AT005NP020MSF

N and P-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
20V	38mΩ@4.5V	5A
	45mΩ@2.5V	

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-20V	80mΩ@-4.5V	-4A
	100mΩ@-2.5V	

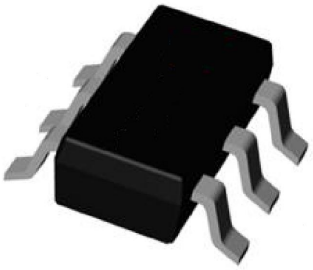
Feature

- High power and current handing capability
- Surface mount package

Application

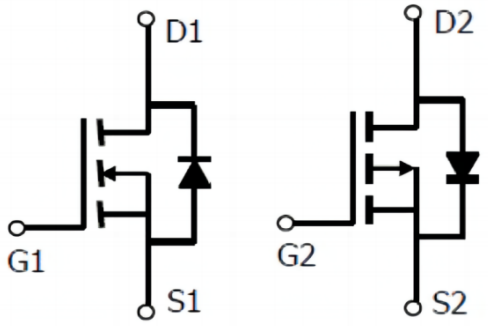
- Battery Switch
- DC/DC Converter

Package

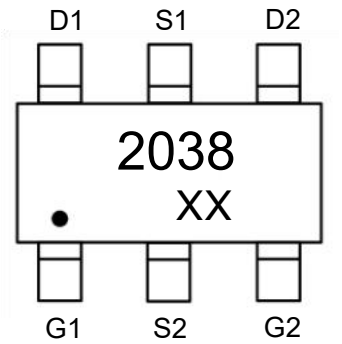


SOT-23-6L

Circuit diagram



Marking



Absolute maximum ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	±12	±12	V
Continuous Drain Current	I_D	5	-4	A
Pulsed Drain Current	I_{DM}	20	-16	A
Power Dissipation	P_D	1.3	1.3	W
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	96	96	℃/W
Operating Junction Temperature	T_J	-55 ~ +150	-55 ~ +150	℃
Storage Temperature	T_{STG}	-55 ~ +150	-55 ~ +150	℃

N-CH Electrical characteristics (T_A=25 ºC, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =250μA	20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =16V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±12V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.5	0.7	1	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =4.5V, I_D =4.5A		25	38	mΩ
		V_{GS} =2.5V, I_D =3.5A		35	45	
Dynamic characteristics[1)]						
Input Capacitance	C_{iss}	V_{DS} =10V, V_{GS} =0V, f =1MHz		456		pF
Output Capacitance	C_{oss}			62		
Reverse Transfer Capacitance	C_{rss}			54		
Total Gate Charge	Q_g	V_{DS} =10V, V_{GS}=4.5V, I_D =2A		6		nC
Gtae-Source Charge	Q_{gs}			1		
Gtae-Drain Charge	Q_{gd}			1.4		
Turn-on delay time	$t_{d(on)}$	V_{DS} =10V, V_{GS} =4.5V, I_D =2A R_G =2.7Ω		5		nS
Turn-on rise time	t_r			13		
Turn-off delay time	$t_{d(off)}$			65		
Turn-off fall time	t_f			28		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				5	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =1A, T_J=25℃			1.2	V

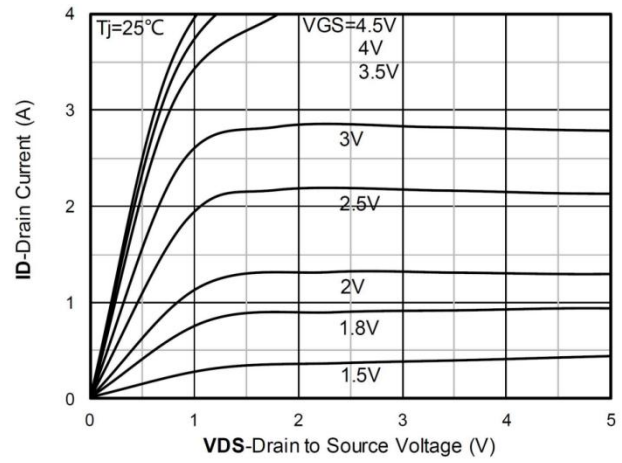
P-CH Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =-250μA	-20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-16V, V_{GS} =0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±12V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.5	-0.7	-1	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-3A		55	80	mΩ
		V_{GS} =-2.5V, I_D =-2A		65	100	
Dynamic characteristics[1)]						
Input Capacitance	C_{iss}	V_{DS} =-10V, V_{GS} =0V, f =1MHz		405		pF
Output Capacitance	C_{oss}			75		
Reverse Transfer Capacitance	C_{rss}			55		
Total Gate Charge	Q_g	V_{DS} =-10V, V_{GS}=-4.5V I_D =-3A		5.5		nC
Gtae-Source Charge	Q_{gs}			1.18		
Gtae-Drain Charge	Q_{gd}			1.3		
Turn-on delay time	$t_{d(on)}$	V_{DS} =-10V, V_{GS} =-4.5V I_D =-1A, R_G =3Ω		6.4		nS
Turn-on rise time	t_r			22		
Turn-off delay time	$t_{d(off)}$			35		
Turn-off fall time	t_f			31		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-4	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S=-1A, T_J=25℃			-1.2	V

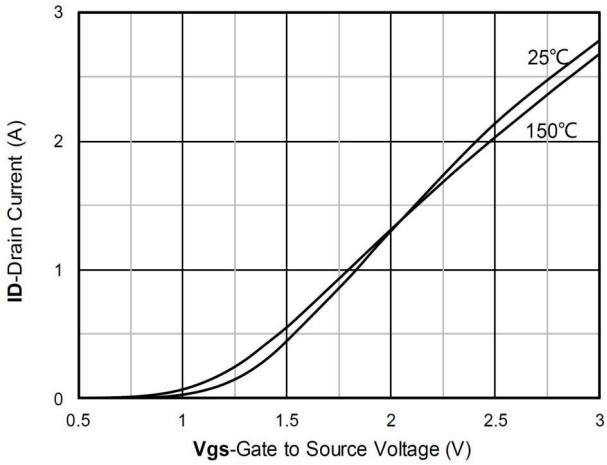
Notes:

1) Guaranteed by design, not subject to production testing.

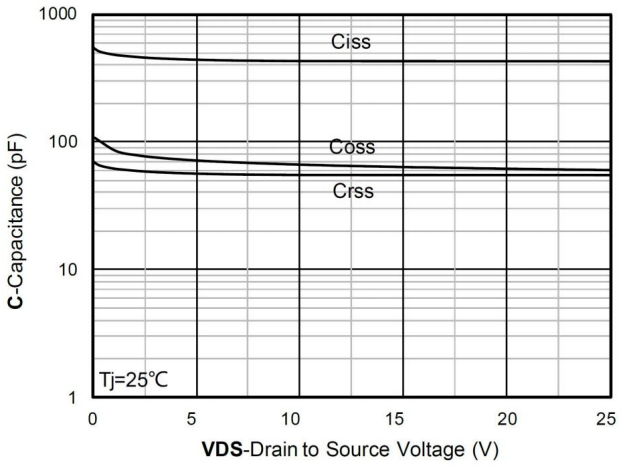
N-Channel Typical Characteristics



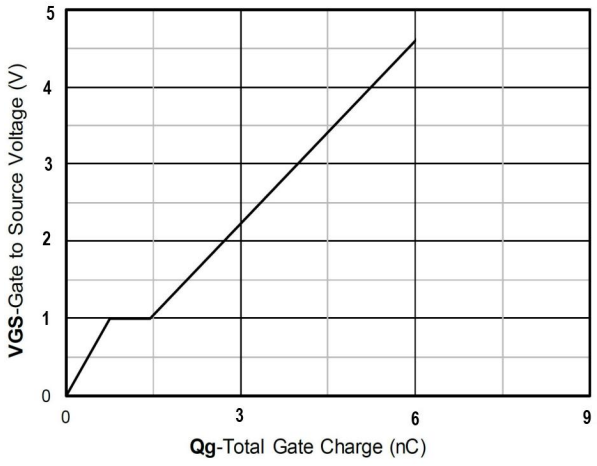
Output Characteristics



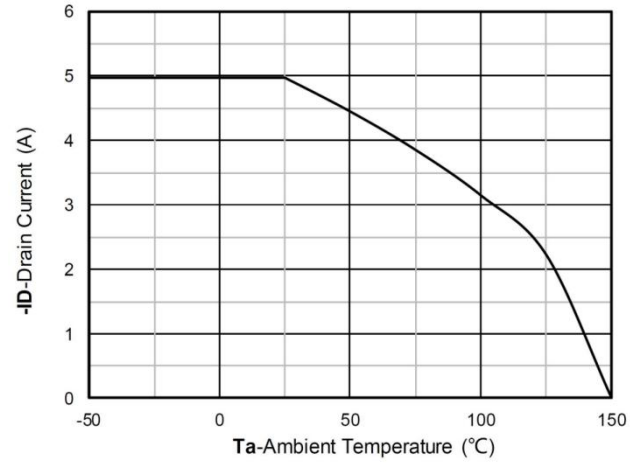
Transfer Characteristics



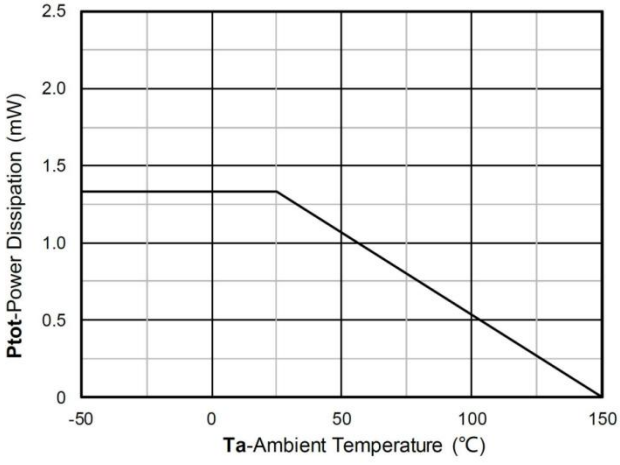
Capacitance Characteristics



Gate Charge

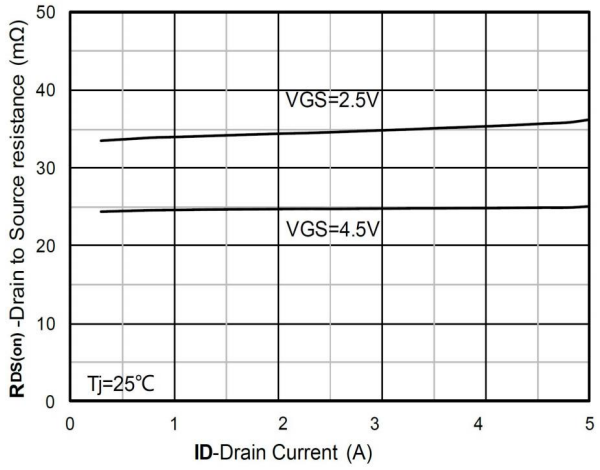


Current dissipation

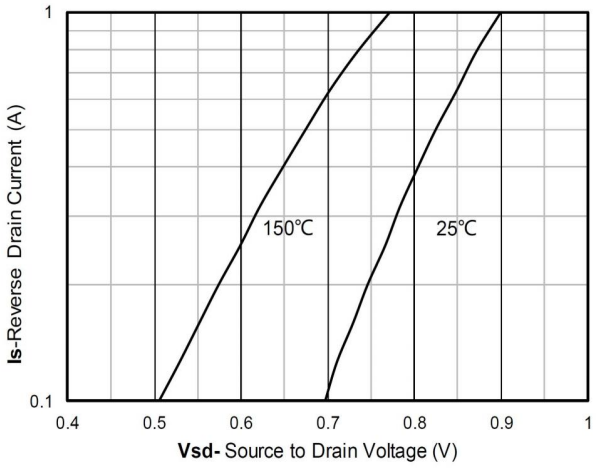


Power dissipation

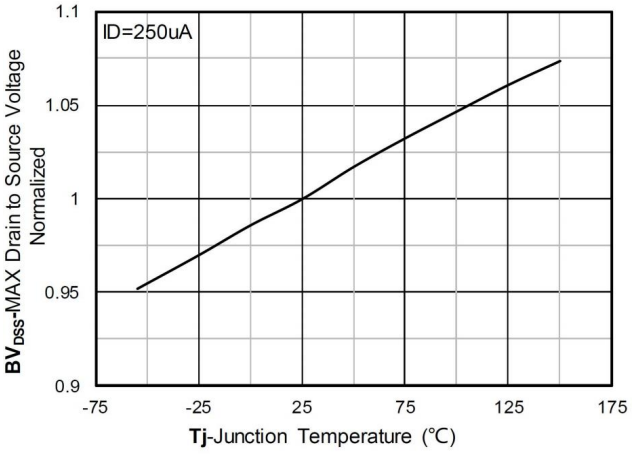
N-Channel Typical Characteristics



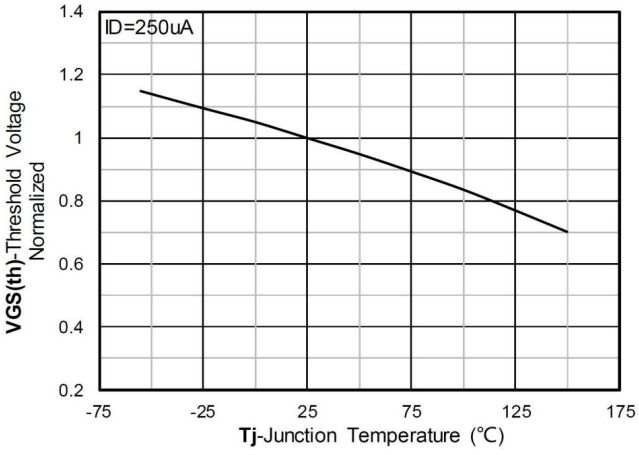
RDS(on) VS Drain Current



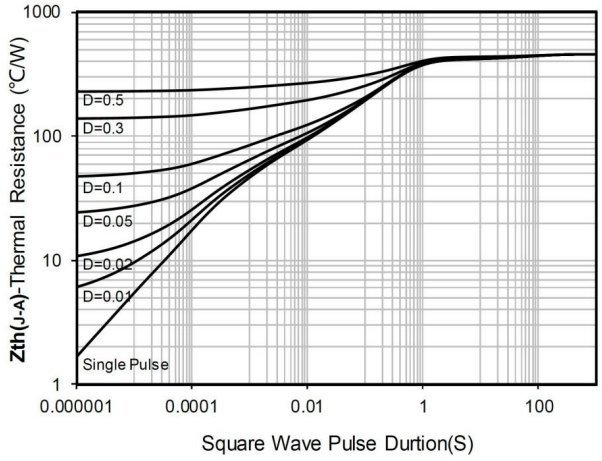
Forward characteristics of reverse diode



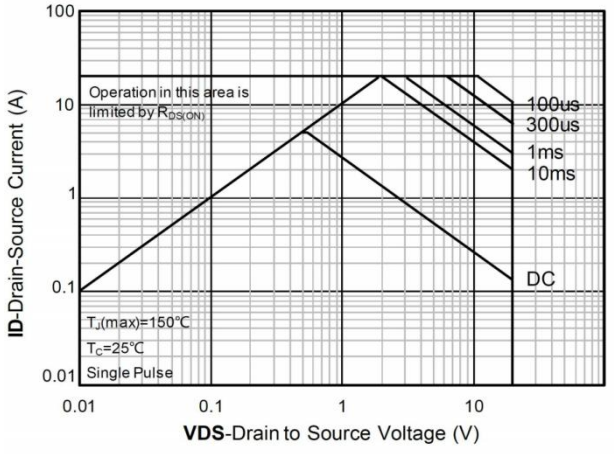
Normalized breakdown voltage



Normalized Threshold voltage

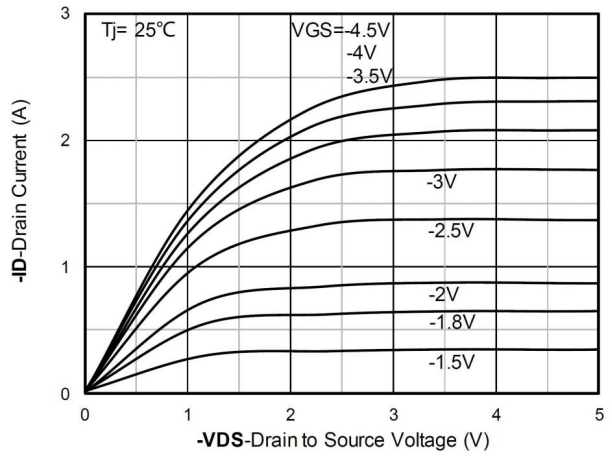


Maximum Transient Thermal Impedance

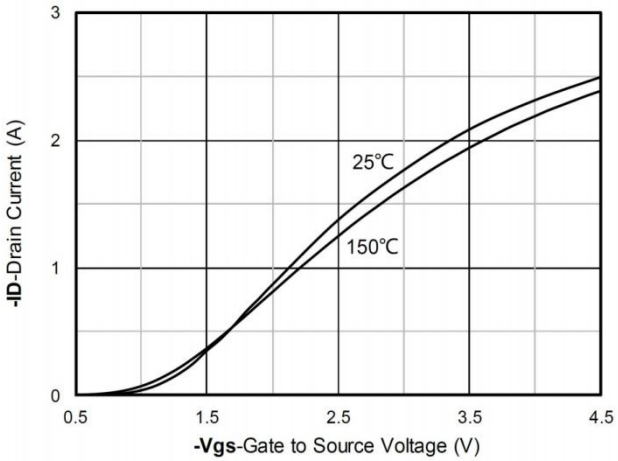


Safe Operation Area

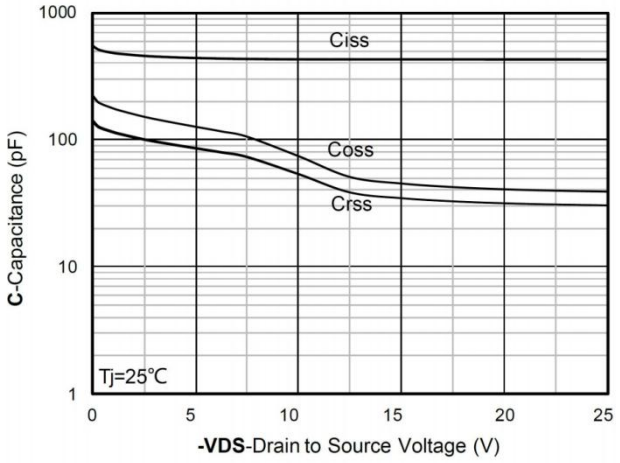
P-Channel Typical Characteristics



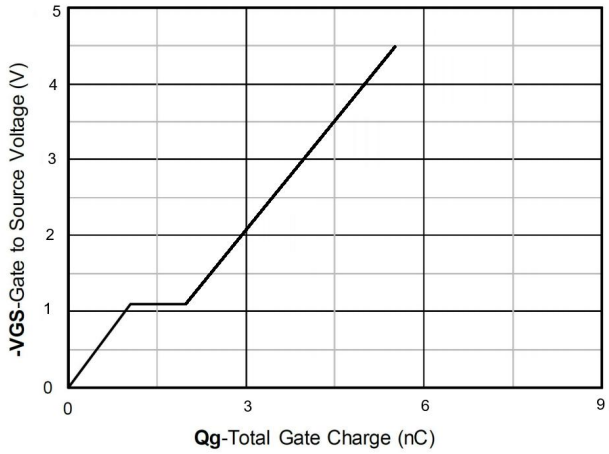
Output Characteristics



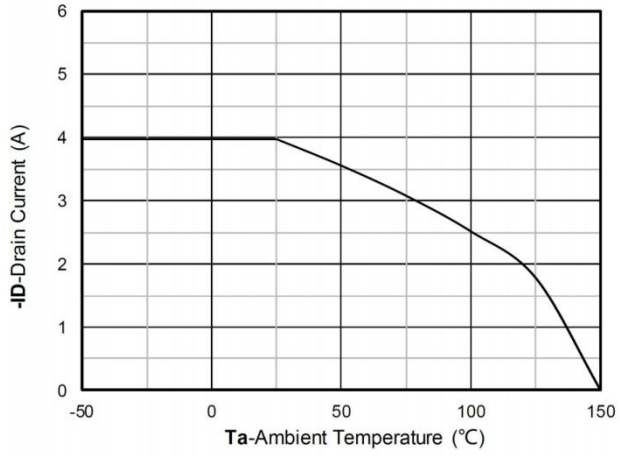
Transfer Characteristics



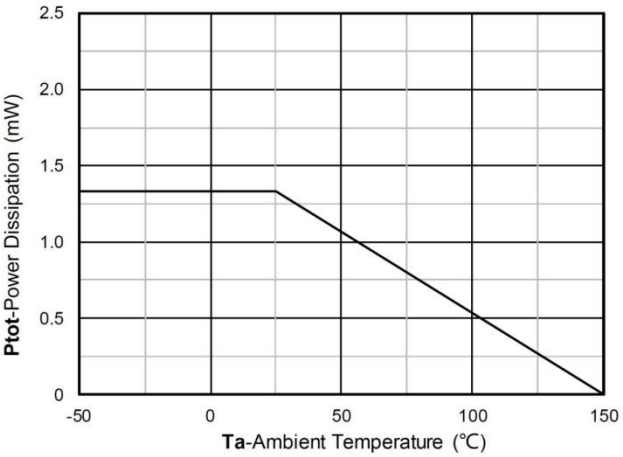
Capacitance Characteristics



Gate Charge

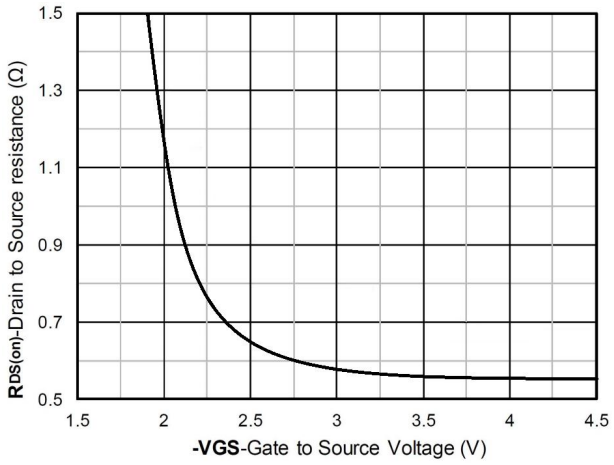


Current dissipation

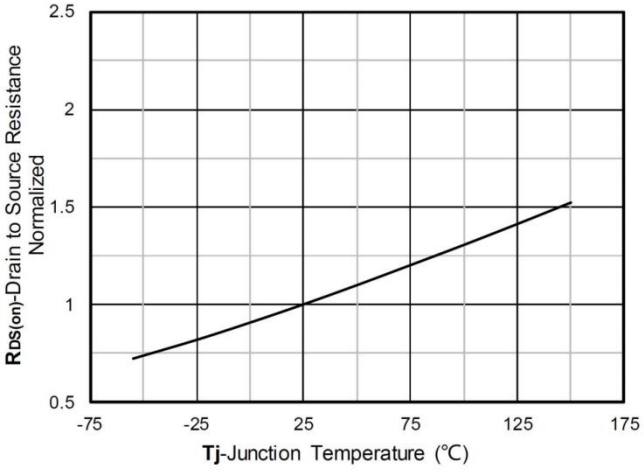


Power dissipation

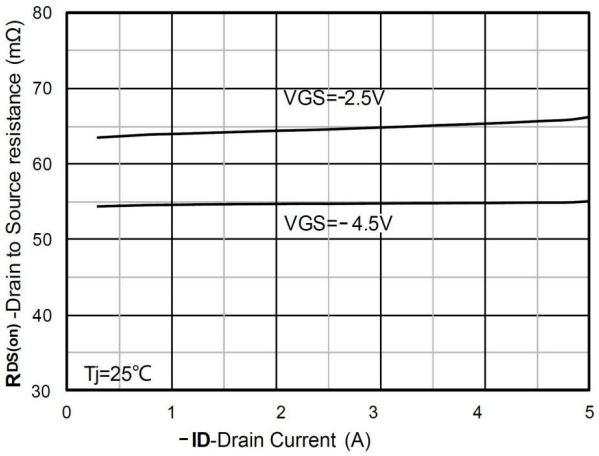
P-Channel Typical Characteristics



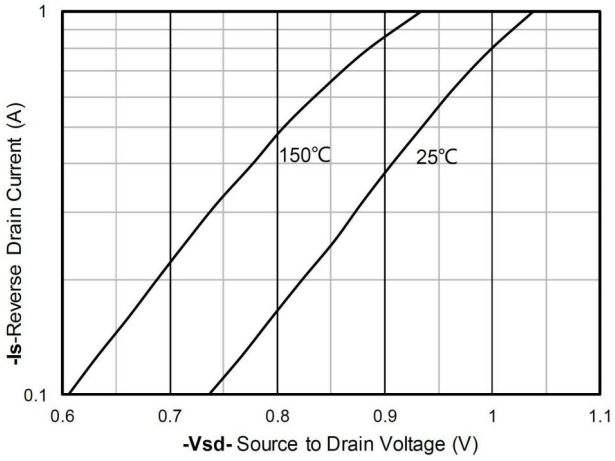
On-Resistance vs Gate to Source Voltage



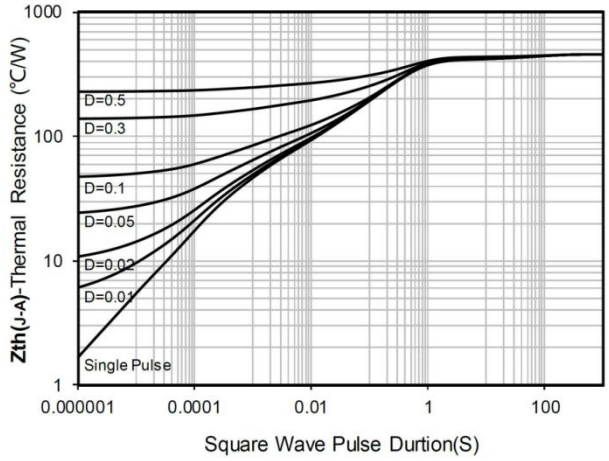
Normalized On-Resistance



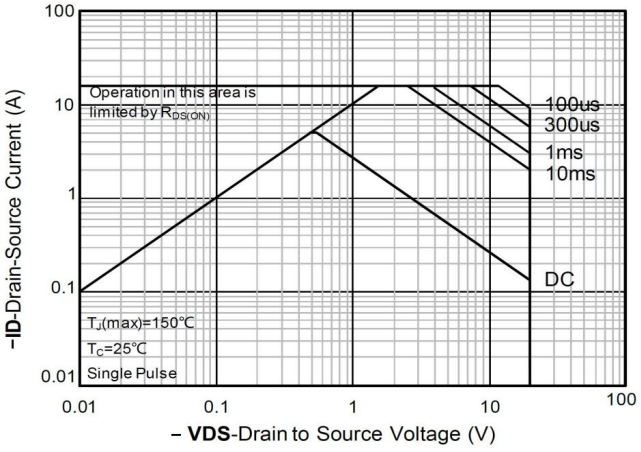
RDS(on) VS Drain Current



Forward characteristics of reverse diode

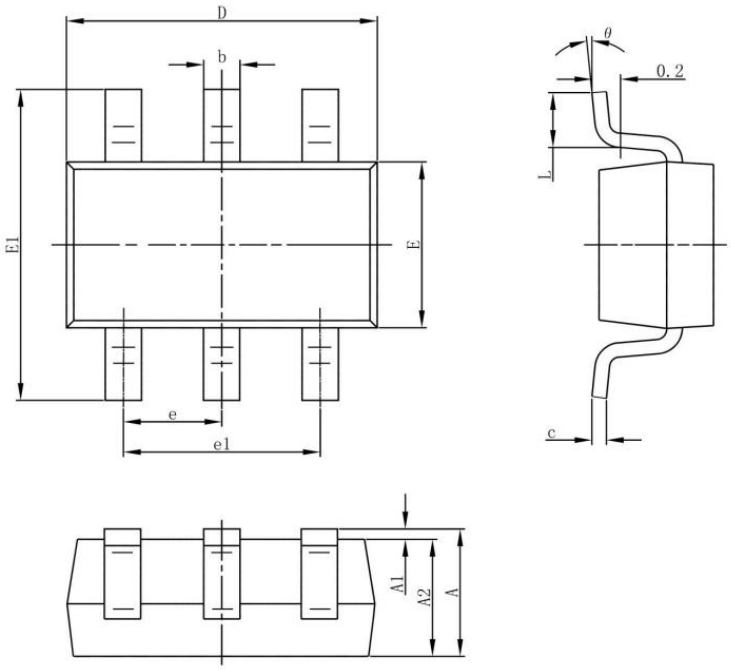


Maximum Transient Thermal Impedance



Safe Operation Area

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°