General Description

The WST3078 is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density , which provide excellent R_{DSON} and gate charge for most of the small power switching and load switch applications.

The WST3078 meet the RoHS and Green Product requirement with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

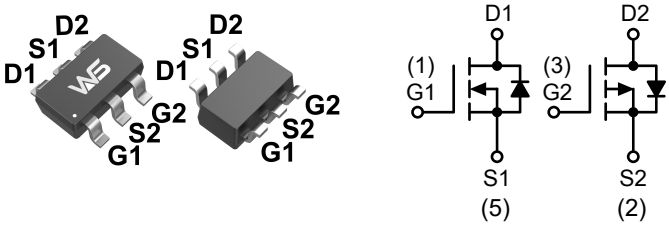
Product Summery

BV_{DSS}	R_{DSON}	I_D
30V	32mΩ	3.5A
-30V	78mΩ	-3A

Applications

- High Frequency Point-of-Load Synchronous s Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

SOT-23-6L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_c=25℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	3.5	-3	A
I_D@T_c=70℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	3.0	-2.4	A
I_{DM}	Pulsed Drain Current[2]	19	-12	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.4	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	125	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	90	℃/W

N-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.025	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=2.7A	---	32	50	mΩ
		V_{GS}=4.5V , I_D=2A	---	56	68	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.3	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.54	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=85℃	---	---	30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±10	uA
gfs	Forward Transconductance	V_{DS}=5V , I_D=2A	---	11	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.3	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=2A	---	3	---	nC
Q_{gs}	Gate-Source Charge		---	1.1	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=10V , V_{GEN}=4.5V , R_G=6Ω I_D=2A R_L=10Ω	---	5.3	8	ns
T_r	Rise Time		---	11	16	
$T_{d(off)}$	Turn-Off Delay Time		---	2.6	4	
T_f	Fall Time		---	12	17	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	215	---	pF
C_{oss}	Output Capacitance		---	37	---	
C_{rss}	Reverse Transfer Capacitance		---	28	---	

Drain-Source Body Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source-Drain Diode Current[1,4]	V_G=V_D=0V , Force Current	---	---	1.0	A
I_{SM}	Pulsed Diode Forward Current[2,4]		---	---	5	A
V_{SD}	Body Diode Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_F=5A , dI/dt=100A/μs , T_J=25℃	---	9.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	4.3	---	nC

Note :
1.The data tested by Surface Mounted on 1in2 pad area. .
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

P-Channel Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.013	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-2A	---	78	100	mΩ
		V_{GS}=-4.5V , I_D=-1.5A	---	120	170	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.3	-1.6	-2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.3	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=85℃	---	---	-30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±10	uA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-2A	---	3.8	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-10V , I_D=-2A	---	3.3	---	nC
Q_{gs}	Gate-Source Charge		---	1.1	---	
Q_{gd}	Gate-Drain Charge		---	1.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V , V_{GEN}=-10V , R_G=6Ω I_D=-1A ,R_L=15Ω.	---	5.3	---	ns
T_r	Rise Time		---	9.3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	3.6	---	
T_f	Fall Time		---	15.4	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	229	---	pF
C_{oss}	Output Capacitance		---	42	---	
C_{rss}	Reverse Transfer Capacitance		---	33	---	

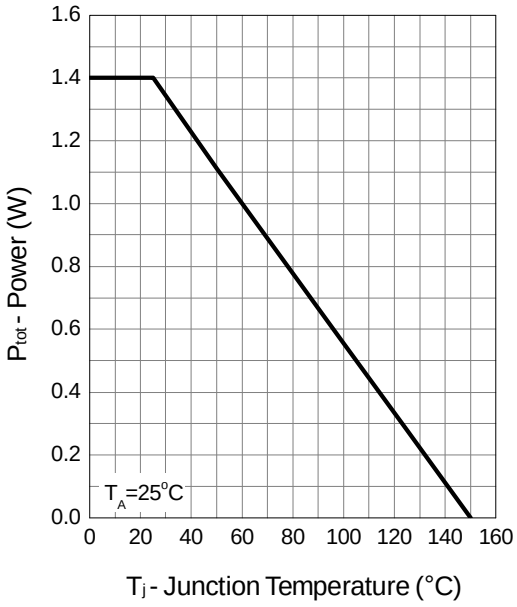
Drain-Source Body Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source-Drain Diode Current[1,4]	V_G=V_D=0V , Force Current	---	---	-3.2	A
I_{SM}	Pulsed Diode Forward Current[2,4]		---	---	-15	A
V_{SD}	Body Diode Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	0.75	-1.1	V
t_{rr}	Reverse Recovery Time	IF=-2A,dI/dt=100A/μs , T_J=25℃	---	19	---	nS
Q_{rr}	Reverse Recovery Charge		---	14	---	nC

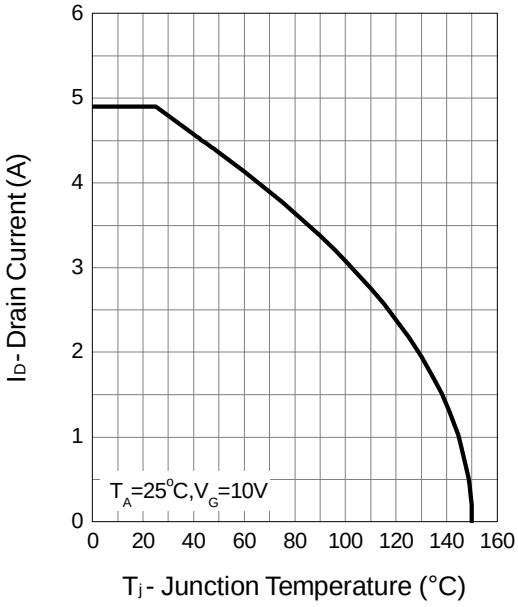
Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

N-Channel Typical Characteristics

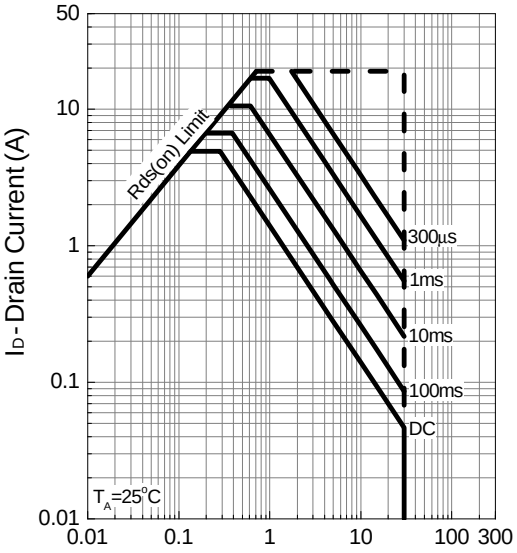
Power Dissipation



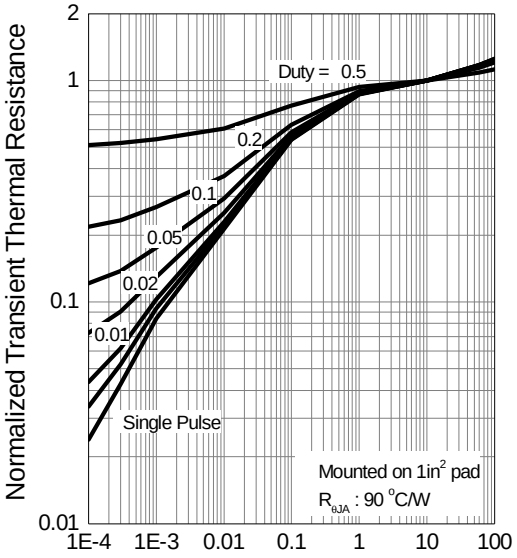
Drain Current



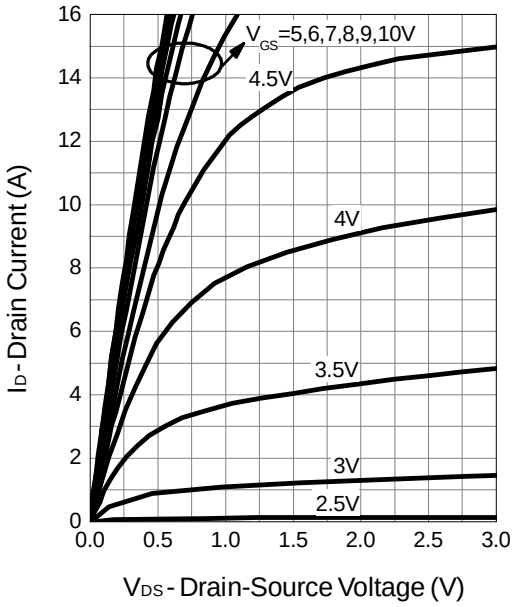
Safe Operation Area



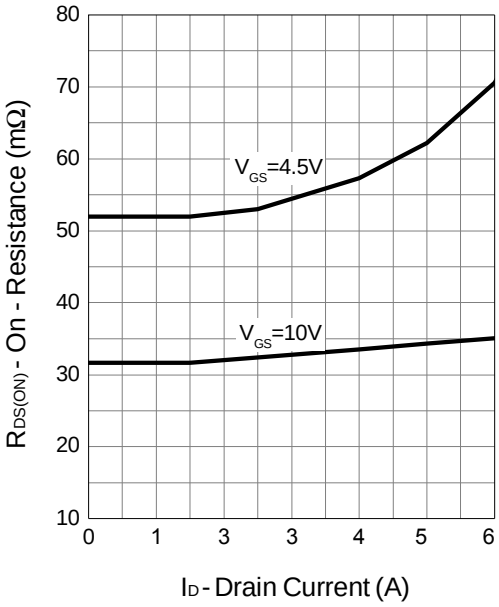
Thermal Transient Impedance



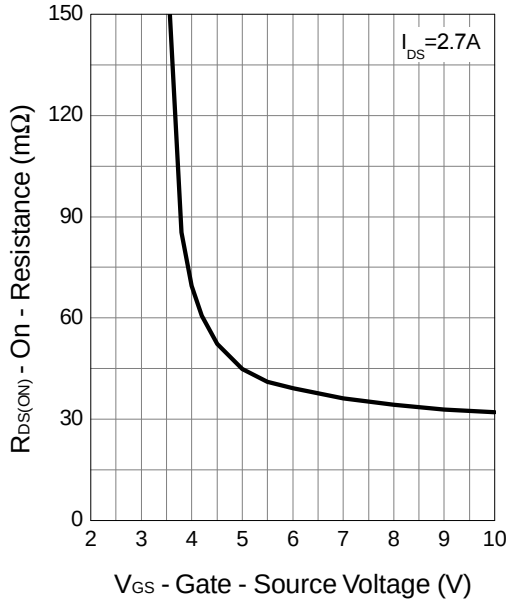
Output Characteristics



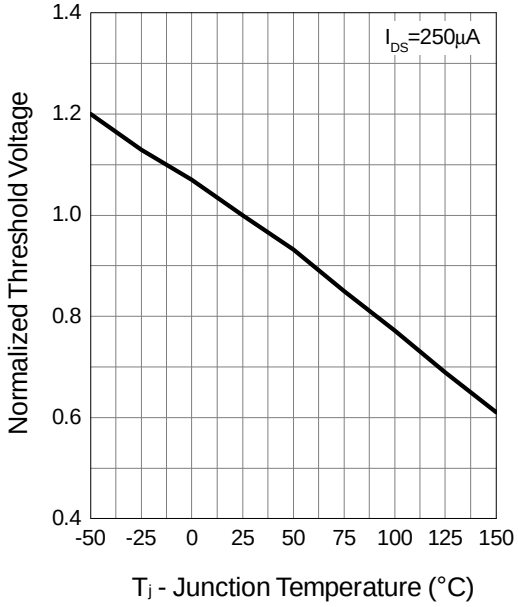
Drain-Source On Resistance



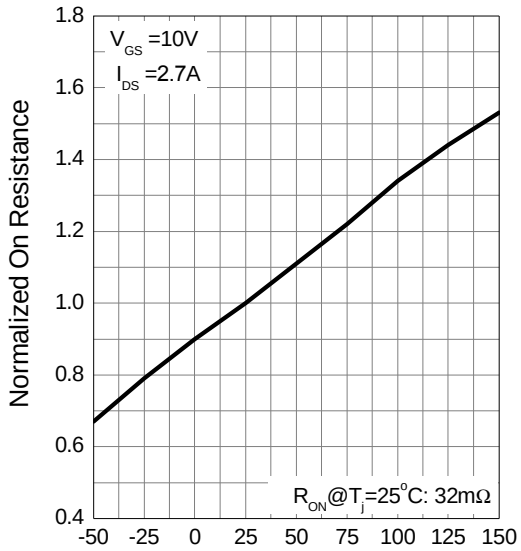
Gate-Source On Resistance



Gate Threshold Voltage

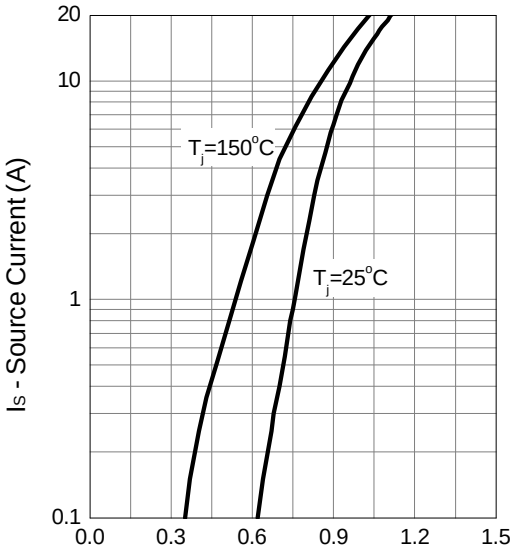


Drain-Source On Resistance



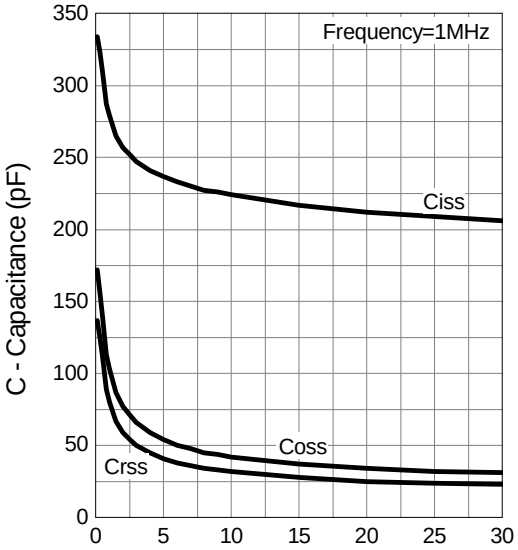
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



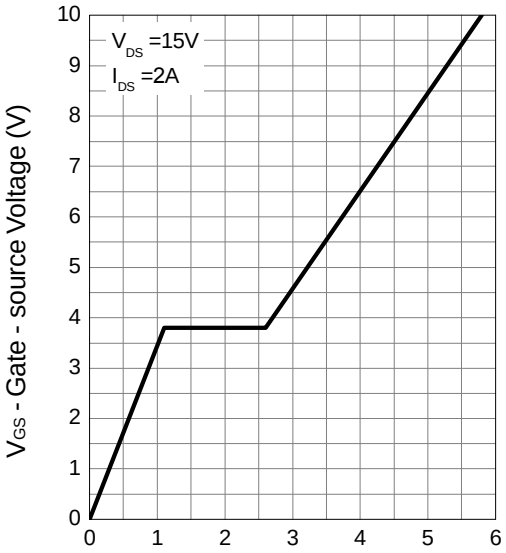
V_{SD} - Source - Drain Voltage (V)

Capacitance



V_{DS} - Drain - Source Voltage (V)

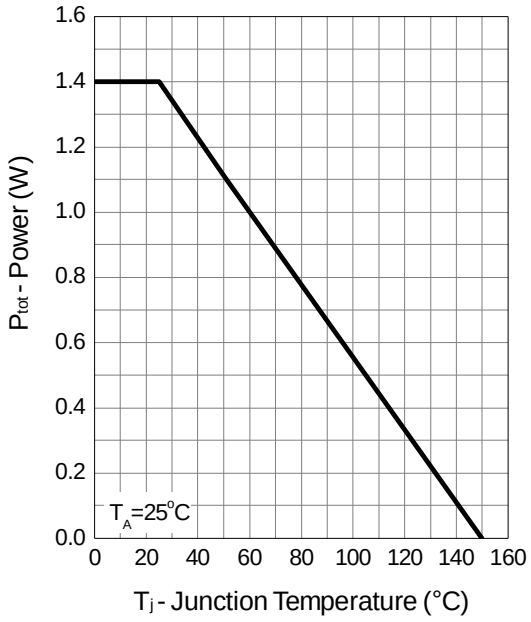
Gate Charge



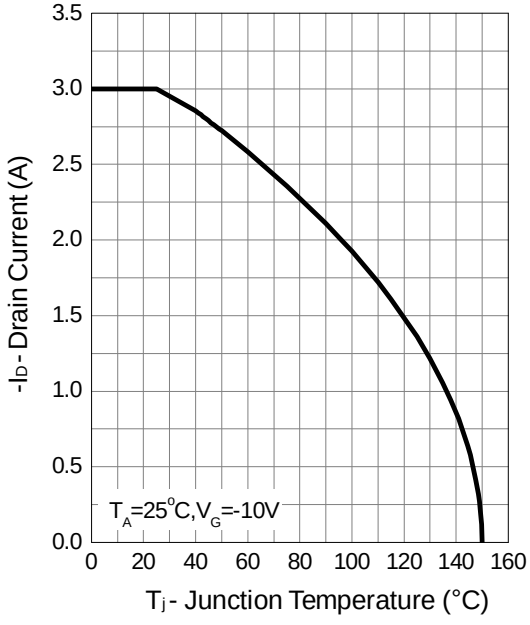
Q_G - Gate Charge (nC)

P-Channel Typical Characteristics

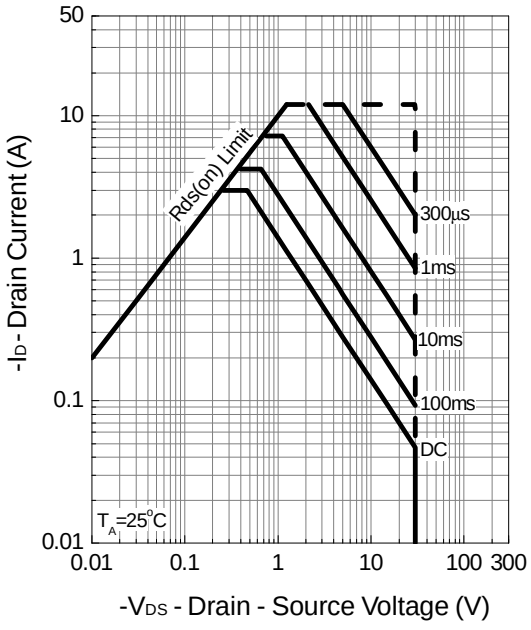
Power Dissipation



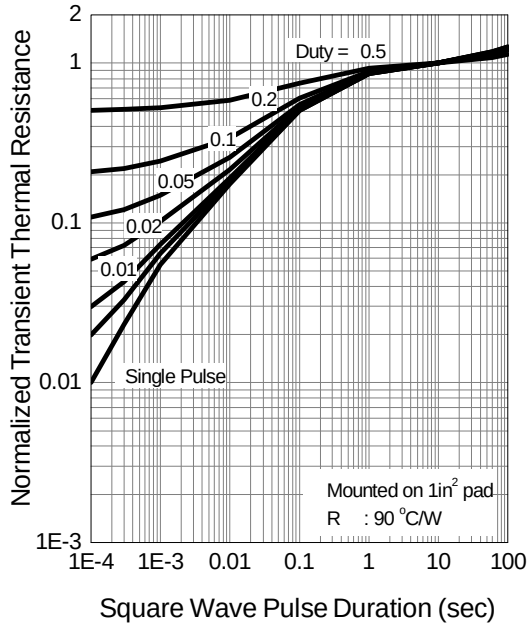
Drain Current



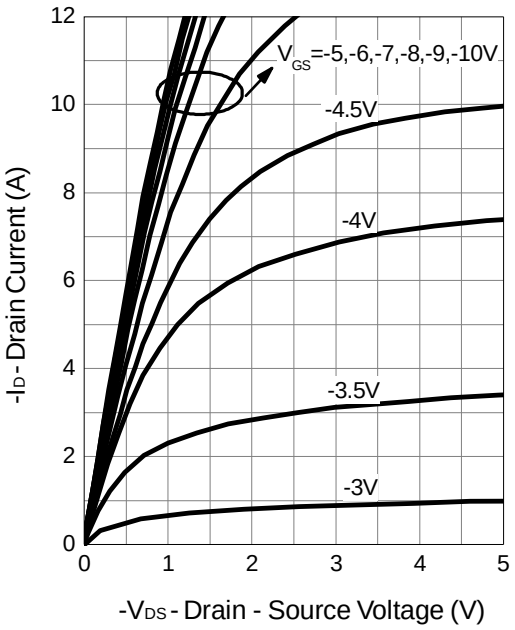
Safe Operation Area



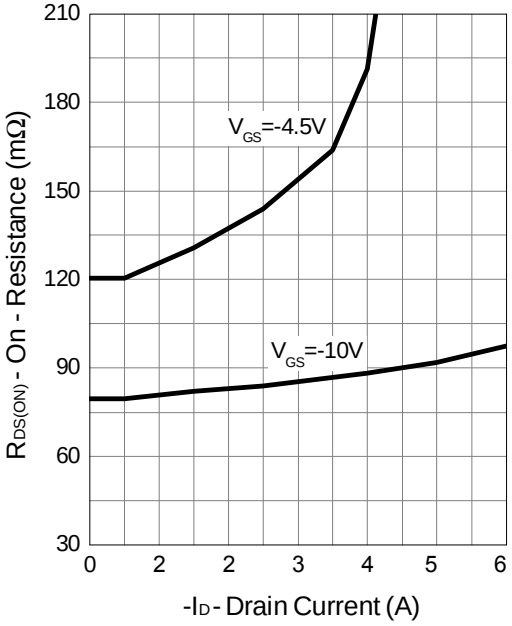
Thermal Transient Impedance



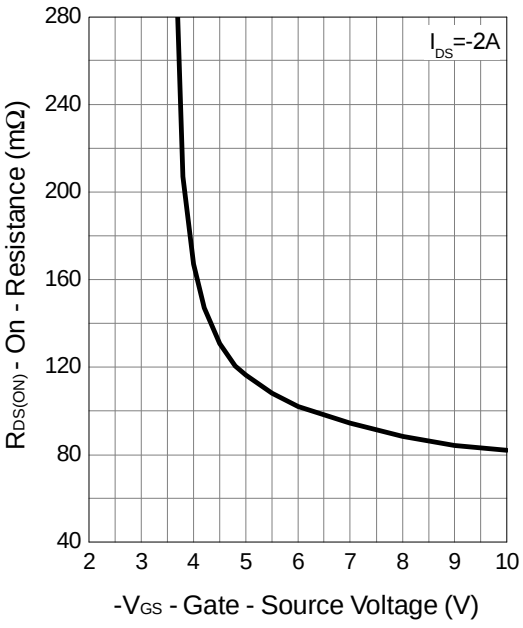
Output Characteristics



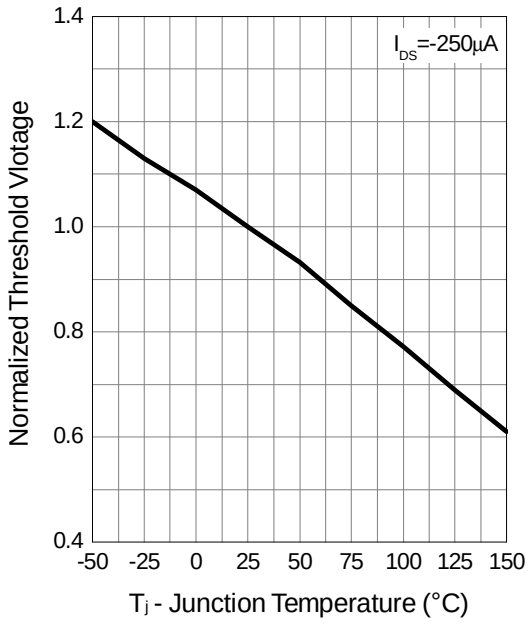
Drain-Source On Resistance



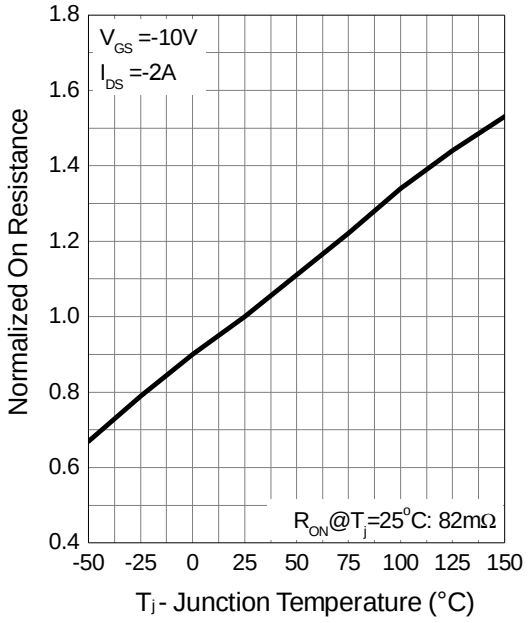
Gate-Source On Resistance



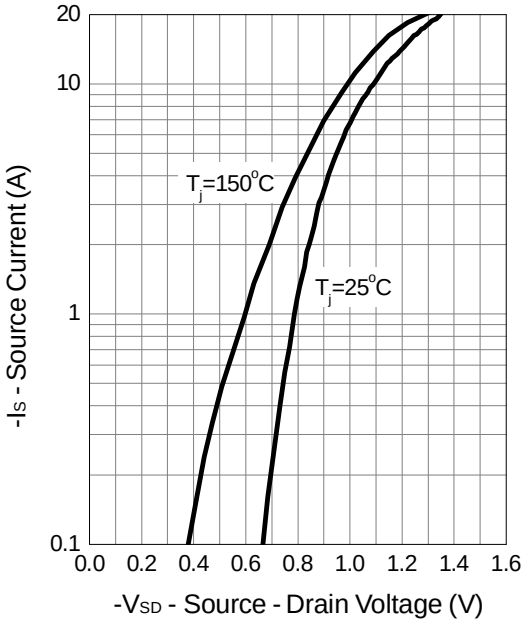
Gate Threshold Voltage



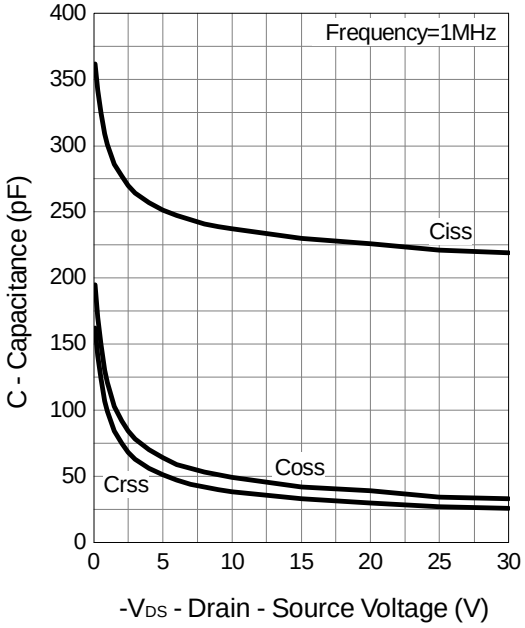
Drain-Source On Resistance



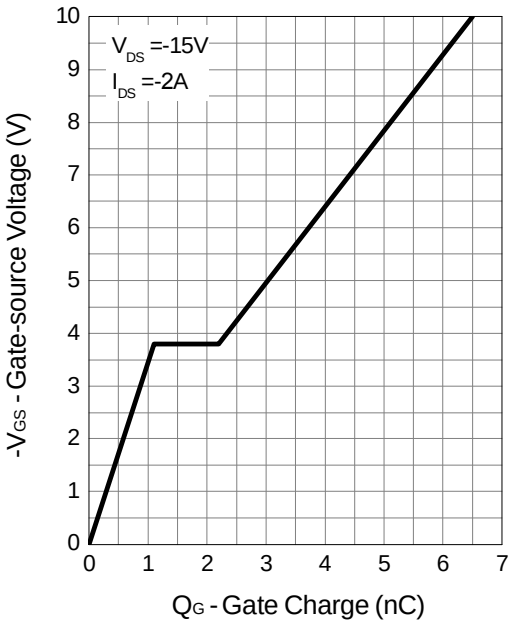
Source-Drain Diode Forward



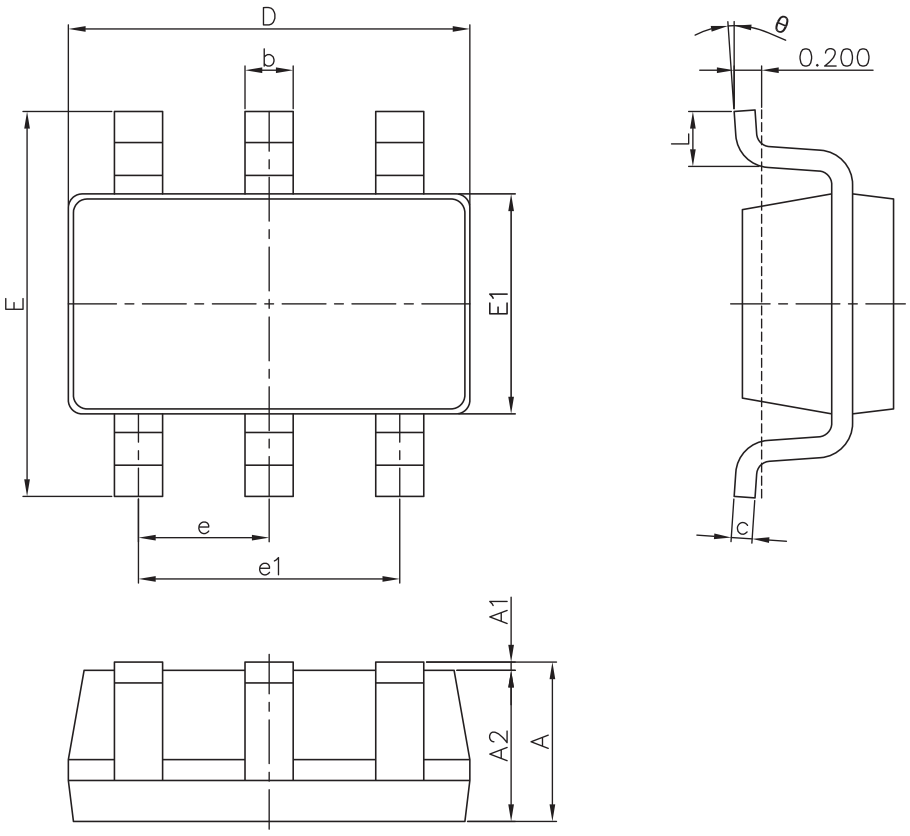
Capacitance



Gate Charge



Packaging 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
E1	1.500	1.700	0.059	0.067
E	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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