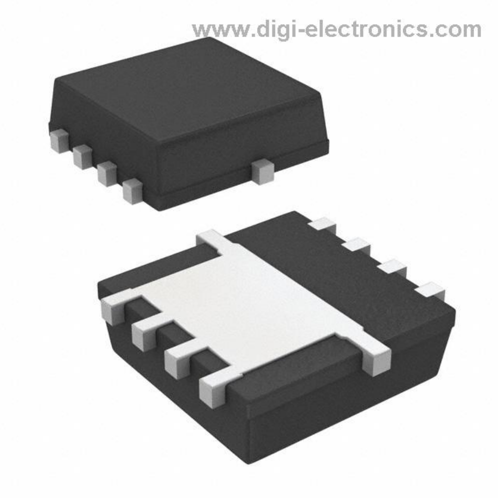
SI7802DN-T1-E3 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	SI7802DN-T1-E3-DG
Manufacturer	Vishay Siliconix
Manufacturer Product Number	SI7802DN-T1-E3
Description	MOSFET N-CH 250V 1.24A PPAK
Detailed Description	N-Channel 250 V 1.24A (Ta) 1.5W (Ta) Surface Mount PowerPAK® 1212-8

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
SI7802DN-T1-E3	Vishay Siliconix
Series:	Product Status:
TrenchFET®	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
250 V	1.24A (Ta)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
6V, 10V	435mOhm @ 1.95A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
3.6V @ 250µA	21 nC @ 10 V
Vgs (Max):	FET Feature:
±20V	-
Power Dissipation (Max):	Operating Temperature:
1.5W (Ta)	-55°C ~ 150°C (TJ)
Mounting Type:	Supplier Device Package:
Surface Mount	PowerPAK® 1212-8
Package / Case:	Base Product Number:
PowerPAK® 1212-8	SI7802

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

Si7802DN

Vishay Siliconix

N-Channel 250-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
250	0.435 at V_{GS} = 10 V	1.95
	0.445 at V_{GS} = 6 V	1.9

FEATURES

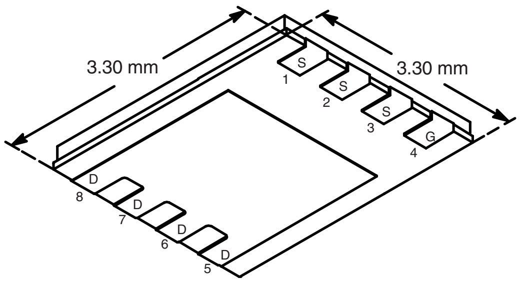
- **Halogen-free According to IEC 61249-2-21 Available**
- PWM-Optimized TrenchFET® Power MOSFET
- Avalanche Tested
- 100 % R_g Tested

Pb-free
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

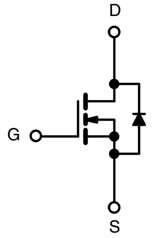
- Primary Side Switch
- Small DC/DC Circuits
- Single-Ended Primary Switching Circuits

PowerPAK® 1212-8



Bottom View

Ordering Information: Si7802DN-T1-E3 (Lead (Pb)-free)
Si7802DN-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	250		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	1.95	1.24	A
	T_A = 70 °C		1.56	0.99	
Pulsed Drain Current		I_{DM}	8		
Continuous Source Current (Diode Conduction)[a]		I_S	3.2	1.3	
Single Avalanche Current	L = 0.1 mH	I_{AS}	2.5		
Single Avalanche Energy		E_{AS}	0.3		mJ
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	3.8	1.5	W
	T_A = 70 °C		2.0	0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature)[b, c]			260		

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 s	R_{thJA}	26	33	°C/W
	Steady State		65	81	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.9	2.4	

Notes:

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

b. See Solder Profile (*www.vishay.com/ppg?73257*). The PowerPAK 1212-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

MOSFET SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA	2.4		3.6	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 250 V, V_{GS} = 0 V			1	µA
		V_{DS} = 250 V, V_{GS} = 0 V, T_J = 55 °C			5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	8			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 1.95 A		0.360	0.435	Ω
		V_{GS} = 6 V, I_D = 1.9 A		0.370	0.445	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 1.95 A		8		S
Diode Forward Voltage[a]	V_{SD}	I_S = 3.2 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 125 V, V_{GS} = 10 V, I_D = 1.95 A		14	21	nC
Gate-Source Charge	Q_{gs}			2.8		
Gate-Drain Charge	Q_{gd}			4.4		
Gate Resistance	R_g	f = 1MHz		1.6	2.4	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 125 V, R_L = 1.25 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		10	15	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(off)}$			21	35	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 3.2 A, dI/dt = 100 A/µs		65	100	

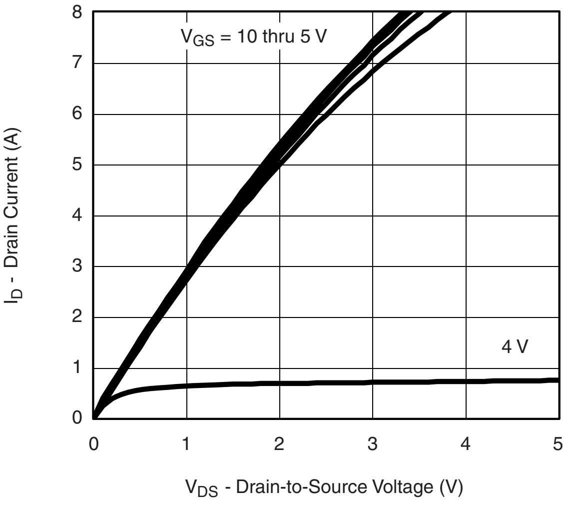
Notes:

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

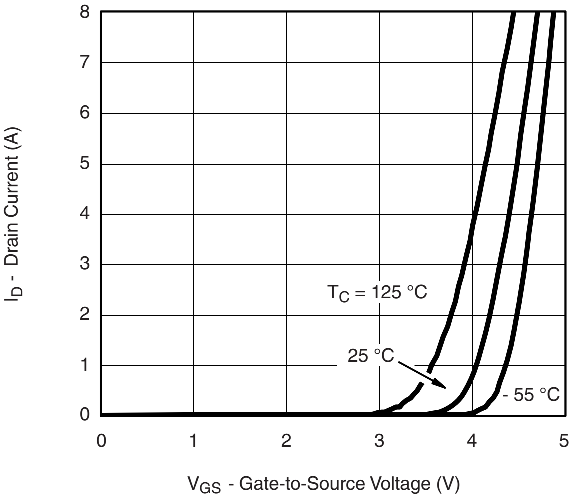
b. Guaranteed by design, not subject to production testing.

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

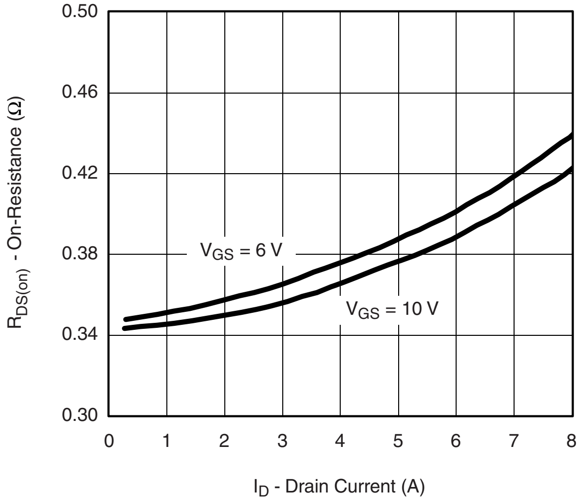


Output Characteristics

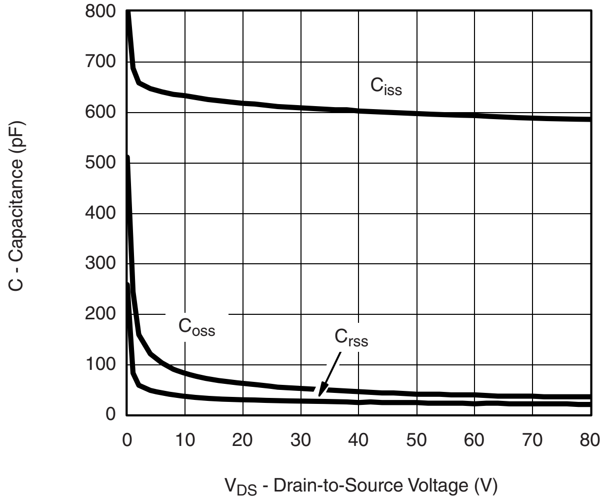


Transfer Characteristics

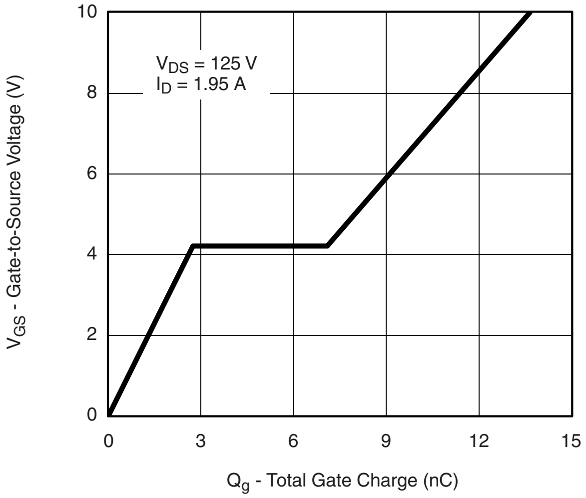
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



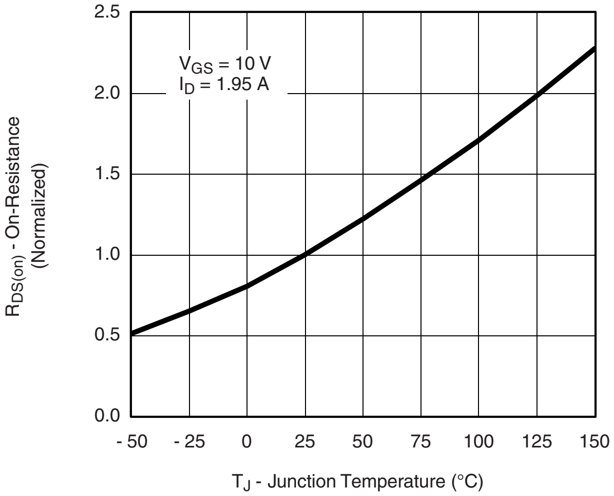
On-Resistance vs. Drain Current



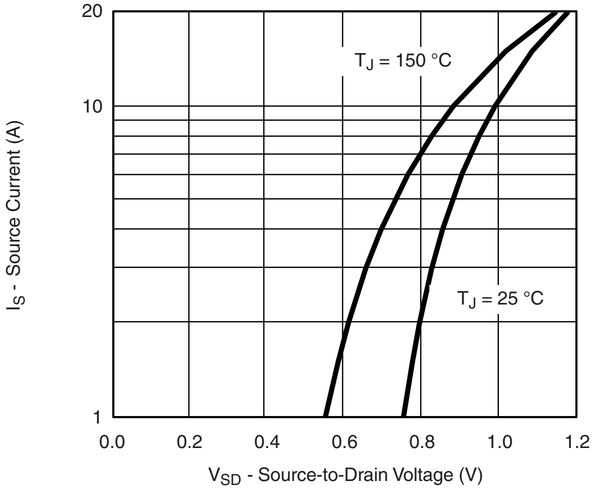
Capacitance



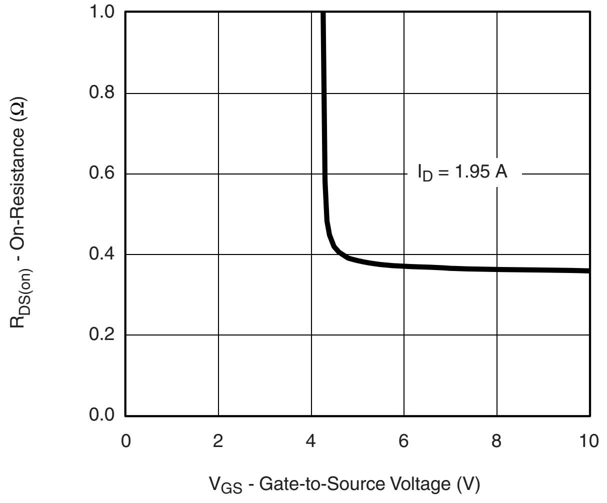
Gate Charge



On-Resistance vs. Junction Temperature

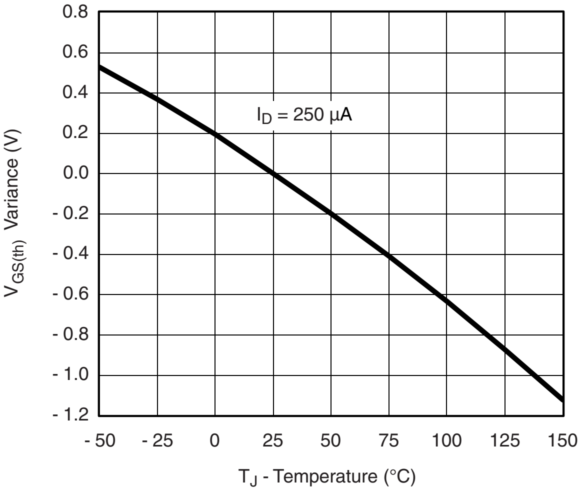


Source-Drain Diode Forward Voltage

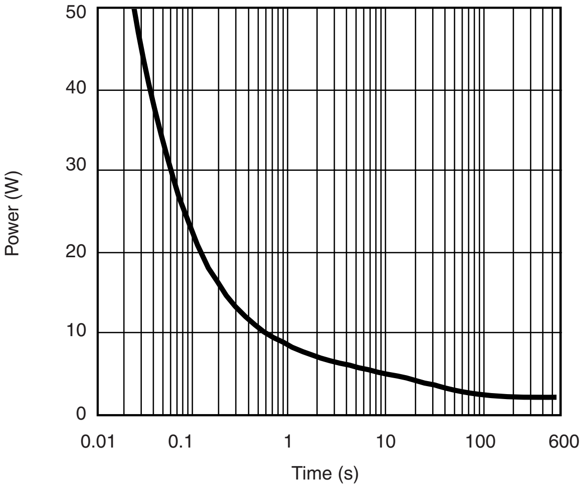


On-Resistance vs. Gate-to-Source Voltage

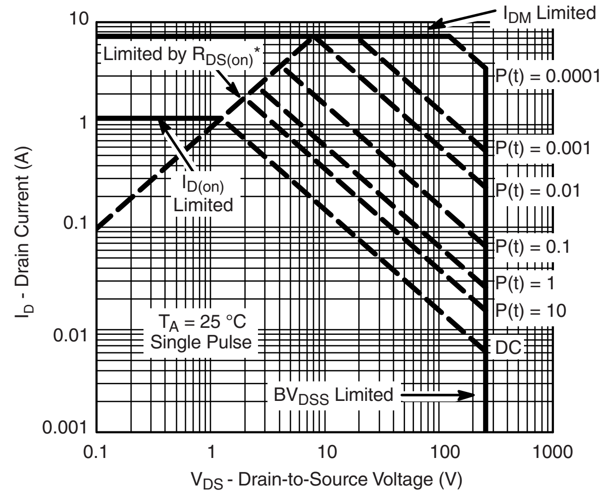
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Threshold Voltage

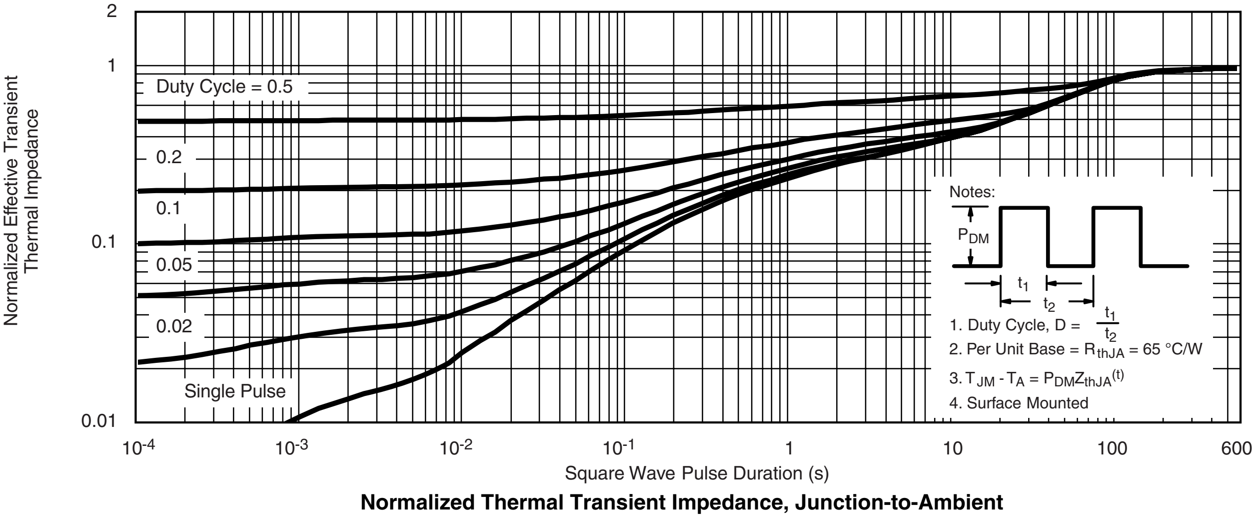


Single Pulse Power, Junction-to-Ambient



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

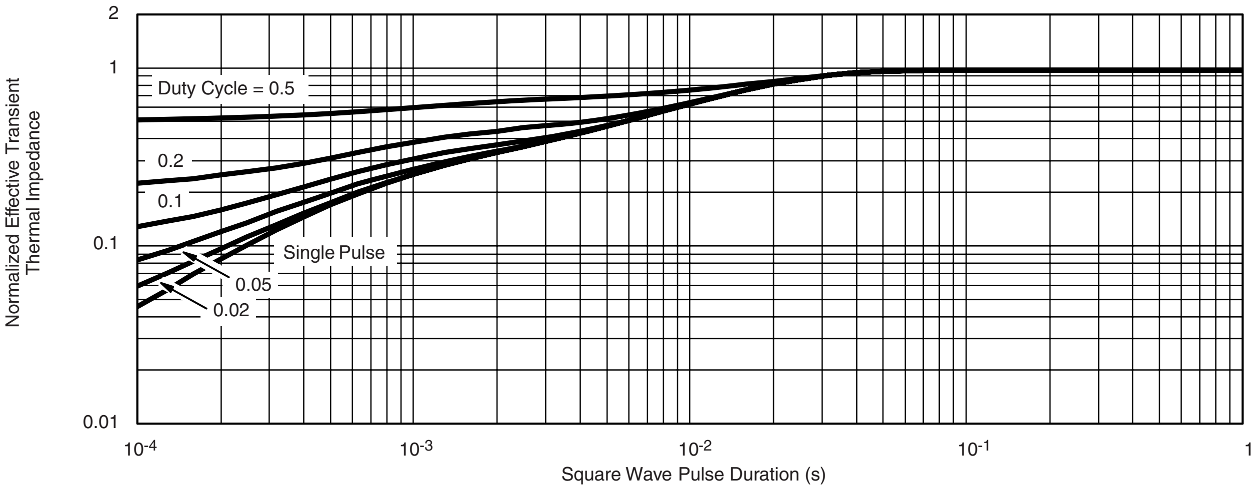
Safe Operating Area



1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 65 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

Normalized Thermal Transient Impedance, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Case

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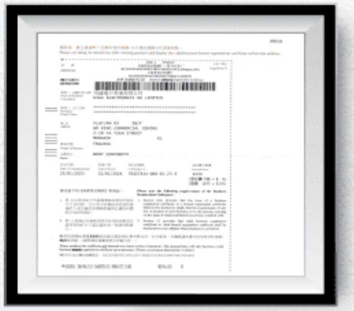

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