

SOT-23-6L Plastic-Encapsulate MOSFETS

Complementary Enhancement Mode Field Effect Transistor

N-Channel

V(BR)DSS	RDS(on)MAX	ID
20 V	40mΩ@ 4.5V	3.4A
	50mΩ@ 2.5V	

P-Channel

V(BR)DSS	RDS(on)MAX	ID
-20	90mΩ@ -4.5V	-2.5A
	115mΩ@ -2.5V	

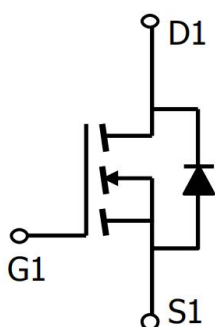
FEATURE:

※ TrenchFET Power MOSFET

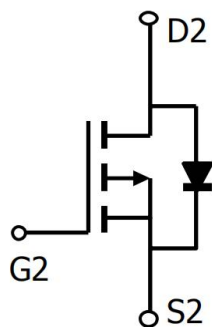
General Description:

The AO6604 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. The complementary MOSFETs form a high-speed power inverter, suitable for a multitude of applications. Standard Product AO6604 is Pb-free (meets ROHS & Sony 259 specifications).

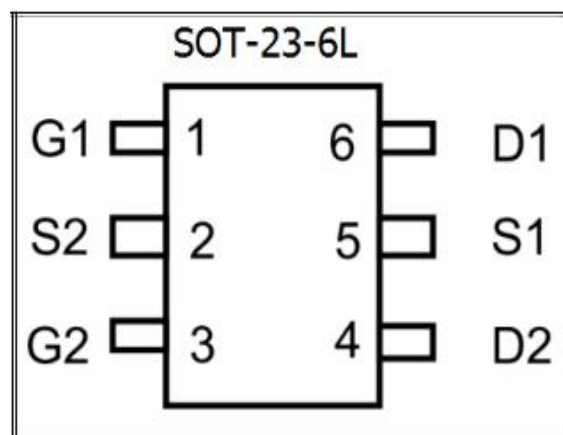
Equivalent Circuit:



n-channel



p-channel



Maximum ratings (Ta=25℃ unless otherwise noted)

Parameter	Symbol	Max n-channel	Max P-channel	Unit
Drain-Source Voltage	VDS	20	-20	V
Gate-Source Voltage	VGS	±8	±8	
Continuous Drain Current	ID	3.4	-2.5	A
Pulsed Diode Current	IDM	13	-13	
Continuous Source-Drain Current(Diode Conduction)	IS	1.5	-1.5	
Power Dissipation	PD	1.1	1.1	W
Thermal Resistance from Junction to Ambient (t≤10s)	RθJA	125	125	℃/W
Operating Junction	TJ	150	150	℃
Storage Temperature	TSTG	-55~+150	-55~+150	℃

N-channel

N-channel MOSFET Electrical Characteristics (Ta = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V(BR)DSS	VGS = 0V, ID = 250μA	20			V
Gate-source threshold voltage	VGS(th)	VDS = VGS, ID = 250μA	0.4		1	V
Gate-body leakage current	IGSS	VDS = 0V, VGS = ±8V			±100	nA
Zero gate voltage drain current	IDSS	VDS = 20V, VGS = 0V			1	μA
Static Drain-Source On-Resistance	RDS(on)	VGS = 4.5V, ID = 2.8A		25	40	mΩ
		VGS = 2.5V, ID = 2A		37	50	mΩ
Forward transconductance	gfs	VDS = 5V, ID = 3.4A		16		S
Diode forward voltage	VSD	IS = 1A, VGS = 0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	IS				1.5	A
Dynamic						
Input capacitance	Ciss	VDS = 10V, VGS = 0V, f = 1MHz		260		pF
Output capacitance	Coss			48		pF
Reverse transfer capacitance	Crss			27		pF
Total gate charge	Qg	VDS = 10V, VGS = 4.5V, ID = 3.4A		2.9		nC
Gate-source charge	Qgs			0.4		nC
Gate-drain charge	Qgd			0.6		nC
Gate resistance	Rg	f = 1MHz		3		Ω
Switching						
Turn-on delay time	td(on)	VDS = 10V RL = 3Ω, ID = 3.4A, VGS = 4.5V, Rg = 6Ω		2.5		ns
Rise time	tr			3.2		ns
Turn-off delay time	td(off)			21		ns
Fall time	tf			3		ns
Body Diode Reverse Recovery Time	Trr	IF = 3.4A, dI/dt = 100A/μs		14		ns
Body Diode Reverse Recovery Charge	Qrr	IF = 3.4A, dI/dt = 100A/μs		3.8		nC

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

P-channel

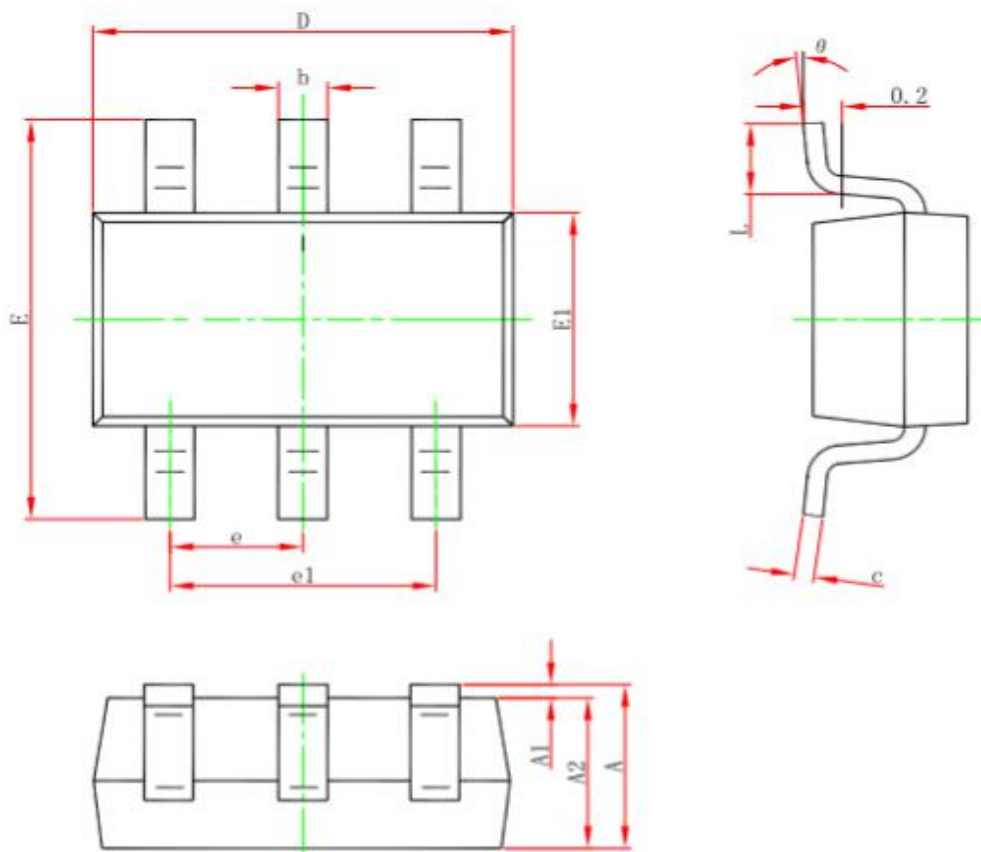
P-channel MOSFET Electrical Characteristics (Ta = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V(BR)DSS	VGS = 0V, ID = -250μA	-20			V
Gate-source threshold voltage	VGS(th)	VDS = VGS, ID = -250μA	-0.4		-1	V
Gate-body leakage current	IGSS	VDS = 0V, VGS = ±8V			±100	nA
Zero gate voltage drain current	IDSS	VDS = -20V, VGS = 0V			-1	μA
Static Drain-Source On-Resistance	RDS(on)	VGS = -4.5V, ID = -2.8A		69	90	mΩ
		VGS = -2.5V, ID = -2A		93	115	mΩ
Forward transconductance	gfs	VDS = -5V, ID = -2.5A		13		S
Diode forward voltage	VSD	IS = -1A, VGS = 0V		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	IS				-1.5	A
Dynamic						
Input capacitance	Ciss	VDS = -10V, VGS = 0V, f = 1MHz		560		pF
Output capacitance	Coss			80		pF
Reverse transfer capacitance	Crss			70		pF
Total gate charge	Qg	VDS = -10V, VGS = -4.5V, ID = -2.5A		8.5		nC
Gate-source charge	Qgs			1.2		nC
Gate-drain charge	Qgd			2.1		nC
Gate resistance	Rg	f = 1MHz		15		Ω
Switching						
Turn-on delay time	td(on)	VDS = -10V RL = 4Ω, ID = -2.5A, VGS = -4.5V, Rg = 6Ω		7.2		ns
Rise time	tr			36		ns
Turn-off delay time	td(off)			53		ns
Fall time	tf			56		ns
Body Diode Reverse Recovery Time	Trr	IF = -2.5A, dI/dt = 100A/μs		37		ns
Body Diode Reverse Recovery Charge	Qrr	IF = -2.5A, dI/dt = 100A/μs		27		nC

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

SOT-23-6L PACKAGE OUTLINE DIMENSIONS:



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°

N-channel Typical Electrical AND Thermal Characteristics:

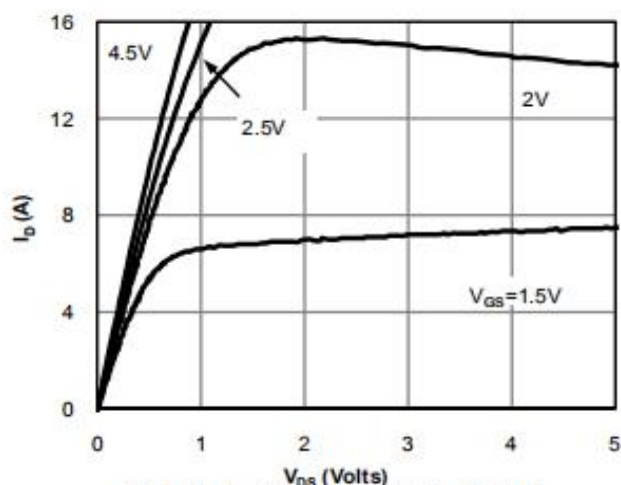


Figure 1: On-Region Characteristics (Note E)

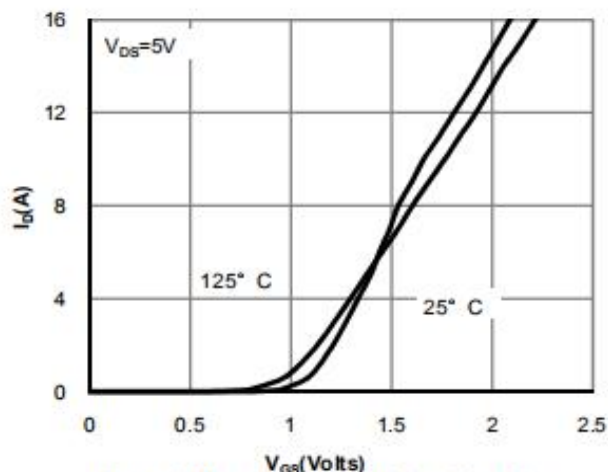


Figure 2: Transfer Characteristics (Note E)

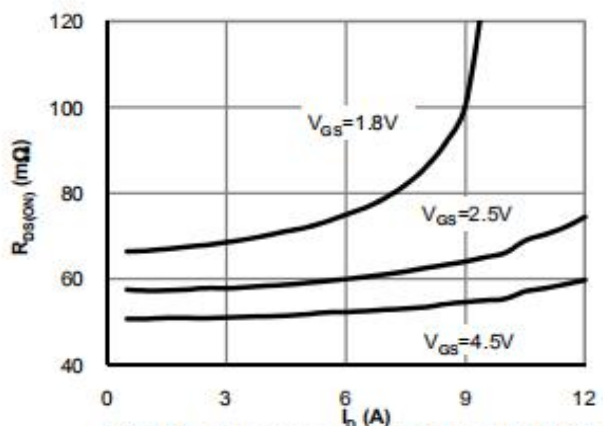


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

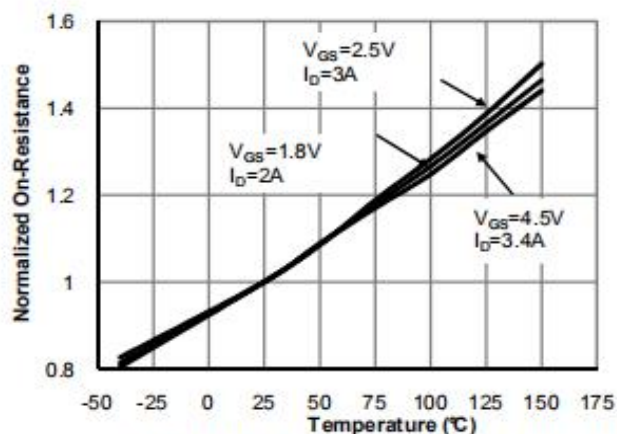


Figure 4: On-Resistance vs. Junction Temperature (Note E)

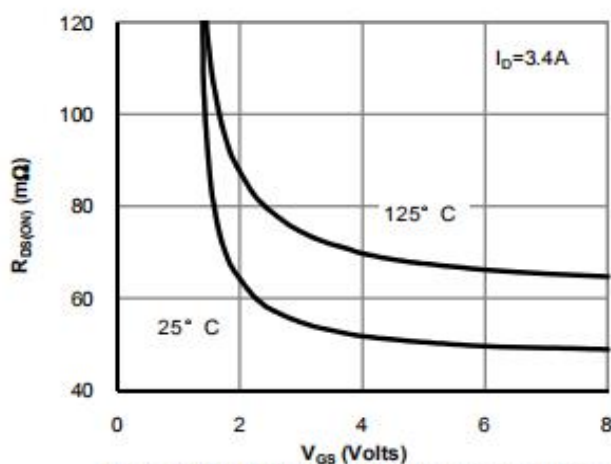


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

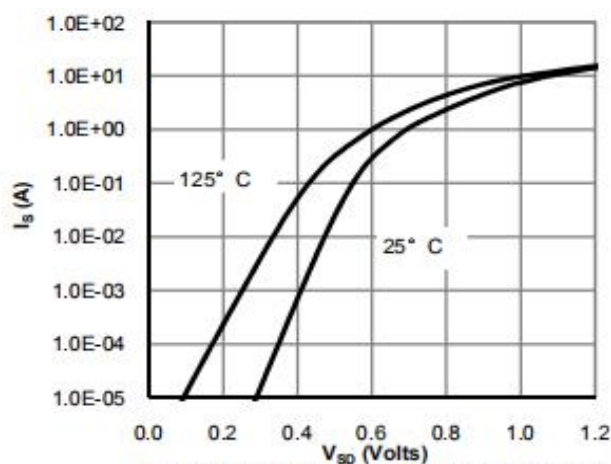


Figure 6: Body-Diode Characteristics (Note E)

N-channel Typical Electrical AND Thermal Characteristics:

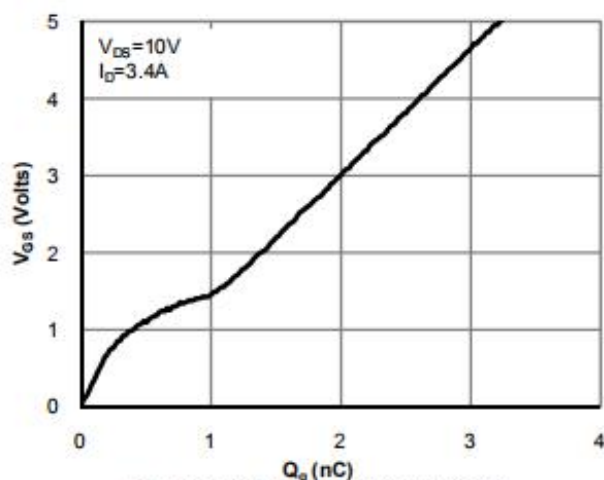


Figure 7: Gate-Charge Characteristics

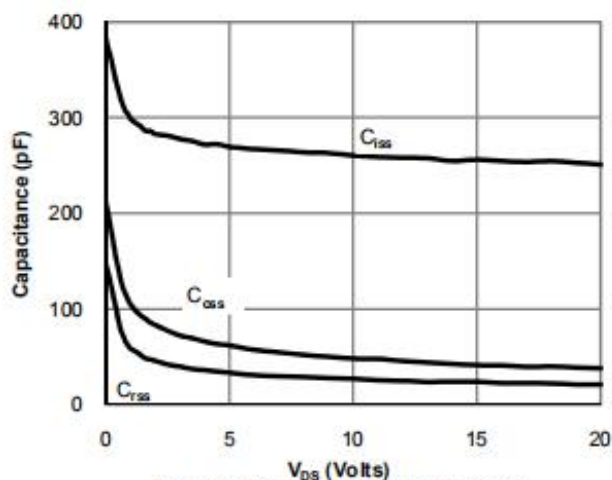


Figure 8: Capacitance Characteristics

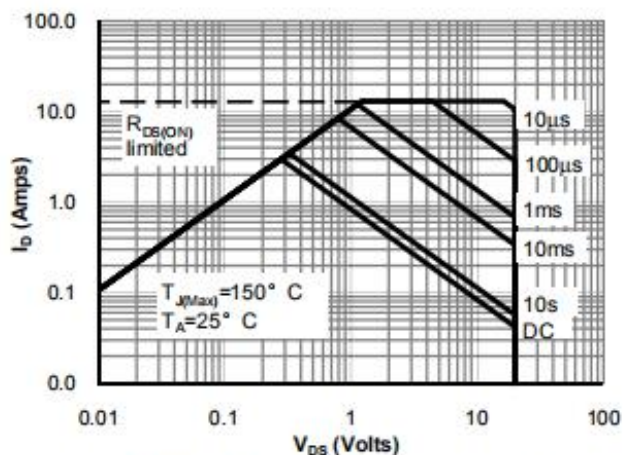


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

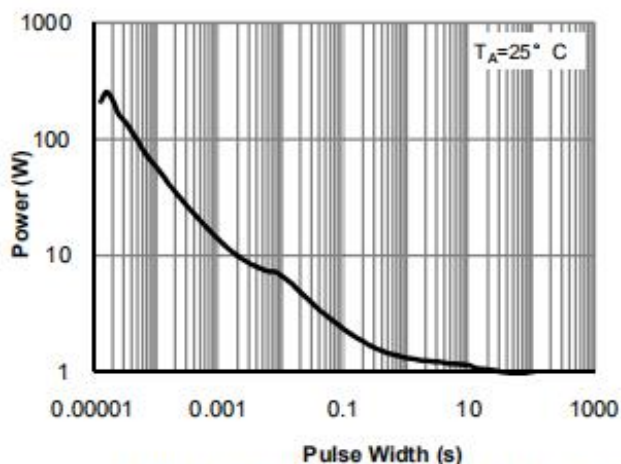


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

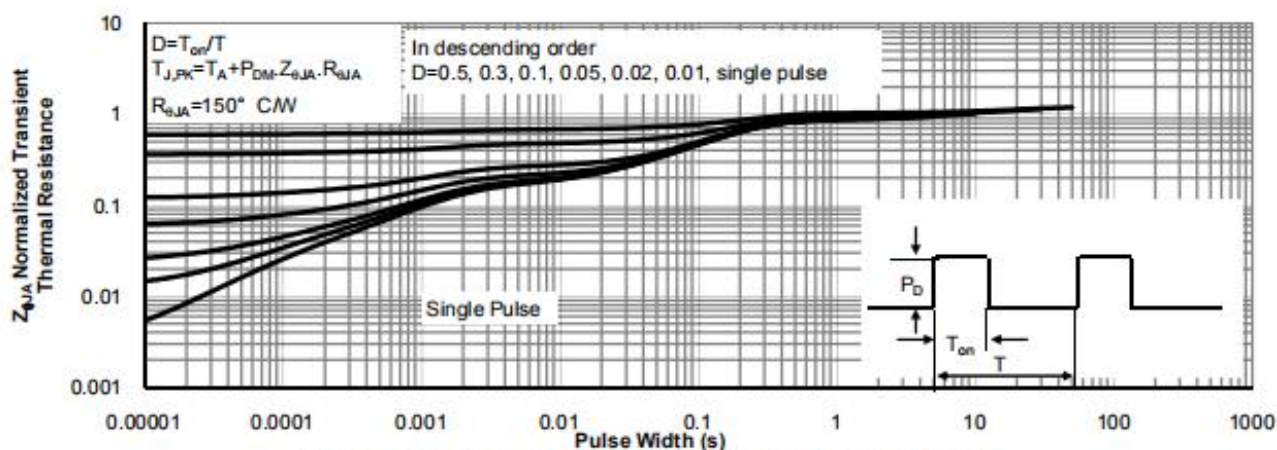


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

P-channel Typical Electrical AND Thermal Characteristics:

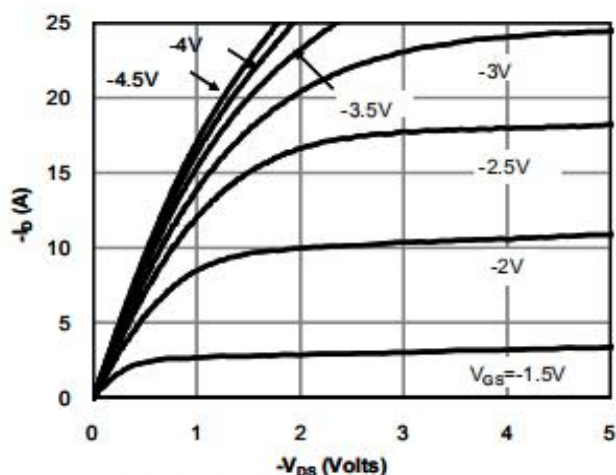


Figure 1: On-Region Characteristics (Note E)

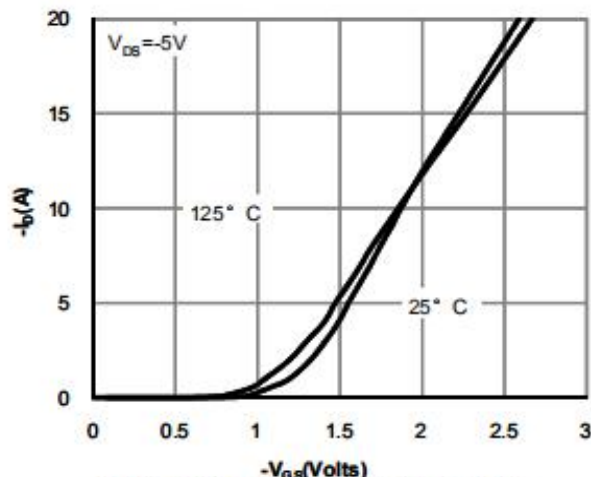


Figure 2: Transfer Characteristics (Note E)

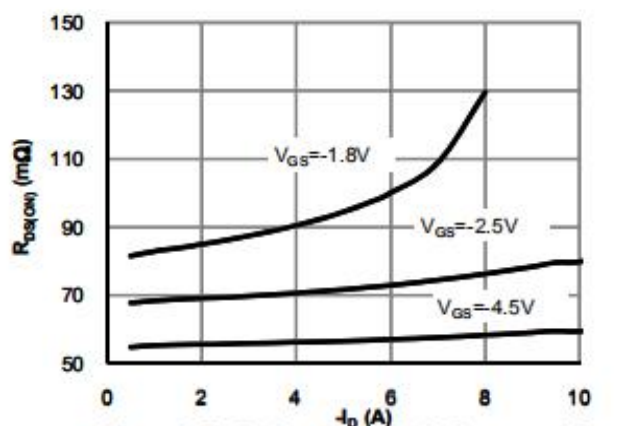


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

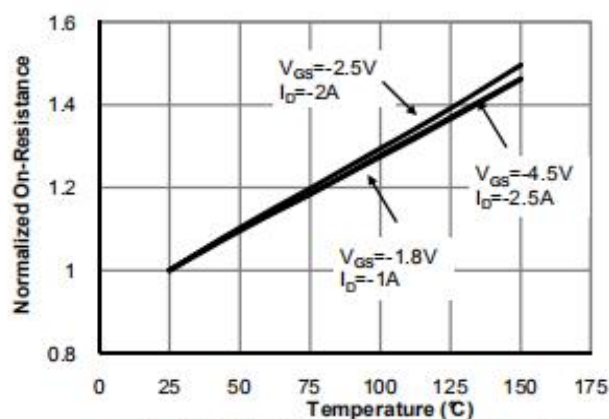


Figure 4: On-Resistance vs. Junction Temperature (Note E)

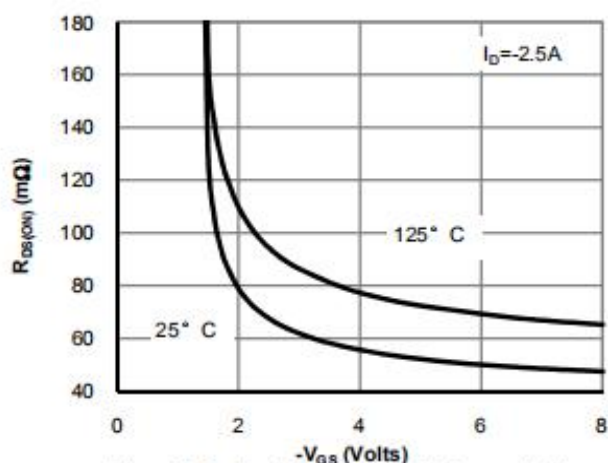


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

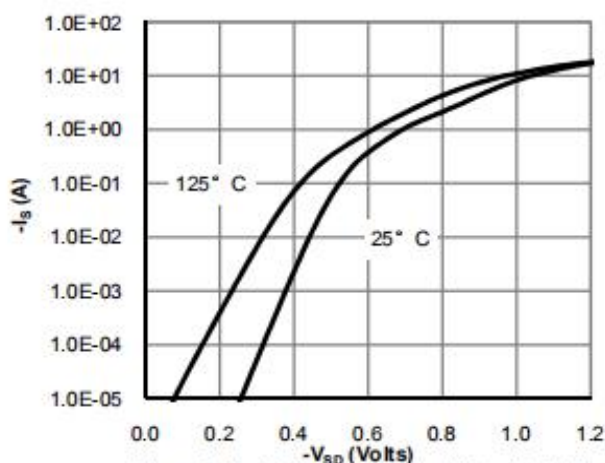


Figure 6: Body-Diode Characteristics (Note E)

P-channel Typical Electrical AND Thermal Characteristics:

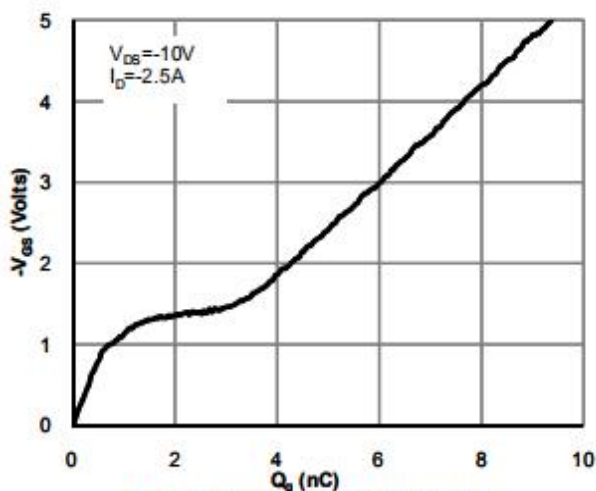


Figure 7: Gate-Charge Characteristics

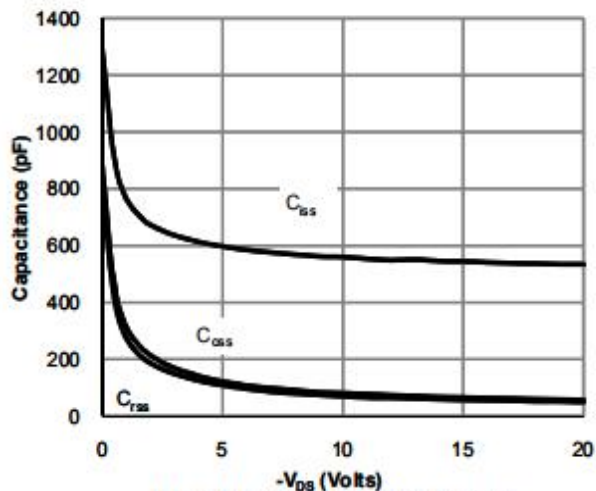


Figure 8: Capacitance Characteristics

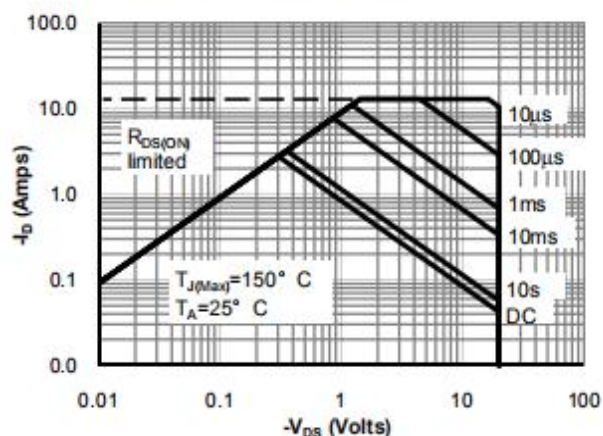


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

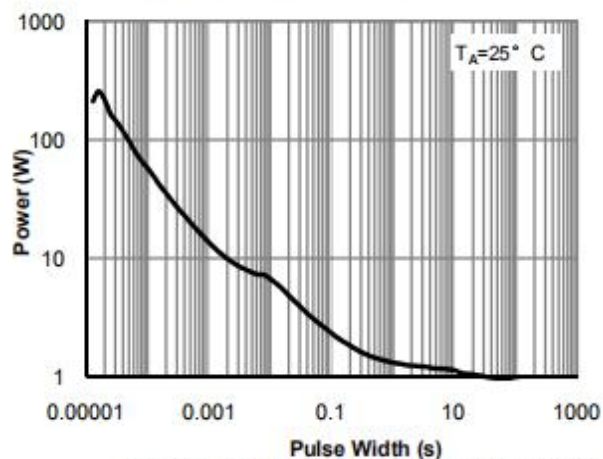


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

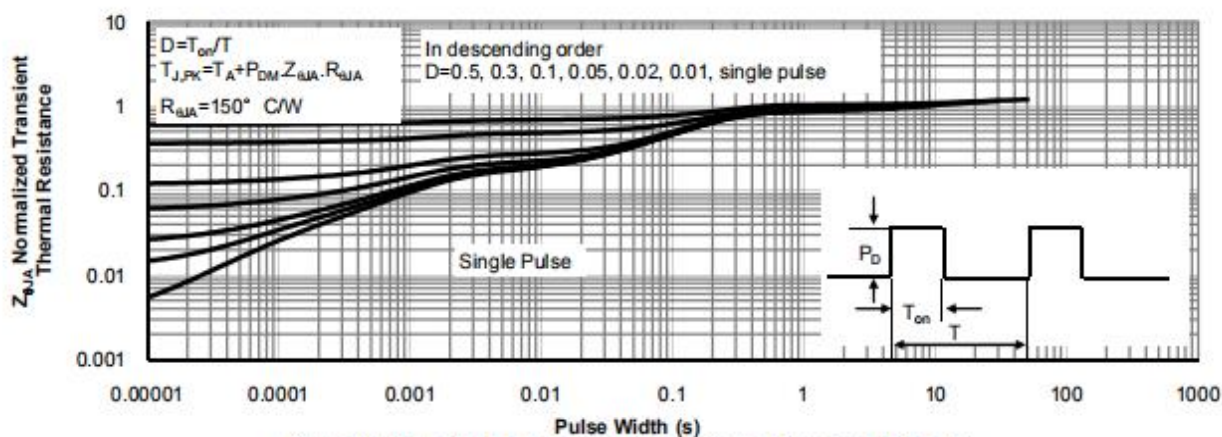


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245°C±5°C	5sec±1sec
Pb-Free device	260°C+0/-5°C	5sec±1sec



This integrated circuit can be damaged by ESD. BYSEMI Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.