General Description

The WSD19N10DN56 is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSD19N10DN56 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

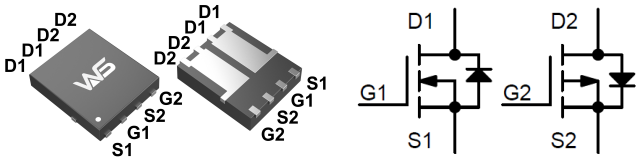
Product Summery

BVDSS	RDSON	ID
100V	100mΩ	15A
-100V	150mΩ	-12A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- CCFL Back-light Inverter

DFN5X6C-8-EP2 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current, $V_{GS(NP)}$=10V,T_c=25℃	15	-12	A
	Continuous Drain Current, $V_{GS(NP)}$=10V,T_c=100℃	6.0	-4.8	A
I_{DP} [a]	Pulse Drain Current Tested, $V_{GS(NP)}$=10V	45	-36	A
E_{AS} [c]	Avalanche Energy, Single pulse , L=0.5mH	6.25	20	mJ
I_{AS} [c]	Avalanche Current, Single pulse , L=0.5mH	5	-9	A
P_D	Total Power Dissipation, T_a=25℃	17.8	17.8	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	150	150	℃
$R_{\theta JA}$ [b]	Thermal Resistance-Junction to Ambient,Steady State	85	85	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case,Steady State	6.25	6.25	℃/W

Note * : Max. current is limited by bonding wire.
Note a : Pulse width limited by max. junction temperature.
Note b : $R_{\theta JA}$ steady state t=999s. $R_{\theta JA}$ is measured with the device mounted on 1in^2, FR-4 board with 2oz. Copper.
Note c : UIS tested and pulse width limited by maximum junction temperature 175°C (initial temperature T_j=25°C).

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	100	---	---	V
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=4A	---	100	110	mΩ
		V_{GS}=4.5V , I_D=3A	---	110	150	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.3	1.8	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=20V , V_{GS}=0V , T_J=85℃	---	---	30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.5	3.6	Ω
Q_g[e]	Total Gate Charge	V_{DS}=50V, V_{GS}=10V, I_{DS}=4A	---	10	---	nC
Q_{gs}[e]	Gate-Source Charge		---	2.5	---	
Q_{gd}[e]	Gate-Drain Charge		---	3.3	---	
$T_{d(on)}$[e]	Turn-On Delay Time	V_{DD}=30V,R_L=30R, I_{DS}=1A,V_{GEN}=10V , R_G=6R.	---	9	---	ns
T_r[e]	Rise Time		---	7	---	
$T_{d(off)}$[e]	Turn-Off Delay Time		---	19	---	
T_f[e]	Fall Time		---	5	---	
C_{iss}[e]	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1MHz	---	450	---	pF
C_{oss}[e]	Output Capacitance		---	31	---	
C_{rss}[e]	Reverse Transfer Capacitance		---	15	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	15	A
V_{SD}[d]	Diode Forward Voltage	V_{GS}=0V , I_S=5A , T_J=25℃	---	---	1.3	V

Note d：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

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	-100	---	---	V
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-3A	---	150	180	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	170	210	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.3	-1.8	-2.3	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-20V , V_{GS}=0V , T_J=85℃	---	---	-30	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g[e]	Total Gate Charge	V_{DS}=-50V , V_{GS}=-4.5V , I_D=-3A	---	16	---	nC
Q_{gs}[e]	Gate-Source Charge		---	2.5	---	
Q_{gd}[e]	Gate-Drain Charge		---	3.5	---	
$T_{d(on)}$[e]	Turn-On Delay Time	V_{DD}=-30V , V_{GS}=-10V , R_G=6Ω, I_D=-1A ,R_L=15Ω,	---	9	---	ns
T_r[e]	Rise Time		---	5	---	
$T_{d(off)}$[e]	Turn-Off Delay Time		---	50	---	
T_f[e]	Fall Time		---	30	---	
C_{iss}[e]	Input Capacitance	V_{DS}=-30V , V_{GS}=0V , f=1MHz	---	700	---	pF
C_{oss}[e]	Output Capacitance		---	50	---	
C_{rss}[e]	Reverse Transfer Capacitance		---	28	---	

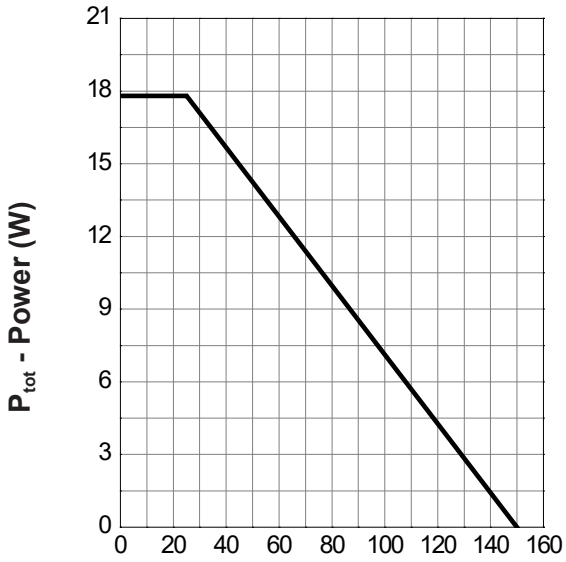
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-12	A
V_{SD}[e]	Diode Forward Voltage	V_{GS}=0V , I_S=-3A , T_J=25℃	---	---	-1.2	V

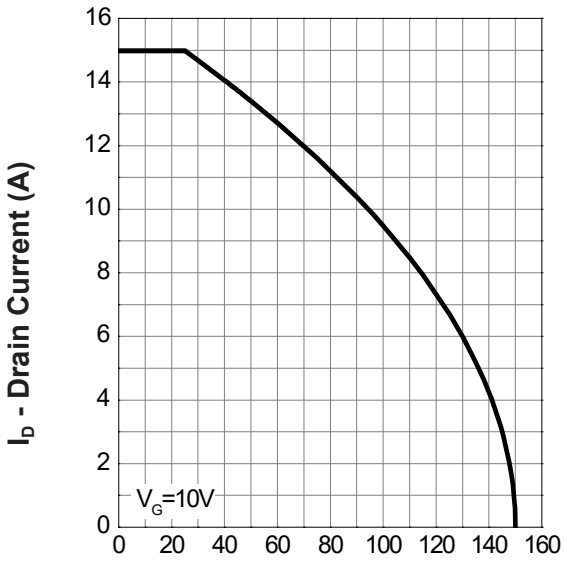
Note d：Pulse test; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

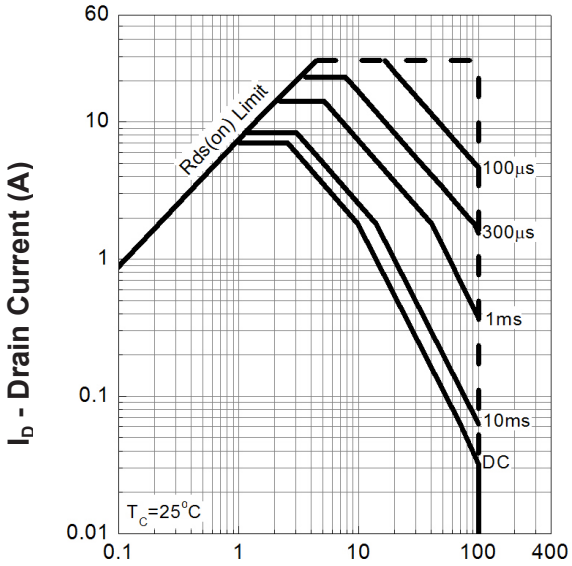
Power Dissipation



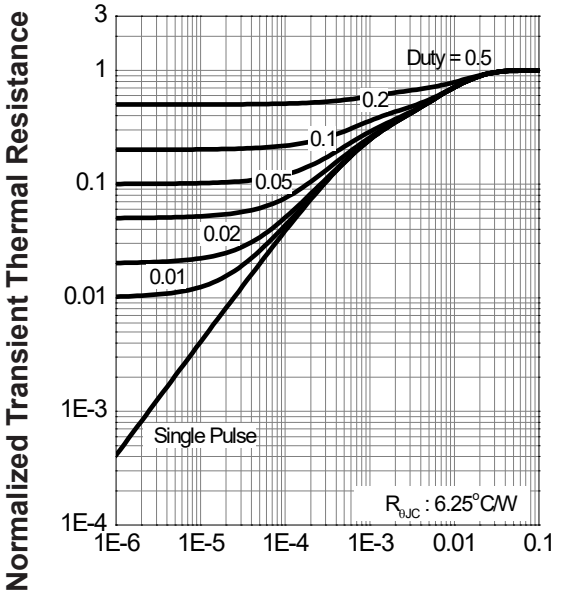
Drain Current



Safe Operation Area

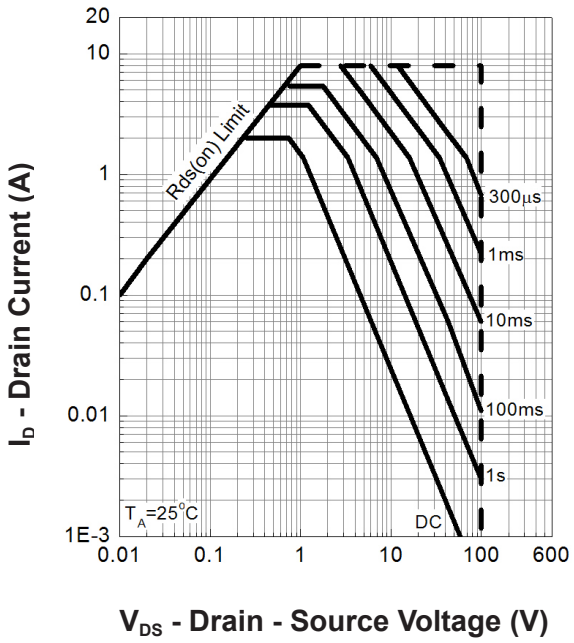


Thermal Transient Impedance

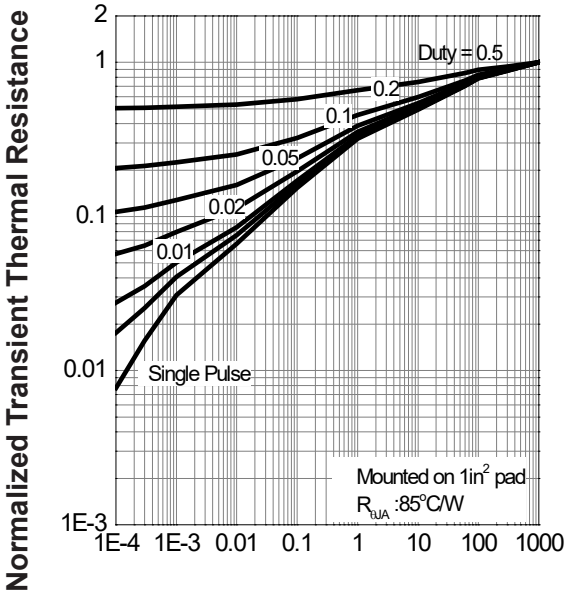


N-Channel Typical Characteristics

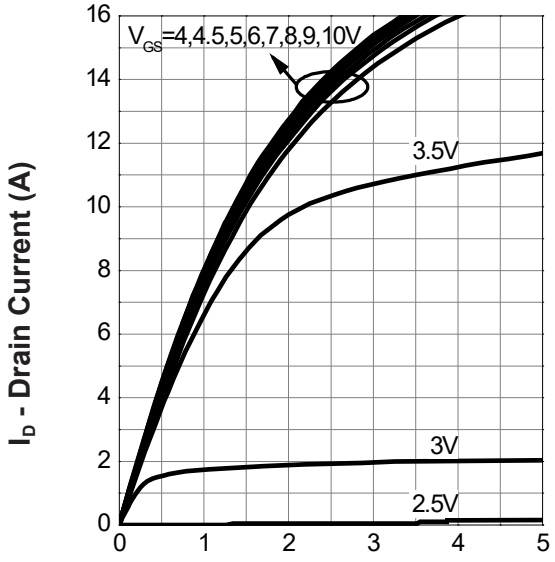
Safe Operation Area



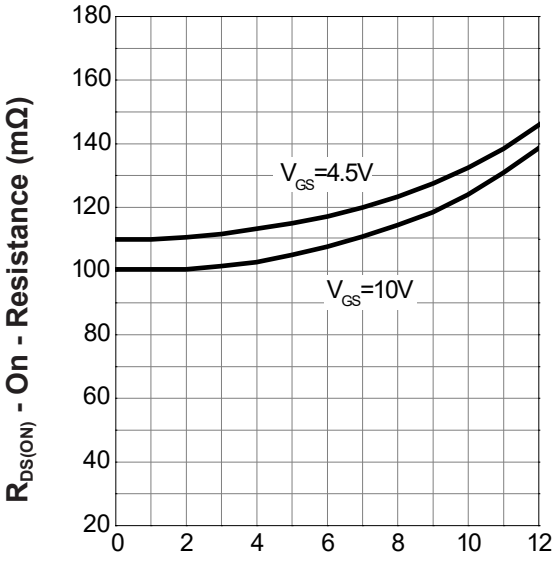
Thermal Transient Impedance



Output Characteristics

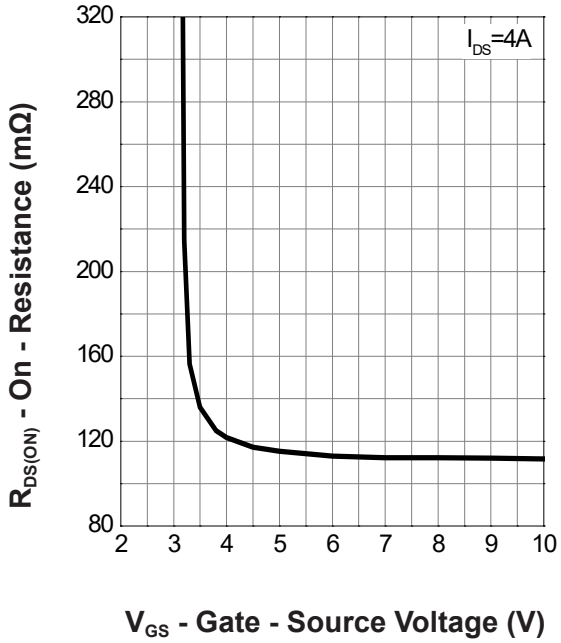


Drain-Source On Resistance

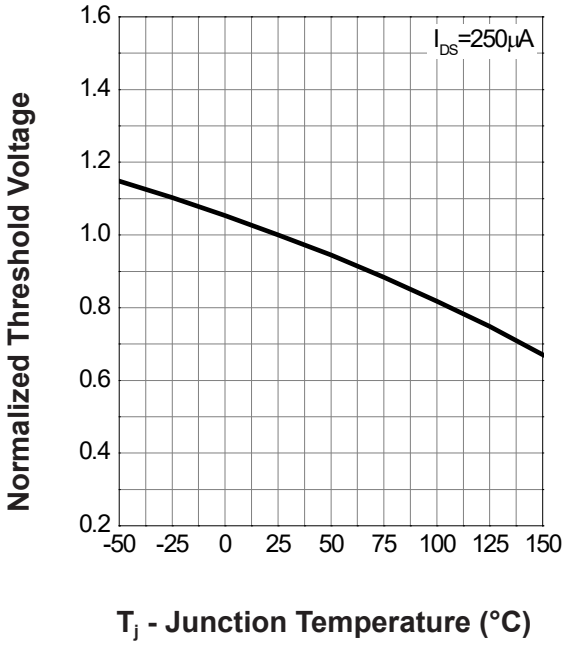


N-Channel Typical Characteristics

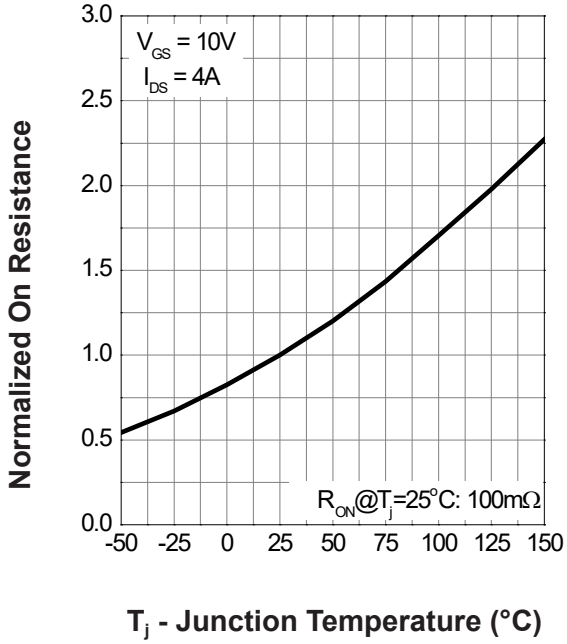
Gate-Source On Resistance



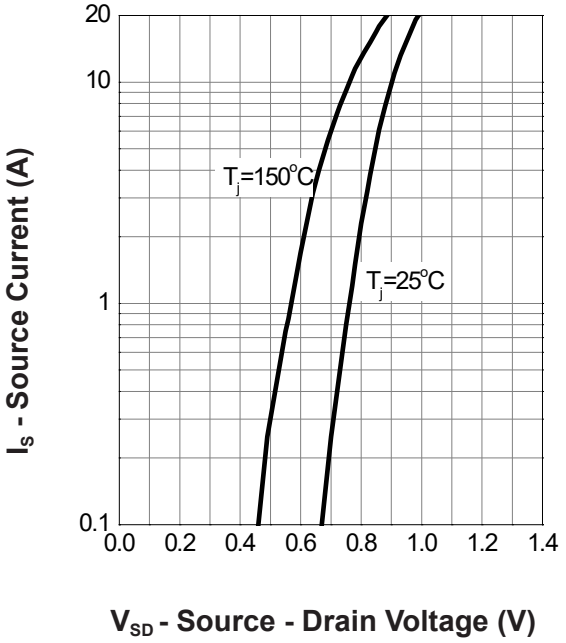
Gate Threshold Voltage



Drain-Source On Resistance

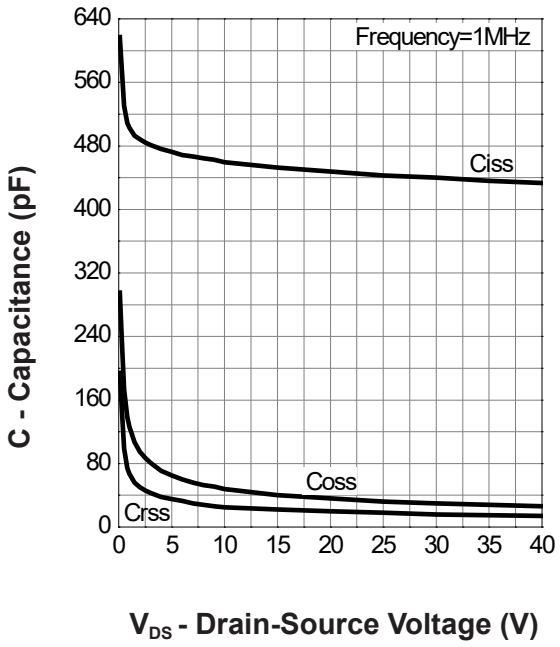


Source-Drain Diode Forward

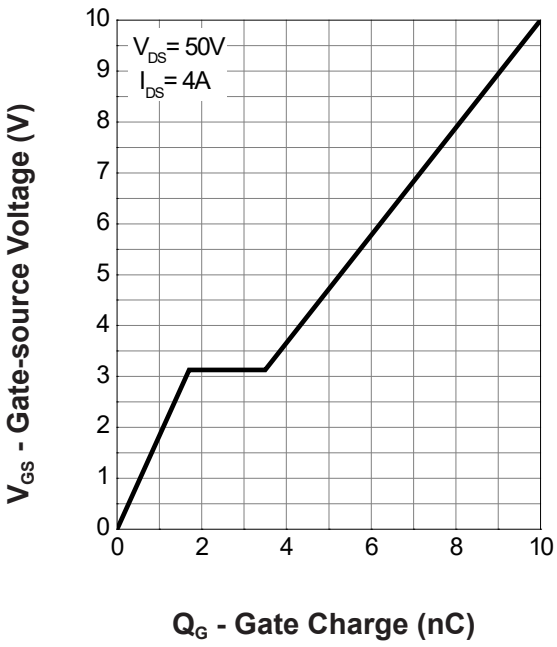


N-Channel Typical Characteristics

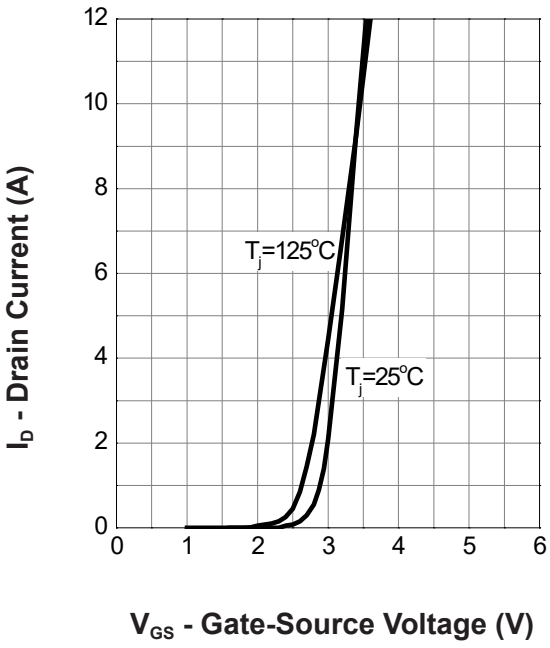
Capacitance



Gate Charge

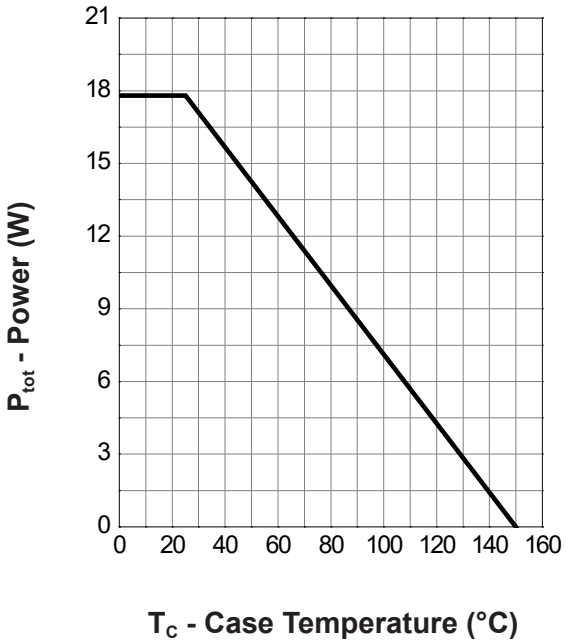


Transfer Characteristics

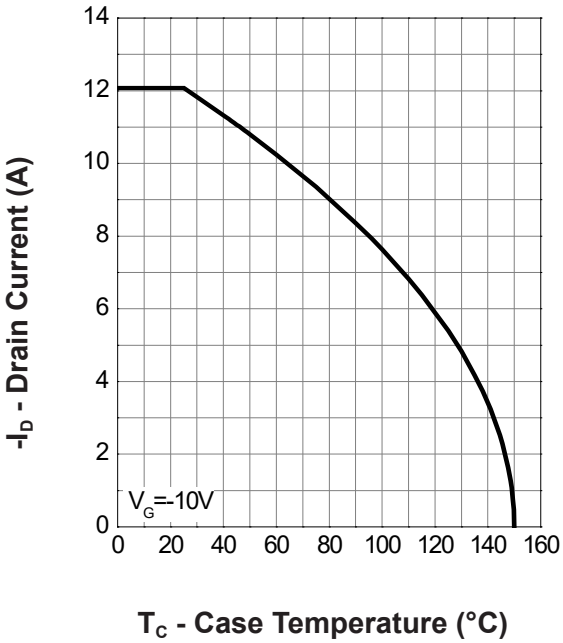


P-Channel Typical Characteristics

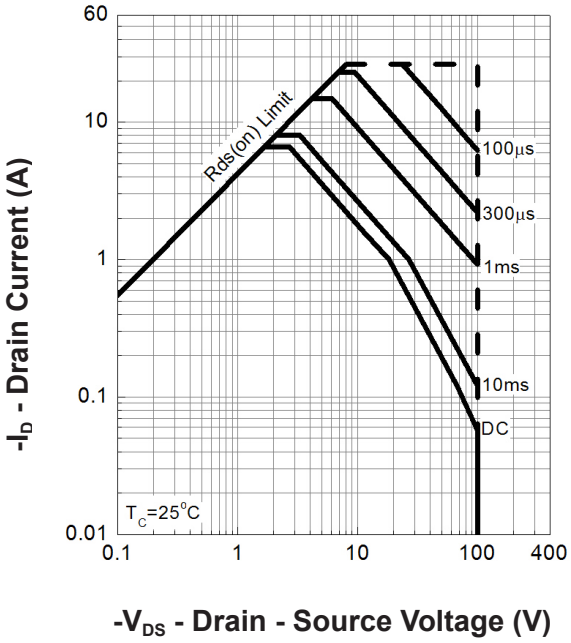
Power Dissipation



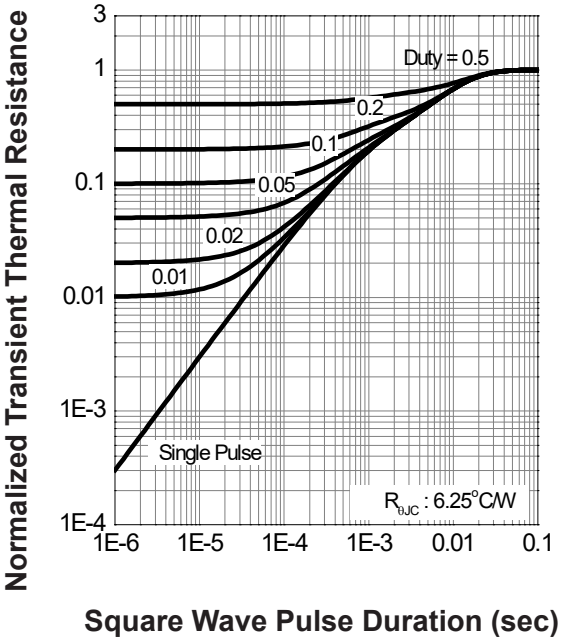
Drain Current



Safe Operation Area

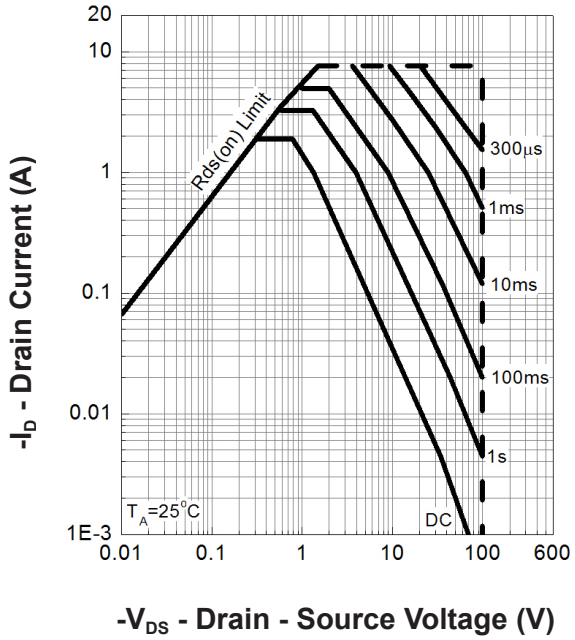


Thermal Transient Impedance

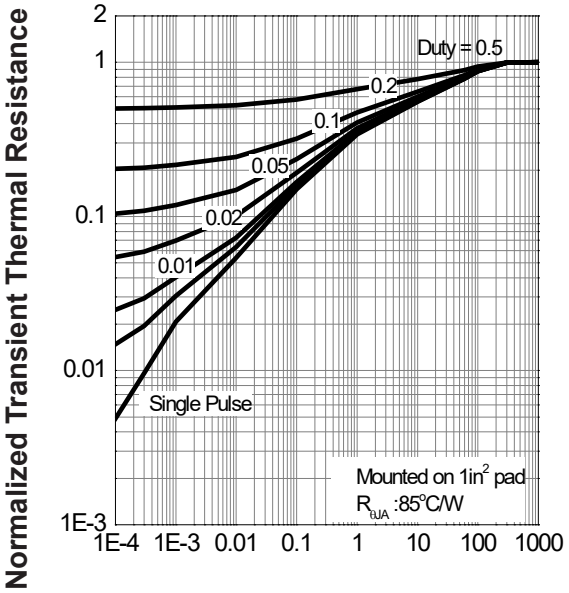


P-Channel Typical Characteristics

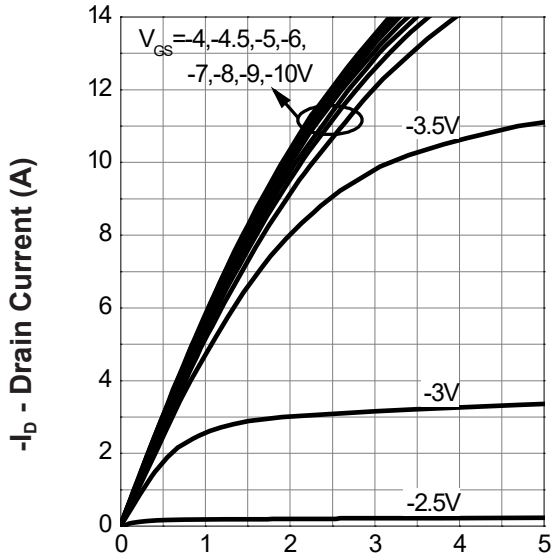
Safe Operation Area



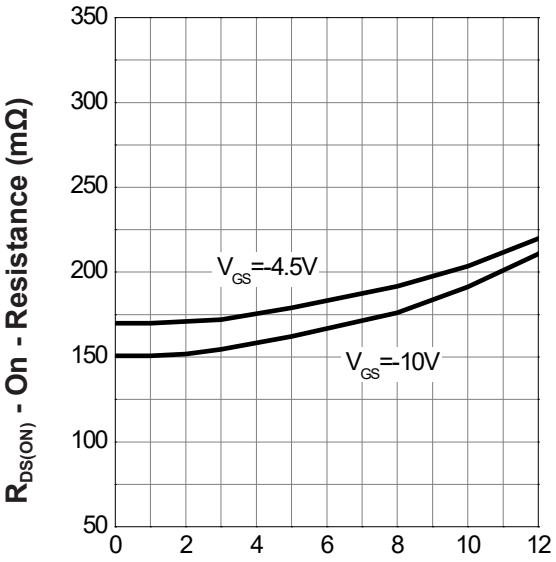
Thermal Transient Impedance



Output Characteristics

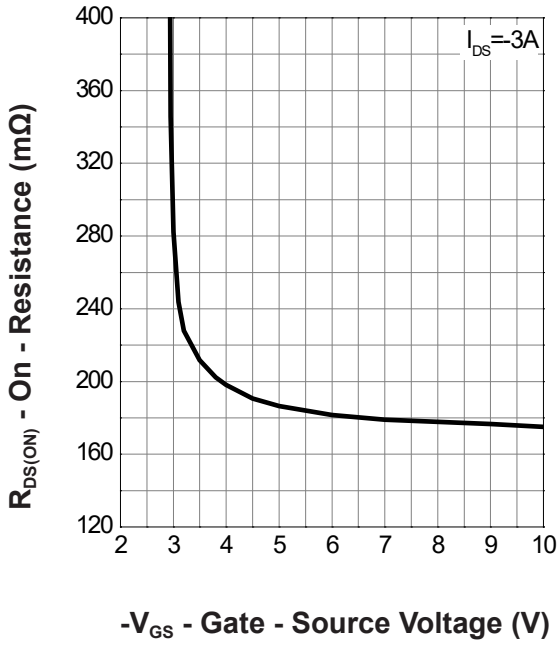


Drain-Source On Resistance

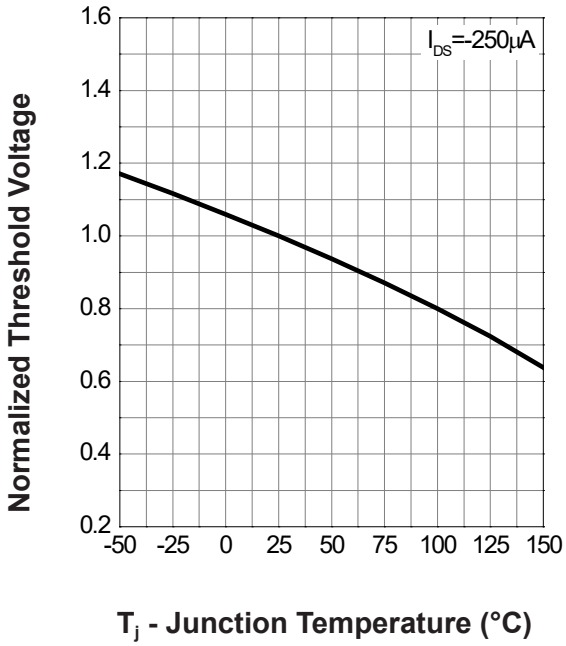


P-Channel Typical Characteristics

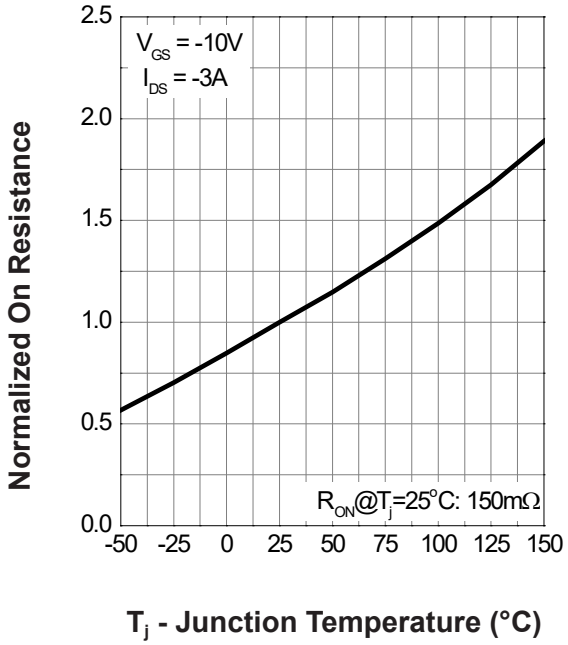
Gate-Source On Resistance



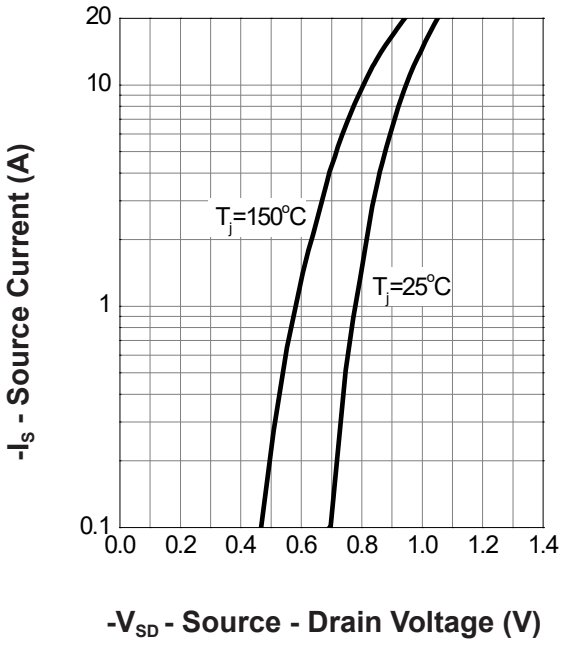
Gate Threshold Voltage



Drain-Source On Resistance

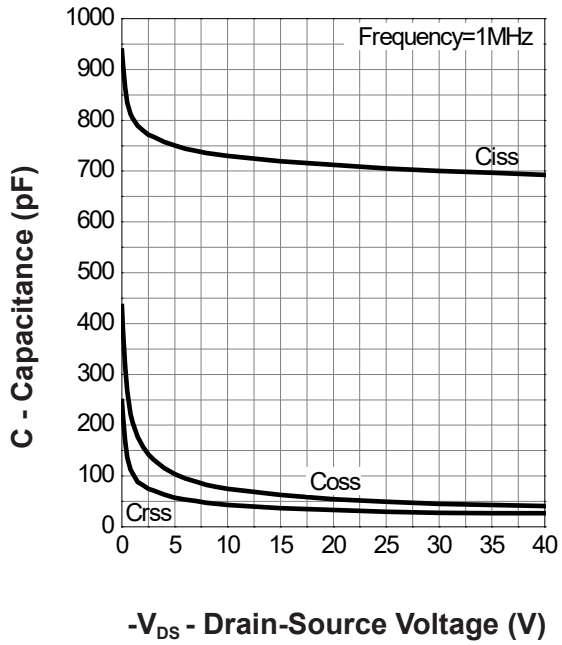


Source-Drain Diode Forward

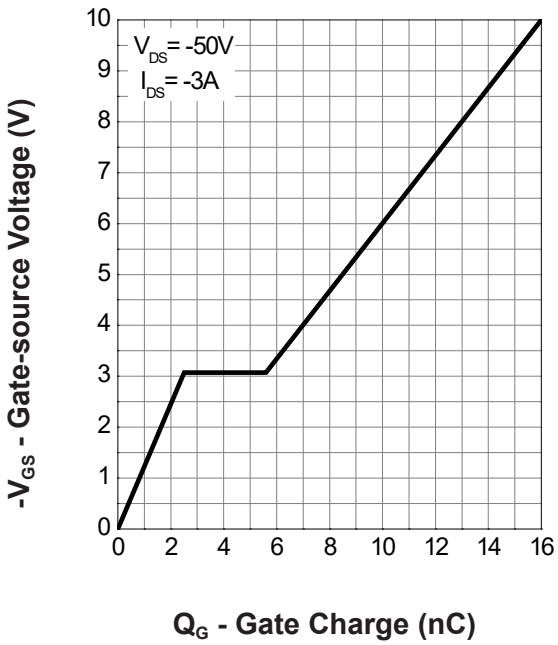


P-Channel Typical Characteristics

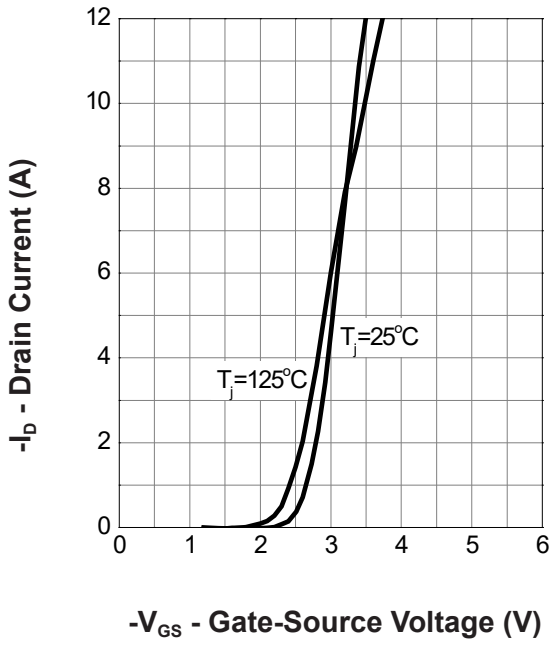
Capacitance



Gate Charge



Transfer Characteristics



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