

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

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
100	0.0183 at V _{GS} = 10 V	60	48
	0.023 at V _{GS} = 8.0 V	53	

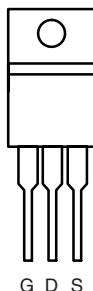
FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT

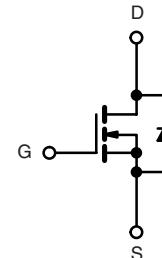
APPLICATIONS

- Industrial
- Power Supply

TO-220AB


Top View

Ordering Information: SUP60N10-18P-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °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 = 175 °C)	T _C = 25 °C	I _D	A
	T _C = 70 °C	50	
Pulsed Drain Current	I _{DM}	100	
Avalanche Current	I _{AS}	45	
Single Avalanche Energy ^a	E _{AS}	101	mJ
Maximum Power Dissipation ^a	T _C = 25 °C	P _D	W
	T _A = 25 °C ^c	3.75	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) ^c	R _{thJA}	40	°C/W
Junction-to-Case (Drain)	R _{thJC}	1.0	

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. When Mounted on 1" square PCB (FR-4 material).

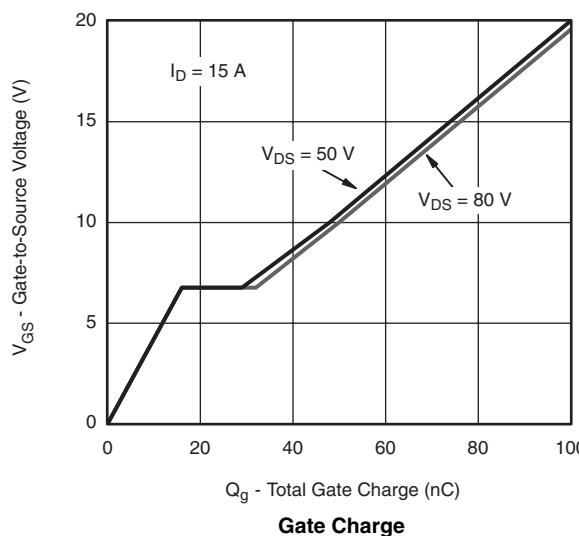
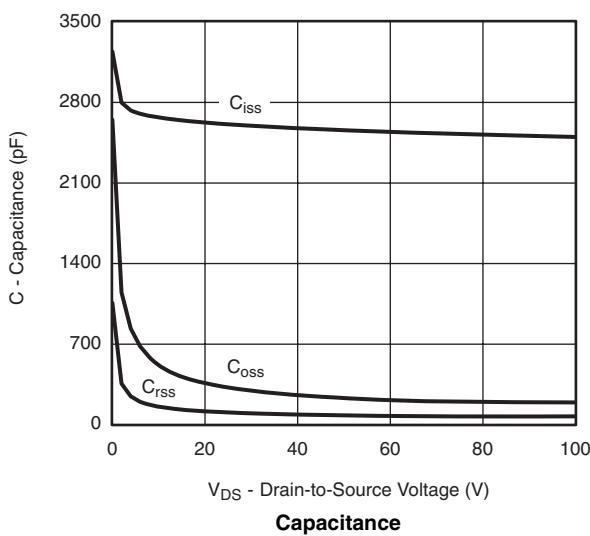
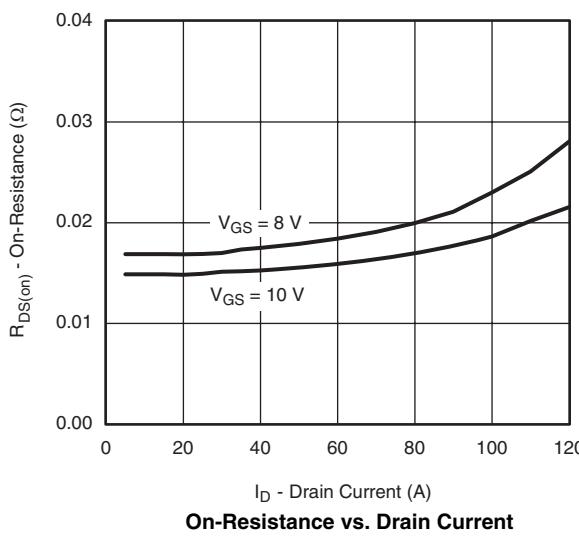
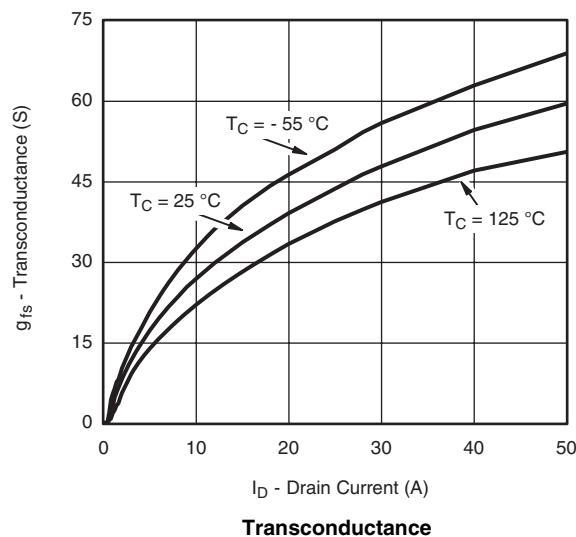
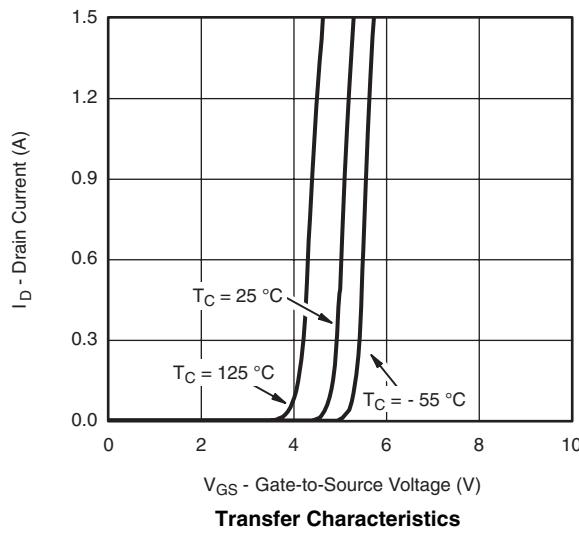
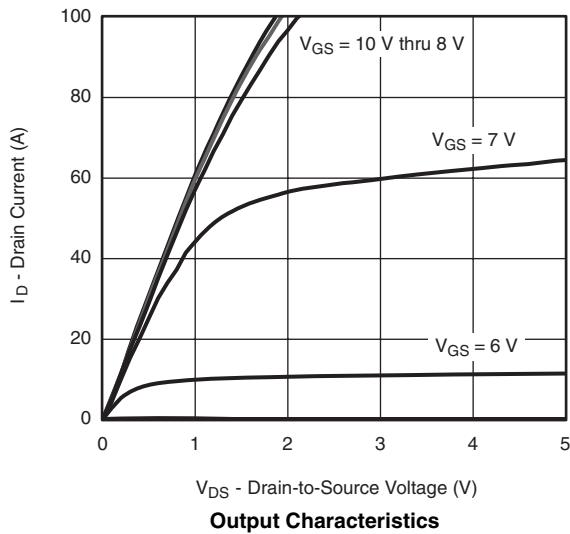
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2.5		4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 175^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 10 \text{ V}, V_{GS} = 10 \text{ V}$	50			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}, I_D = 15 \text{ A}$		0.015	0.0183	Ω
		$V_{GS} = 10 \text{ V}, I_D = 15 \text{ A}, T_J = 125^\circ\text{C}$		0.027	0.033	
		$V_{GS} = 8.0 \text{ V}, I_D = 10 \text{ A}$		0.018	0.023	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}, I_D = 15 \text{ A}$		33		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}, V_{DS} = 50 \text{ V}, f = 1 \text{ MHz}$		2600		pF
Output Capacitance	C_{oss}			230		
Reverse Transfer Capacitance	C_{rss}			80		
Total Gate Charge ^c	Q_g	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 50 \text{ A}$		48	75	nC
Gate-Source Charge ^c	Q_{gs}			16		
Gate-Drain Charge ^c	Q_{gd}			13		
Gate Resistance	R_g	$f = 1 \text{ MHz}$	0.25	1.1	2.4	Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}, R_L = 1.0 \Omega$ $I_D \geq 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		12	20	ns
Rise Time ^c	t_r			10	20	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			18	35	
Fall Time ^c	t_f			8	15	
Drain-Source Body Diode Characteristics $T_C = 25^\circ\text{C}$ ^b						
Continuous Current	I_S				60	A
Pulsed Current	I_{SM}				100	
Forward Voltage ^a	V_{SD}	$I_F = 15 \text{ A}, V_{GS} = 0 \text{ V}$		0.85	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 50 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}$		80	120	ns
Peak Reverse Recovery Current	$I_{RM(\text{REC})}$			4		A
Reverse Recovery Charge	Q_{rr}			160	240	nC

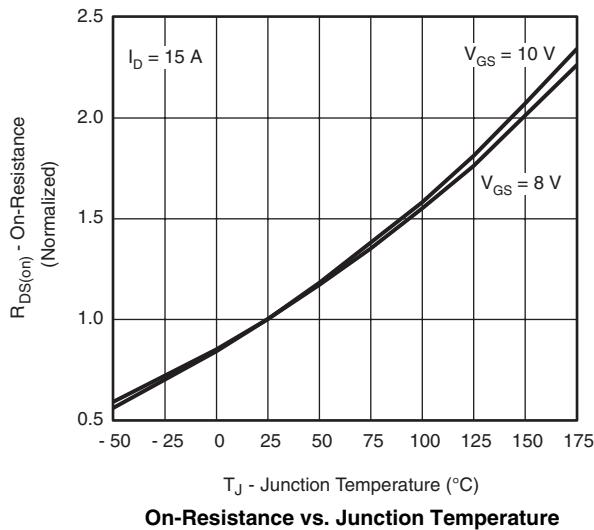
Notes:

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

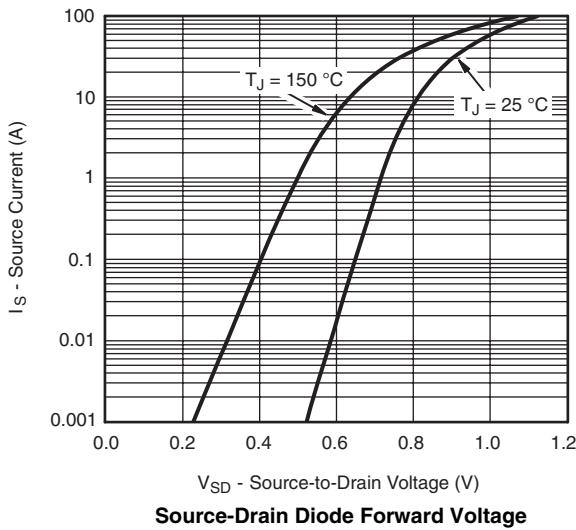
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


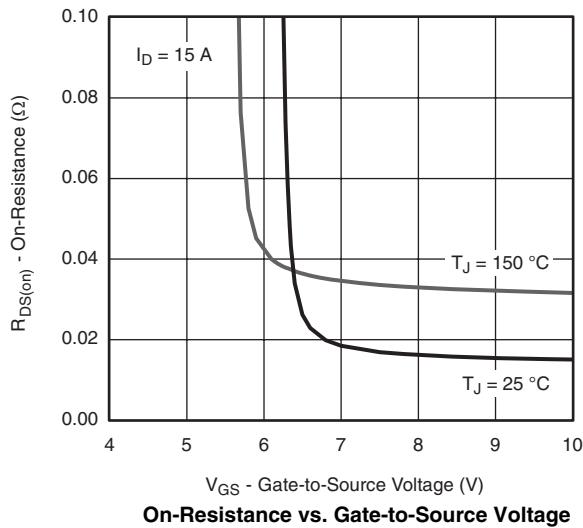
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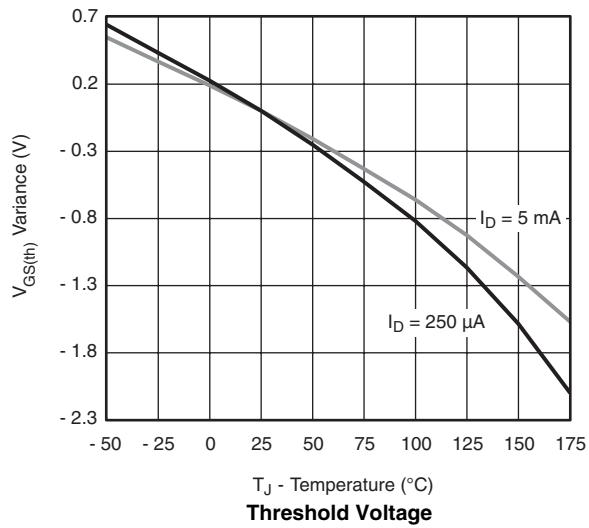
On-Resistance vs. Junction Temperature



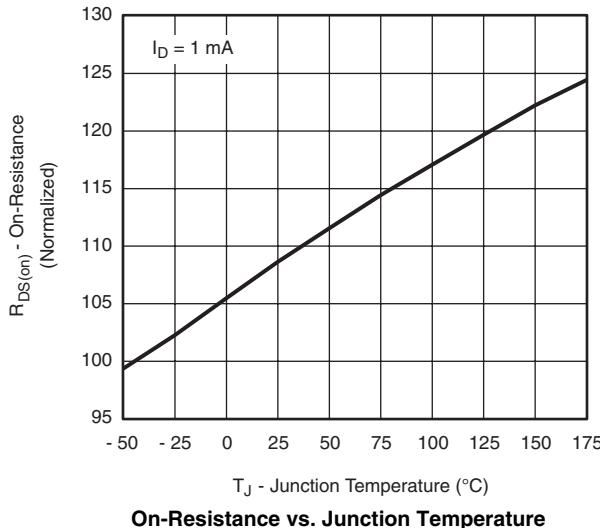
Source-Drain Diode Forward Voltage



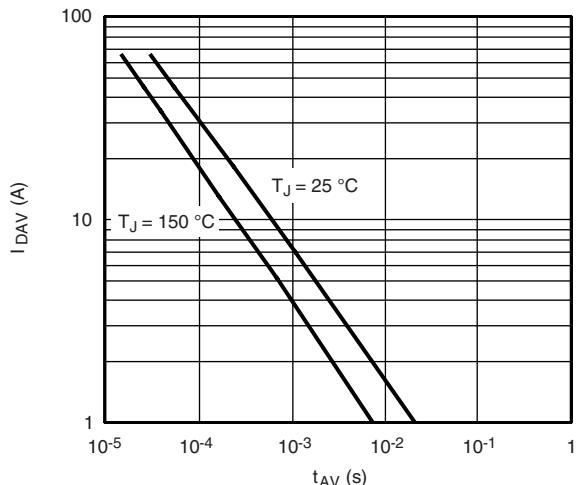
On-Resistance vs. Gate-to-Source Voltage



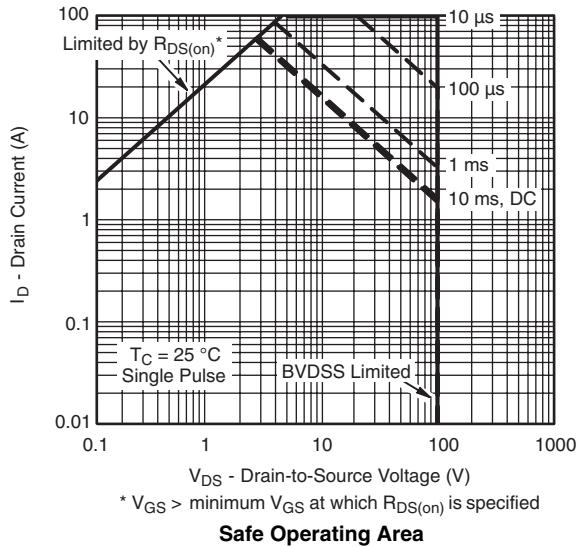
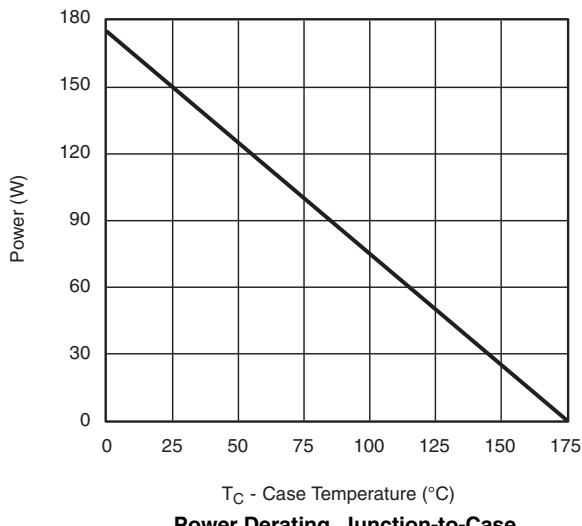
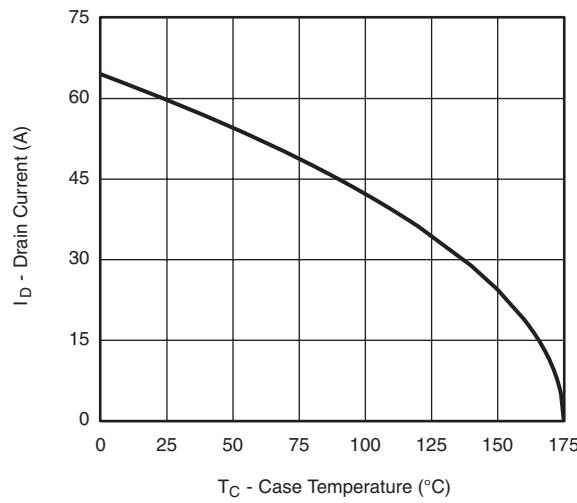
Threshold Voltage



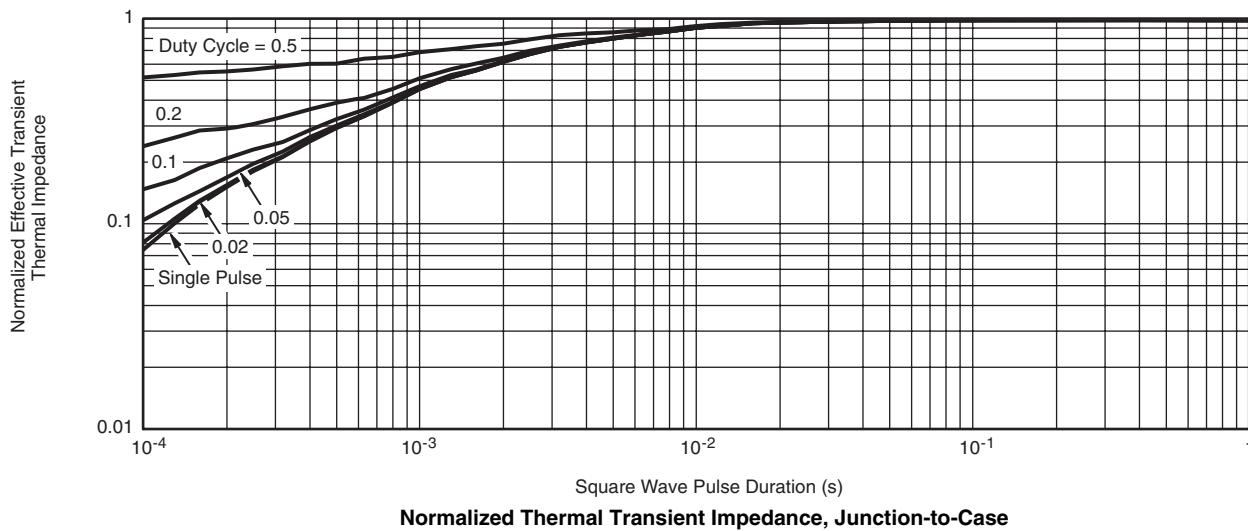
On-Resistance vs. Junction Temperature



Avalanche Current vs. Time

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Safe Operating Area

Power Derating, Junction-to-Case

Current Derating*

* The power dissipation P_D is based on $T_{J(\text{max.})} = 175^\circ\text{C}$, 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

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