



P-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^c	Q_g (Typ.)
- 100	0.043 at $V_{GS} = - 10$ V	- 36	54 nC
	0.048 at $V_{GS} = - 4.5$ V	- 34.4	

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

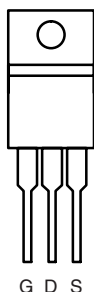


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- LCD Inverter
- Backlighting

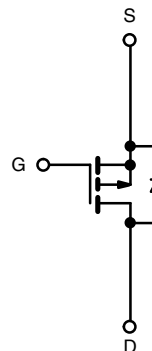
TO-220AB



G D S

Top View

Drain connected to Tab



P-Channel MOSFET

Ordering Information: SUP40P10-43-GE3 (Lead (Pb)-free and Halogen-free)

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 100	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^c	I_D	- 36	A
		- 16	
Pulsed Drain Current	I_{DM}	- 40	
Avalanche Current	I_{AS}	- 35	
Single Pulse Avalanche Energy ^a	E_{AS}	61	mJ
Power Dissipation	P_D	125 ^b	W
		2.0	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient Free Air	R_{thJA}	62	$^\circ\text{C}/\text{W}$
Junction-to-Case	R_{thJC}	1.0	

Notes:

a. Duty cycle $\leq 1\%$.

b. See SOA curve for voltage derating.

SUP40P10-43

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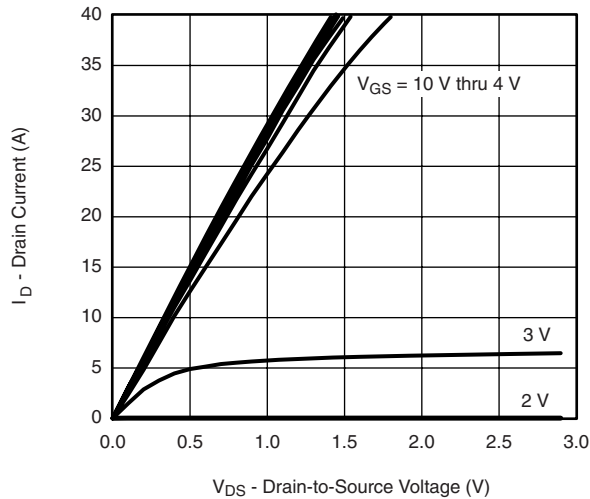
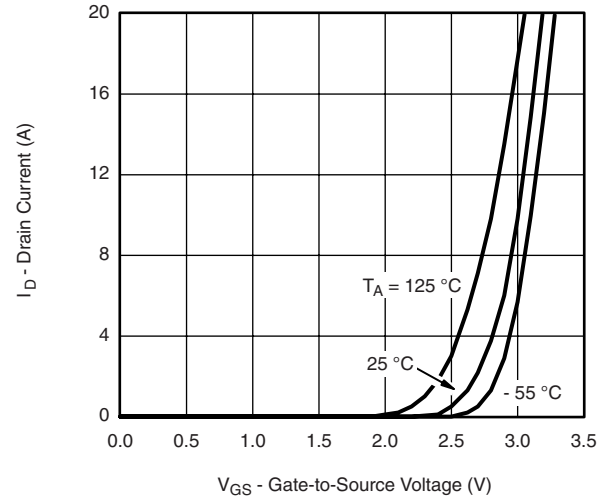
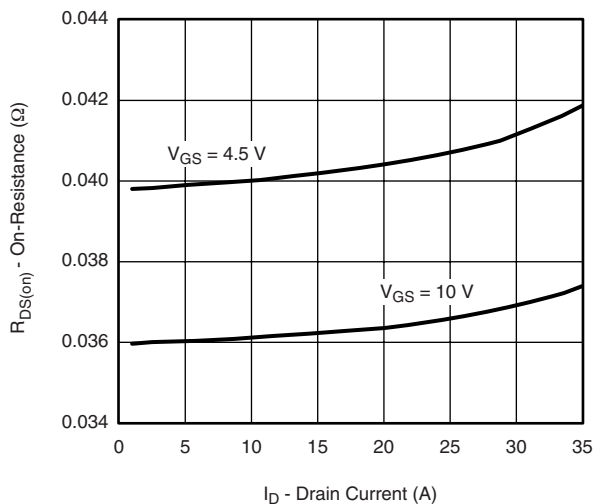
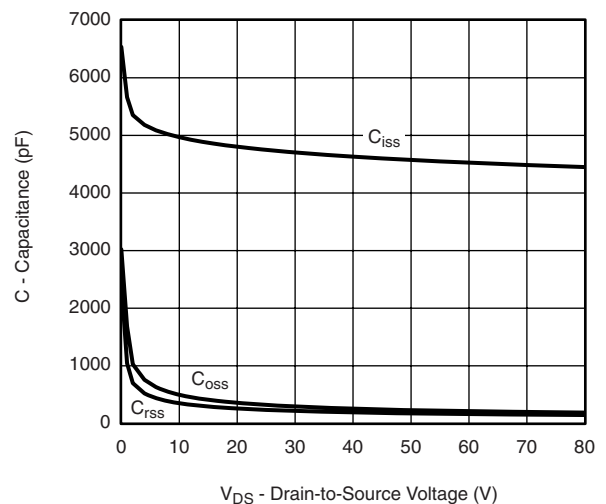
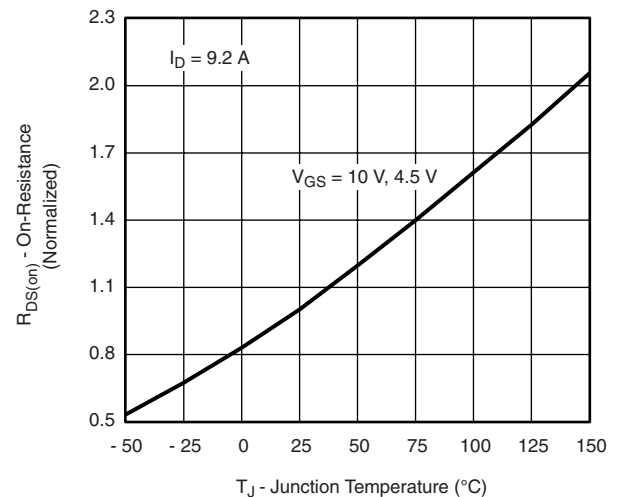
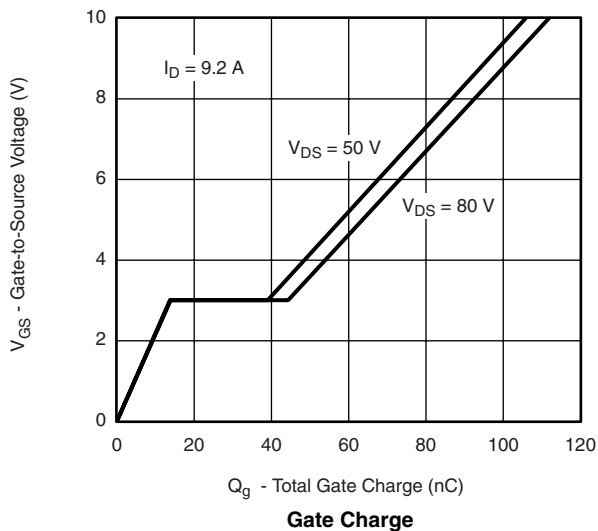


SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = - 250 μA	- 100			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1		- 3	
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = - 250 μA		- 109		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J	I _D = - 250 μA		5.9		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 100 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 100 V, V _{GS} = 0 V, T _J = 125 °C			- 50	
		V _{DS} = - 100 V, V _{GS} = 0 V, T _J = 150 °C			- 200	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = - 5 V, V _{GS} = - 10 V	- 40			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 10 A		0.036	0.043	Ω
		V _{GS} = - 10 V, I _D = - 10 A, T _J = 125 °C			0.078	
		V _{GS} = - 10 V, I _D = - 10 A, T _J = 150 °C			0.088	
		V _{GS} = - 4.5 V, I _D = - 8 A		0.040	0.048	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 15 V, I _D = - 10 A		38		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = - 50 V, f = 1 MHz		4600		pF
Output Capacitance	C _{oss}			230		
Reverse Transfer Capacitance	C _{rss}			175		
Total Gate Charge ^c	Q _g	V _{DS} = - 50 V, V _{GS} = - 10 V, I _D = - 10 A		106	160	nC
				54	81	
Gate-Source Charge ^c	Q _{gs}	V _{DS} = - 50 V, V _{GS} = - 4.5 V, I _D = - 10 A		14		
Gate-Drain Charge ^c	Q _{gd}			26		
Gate Resistance	R _g	f = 1.0 MHz	0.8	4	8	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = - 50 V, R _L = 6.3 Ω I _D ≅ - 8 A, V _{GEN} = - 10 V, R _g = 1.0 Ω		15	25	ns
Rise Time ^c	t _r			20	30	
Turn-Off Delay Time ^c	t _{d(off)}			110	165	
Fall Time ^c	t _f			100	150	
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = - 50 V, R _L = 6.3 Ω I _D ≅ 8 A, V _{GEN} = - 4.5 V, R _g = 1.0 Ω		42	65	
Rise Time ^c	t _r			160	240	
Turn-Off Delay Time ^c	t _{d(off)}			100	150	
Fall Time ^c	t _f			100	150	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				- 40	A
Pulsed Current	I _{SM}				- 40	
Forward Voltage ^a	V _{SD}	I _F = - 10 A, V _{GS} = 0 V		- 0.8	- 1.5	V
Reverse Recovery Time	t _{rr}	I _F = - 8 A, dI/dt = 100 A/μs		60	90	ns
Peak Reverse Recovery Current	I _{RM(REC)}			- 5	- 7.5	A
Reverse Recovery Charge	Q _{rr}			150	225	nC

Notes:

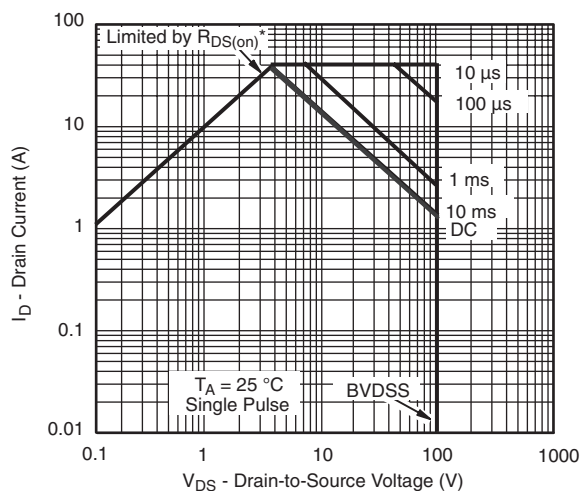
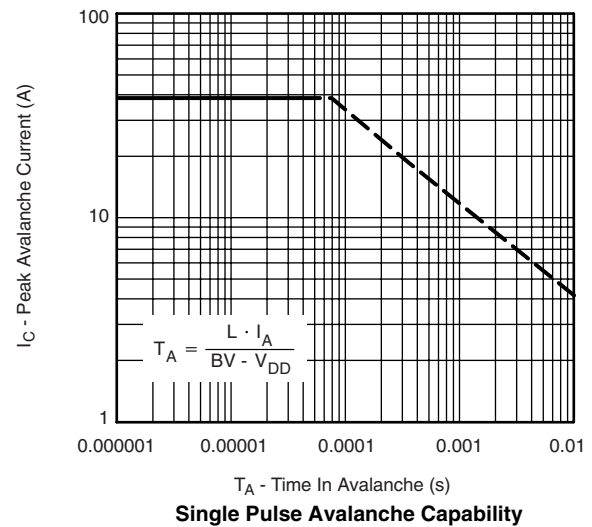
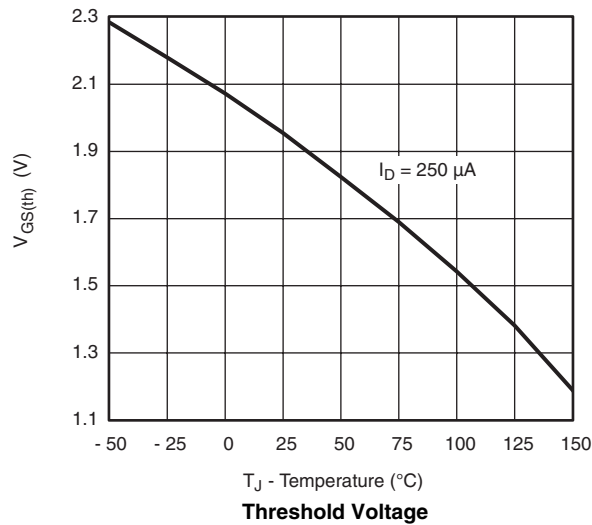
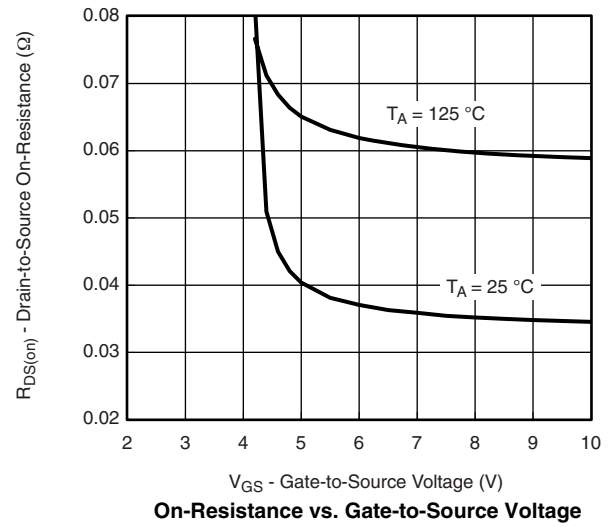
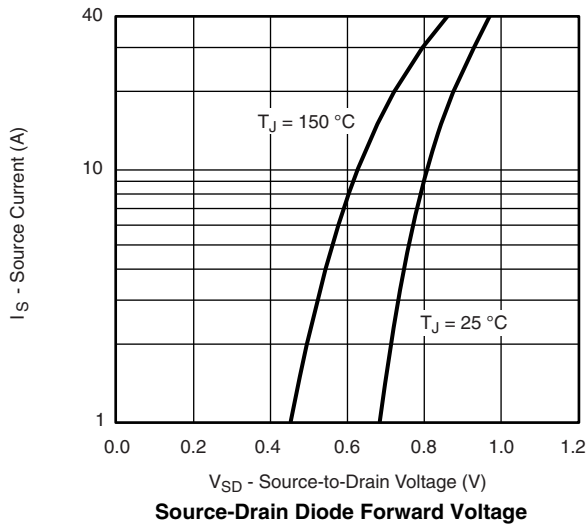
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

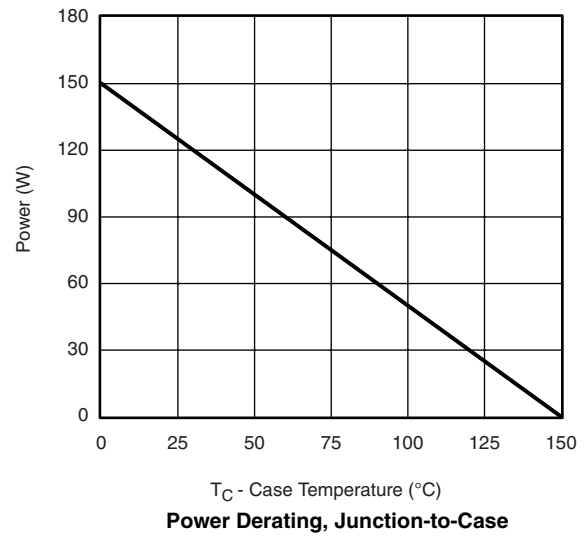
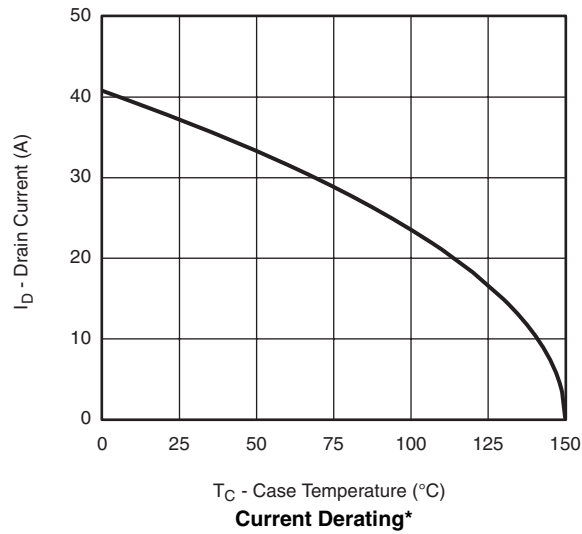
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure 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 and Gate Voltage****Capacitance****On-Resistance vs. Junction Temperature**

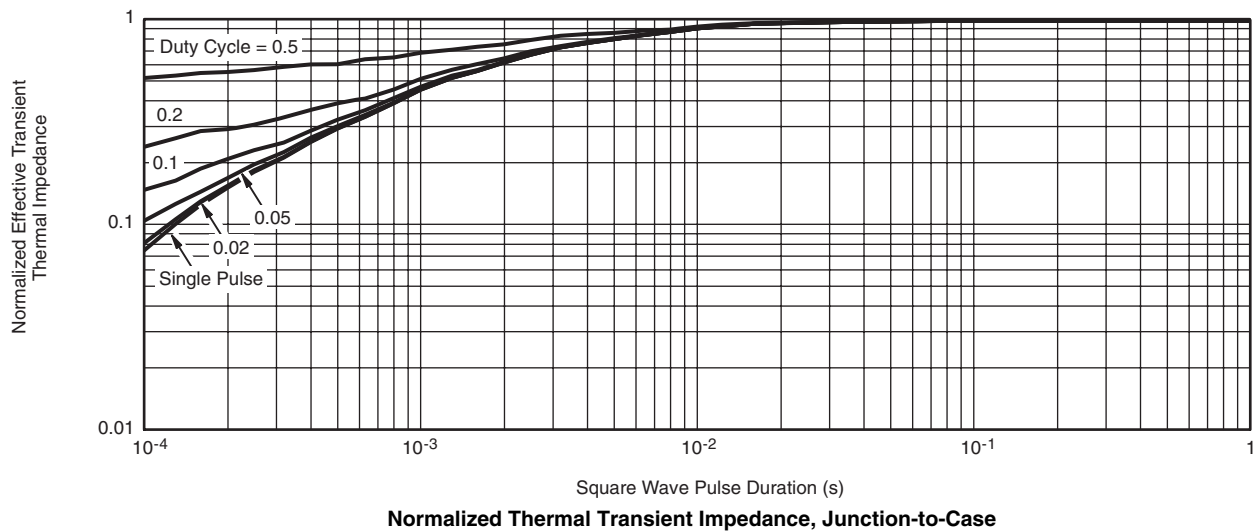
SUP40P10-43

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**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified**Safe Operating Area, Junction-to-Ambient**

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

* 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.



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