

## Dual P-Channel 12-V (D-S) MOSFET

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 12	0.015 at $V_{GS} = - 4.5$ V	- 12.8
	0.019 at $V_{GS} = - 2.5$ V	- 11.4
	0.024 at $V_{GS} = - 1.8$ V	- 10.1

### FEATURES

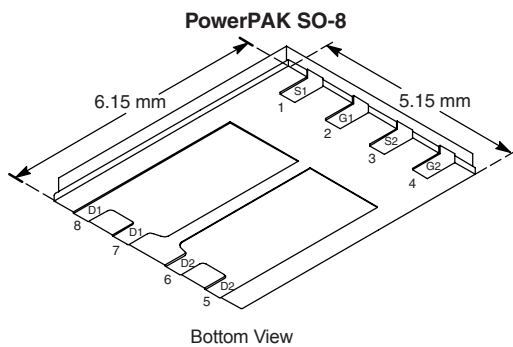
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET: 1.8 V Rated
- New Low Thermal Resistance PowerPAK® Package



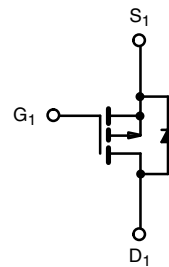
**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available

### APPLICATIONS

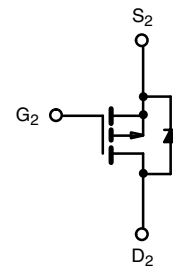
- Load Switch



**Ordering Information:** Si7973DP-T1-E3 (Lead (Pb)-free)  
Si7973DP-T1-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET



P-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	10 s	Steady State	Unit
Drain-Source Voltage	$V_{DS}$	- 12		V
Gate-Source Voltage	$V_{GS}$	$\pm 8$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$I_D$	- 12.8	- 8.2	A
		- 9.2	- 5.9	
Pulsed Drain Current	$I_{DM}$	- 30		
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	- 2.9	- 1.2	
Maximum Power Dissipation <sup>a</sup>	$P_D$	3.5	1.4	W
		1.9	0.8	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150		$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)		260		

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	26	35	$^\circ\text{C/W}$
		60	85	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	2.2	2.7	

Notes

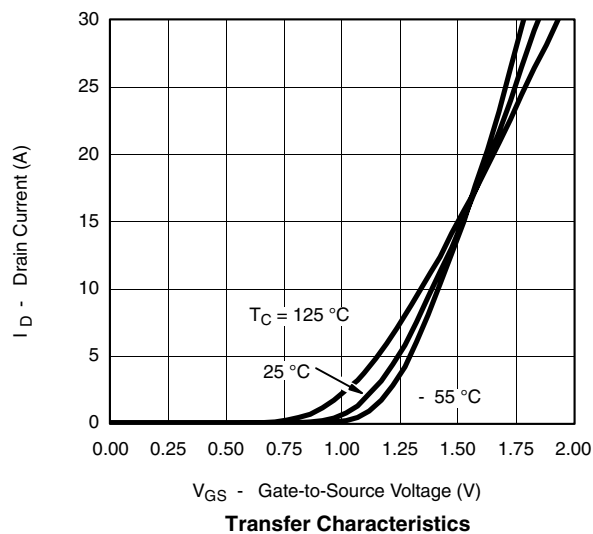
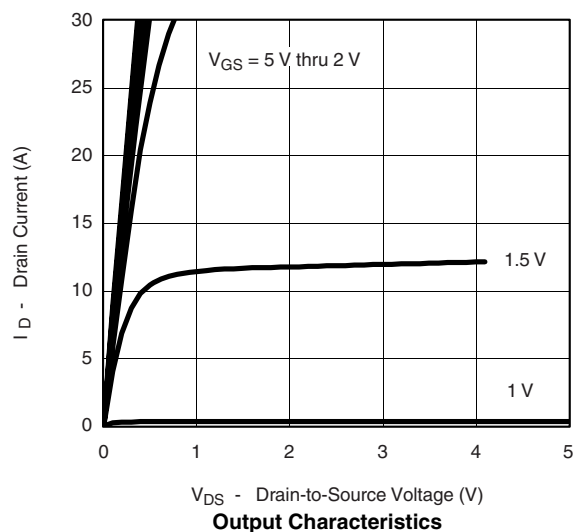
a. Surface Mounted on 1" x 1" FR4 board.

<b>SPECIFICATIONS</b> $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -600\ \mu\text{A}$	-0.40		-1.0	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}$ , $V_{GS} = \pm 8\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -12\ \text{V}$ , $V_{GS} = 0\ \text{V}$			-1	$\mu\text{A}$
		$V_{DS} = -12\ \text{V}$ , $V_{GS} = 0\ \text{V}$ , $T_J = 85^\circ\text{C}$			-5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\ \text{V}$ , $I_D = -12.8\ \text{A}$		0.012	0.015	$\Omega$
		$V_{GS} = -2.5\ \text{V}$ , $I_D = -11.4\ \text{A}$		0.015	0.019	
		$V_{GS} = -1.8\ \text{V}$ , $I_D = -4.2\ \text{A}$		0.019	0.024	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -6\ \text{V}$ , $I_D = -12.8\ \text{A}$		35		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.9\ \text{A}$ , $V_{GS} = 0\ \text{V}$		-0.8	-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -6\ \text{V}$ , $V_{GS} = -4.5\ \text{V}$ , $I_D = -12.8\ \text{A}$		55	80	nC
Gate-Source Charge	$Q_{gs}$			8.1		
Gate-Drain Charge	$Q_{gd}$			15.4		
Gate Resistance	$R_g$	$f = 1\ \text{MHz}$		8		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\ \text{V}$ , $R_L = 6\ \Omega$ $I_D \cong -1\ \text{A}$ , $V_{GEN} = -4.5\ \text{V}$ , $R_g = 6\ \Omega$		40	60	ns
Rise Time	$t_r$			72	110	
Turn-Off Delay Time	$t_{d(off)}$			360	540	
Fall Time	$t_f$			260	390	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -2.9\ \text{A}$ , $dI/dt = 100\ \text{A}/\mu\text{s}$		166	250	

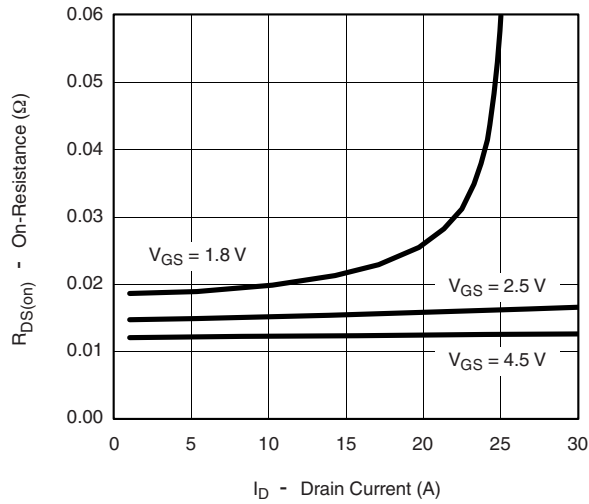
**Notes**a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

b. Guaranteed by design, not subject to production testing.

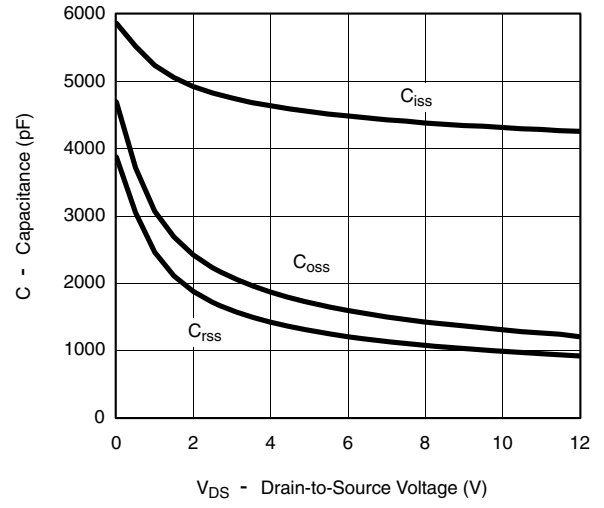
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS**  $25^\circ\text{C}$ , unless otherwise noted

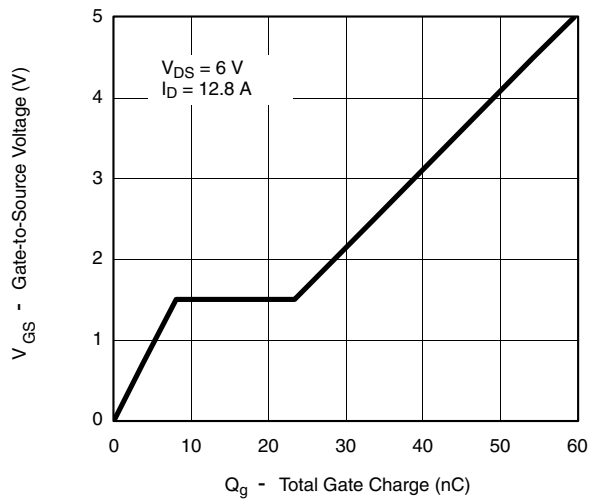
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



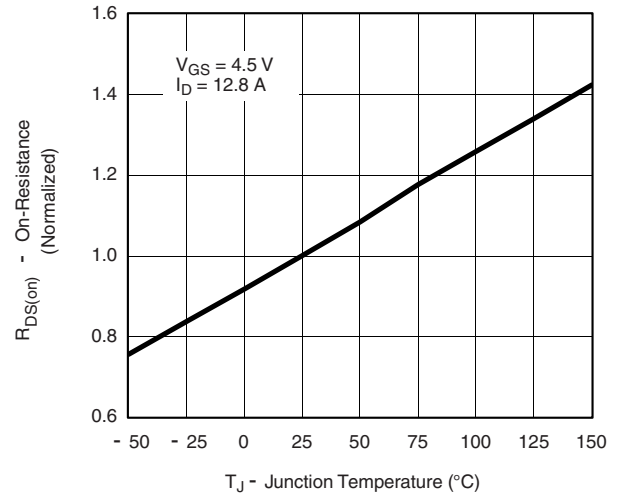
On-Resistance vs. Drain Current



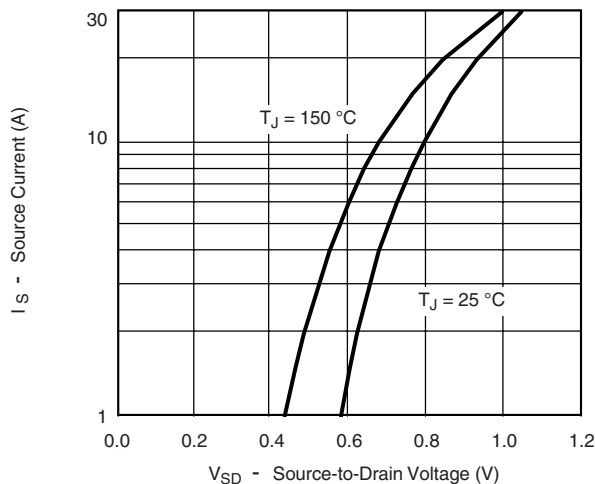
Capacitance



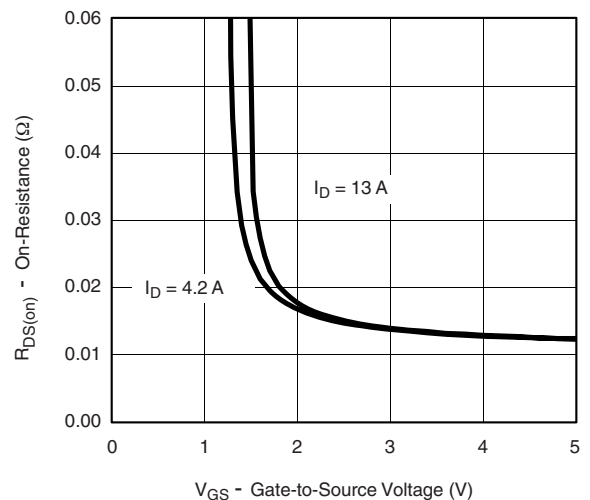
Gate Charge



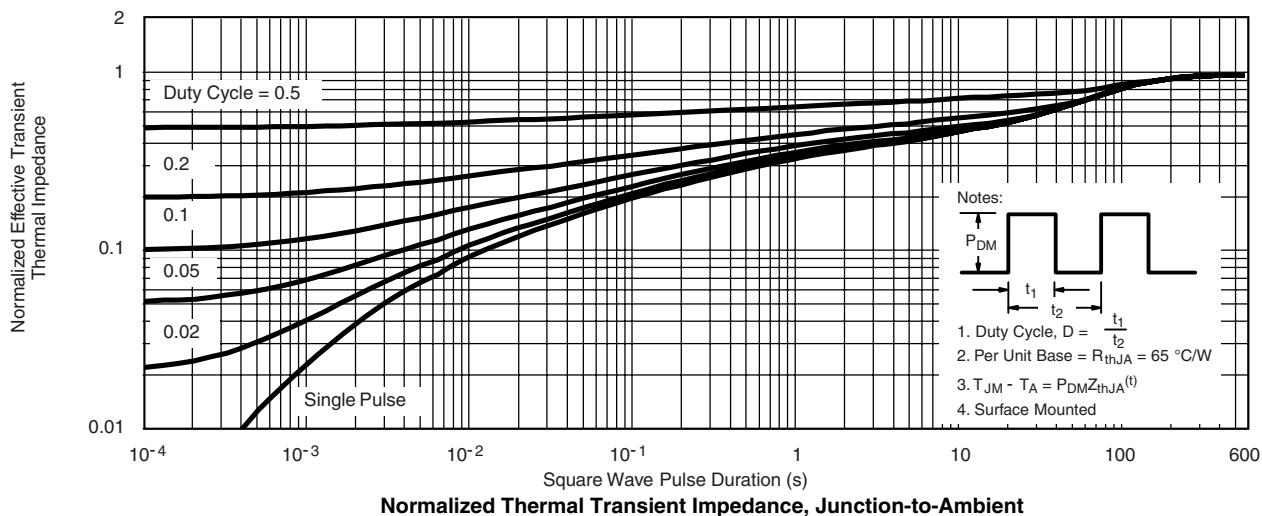
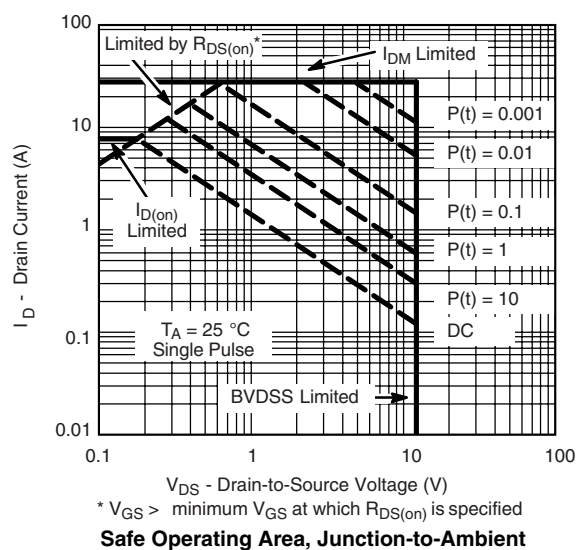
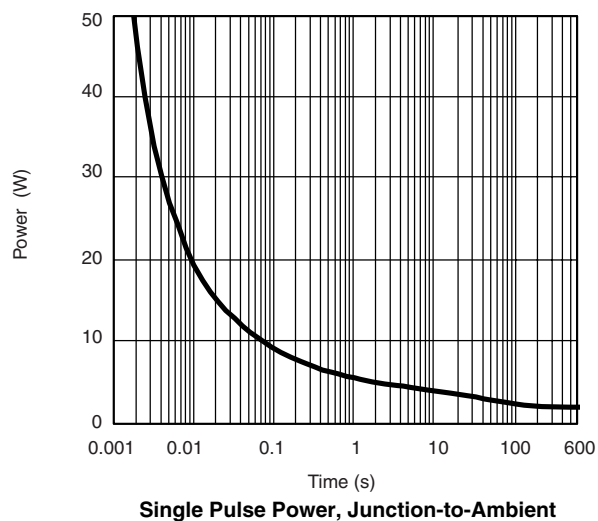
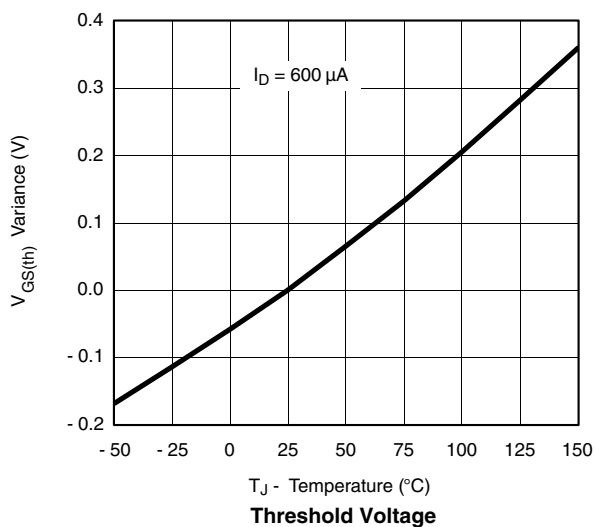
On-Resistance vs. Junction Temperature



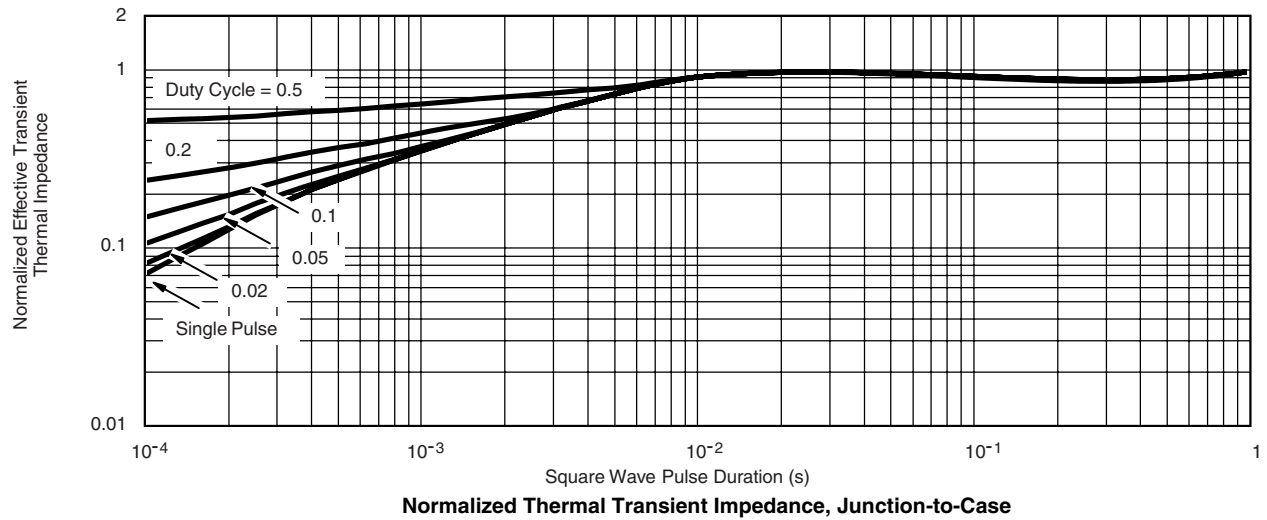
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

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