ZK3010DS

N and P-channel Enhancement Mode Power MOSFET

Features

- Advanced
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- 100% UIS TESTED!,100% Rg TESTED!

Applications

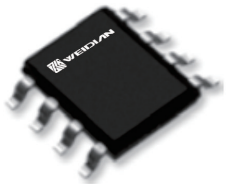
- Load Switch
- PWM Application
- Power Management

N-Channel

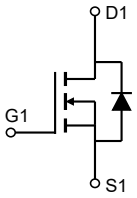
Parameters	Value	Unit
V_{DSS}	30	V
$V_{GS(th)\_Typ}$	1.5	V
I_D(@V_{GS}=10V)	5.6	A
$R_{DS(ON)\_Typ}$(@V_{GS}=10V	18	mΩ
$R_{DS(ON)\_Typ}$(@V_{GS}=4.5V	25	mΩ

P-Channel

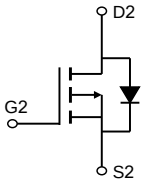
Parameters	Value	Unit
V_{DSS}	-30	V
$V_{GS(th)\_Typ}$	-1.5	V
I_D(@V_{GS}=-10V)	-10	A
$R_{DS(ON)\_Typ}$(@V_{GS}=-10V)	24.5	mΩ
$R_{DS(ON)\_Typ}$(@V_{GS}=-4.5V)	36.5	mΩ



SOP8 Top View



N-channel



P-channel

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK3010DS	3010D	SOP8	Reel	N/A	N/A	4000

MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_C = 25°C	I_D	5.6	-10	A
	T_C = 70°C		3	-5	
Pulsed Drain Current		I_{DM}	60	-60	A
Maximum Power Dissipation	T_A=25℃	P_D	6.0	5.5	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	-55 To 150	℃

N-CH ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = 250uA	30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = 30V, V_{GS} =0V			100	nA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±20V			±100	nA
On characteristics						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250uA	1.0	1.5	2.2	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =5.6A		18	25	mΩ
		V_{GS} =4.5V, I_D =5A		25	35	mΩ
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =20V,V_{GS} =0V f =1MHz		1700		pF
Output capacitance	C_{oss}			755		
Reverse transfer capacitance	C_{rss}			254		
Gate Resistance	R_g	f =1MHz		2.6		Ω
Switching characteristics						
Total gate charge	Q_g	V_{GS}=0 to 10V V_{DS}=20V, I_D=10A		20.0		nC
Gate-source charge	Q_{gs}			2.3		
Gate-drain charge	Q_{gd}			1.7		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V,I_D=5.4A V_{GS}=10V,R_{GEN}=1Ω		5		ns
Turn-on rise time	t_r			10		
Turn-off delay time	$t_{d(off)}$			16		
Turn-off fall time	t_f			7		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=5.4A			1.2	V
Continuous drain-source diode forward current	I_S ①	T_C =25℃			5.6	A

Notes:

1.Guaranteed by design, not subject to production testing.
2.Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
3.Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

P-CH ELECTRICAL CHARACTERISTICS

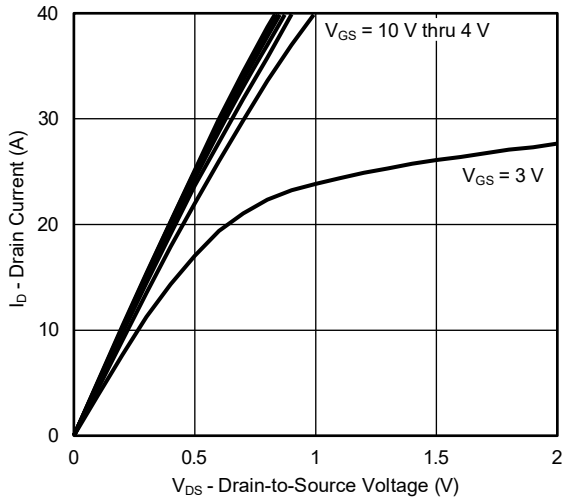
T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = -250uA	-30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, V_{GS} =0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±20V			±100	nA
On characteristics						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =-10V, I_D =-250uA	-1.0	-1.5	-2.2	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =-10V, I_D =-10A		24.5	32	mΩ
		V_{GS} =-4.5V, I_D =-5A		36.5	50	mΩ
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =-20V,V_{GS} =0V f =1MHz		1515		pF
Output capacitance	C_{oss}			800		
Reverse transfer capacitance	C_{rss}			25		
Gate Resistance	R_g	f =1MHz		12.8		Ω
Switching characteristics						
Total gate charge	Q_g	V_{GS}=0 to -10V V_{DS}=-20V, I_D=-10A		20		nC
Gate-source charge	Q_{gs}			33		
Gate-drain charge	Q_{gd}			5.6		
Turn-on delay time	$t_{d(on)}$	V_{DD}=-20V,R_L=2Ω V_{GS}=-10V,R_{GEN}=1Ω		10		ns
Turn-on rise time	t_r			9		
Turn-off delay time	$t_{d(off)}$			50		
Turn-off fall time	t_f			13		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=-2A			-1.2	V
Continuous drain-source diode forward current	I_S ①	T_C =25℃			-5.6	A

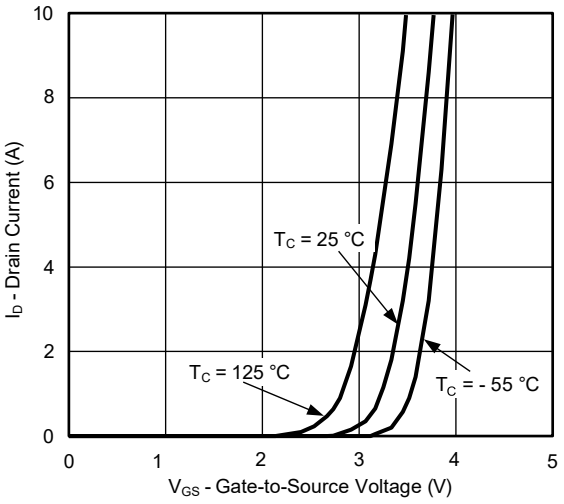
Notes:

1.Guaranteed by design, not subject to production testing.
2.Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
3.Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

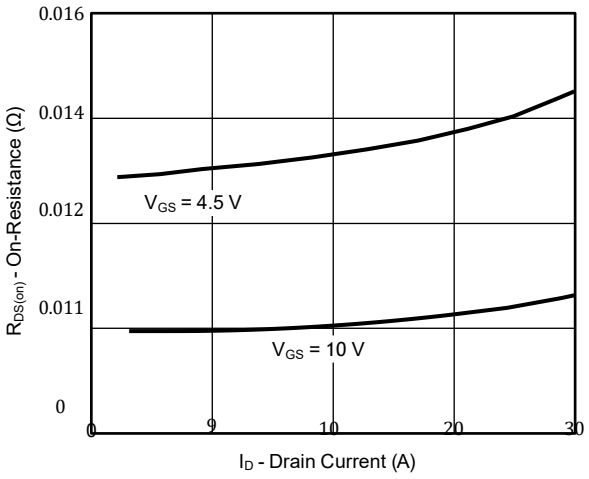
N-CH Typical Electrical & Thermal Characteristics



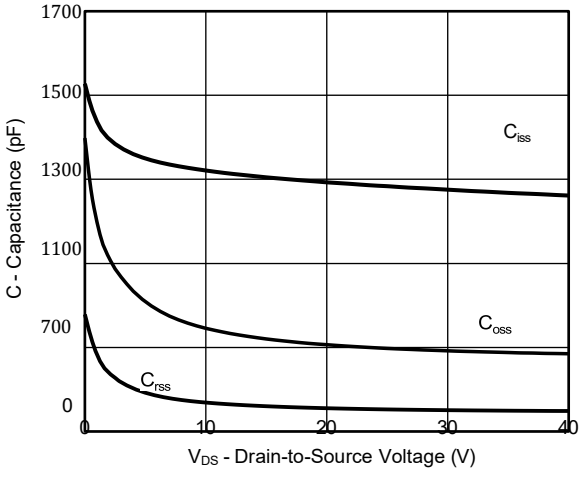
Output Characteristics



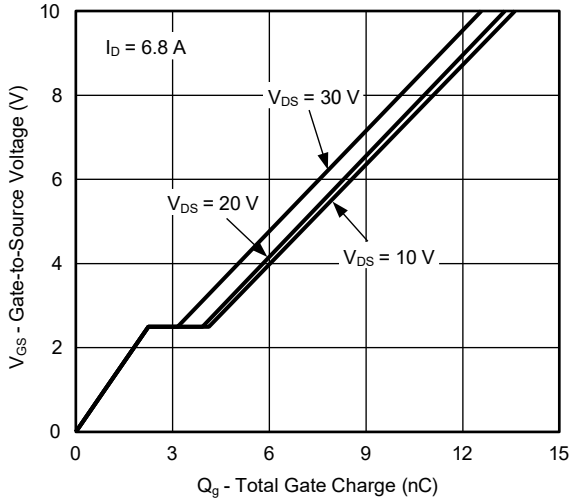
Transfer Characteristics



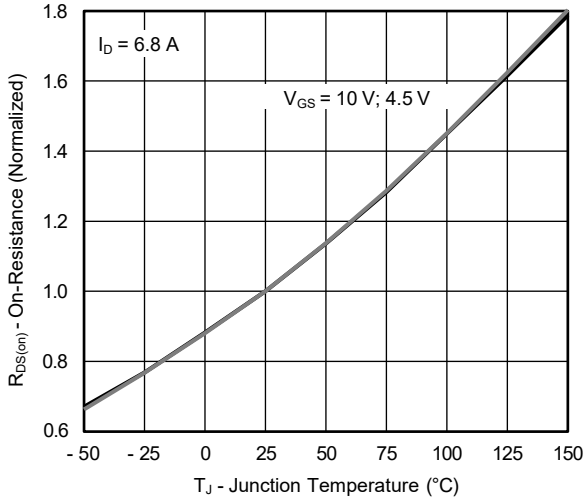
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

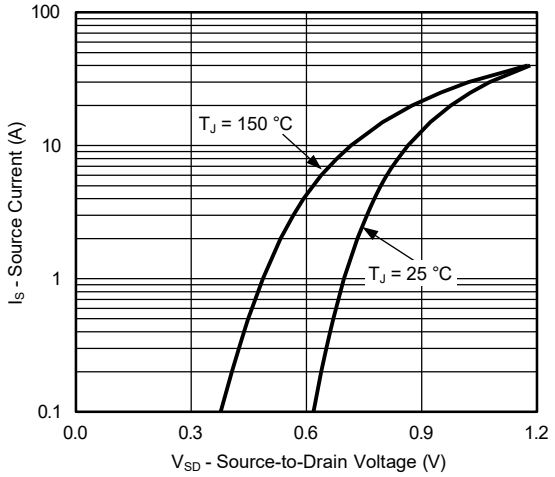


Gate Charge

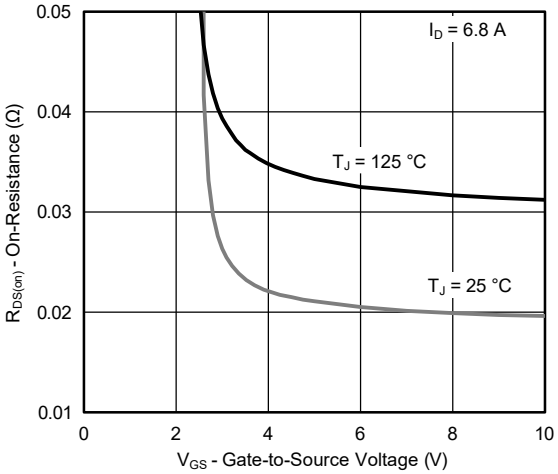


On-Resistance vs. Junction Temperature

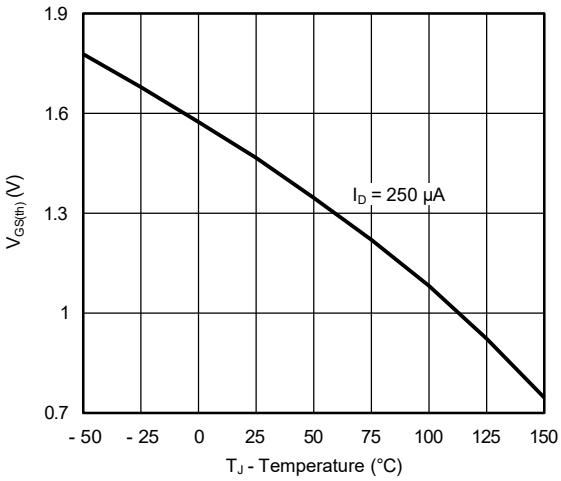
N-CH Typical Electrical & Thermal Characteristics



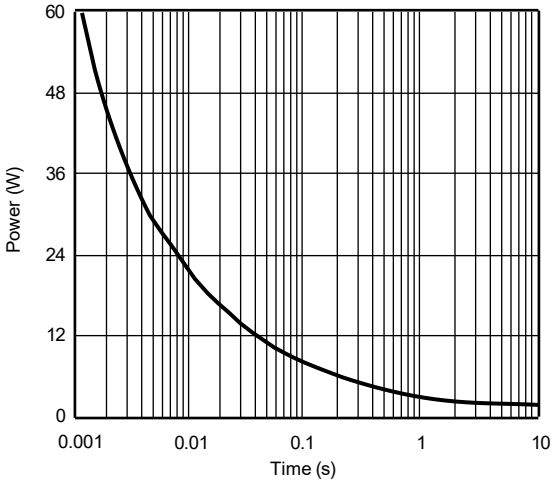
Source-Drain Diode Forward Voltage



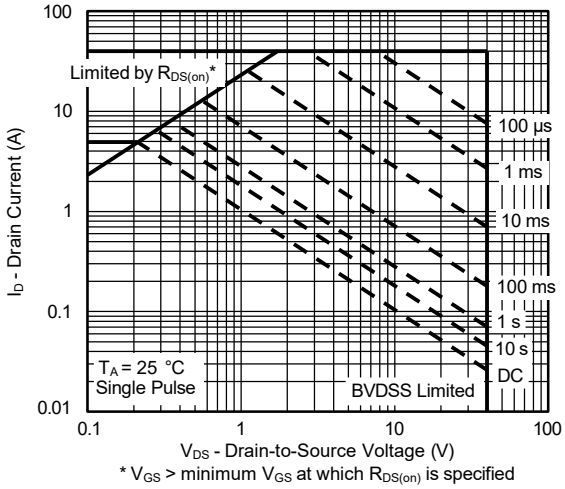
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



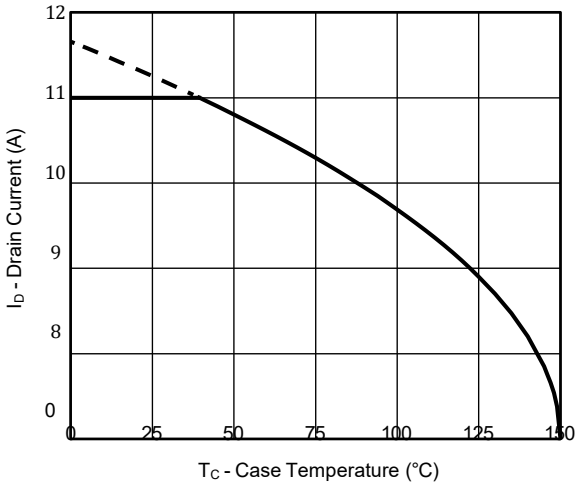
Single Pulse Power, Junction-to-Ambient



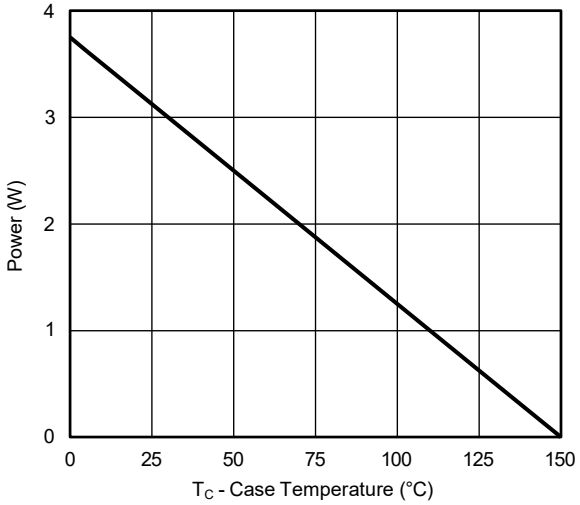
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

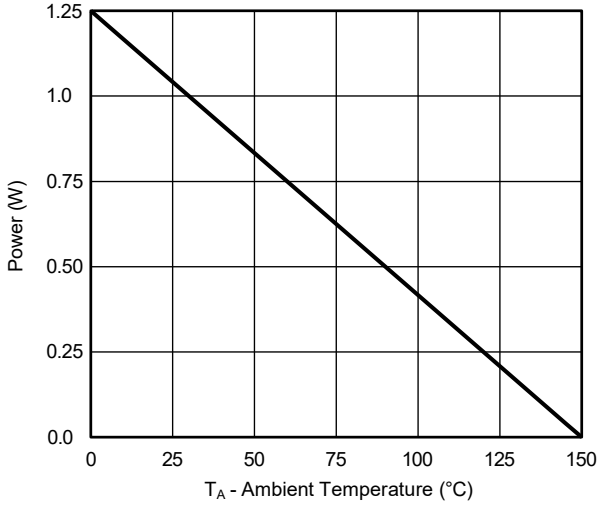
N-CH Typical Electrical & Thermal Characteristics



Current Derating*

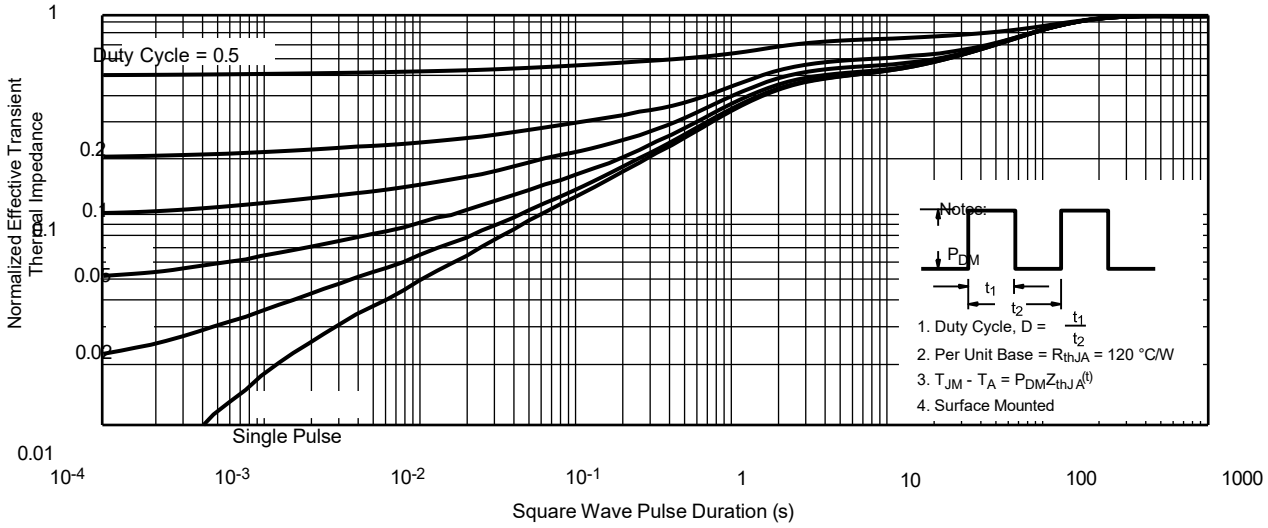


Power Derating, Junction-to-Foot

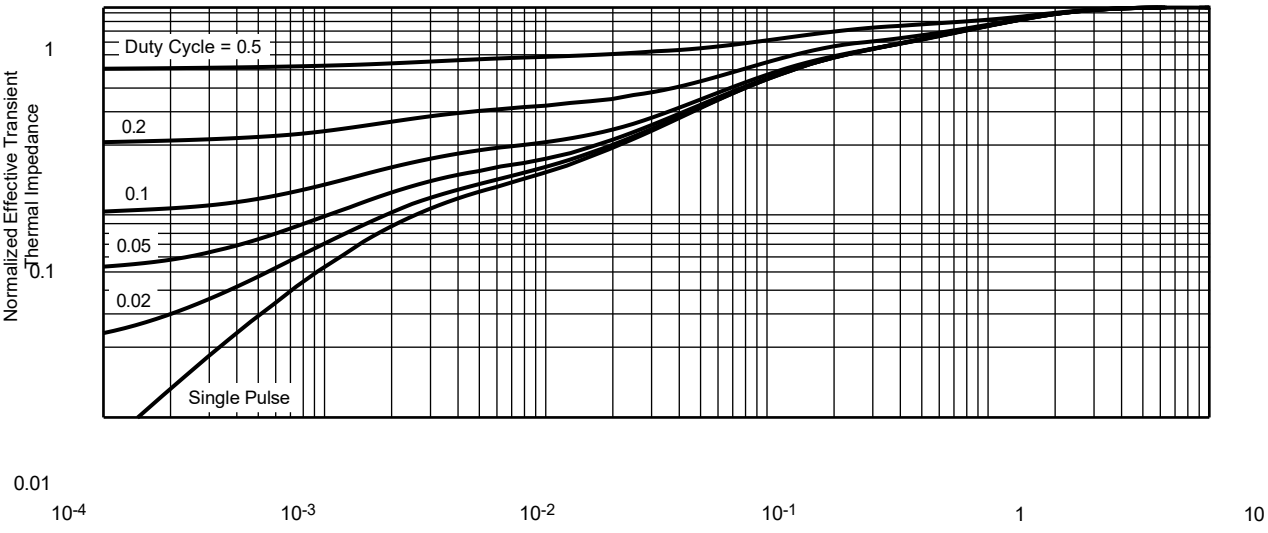


Power Derating, Junction-to-Ambient

N-CH Typical Electrical & Thermal Characteristics

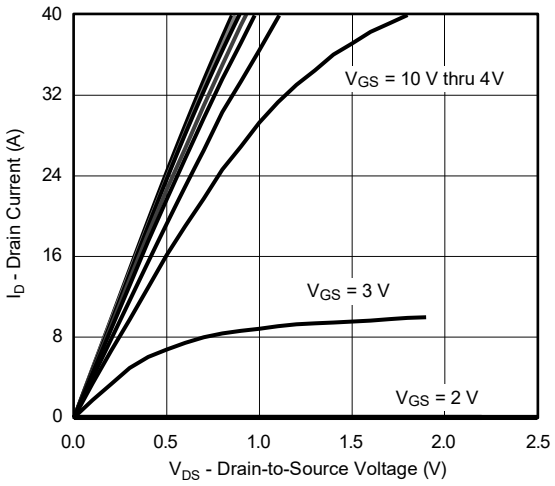


Normalized Thermal Transient Impedance, Junction-to-Ambient

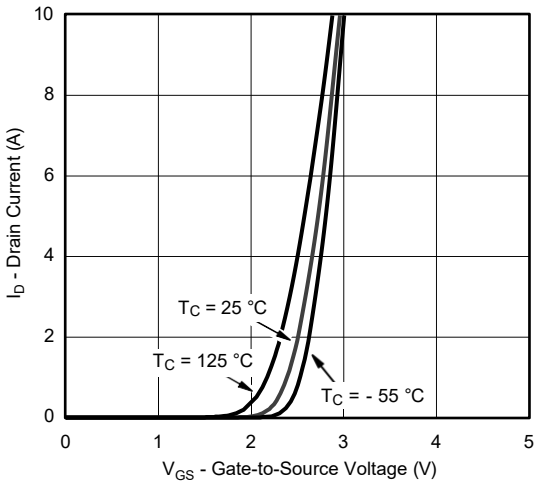


Normalized Thermal Transient Impedance, Junction-to-Foot

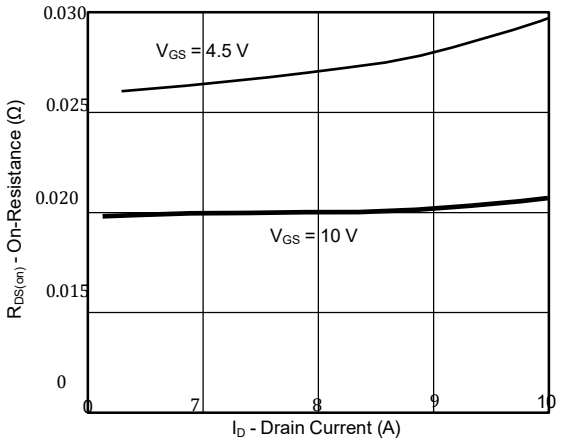
P-CH Typical Electrical & Thermal Characteristics



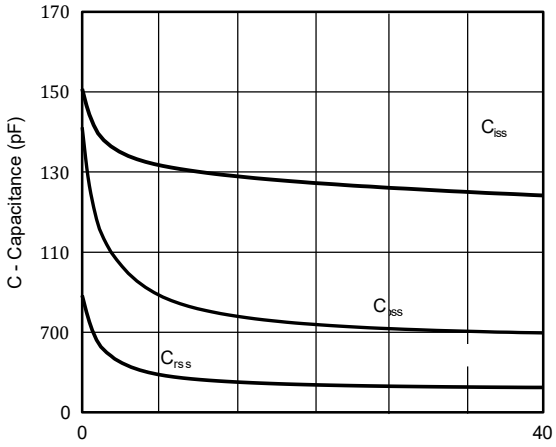
Output Characteristics



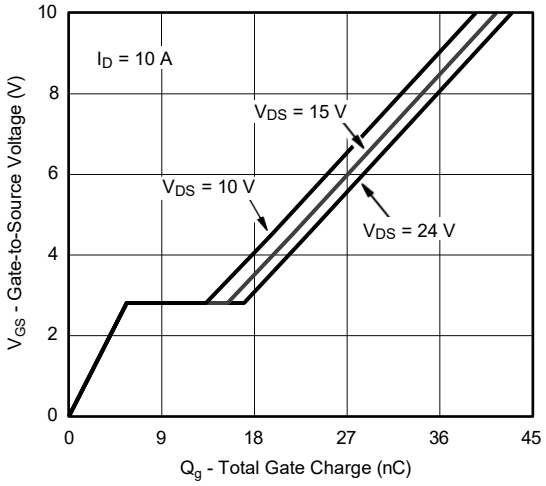
Transfer Characteristics



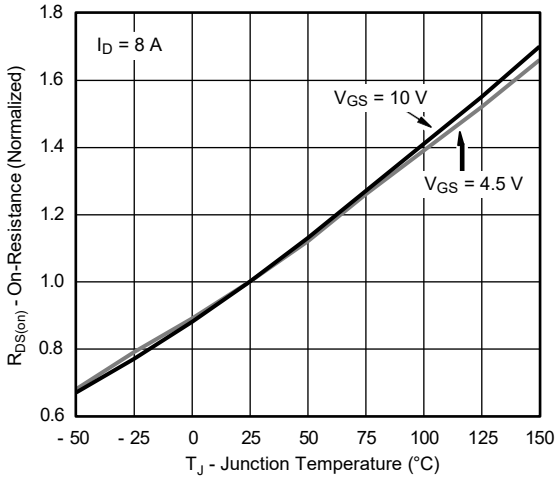
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

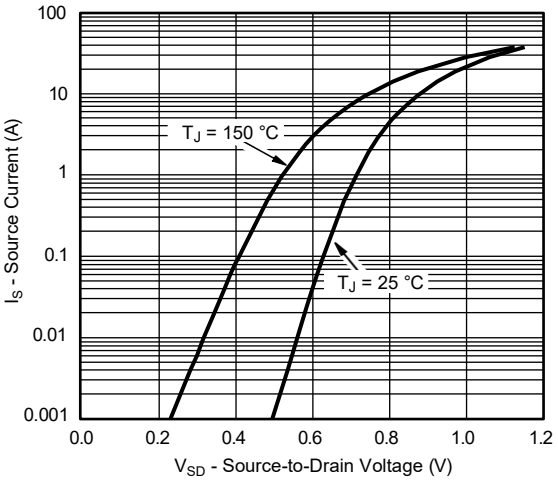


Gate Charge

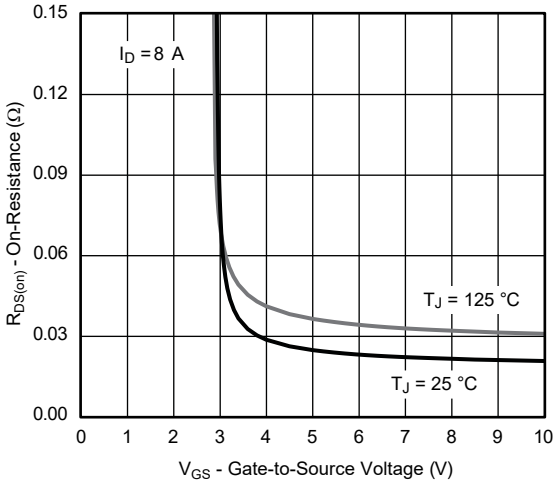


On-Resistance vs. Junction Temperature

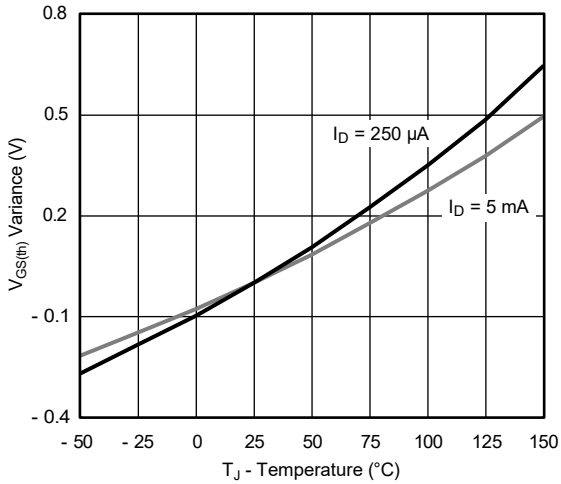
P-CH Typical Electrical & Thermal Characteristics



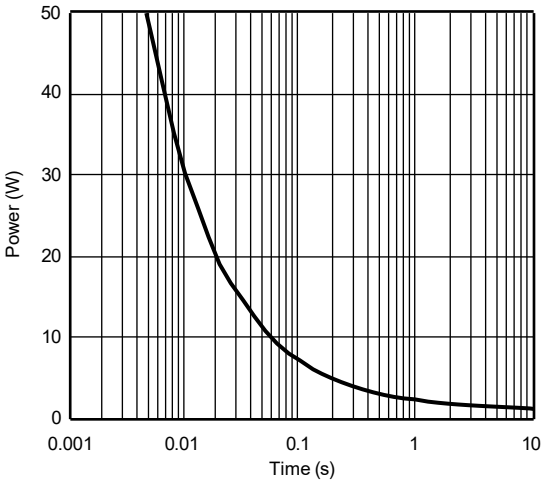
Source-Drain Diode Forward Voltage



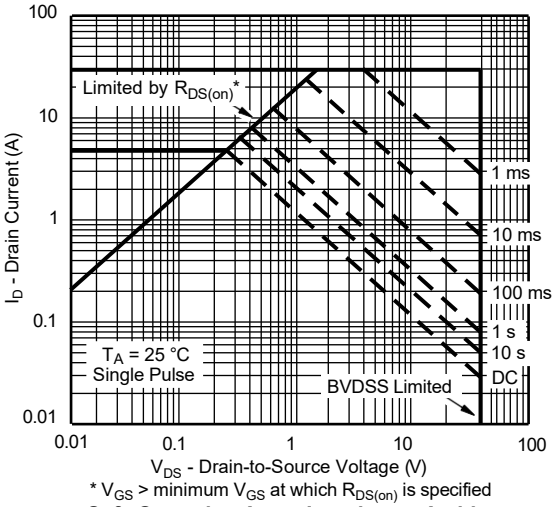
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



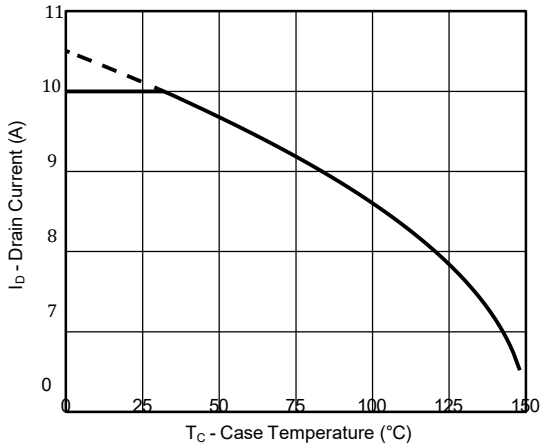
Single Pulse Power, Junction-to-Ambient



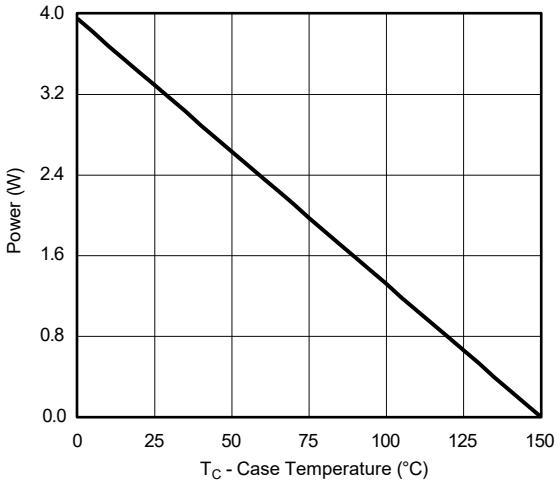
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

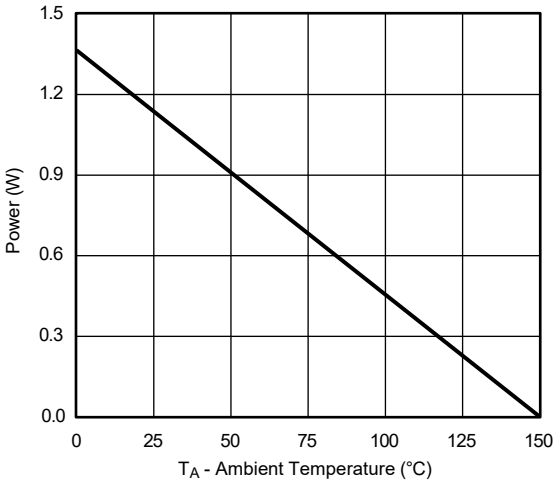
P-CH Typical Electrical & Thermal Characteristics



Current Derating*



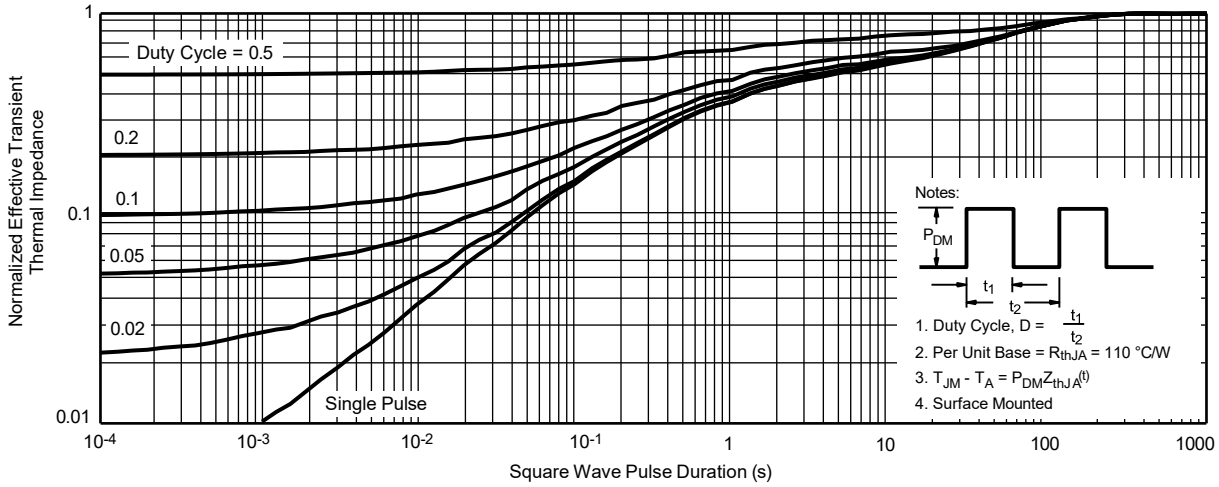
Power Derating, Junction-to-Foot



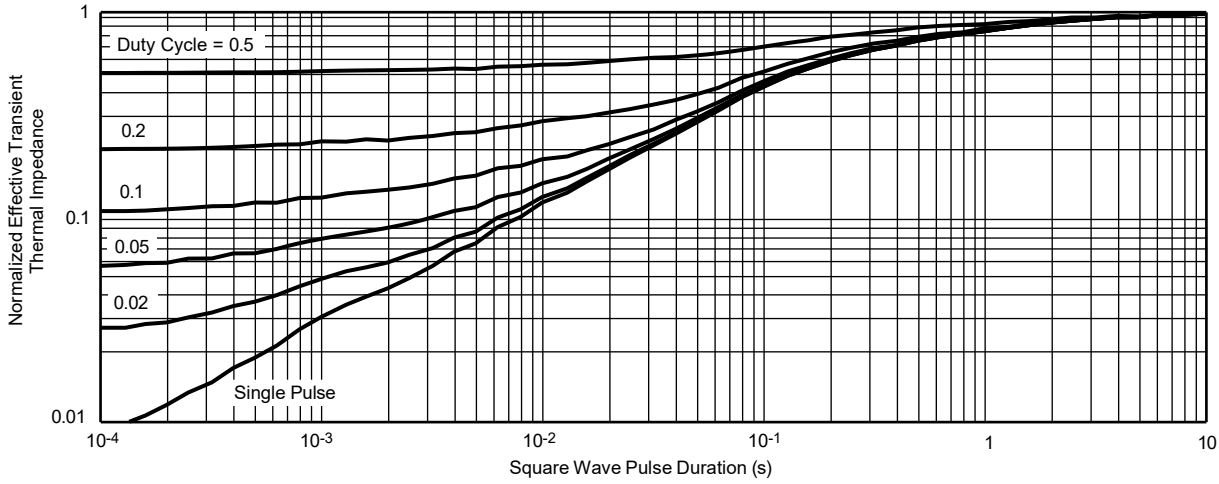
Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

P-CH Typical Electrical & Thermal Characteristics

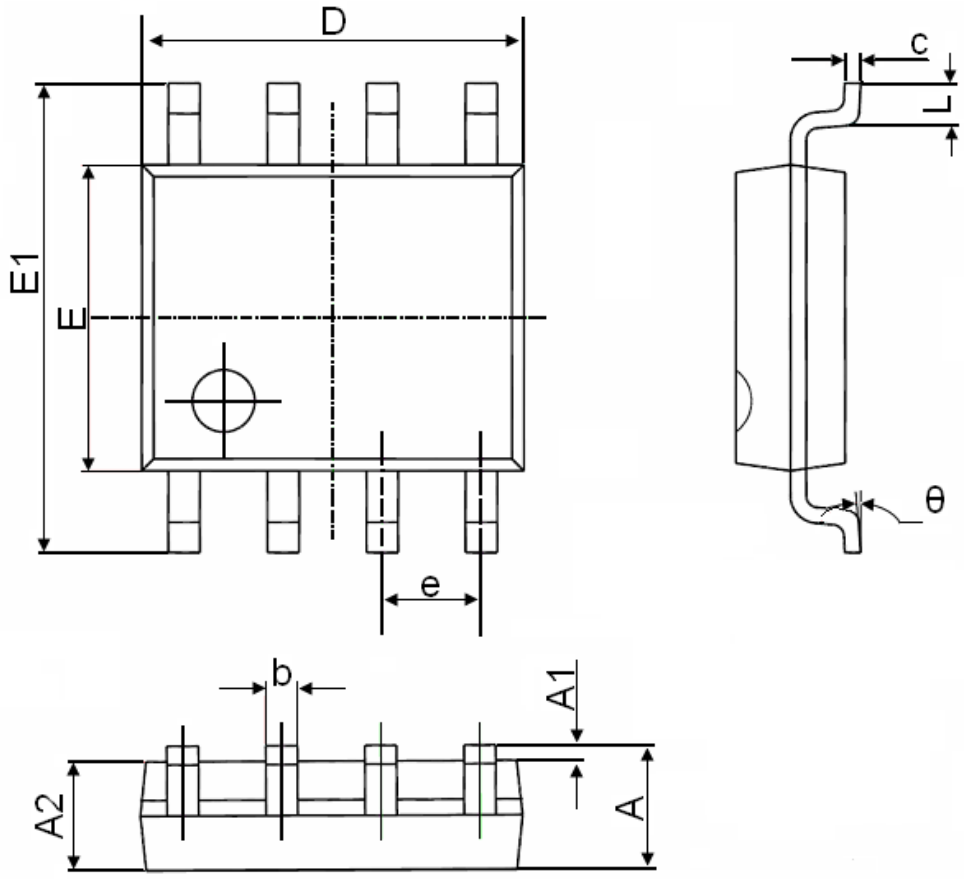


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°