

P-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 40	0.054 at V _{GS} = - 10 V	- 4.5	9
	0.072 at V _{GS} = - 4.5 V	- 3.9	

FEATURES

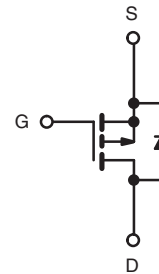
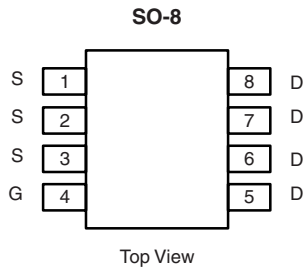
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- CCFL Inverter



Ordering Information: Si4447DY-T1-E3 (Lead (Pb)-free)
Si4447DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	V _{DS}	- 40		V	
Gate-Source Voltage	V _{GS}	± 16			
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	- 4.5	- 3.3	A
		T _A = 70 °C	- 3.6	- 2.7	
Pulsed Drain Current	I _{DM}	- 30			
Continuous Source Current (Diode Conduction) ^a	I _S	- 1.7	- 0.9		
Avalanche Current	L = 0.1 mH	I _{AS}	16		
Single Pulse Avalanche Energy		E _{AS}	13		mJ
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	2	1.1	W
		T _A = 70 °C	1.3	0.7	
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 ^a	R _{thJA}	t ≤ 10 s	50	62.5	°C/W
		Steady State	85	110	
Maximum Junction-to-Foot (Drain)	R _{thJF}	30	40		

Notes:

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

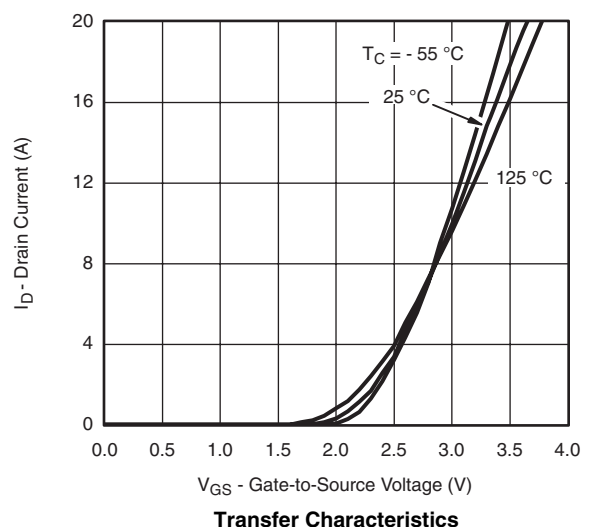
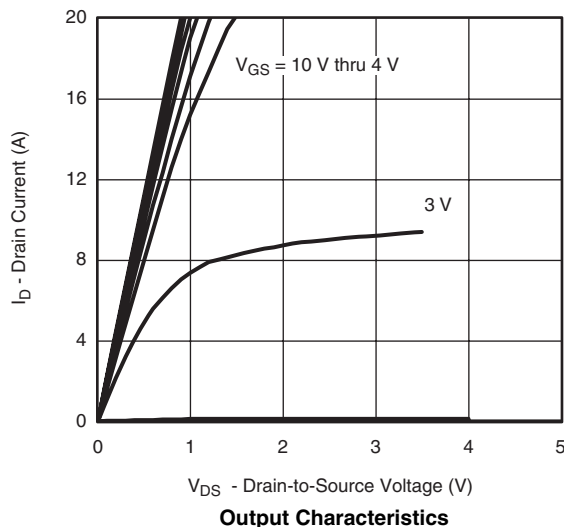
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.8		-2.2	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-40		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		3.4			
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 16\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -4.5\text{ A}$		0.045	0.054	Ω
		$V_{GS} = -15\text{ V}, I_D = -4.5\text{ A}$		0.059	0.072	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -4.5\text{ A}$		13		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.7\text{ A}, V_{GS} = 0\text{ V}$		-0.79	-1.2	V
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		805		pF
Output Capacitance	C_{oss}		120			
Reverse Transfer Capacitance	C_{rss}		85			
Total Gate Charge	Q_g	$V_{DS} = -20\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -4.5\text{ A}$		9	14	nC
Gate-Source Charge	Q_{gs}		2			
Gate-Drain Charge	Q_{gd}		3.6			
Gate Resistance	R_g	$f = 1\text{ MHz}$		11.5	18	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$		8	13	ns
Rise Time	t_r		12	18		
Turn-Off Delay Time	$t_{d(off)}$		74	110		
Fall Time	t_f		38	60		
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$		27	45	nC
Body Diode Reverse Recovery Charge	Q_{rr}			17	26	

Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

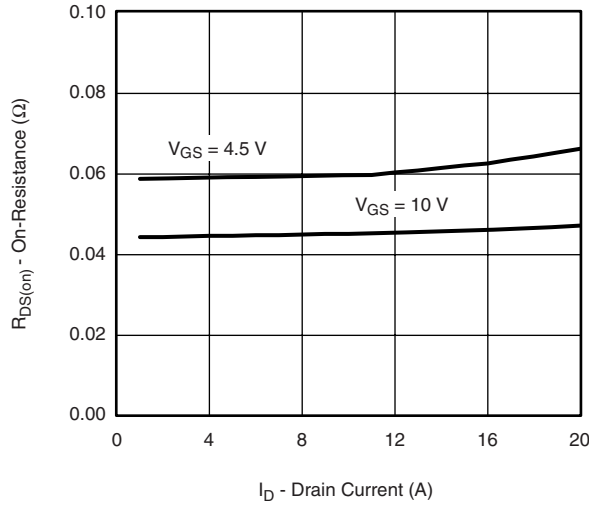
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

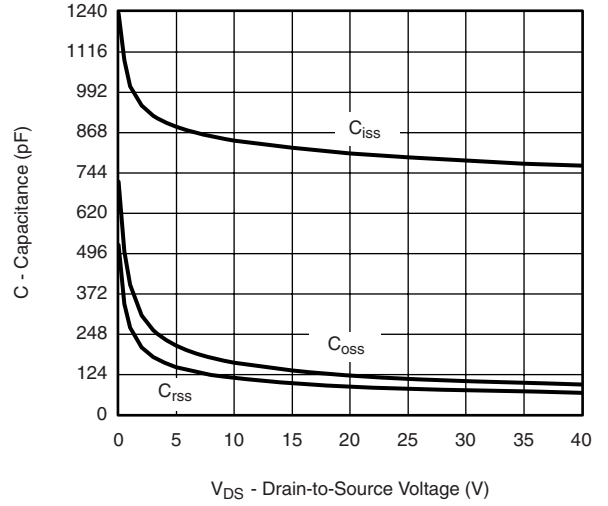




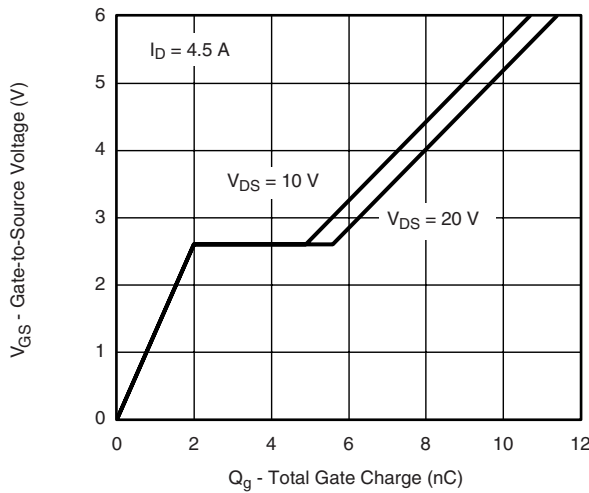
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



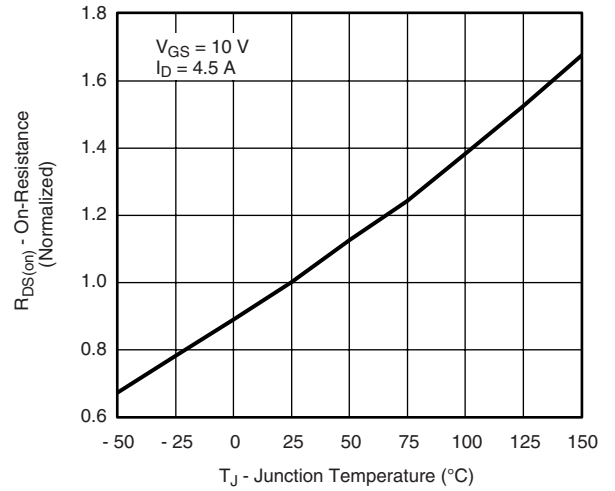
On-Resistance vs. Drain Current



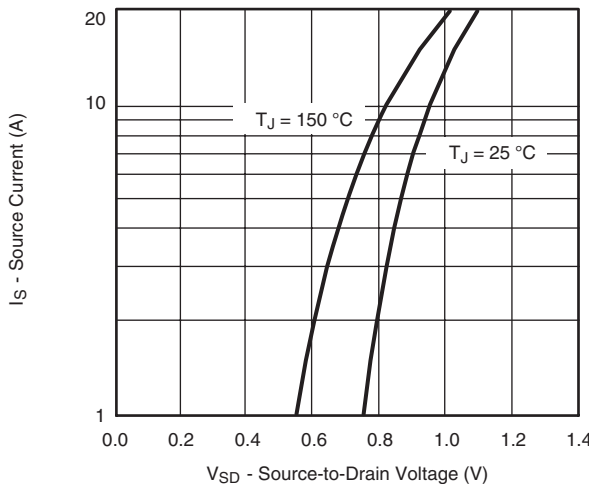
Capacitance



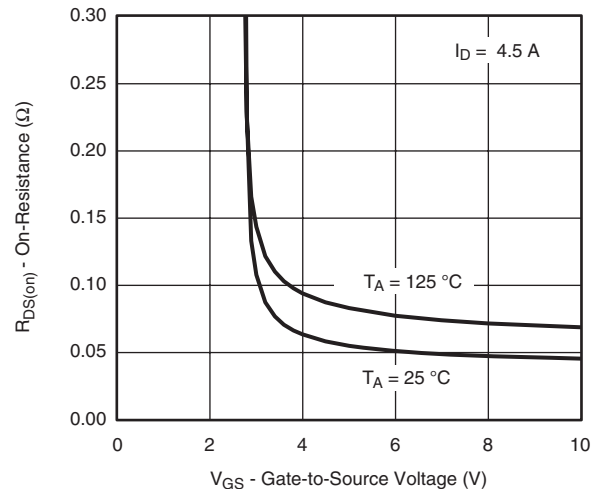
Gate Charge



On-Resistance vs. Junction Temperature

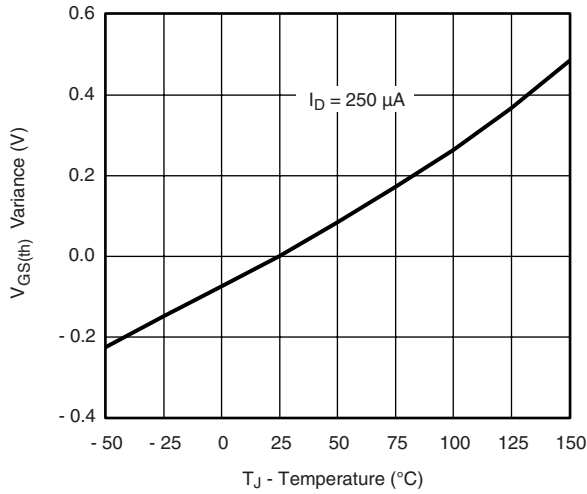


Source-Drain Diode Forward Voltage

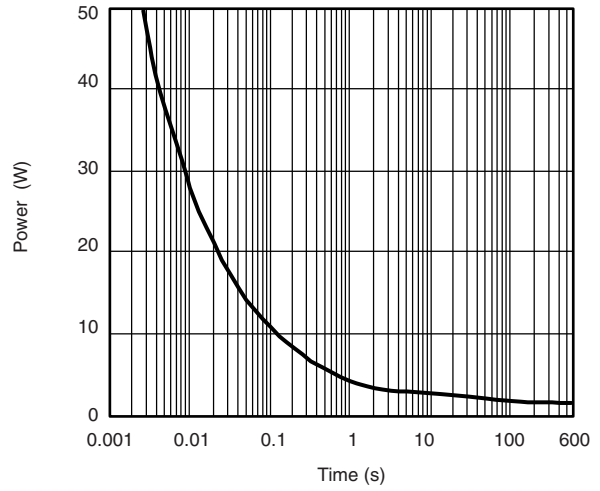


On-Resistance vs. Gate-to-Source Voltage

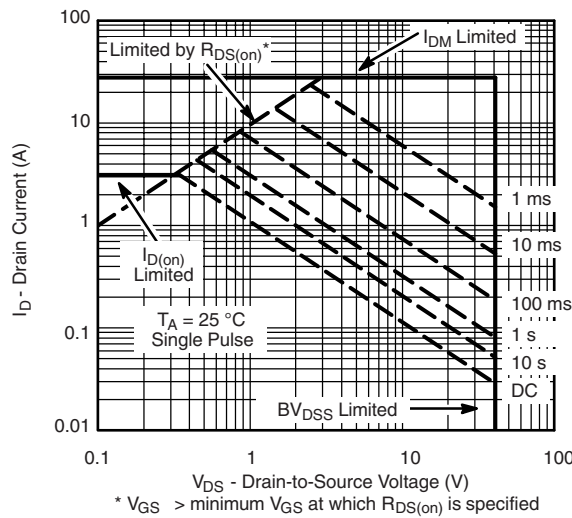
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



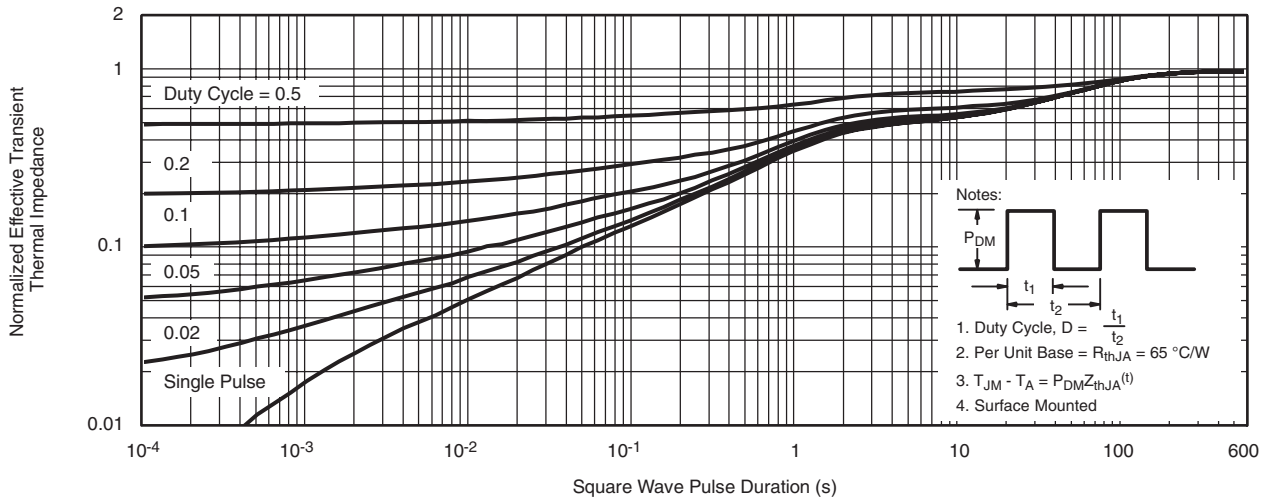
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



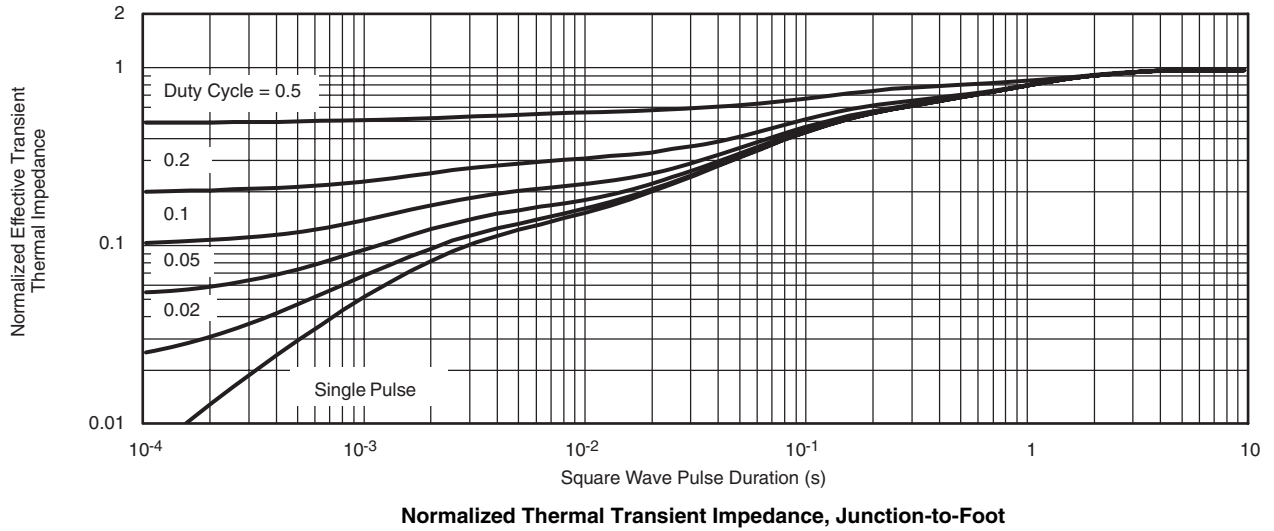
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026

ECN: C-06527-Rev. I, 11-Sep-06
DWG: 5498

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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