WSD3067DN56

N-Ch and P-Channel MOSFET

General Description

The WSD3067DN56 is the highest performance trench N-ch and P-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSD3067 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

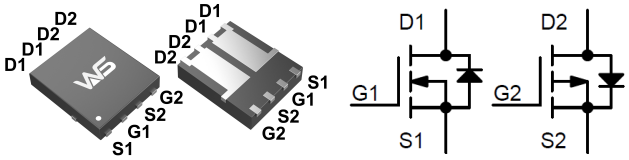
Product Summery

BVDSS	RDSON	ID
30V	15mΩ	24A
-30V	11mΩ	-19.8A

Applications

- Synchronous Rectification.
- Motor Control.
- High Current, High Speed Switching.
- Protable equipment application.

DFN5X6C-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
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} @ 10V	24	-19.8	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	15	-12.6	A
I_{DM}@T_A=25℃	Pulsed Drain Current	36	-30.4	A
EAS[a]	Single Pulse Avalanche Energy (L=0.1mH)	8.5	18	mJ
I_{AS}	Avalanche Current	13	-19	A
P_D@T_C=25℃	Total Power Dissipation	18.9	18.9	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]	---	95	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	45	℃/W

Note a：Pulse width limited by max. junction temperature.
Note b：Surface mounted on 1in^2 pad area.
Note c：UIS tested and pulse width limited by maximum junction temperature 150°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	30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.034	---	V/℃
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=8A	---	15	20	mΩ
		V_{GS}=4.5V , I_D=6A	---	18	23	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.3	1.8	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.64	---	mV/℃
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=55℃	---	---	5	
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	---	3.3	4.2	Ω
Q_g[e]	Total Gate Charge	V_{DS}=20V , V_{GS}=4.5V , I_D=8A	---	8.3	---	nC
Q_{gs}[e]	Gate-Source Charge		---	1.1	---	
Q_{gd}[e]	Gate-Drain Charge		---	1.8	---	
$T_{d(on)}$[e]	Turn-On Delay Time	V_{DD}=12V , V_{GS}=10V , R_G=3.3Ω I_D=6A	---	5.5	---	ns
T_r[e]	Rise Time		---	10.5	---	
$T_{d(off)}$[e]	Turn-Off Delay Time		---	15	---	
T_f[e]	Fall Time		---	3.7	---	
C_{iss}[e]	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	395	---	pF
C_{oss}[e]	Output Capacitance		---	105	---	
C_{rss}[e]	Reverse Transfer Capacitance		---	42	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	3.0	A
V_{SD}[d]	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.0	V
t_{rr}	Reverse Recovery Time	IF=4A , dI/dt=100A/μs , T_J=25℃	---	11	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.5	---	nC

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	-30	---	--	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.022	---	V/℃
$R_{DS(ON)}$[d]	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-6A	---	11	14	mΩ
		V_{GS}=-4.5V , I_D=-4A	---	15	20	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.3	-1.8	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.6	---	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=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g[e]	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	12	---	Ω
Q_g[e]	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-6A	---	8	---	nC
Q_{gs}[e]	Gate-Source Charge		---	2	---	
Q_{gd}[e]	Gate-Drain Charge		---	4	---	
$T_{d(on)}$[e]	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω, I_D=-6A	---	9	---	ns
T_r[e]	Rise Time		---	11	---	
$T_{d(off)}$[e]	Turn-Off Delay Time		---	55	---	
T_f[e]	Fall Time		---	34	---	
C_{iss}[e]	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	750	---	pF
C_{oss}[e]	Output Capacitance		---	140	---	
C_{rss}[e]	Reverse Transfer Capacitance		---	102	---	

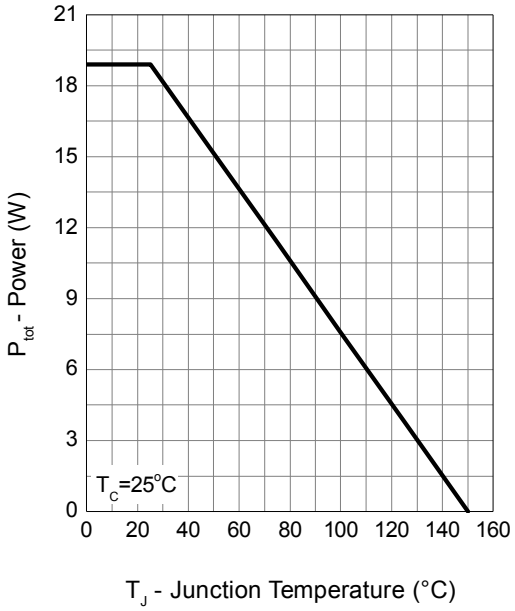
Diode Characteristics[e]

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-6.5	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	IF=-7A , dI/dt=100A/μs , T_J=25℃	---	17	---	nS
Q_{rr}	Reverse Recovery Charge		---	9	---	nC

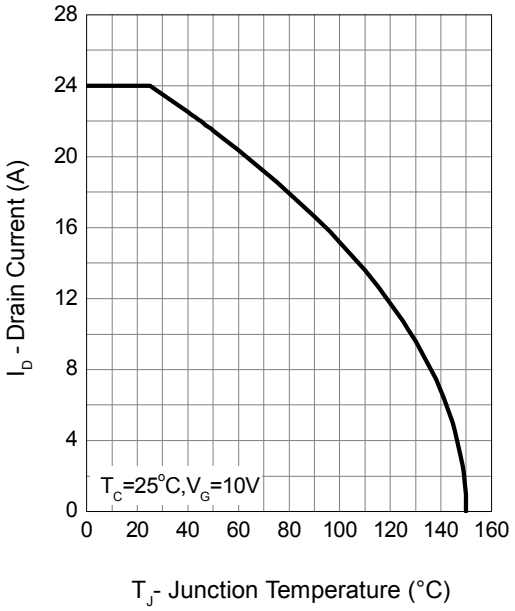
Note d：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

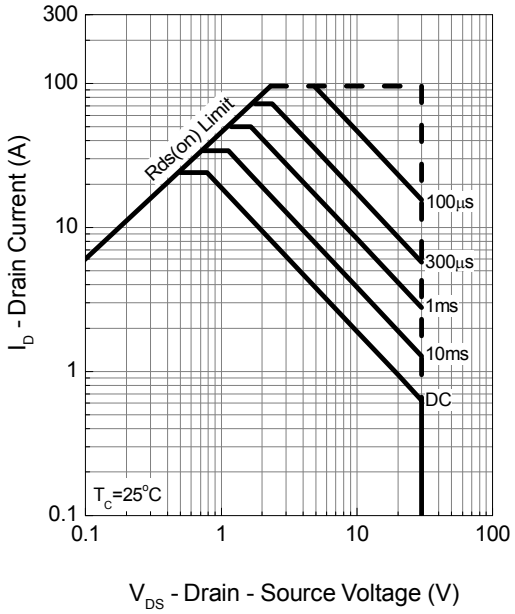
Power Dissipation



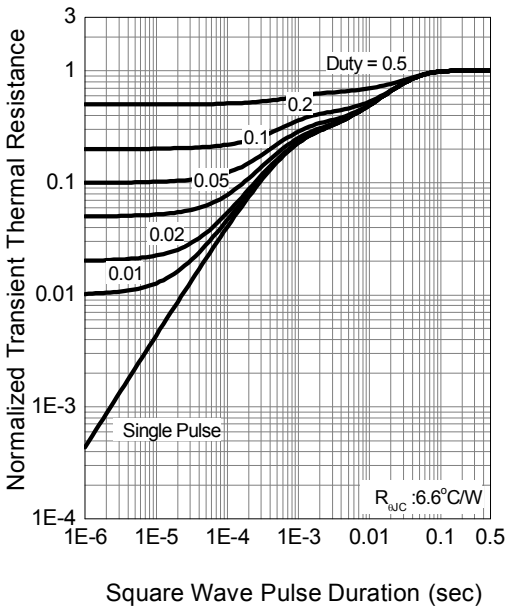
Drain Current



Safe Operation Area

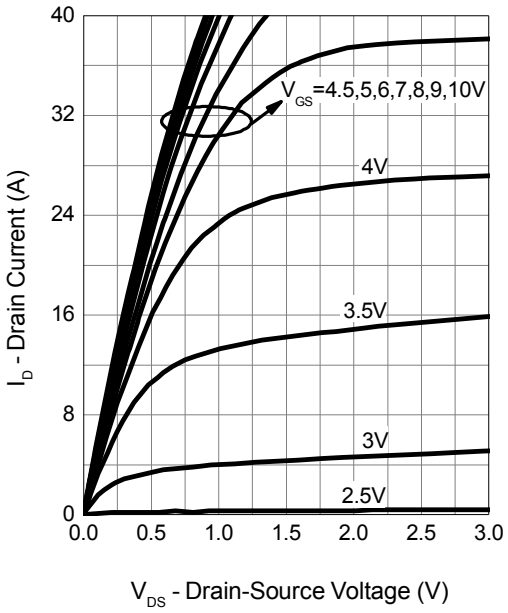


Thermal Transient Impedance

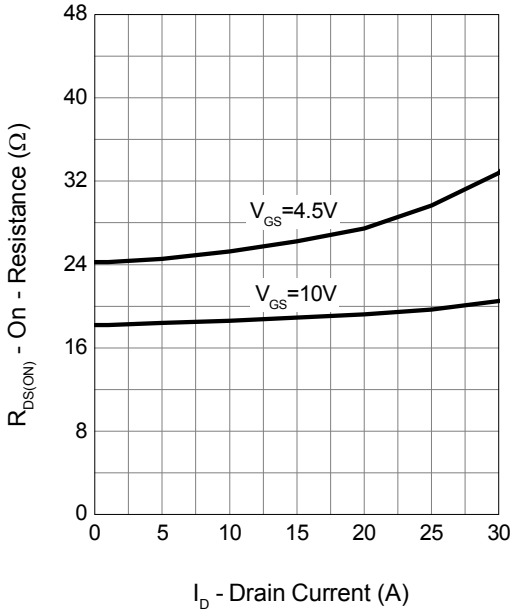


N-Channel Typical Characteristics

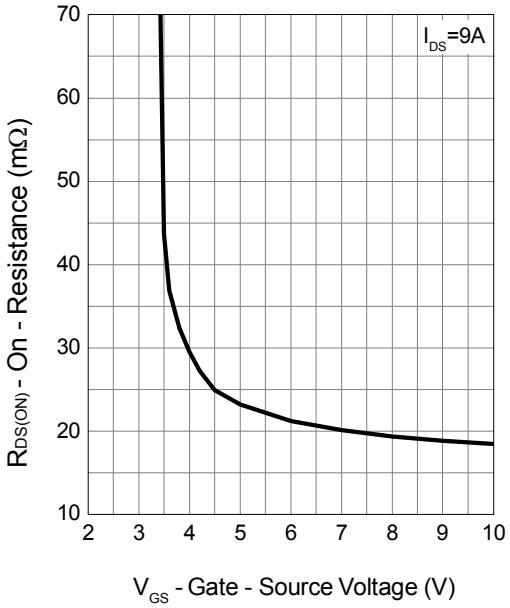
Output Characteristics



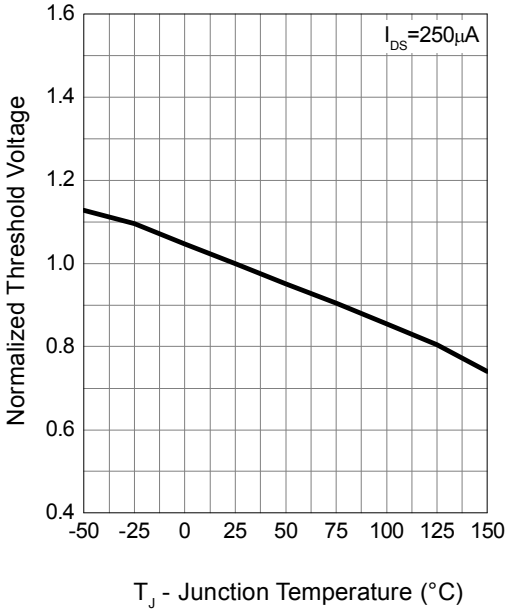
Drain-Source On Resistance



Transfer Characteristics

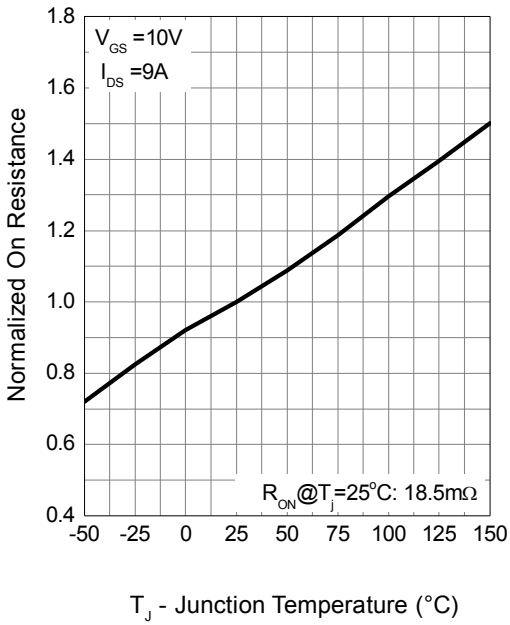


Gate Threshold Voltage



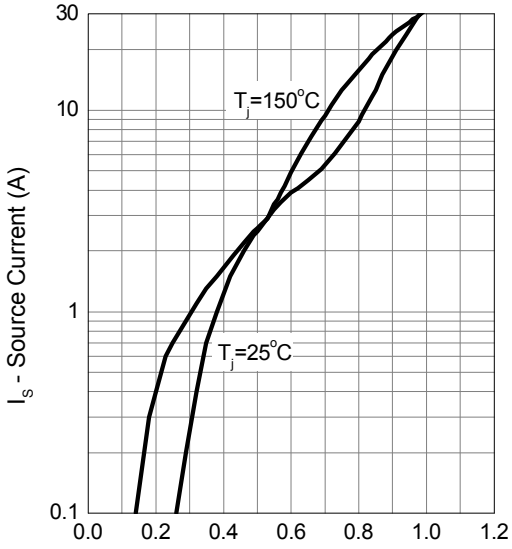
N-Channel Typical Characteristics

Drain-Source On Resistance



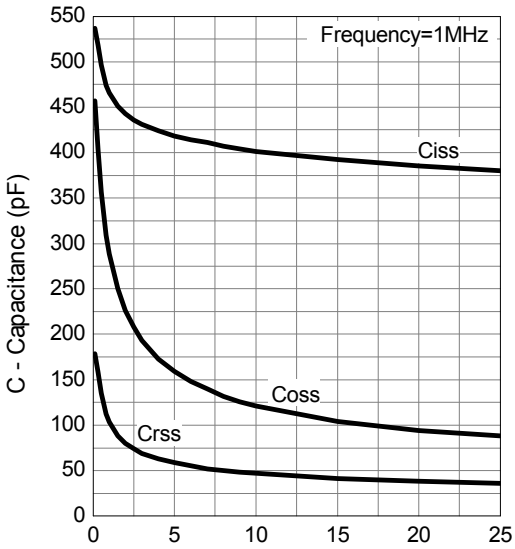
T_J - Junction Temperature (°C)

Source-Drain Diode Forward



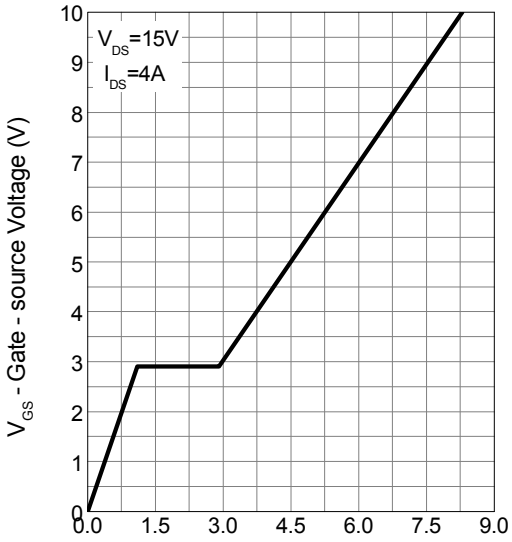
V_{SD} - Source - Drain Voltage (V)

Capacitance



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

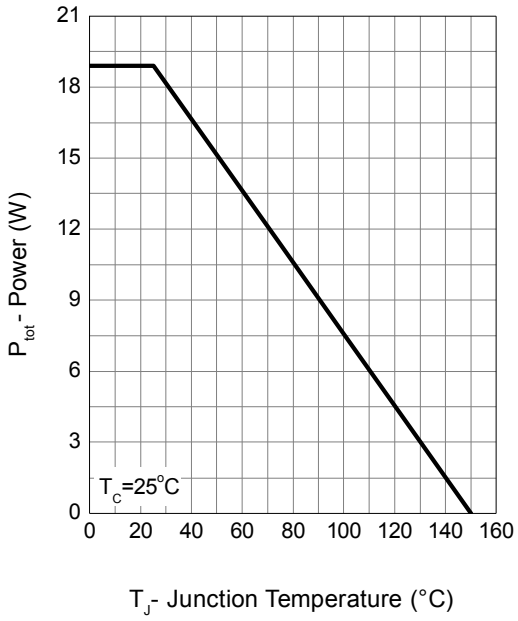
Gate Charge



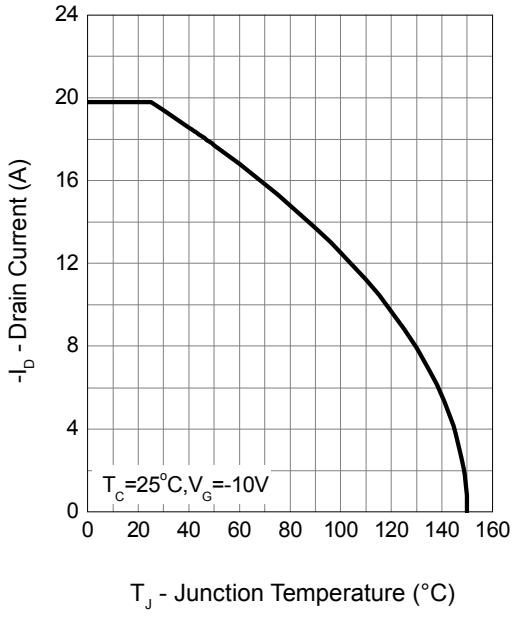
Q_G - Gate Charge (nC)

N-Channel Typical Characteristics

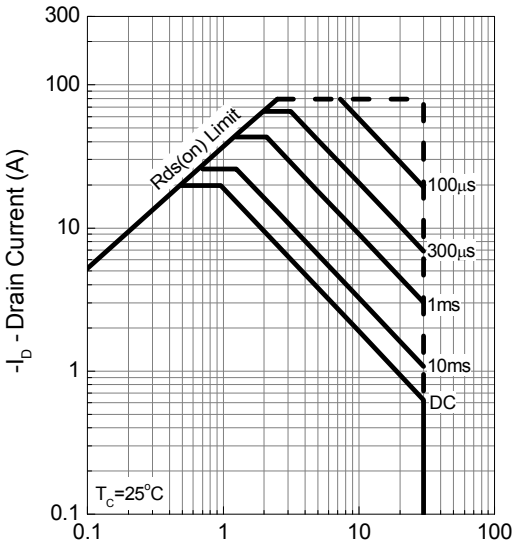
Power Dissipation



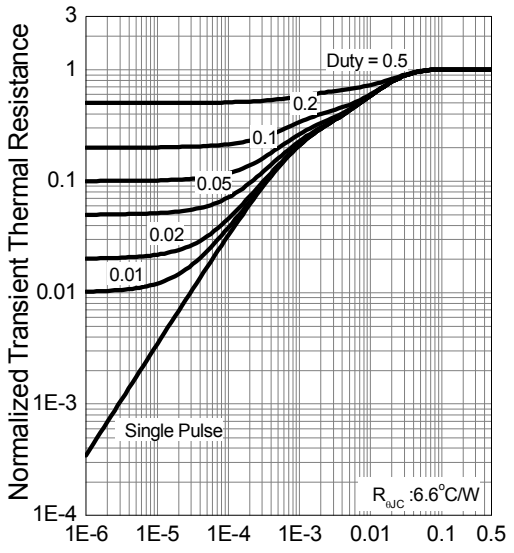
Drain Current



Safe Operation Area

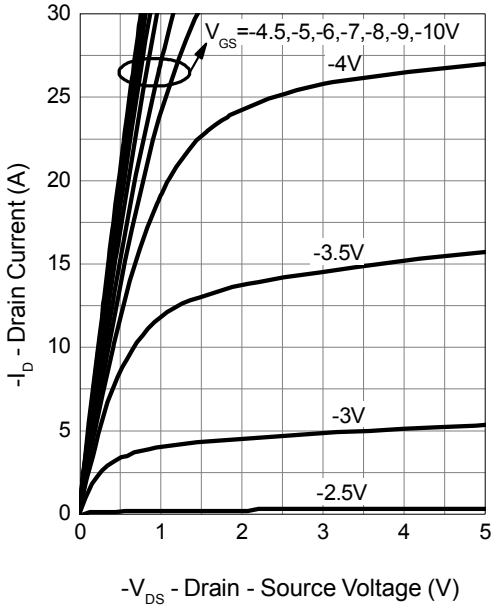


Thermal Transient Impedance

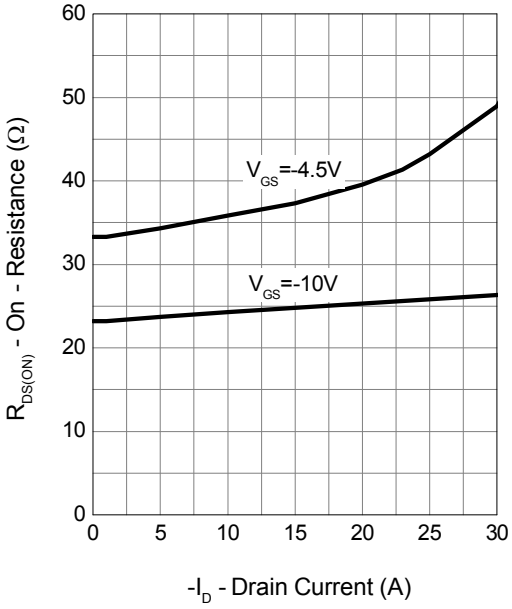


P-Channel Typical Characteristics

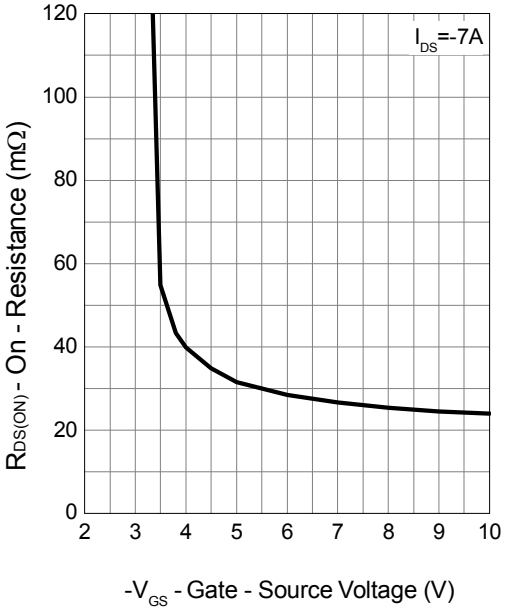
Output Characteristics



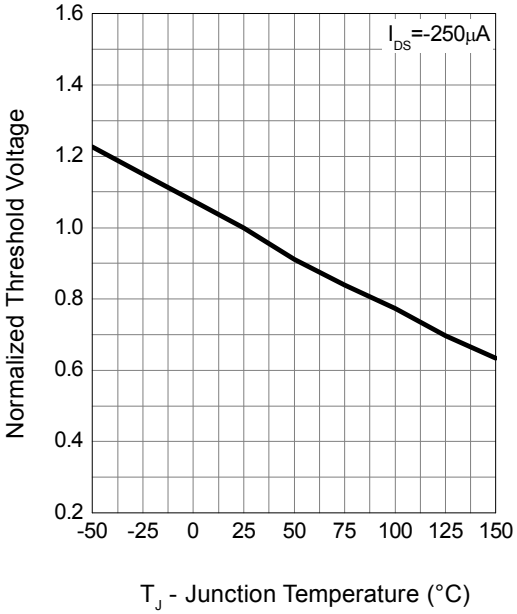
Drain-Source On Resistance



Transfer Characteristics

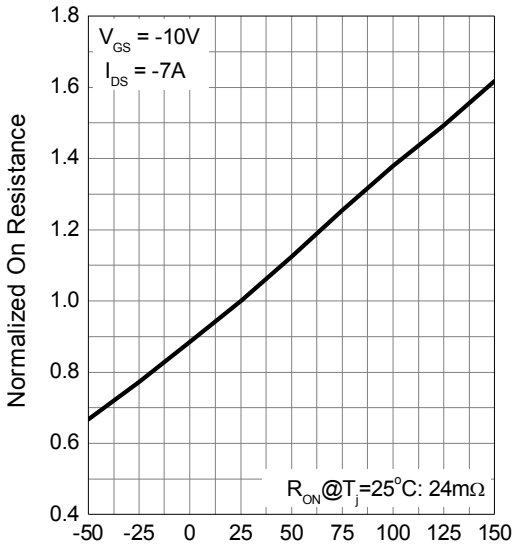


Gate Threshold Voltage



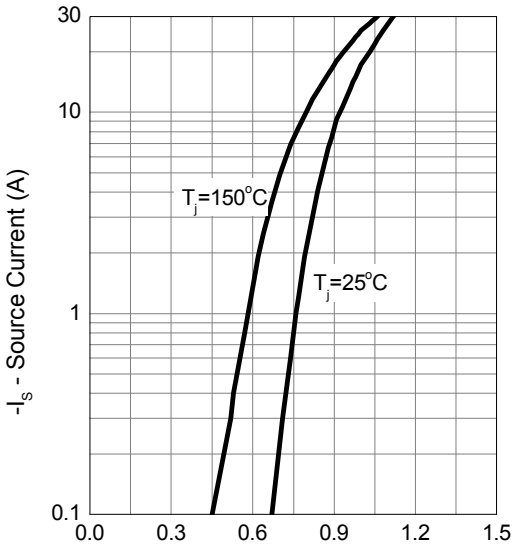
P-Channel Typical Characteristics

Drain-Source On Resistance



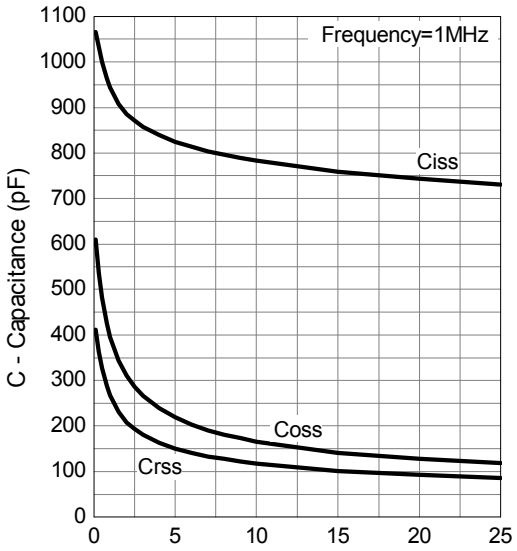
T_J- Junction Temperature (°C)

Source-Drain Diode Forward



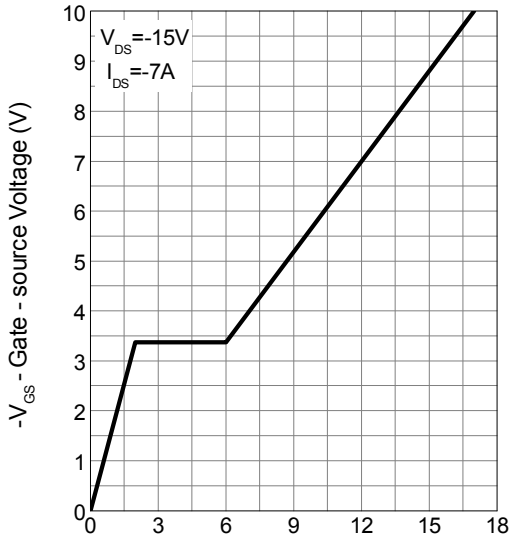
$-V_{SD}$ - Source - Drain Voltage (V)

Capacitance



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

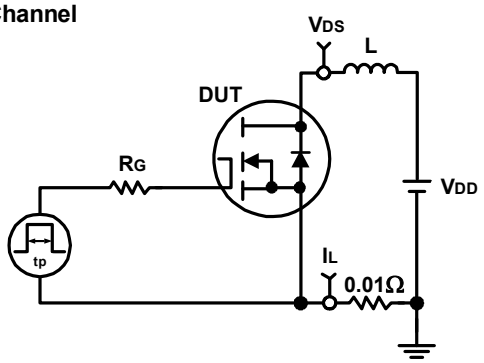
Gate Charge

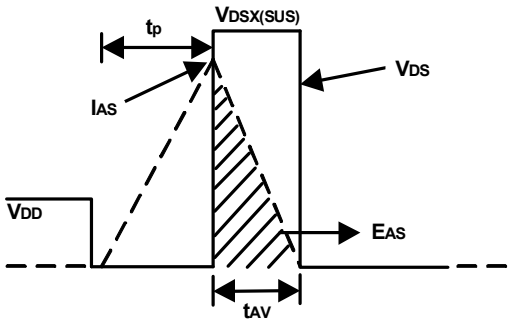


Q_G - Gate Charge (nC)

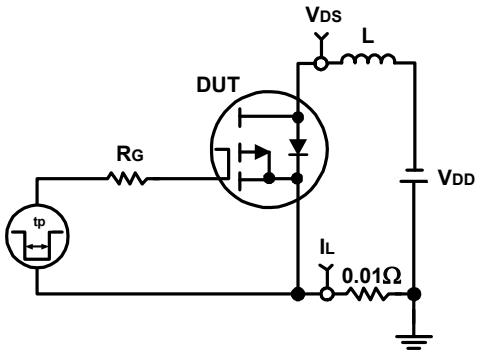
Avalanche Test Circuit and Waveforms

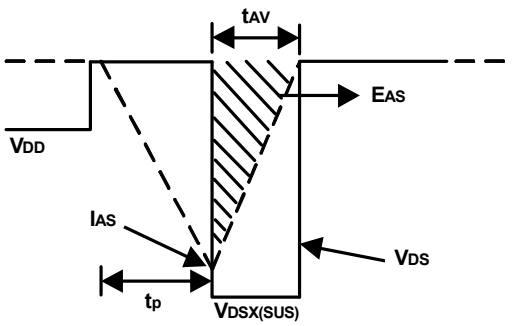
N Channel





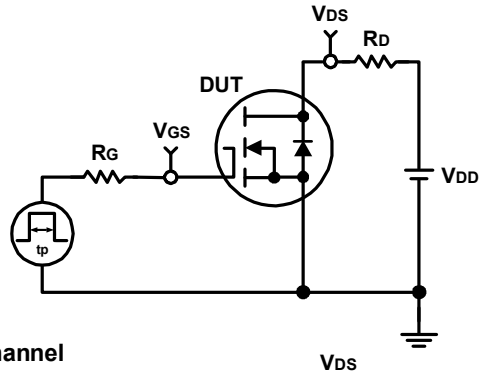
P Channel

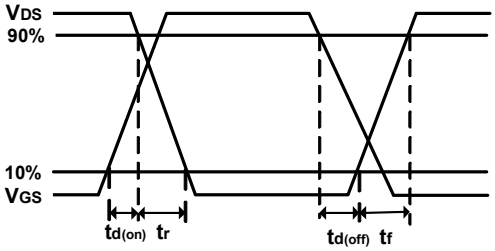




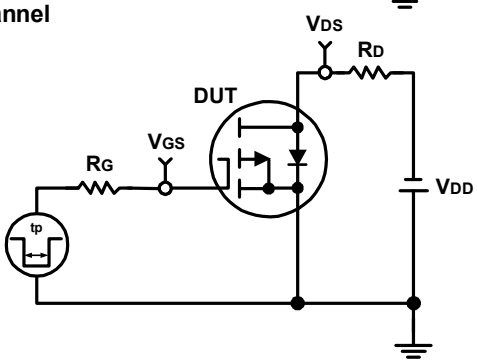
Switching Time Test Circuit and Waveforms

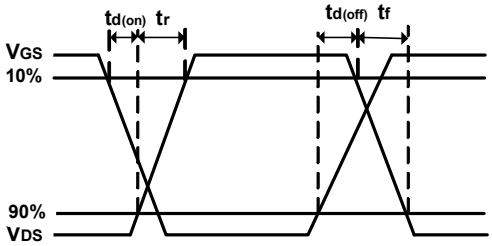
N Channel



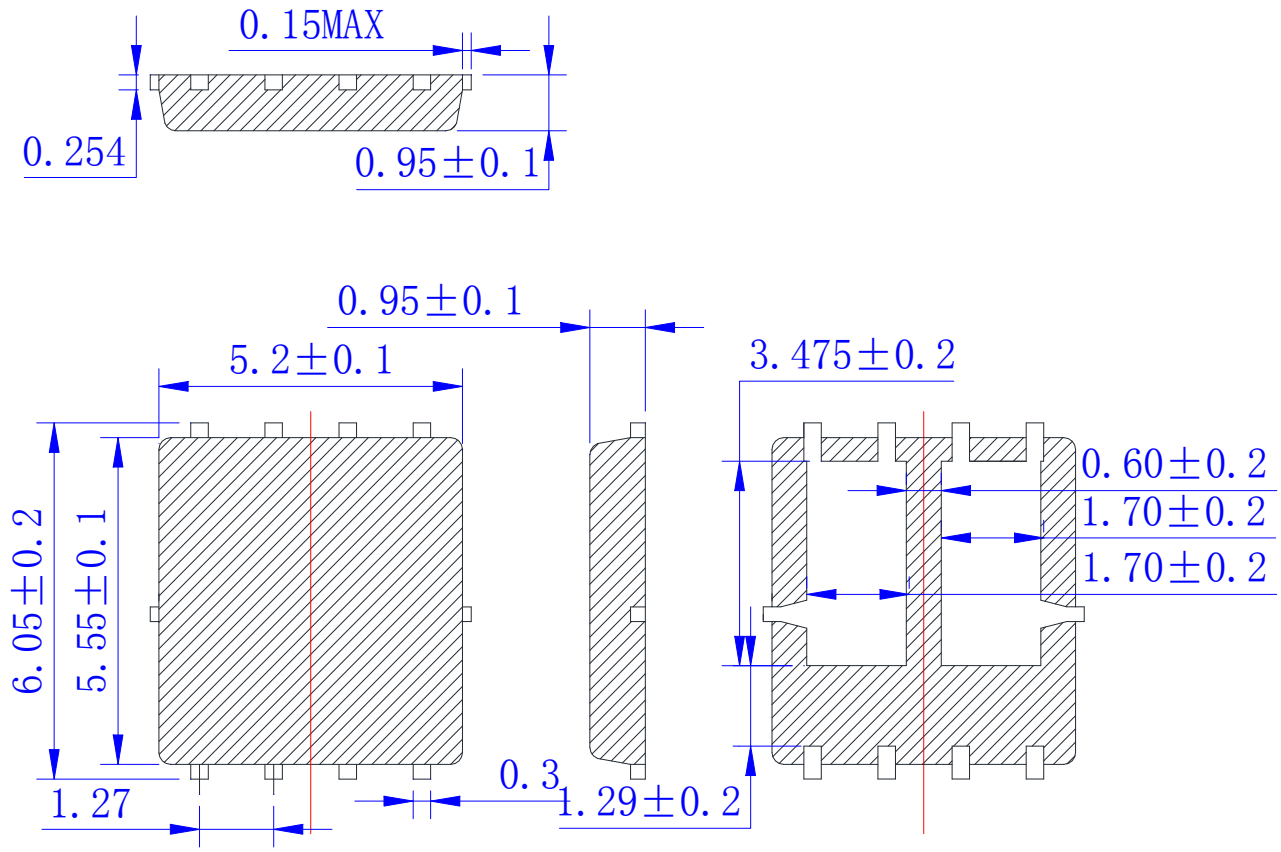


P Channel





DFN5×6C-8 OUTLINE



NAME	DFN5X6C-8 OUTLINE	UNIT	mm	DESIGNED		THIRD ANGLE SYSTEM
DWGNO		PAGE	1 OF 1	CHECKED		
VERSION	Ver.B	ISSUE DATE		APPROVED		

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