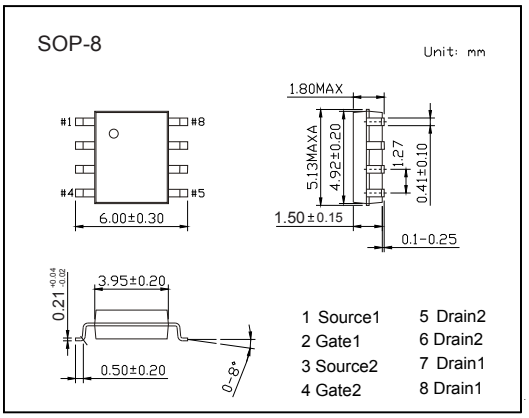
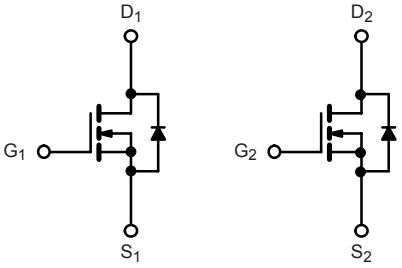
Dual N-Channel MOSFET

SI4946DY-HF (KI4946DY-HF)



■ Features

- $V_{DS\ (V)}$ = 60V
- I_D = 6.5 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 41mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 52mΩ (V_{GS} = 4.5V)
- 175 °C Maximum Junction Temperature
- Pb−Free Package May be Available. The G−Suffix Denotes a Pb−Free Lead Finish



■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	Tc=25℃	I_D	6.5	A
	Tc=70℃		5.5	
	Ta=25℃		5.3	
	Ta=70℃		4.4	
Pulsed Drain Current		I_{DM}	30	
Avalanche Current	L = 0.1mH	I_{AS}	12	
Single-Pulse Avalanche Energy		E_{AS}	7.2	mJ
Power Dissipation	Tc=25℃	P_D	3.7	W
	Tc=70℃		2.6	
	Ta=25℃		2.4	
	Ta=70℃		1.7	
Thermal Resistance.Junction- to-Ambient	t ≤ 10 s	R_{thJA}	62.5	℃/W
Thermal Resistance.Junction- to-Case	Steady State	R_{thJC}	41	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	uA
		V_{DS}=60V, V_{GS}=0V, T_J=55℃			10	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	1		3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=5.3A (Note.1)			41	mΩ
		V_{GS}=4.5V, I_D=4.7A (Note.1)			52	
On State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V (Note.1)	30			A
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=5.3A (Note.1)		24		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=30V, f=1MHz		840		pF
Output Capacitance	C_{oss}			71		
Reverse Transfer Capacitance	C_{rss}			44		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	3.1		9.5	Ω
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 5.3 A		17	25	nC
		V_{DS}=30V, V_{GS}=5V, I_D=5.3A		9.2	12	
Gate Source Charge	Q_{gs}			3.3		
Gate Drain Charge	Q_{gd}			3.7		
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 30 V, R_L = 6.8 Ω I_D ≅ 4.4 A, V_{GEN} = 4.5 V, Rg = 1 Ω			30	ns
Turn-On Rise Time	t_r				180	
Turn-Off DelayTime	$t_{d(off)}$				30	
Turn-Off Fall Time	t_f				45	
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 30 V, R_L = 6.8 Ω I_D ≅ 4.4 A, V_{GEN} = 10 V, Rg = 1 Ω			15	
Turn-On Rise Time	t_r				20	
Turn-Off DelayTime	$t_{d(off)}$				40	
Turn-Off Fall Time	t_f				15	
Body Diode Reverse Recovery Time	t_{rr}	I_F= 4.4 A, dI/dt= 100A/μs,T_J = 25℃			50	
Body Diode Reverse Recovery Charge	Q_{rr}				50	nC
Reverse Recovery Fall Time	t_a			18		ns
Reverse Recovery Rise Time	t_b			7		
Maximum Body-Diode Continuous Current	I_S	Tc = 25 °C			3.1	A
Pulse Diode Forward Curren	I_{SM}	(Note.1)			30	
Diode Forward Voltage	V_{SD}	I_S=2A,V_{GS}=0V (Note.1)			1.2	V

Note.1: Pulse test; pulse width ≤ 300 us, duty cycle ≤ 2 %.

■ Marking

Marking	4946 KA**** F

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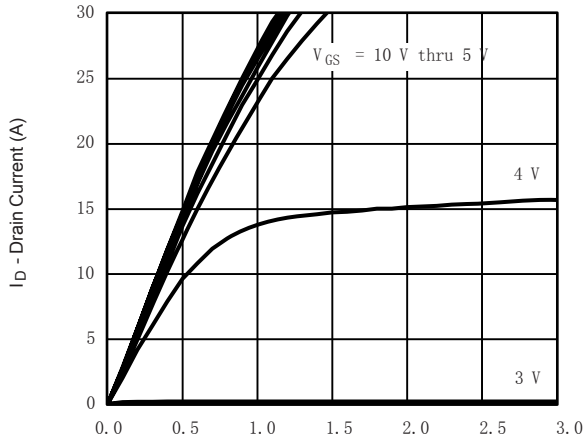
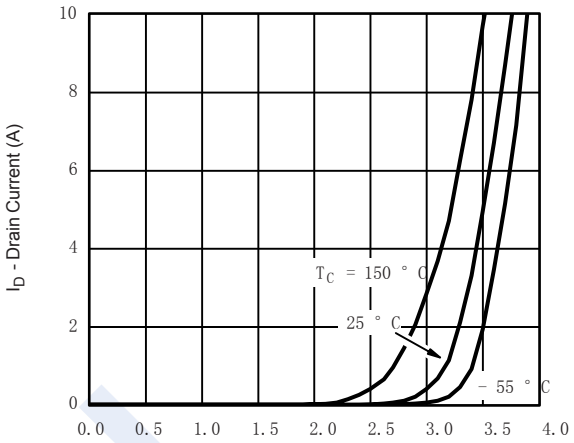
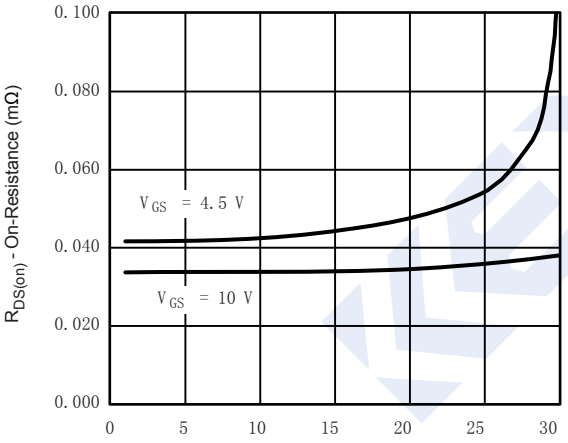
■ Typical Characterisitics



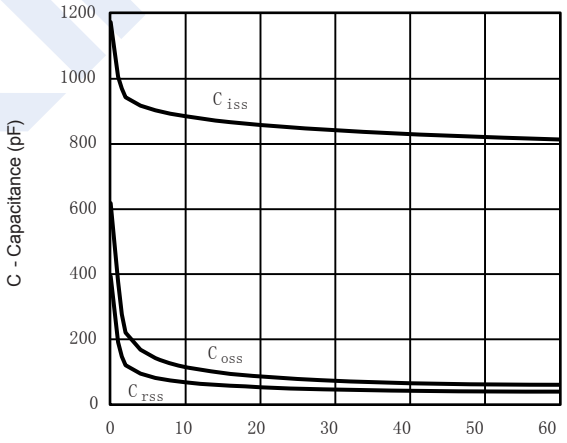
Output Characteristics



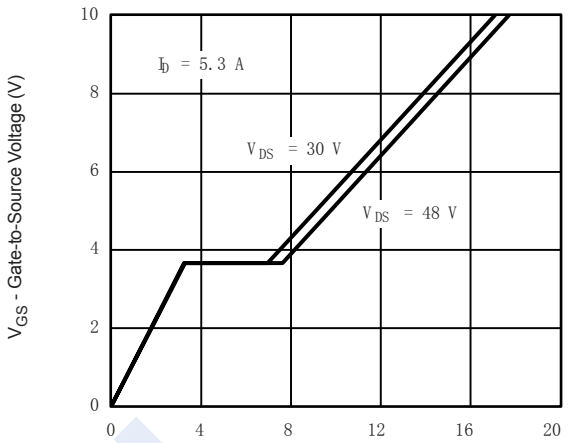
Transfer Characteristics



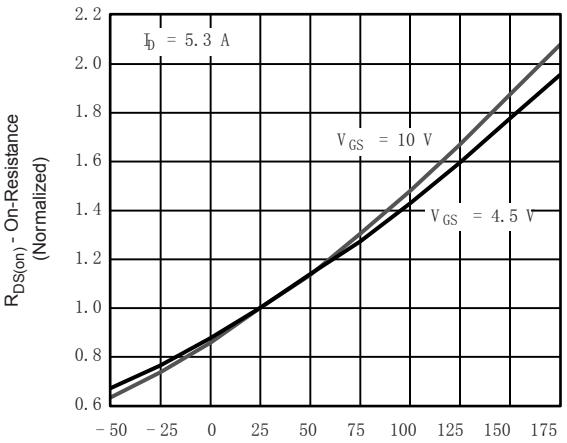
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

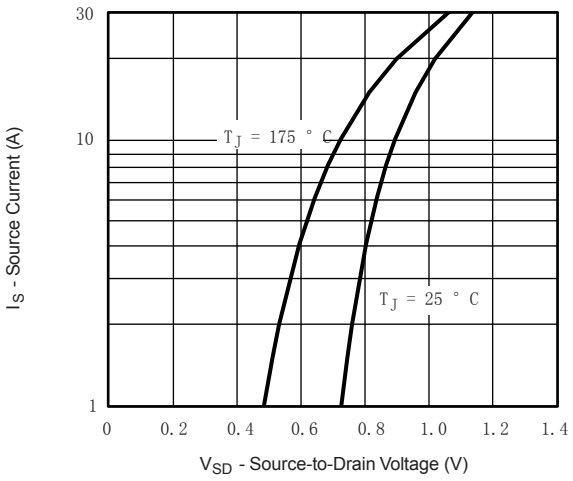


On-Resistance vs. Junction Temperature

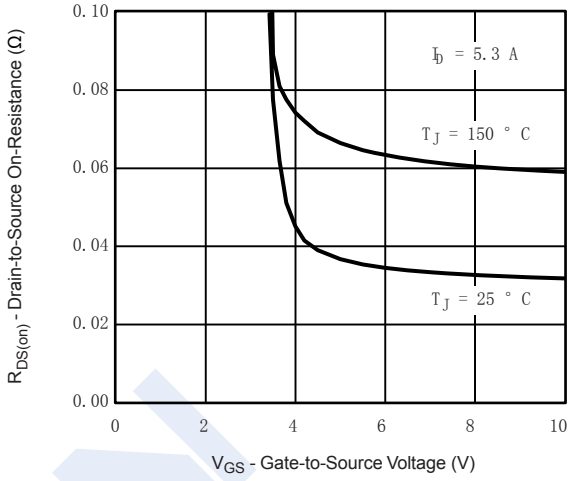
Dual N-Channel MOSFET

SI4946DY-HF (KI4946DY-HF)

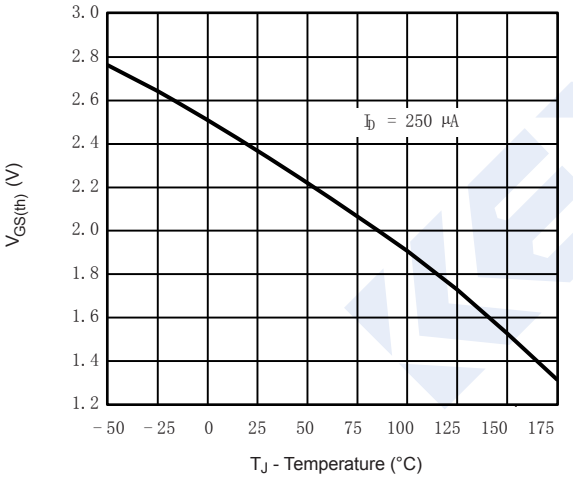
■ Typical Characterisitics



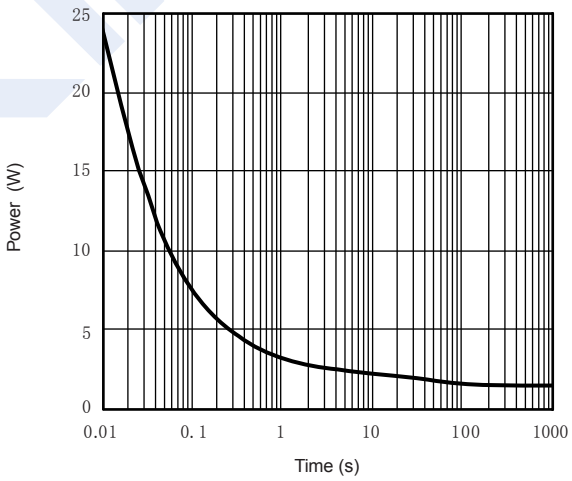
Source-Drain Diode Forward Voltage



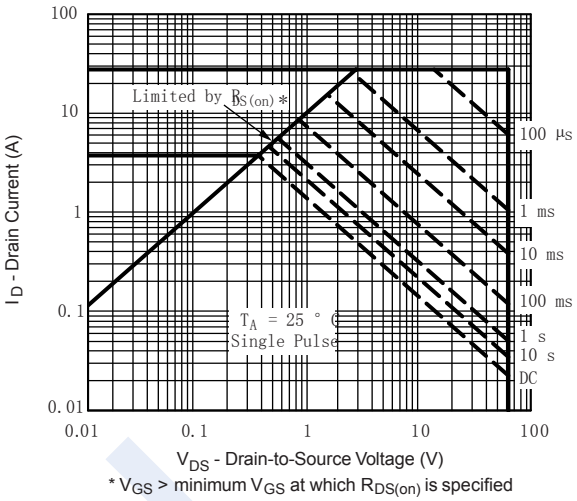
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

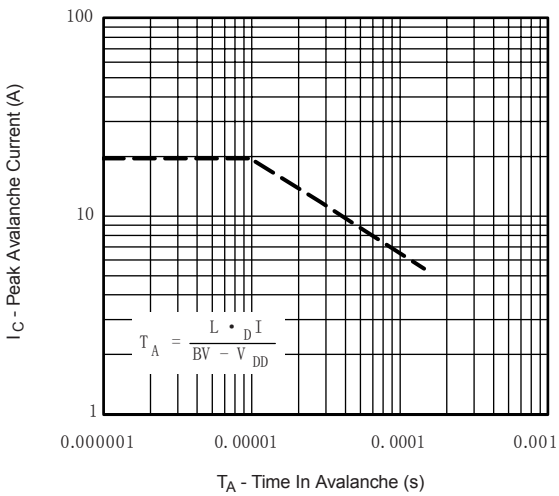


Single Pulse Power, Junction-to-Ambient



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

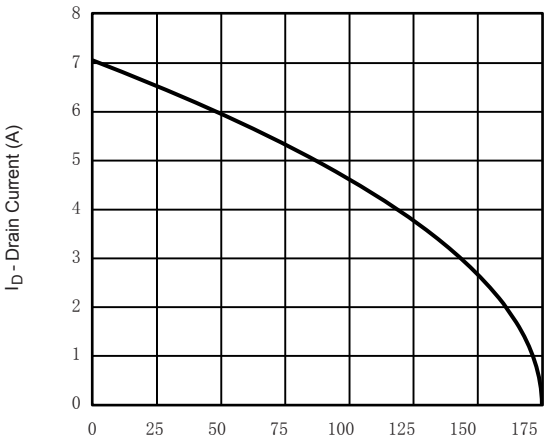
Safe Operating Area, Junction-to-Ambient



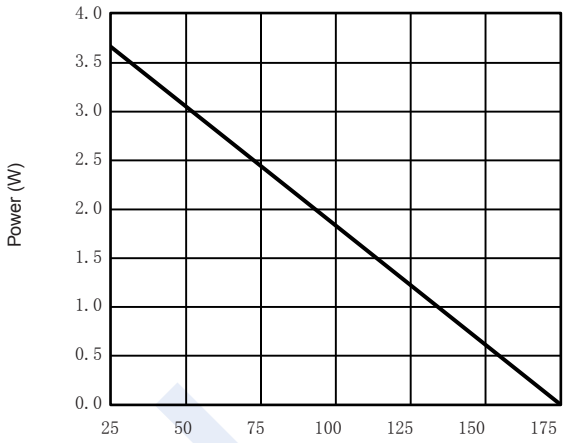
Single Pulse Avalanche Capability

Dual N-Channel MOSFET
SI4946DY-HF (KI4946DY-HF)

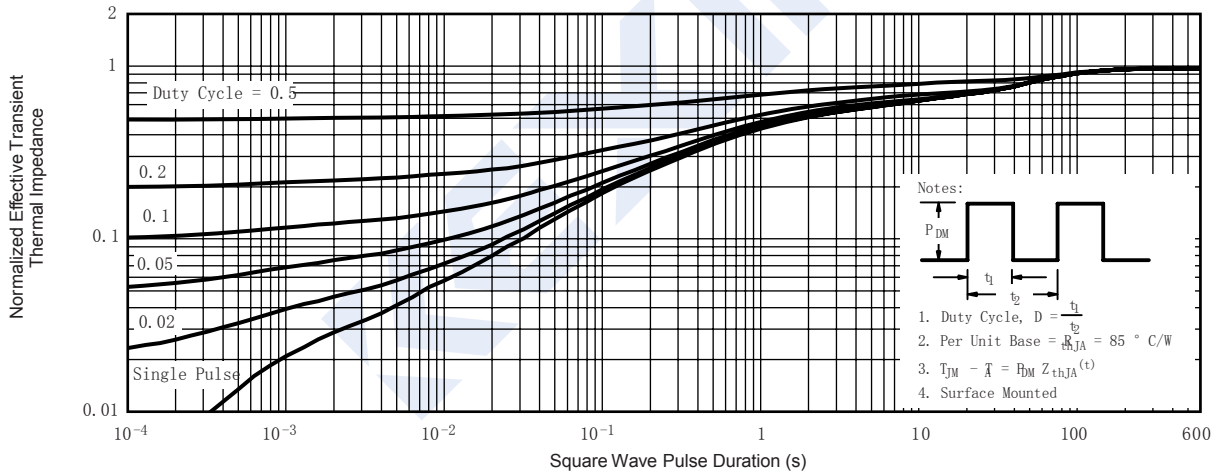
■ Typical Characterisitics



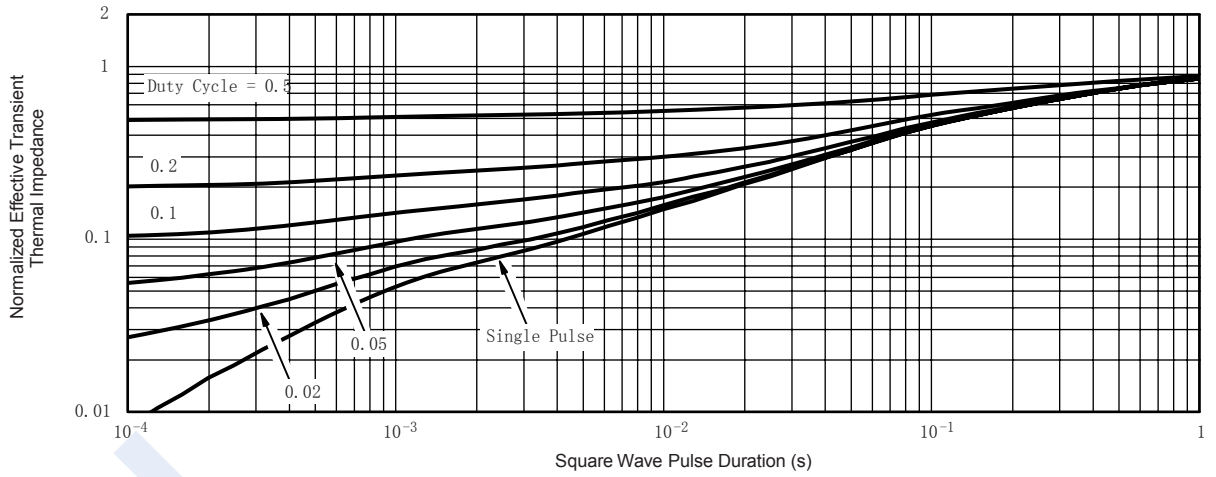
Current Derating*



Power, Junction-to-Case



Normalized Thermal Transient Im pedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case