Dual Asymmetric N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY				
	V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
Channel 1	40	7.2 at V_{GS} = 10 V	40	28
		11 at V_{GS} = - 4.5 V	25	
Channel 2	40	5.5 at V_{GS} = 10 V	65	13
		8.9 at V_{GS} = 4.5 V	30	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

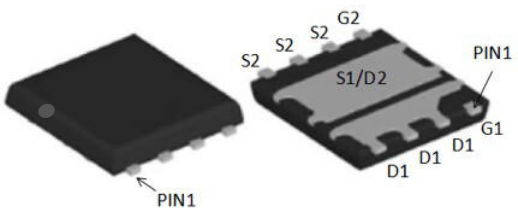
RoHS COMPLIANT

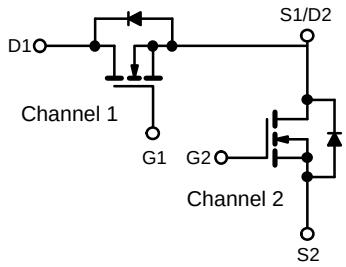
APPLICATIONS

- DC/DC Converters
- On board power for server

DFN5X6 Asymmetric Dual Pin Configuration

Top View Bottom View





Dual N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**Channel 1**	**Channel 2**	**Unit**
Drain-Source Voltage		V_{DS}	40	40	V
Gate-Source Voltage		V_{GS}	± 20	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	40	65	A
	T_C = 70 °C		25	50	
	T_A = 25 °C		12[b, c]	27[b, c]	
	T_A = 70 °C		10[b, c]	20[b, c]	
Pulsed Drain Current (10 µs Pulse Width)		I_{DM}	160	240	
Source-Drain Current Diode Current	T_C = 25 °C	I_S	40	65	
	T_A = 25 °C		12[b, c]	19[b, c]	
Pulsed Source-Drain Current		I_{SM}	160	240	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	39	63	
Single Pulse Avalanche Energy		E_{AS}	50	156	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	35	50	W
	T_C = 70 °C		13	22	
	T_A = 25 °C		2.1[b, c]	3.5[b,c]	
	T_A = 70 °C		1.28[b, c]	1.89[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS							
Parameter		**Symbol**	**Channel 1**		**Channel 2**		**Unit**
			Typ.	**Max.**	**Typ.**	**Max.**	
Maximum Junction-to-Ambient[b]	t ≤ 10 s	R_{thJA}	30	50	25	40	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	3.0	4.0	2	2.5	

Notes:
a. Based on T_C = 25 °C.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 10 s.

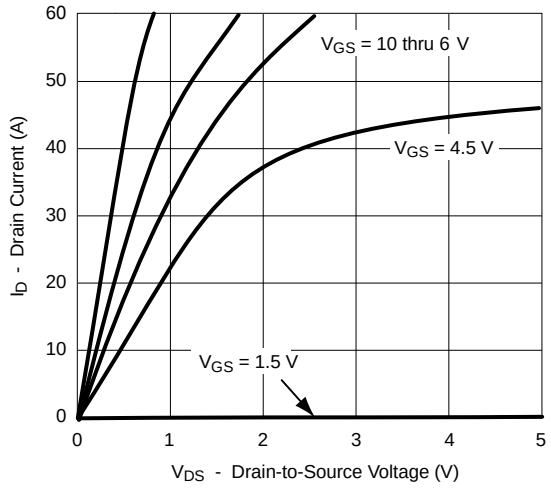
SPECIFICATIONS T_J = 25 °C, unless otherwise noted							
Parameter	**Symbol**	**Test Conditions**		**Min.**	**Typ.[a]**	**Max.**	**Unit**
Static							
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	Ch1	40			V
		V_{GS} = 0 V, I_D = 250 µA	Ch2	40			
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA	Ch1		40		mV/°C
		I_D = 250 µA	Ch2		40		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I_D = 250 µA	Ch1		- 4.5		
		I_D = 250 µA	Ch2		- 4.5		
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	Ch1	1		3	V
		V_{DS} = V_{GS}, I_D = 250 µA	Ch2	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	Ch1			± 100	nA
		V_{DS} = 0 V, V_{GS} = ± 20 V	Ch2			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V	Ch1			1	µA
		V_{DS} = 40 V, V_{GS} = 0 V	Ch2			1	
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 55 °C	Ch1			10	
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 55 °C	Ch2			10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	Ch1	40			A
		V_{DS} = 5 V, V_{GS} = 10 V	Ch2	65			
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A	Ch1		7.2	8.8	mΩ
		V_{GS} = 10 V, I_D = 30 A	Ch2		5.5	6.5	
		V_{GS} = 4.5 V, I_D = 15 A	Ch1		11	13.5	
		V_{GS} = 4.5 V, I_D = 30 A	Ch2		8.9	10.5	
Forward Transconductance[b]	g_{fs}	V_{DS} = 5 V, I_D = 20 A	Ch1		50		S
		V_{DS} = 5 V, I_D = 30 A	Ch2		65		
Dynamic[a]							
Input Capacitance	C_{iss}	V_{DS} = 20 V, V_{GS} = 0 V, f = 1 MHz	Ch1		728		pF
			Ch2		1550		
Output Capacitance	C_{oss}		Ch1		120		
			Ch2		240		
Reverse Transfer Capacitance	C_{rss}		Ch1		48		
			Ch2		102		
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 20 A	Ch1		28		nC
			Ch2		13		
Gate-Source Charge	Q_{gs}		Ch1		2.6		
			Ch2		5.6		
Gate-Drain Charge	Q_{gd}		Ch1		2.6		
			Ch2		9.8		
Gate Resistance	R_g	f = 1 MHz	Ch1		1.5		Ω
			Ch2		3.4		

SPECIFICATIONS T_J = 25 °C, unless otherwise noted							
Parameter	**Symbol**	**Test Conditions**		**Min.**	**Typ.[a]**	**Max.**	**Unit**
Dynamic[a]							
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20 V, R_L = 2 Ω $I_D \cong$ 20 A, V_{GEN} = 10 V, R_g = 1 Ω	Ch1		7		ns
			Ch2		9		
Rise Time	t_r		Ch1		10		
			Ch2		19		
Turn-Off Delay Time	$t_{d(off)}$		Ch1		18		
			Ch2		50		
Fall Time	t_f		Ch1		9		
			Ch2		14		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	Ch1			40	A
			Ch2			65	
Pulse Diode Forward Current[a]	I_{SM}		Ch1			160	
			Ch2			240	
Body Diode Voltage	V_{SD}	I_S = 1 A	Ch1		0.65	1	V
			Ch2		0.65	1	
Body Diode Reverse Recovery Time	t_{rr}	N-Channel I_F = 20 A, dI/dt = 100 A/µs, T_J = 25 °C	Ch1		17		ns
			Ch2		30		
Body Diode Reverse Recovery Charge	Q_{rr}		Ch1		10		nC
			Ch2		26		
Reverse Recovery Fall Time	t_a		Ch1		10		ns
			Ch2		15		
Reverse Recovery Rise Time	t_b		Ch1		7		
			Ch2		15		

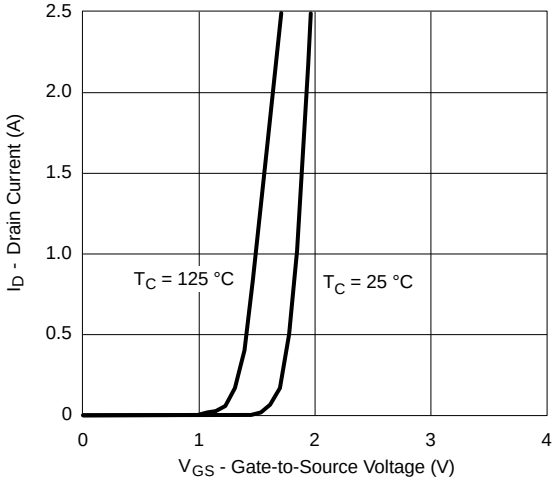
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

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.

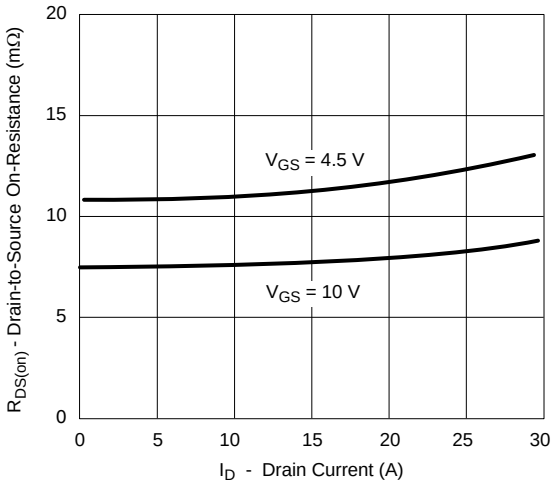
CHANNEL 1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



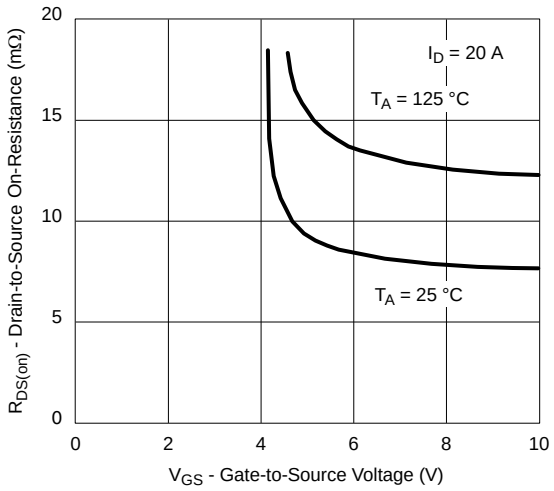
Output Characteristics



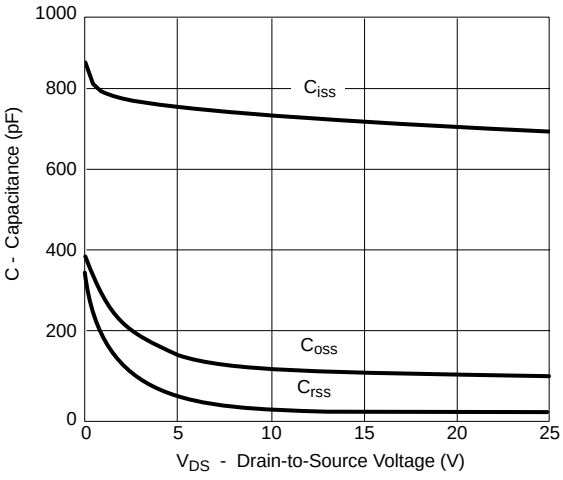
Transfer Characteristics



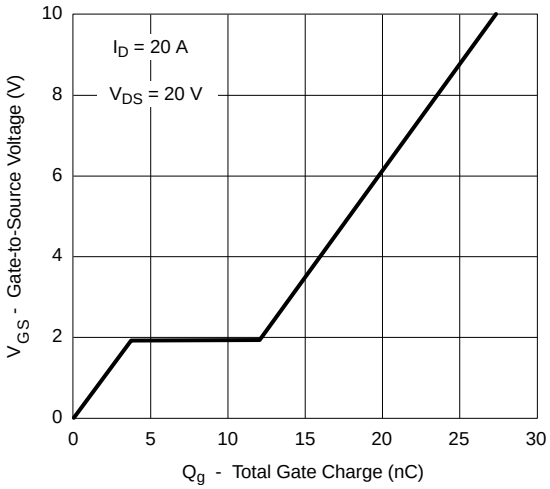
$R_{DS(on)}$ vs. Drain Current



$R_{DS(on)}$ vs. V_{GS} vs. Temperature

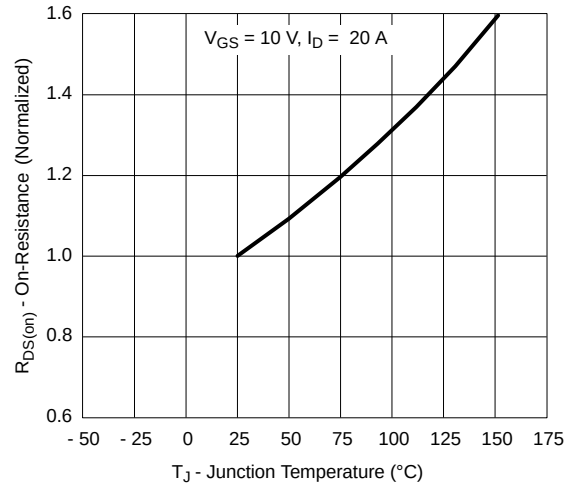


Capacitance

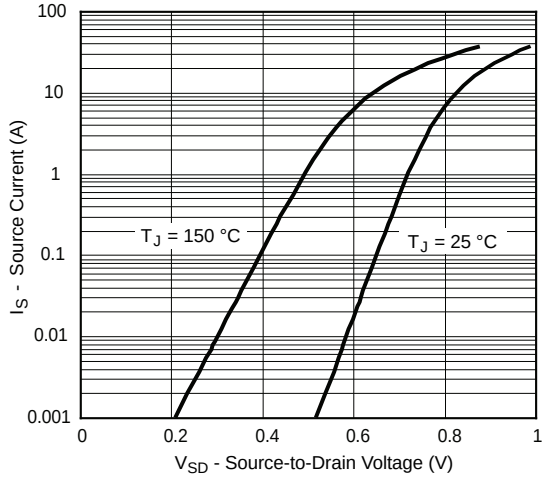


Gate Charge

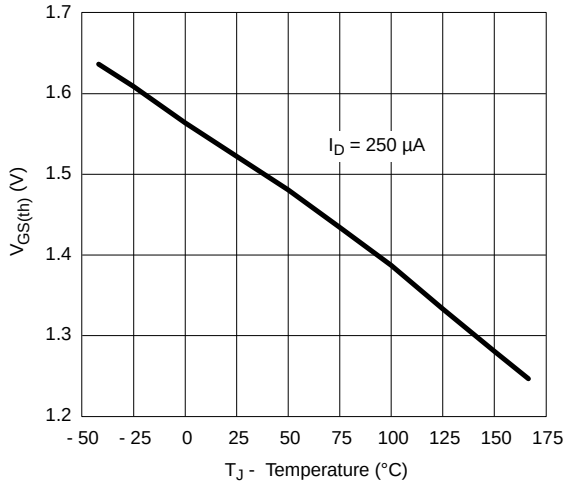
CHANNEL 1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



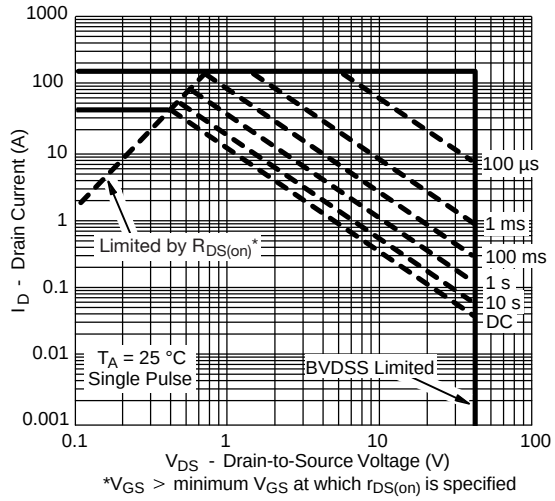
On-Resistance vs. Junction Temperature



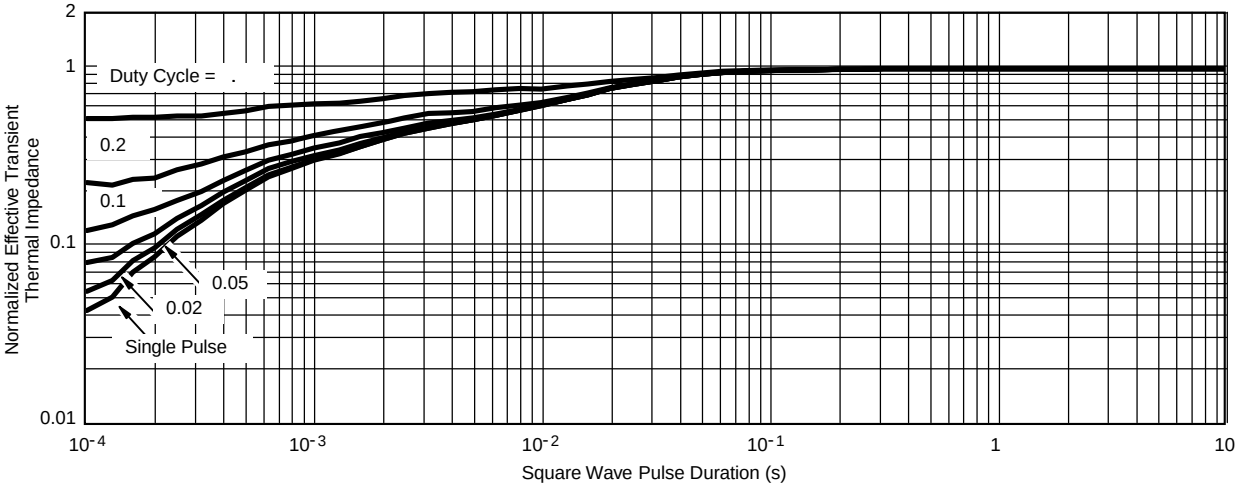
Forward Diode Voltage vs. Temperature



Threshold Voltage

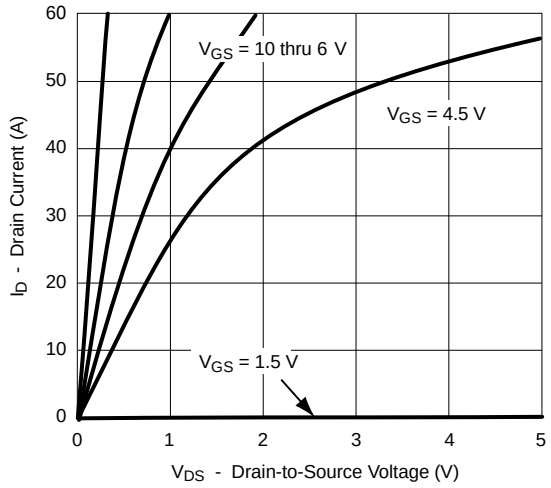


Safe Operating Area, Junction-to-Ambient

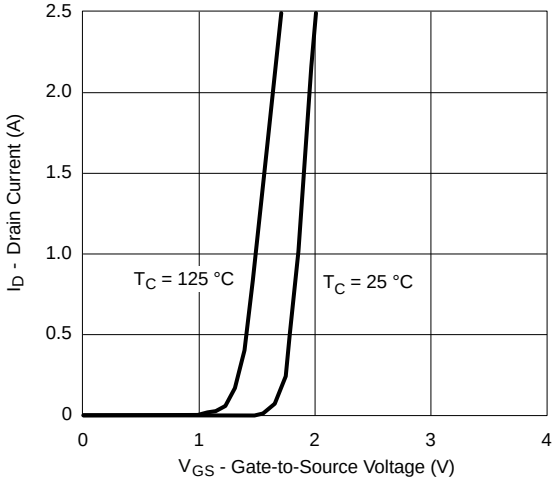


Normalized Thermal Transient Impedance, Junction-to-Case

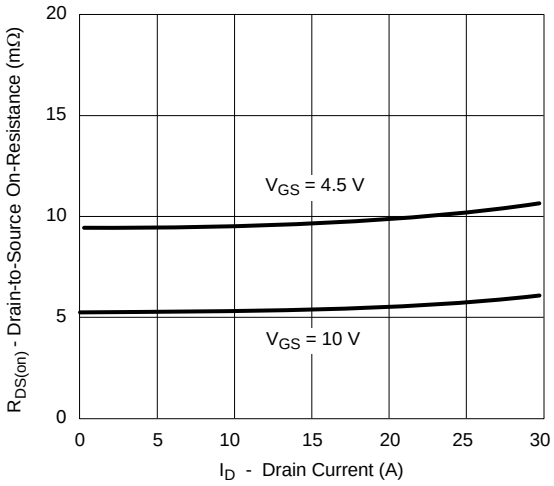
CHANNEL 2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



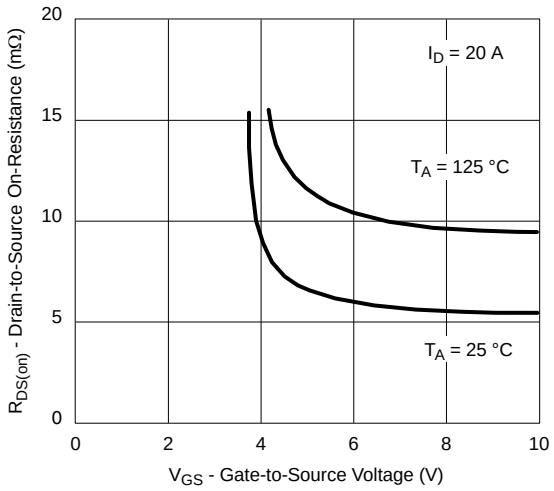
Output Characteristics



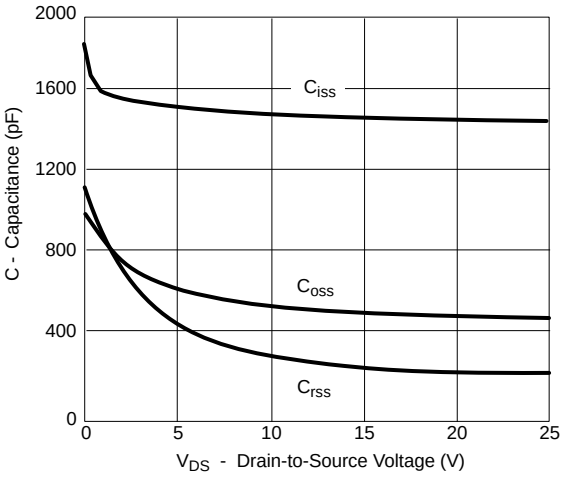
Transfer Characteristics



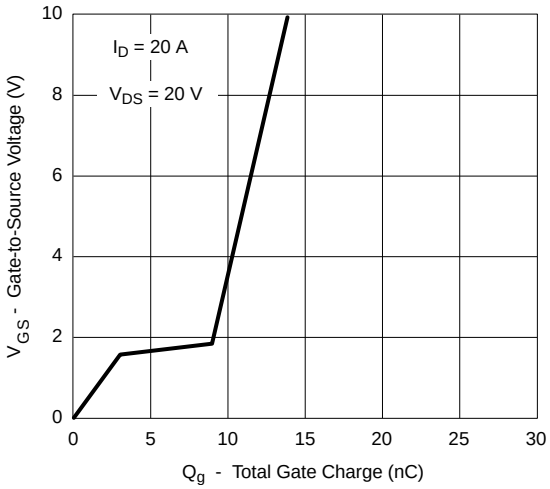
$R_{DS(on)}$ vs. Drain Current



$R_{DS(on)}$ vs. V_{GS} vs. Temperature

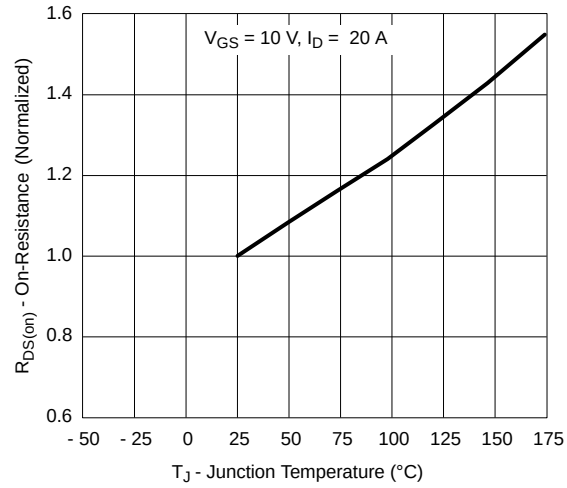


Capacitance

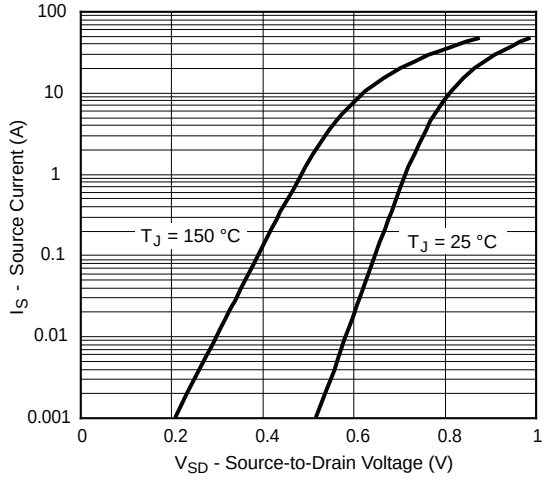


Gate Charge

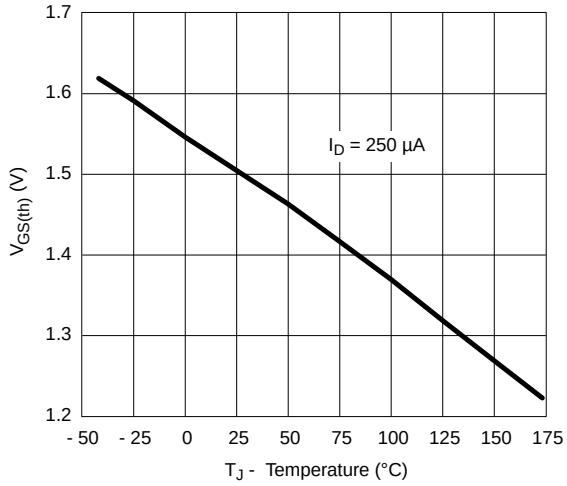
CHANNEL 2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



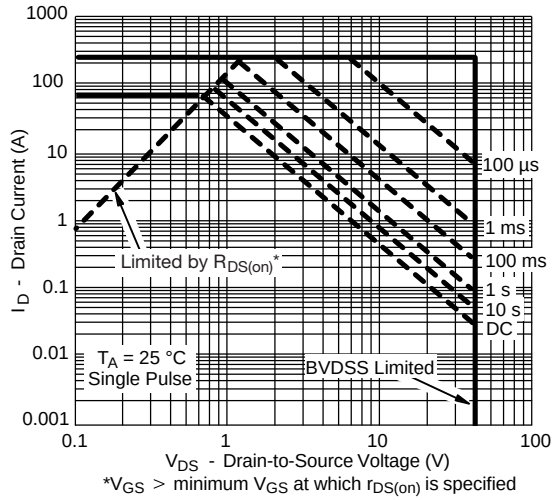
On-Resistance vs. Junction Temperature



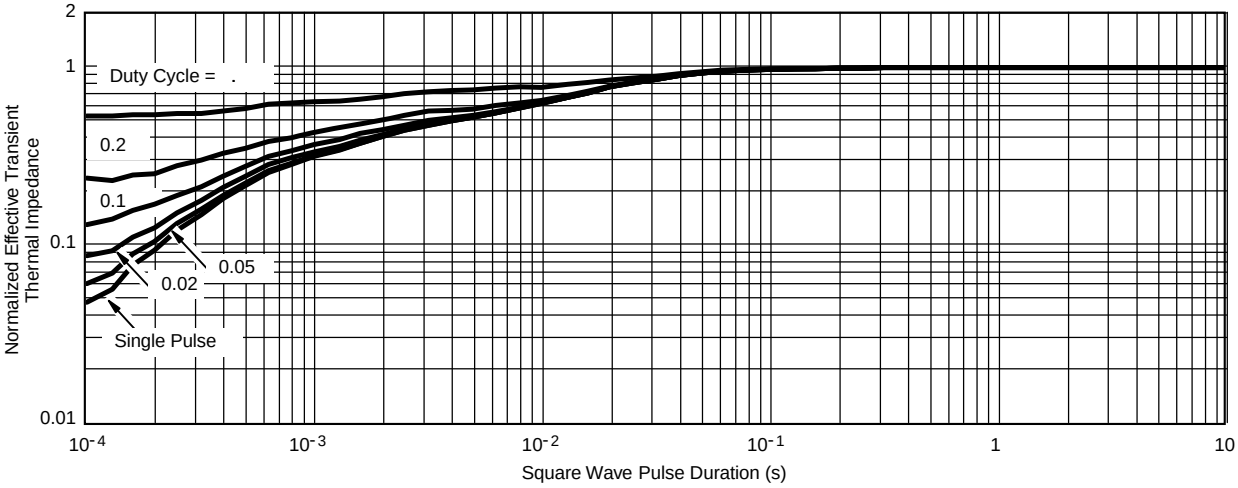
Forward Diode Voltage vs. Temperature



Threshold Voltage



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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