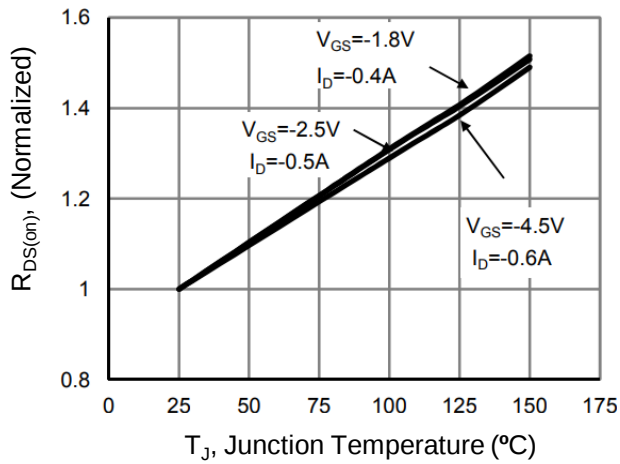


Figure 8. Safe Operation Area

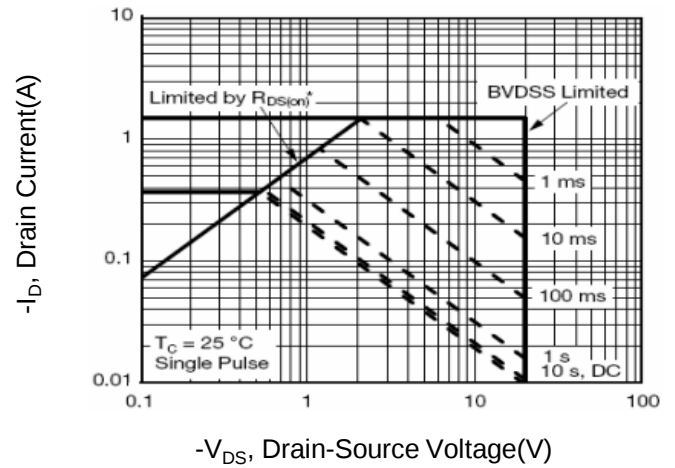
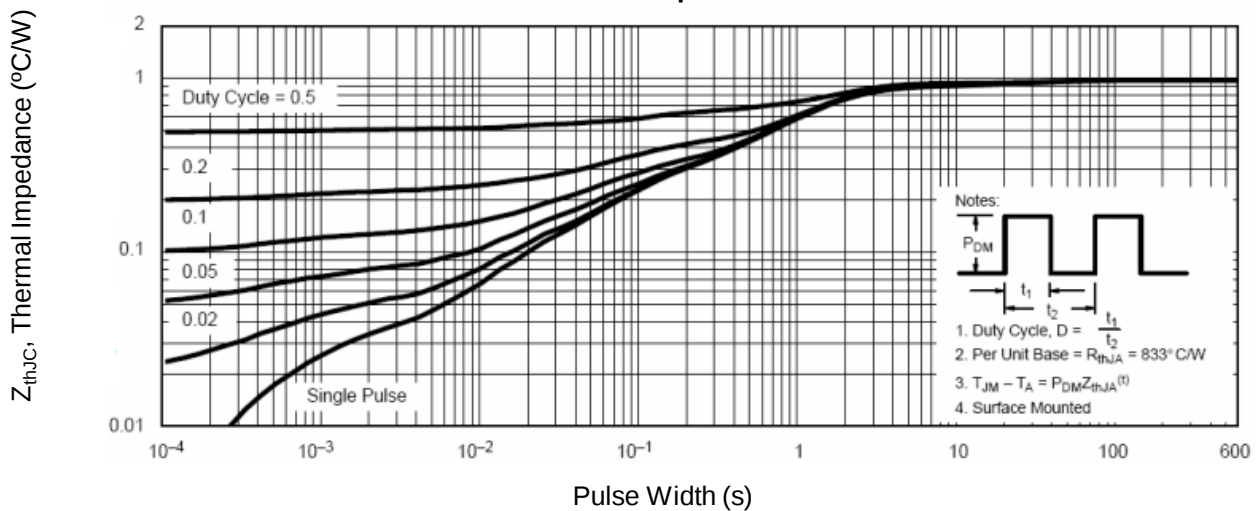
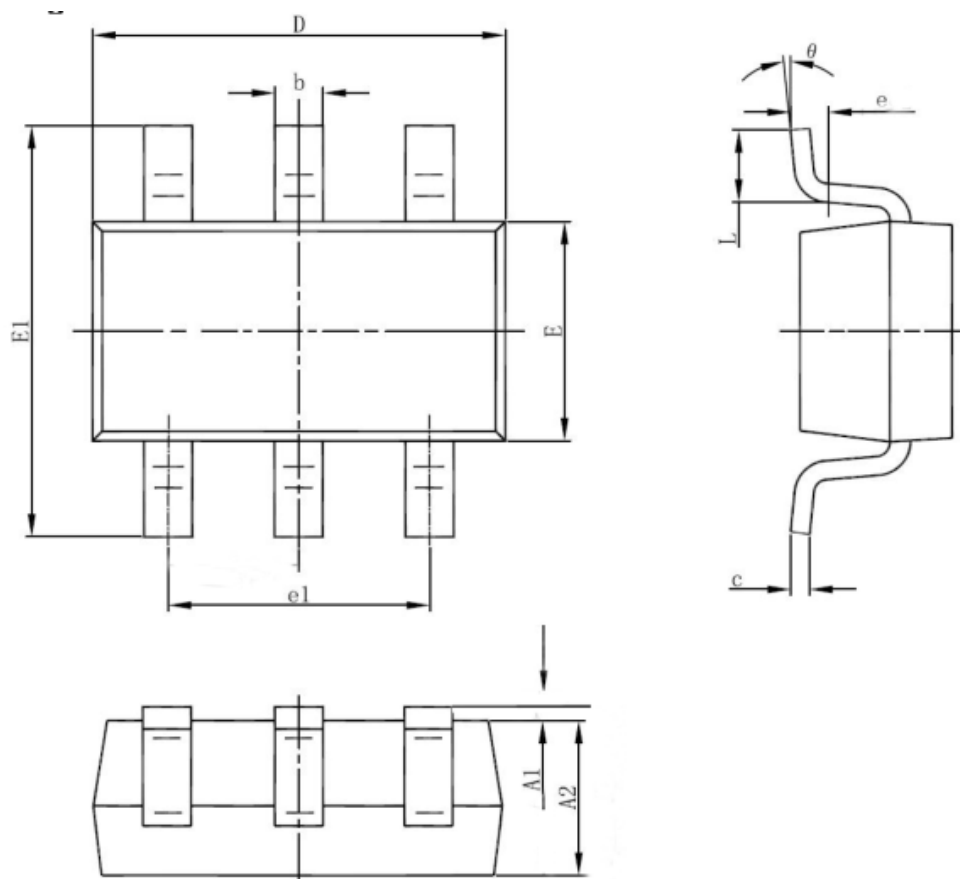


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23-6L Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A1	0.00	-	0.10
A2	1.00	1.10	1.20
b	0.30	0.40	0.50
c	0.10	0.15	0.20
D	2.80	2.90	3.00
E	1.50	1.60	1.70
E1	2.60	2.80	3.00
e	0.2GAUGE PLANE		
e1	-	1.90	-
L	0.30	0.45	0.60
Θ	0°	-	8°
All Dimensions in mm			