Dual P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
- 30	0.021 at V_{GS} = - 10 V	- 10[a]	26 nC
	0.031 at V_{GS} = - 4.5 V	- 10[a]	

FEATURES

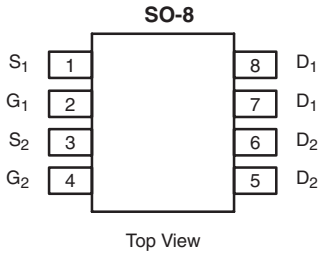
- TrenchFET® Power MOSFET
- ESD Protection: 2500 V

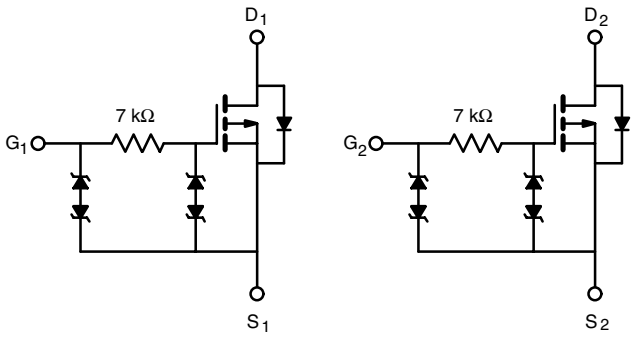
Pb-free

RoHS COMPLIANT

APPLICATIONS

- Load Switch for Portable Devices
- Battery and Load Switching for Notebooks





Ordering Information: Si4941EDY-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 10[a]	A
	T_C = 70 °C		- 8.8	
	T_A = 25 °C		- 8.3[b, c]	
	T_A = 70 °C		- 6.6[b, c]	
Pulsed Drain Current		I_{DM}	- 30	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 3	
	T_A = 25 °C		- 1.7[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	3.6	W
	T_C = 70 °C		2.3	
	T_A = 25 °C		2[b, c]	
	T_A = 70 °C		1.3[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[b, c]	t ≤ 10 s	R_{thJA}	45	62.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	26	35	

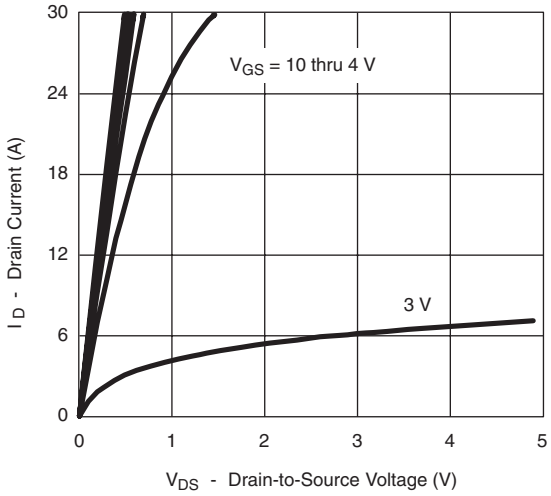
Notes:
a. Package limited.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Maximum under Steady State conditions is 110 °C/W

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 33		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = - 250 µA	- 1.2		- 2.8	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 10 V			± 20	µA
		V_{DS} = 0 V, V_{GS} = ± 20 V			± 1	mA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \leq$ - 5 V, V_{GS} = - 10 V	- 30			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = - 10 V, I_D = - 8.3 A		0.017	0.021	Ω
		V_{GS} = - 4.5 V, I_D = - 6.8 A		0.025	0.031	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 8.3 A		26		S
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 8.3 A		46	70	nC
		V_{DS} = - 15 V, V_{GS} = - 4.5 V, I_D = - 8.3 A		26	39	
Gate-Source Charge	Q_{gs}			6.7		
Gate-Drain Charge	Q_{gd}			14		
Gate Resistance	R_g	f = 1 MHz		7.3		kΩ
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 2.3 Ω $I_D \cong$ - 6.6 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		16	24	µs
Rise Time	t_r			60	90	
Turn-Off Delay Time	$t_{d(off)}$			11	17	
Fall Time	t_f			24	36	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 2.3 Ω $I_D \cong$ - 6.6 A, V_{GEN} = - 10 V, R_g = 1 Ω		5.5	9	
Rise Time	t_r			11	20	
Turn-Off Delay Time	$t_{d(off)}$			30	45	
Fall Time	t_f			24	40	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 10	A
Pulse Diode Forward Current	I_{SM}				30	
Body Diode Voltage	V_{SD}	I_S = - 2.1 A, V_{GS} = 0 V		- 0.83	- 1.2	V

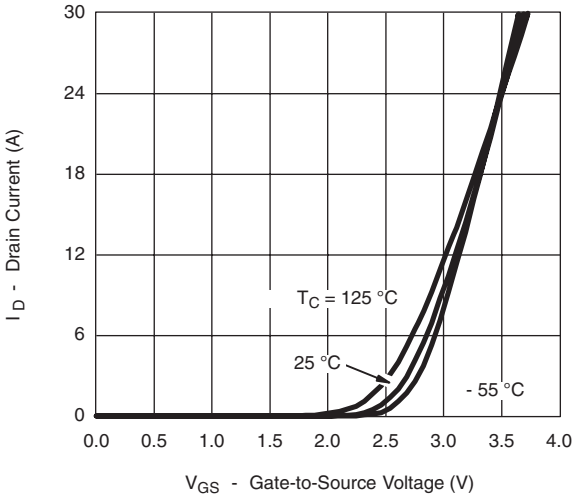
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing.

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.

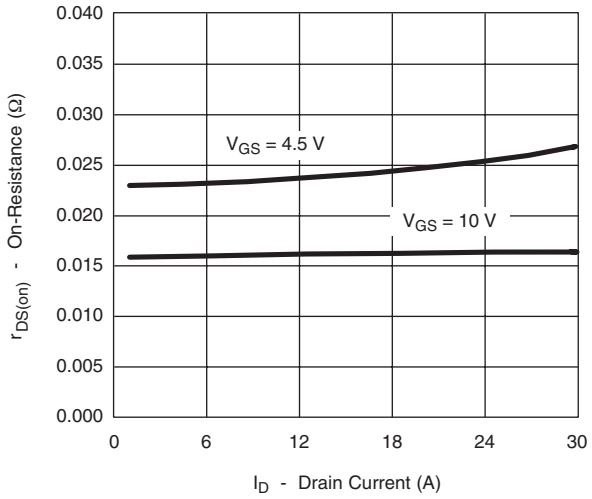
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



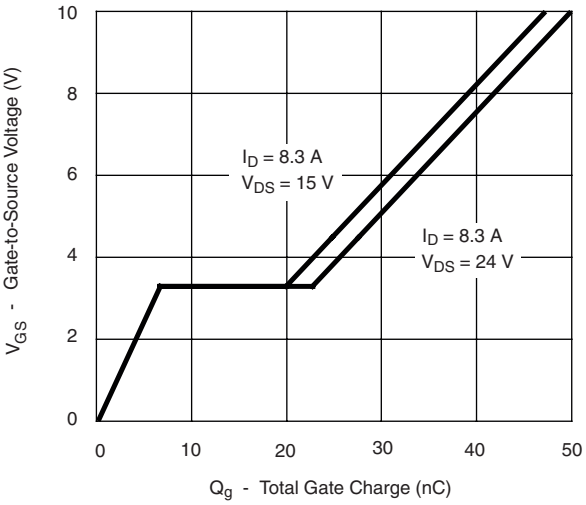
Output Characteristics



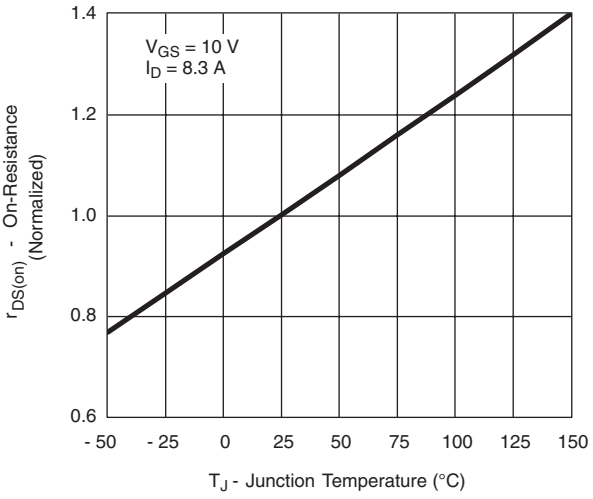
Transfer Characteristics



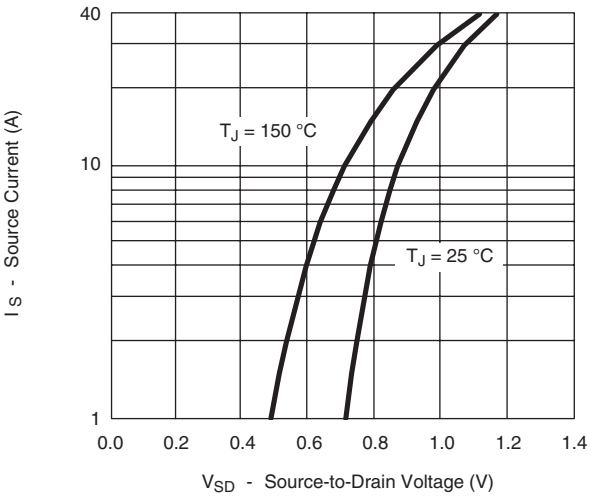
On-Resistance vs. Drain Current



Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

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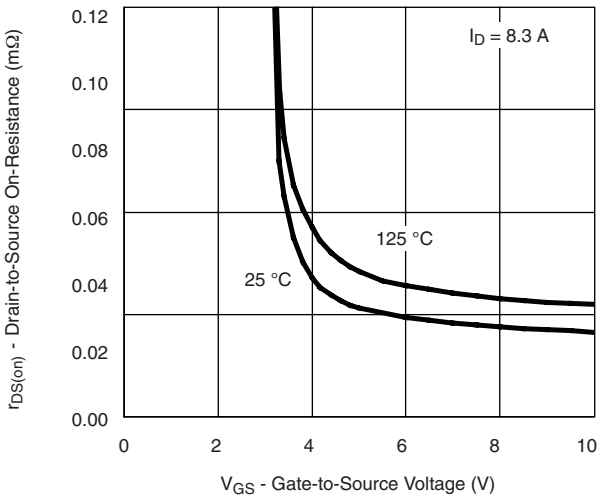
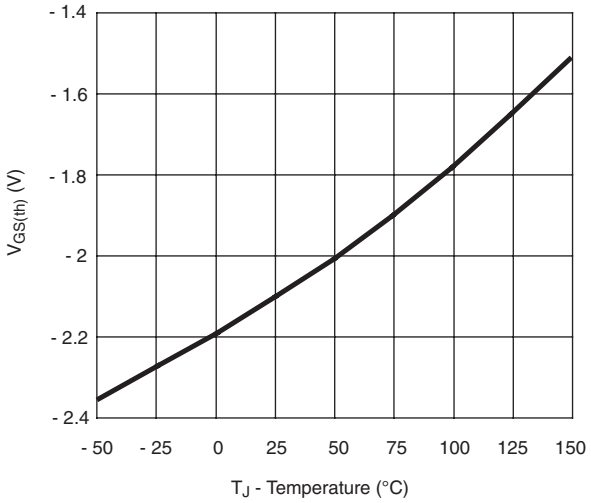
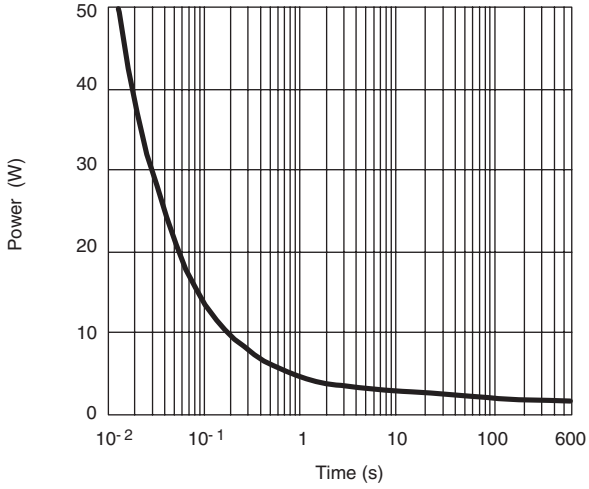


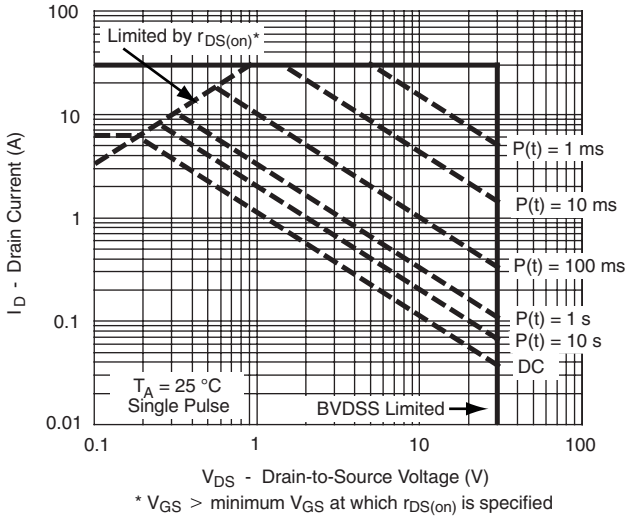
On-Resistance vs. Gate-Source Voltage



Threshold Variance



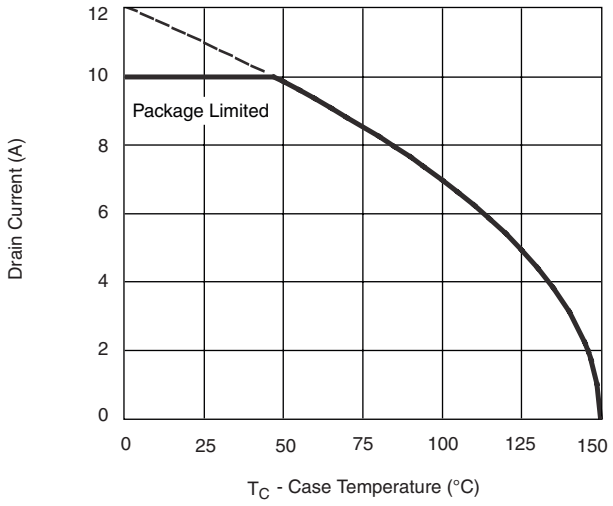
Single Pulse Power



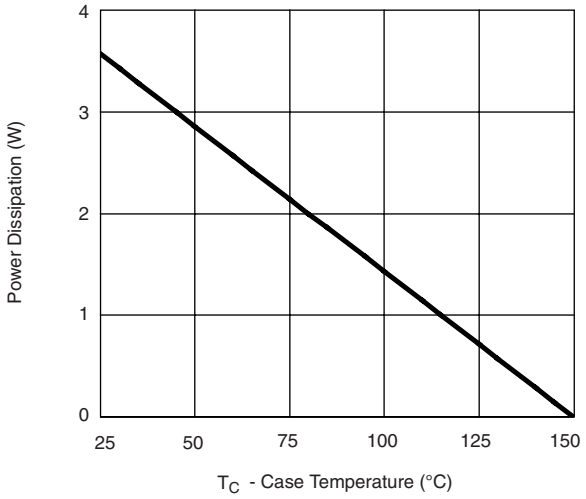
* V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



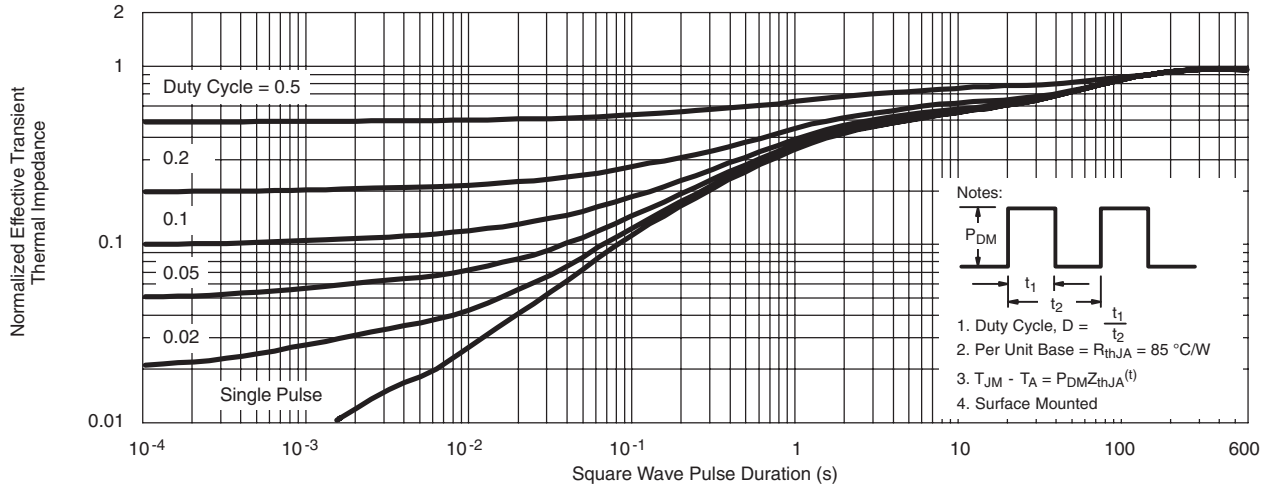
Current Derating*



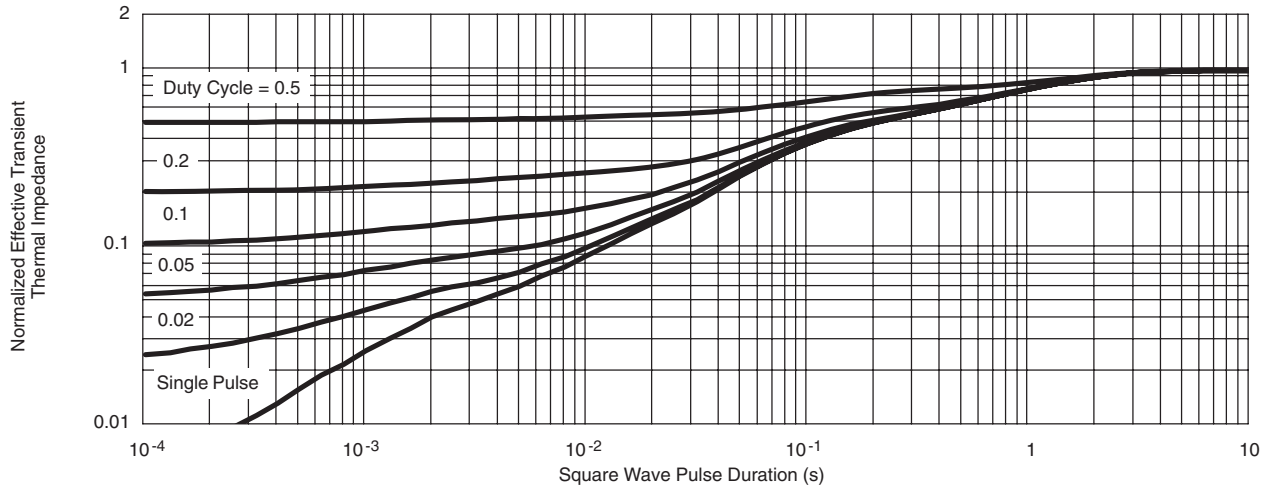
Power Derating

* 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.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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