

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
30	0.0036 at $V_{GS} = 10$ V	85 ^d	67
	0.0044 at $V_{GS} = 4.5$ V	85 ^d	

FEATURES

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

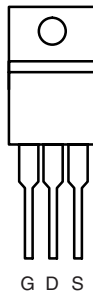


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

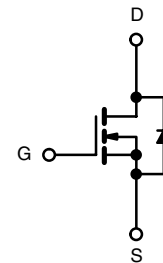
- Power Supply
 - Secondary Synchronous Rectification
- DC/DC Converter

TO-220AB



Top View

Ordering Information: SUP85N03-3m6P-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	30	V	
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	85 ^d	A
		$T_C = 70$ °C	85 ^d	
Pulsed Drain Current	I_{DM}	120		
Avalanche Current	I_{AS}	45		
Single Avalanche Energy ^a	E_{AS}	101	mJ	
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	78.1 ^b	W
		$T_A = 25$ °C ^c	3.1	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°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}	1.6	

Notes:

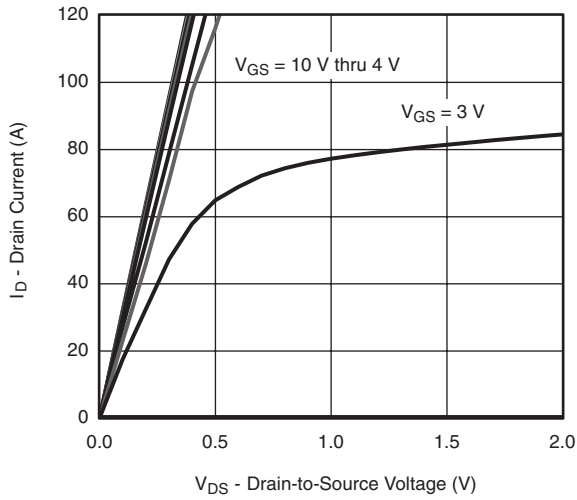
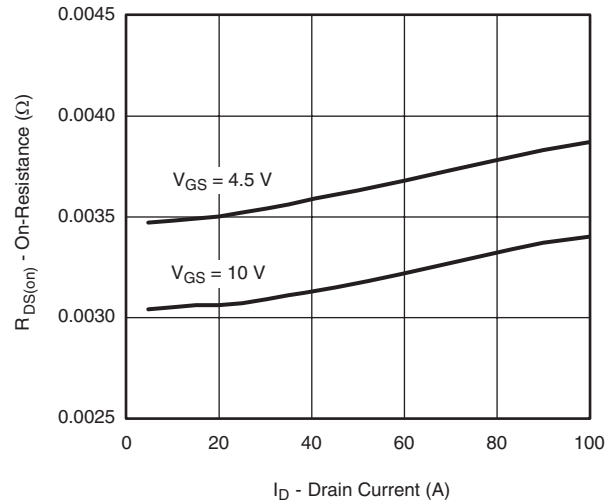
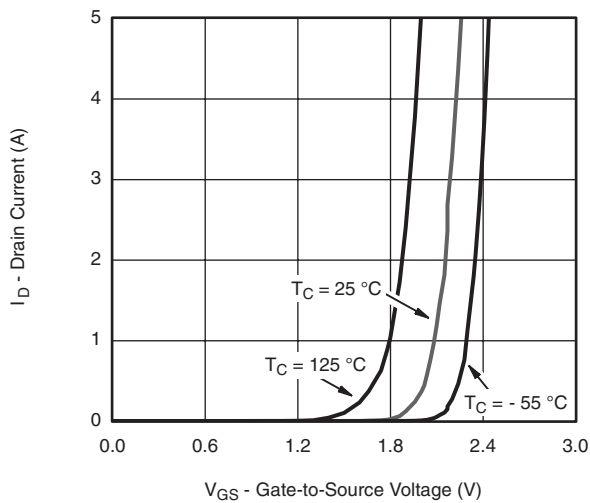
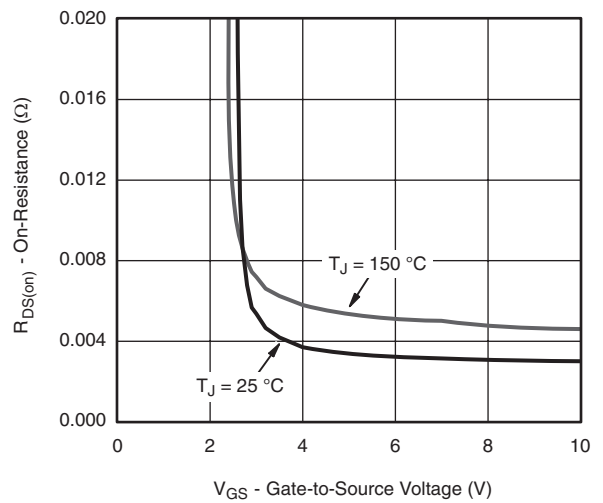
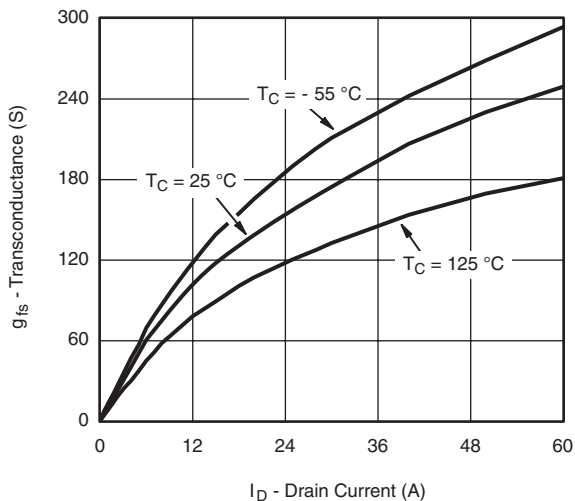
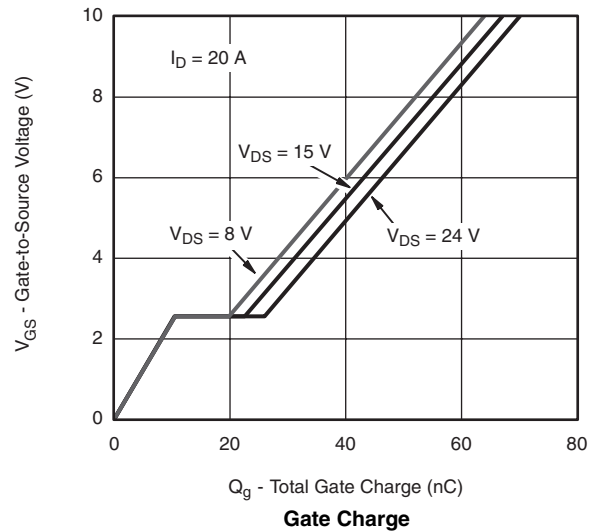
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).
- Package limited.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		2.5	
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}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 22\text{ A}$		0.0030	0.0036	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0036	0.0044	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		110		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}, f = 1\text{ MHz}$		3535		μF
Output Capacitance	C_{oss}			680		
Reverse Transfer Capacitance	C_{rss}			400		
Total Gate Charge ^c	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		67	100	nC
Gate-Source Charge ^c	Q_{gs}			10.5		
Gate-Drain Charge ^c	Q_{gd}			12.2		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.3	1.4	2.8	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D = 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		11	20	ns
Rise Time ^c	t_r			10	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			35	53	
Fall Time ^c	t_f			10	20	
Drain-Source Body Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	I_S				85	A
Pulsed Current	I_{SM}				120	
Forward Voltage ^a	V_{SD}	$I_F = 10\text{ A}, V_{GS} = 0\text{ V}$		0.83	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		41	62	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2	3	A
Reverse Recovery Charge	Q_{rr}			40	60	nC

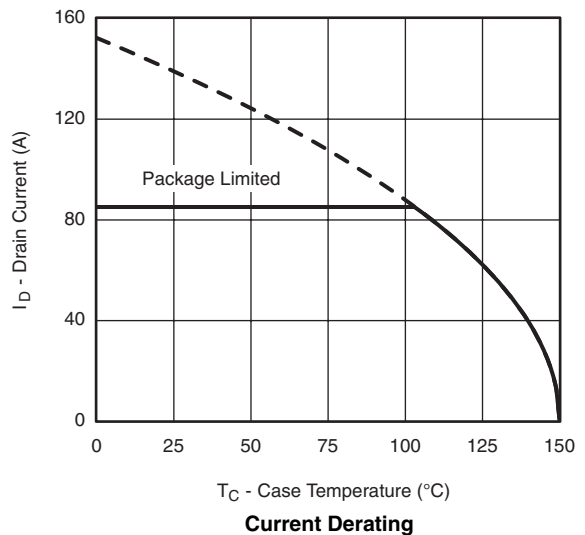
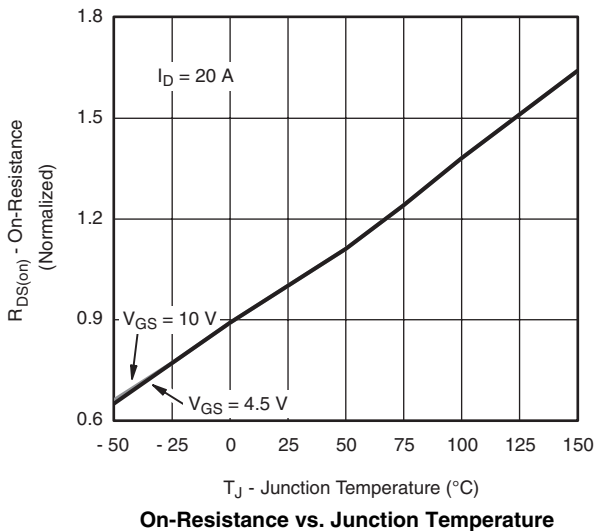
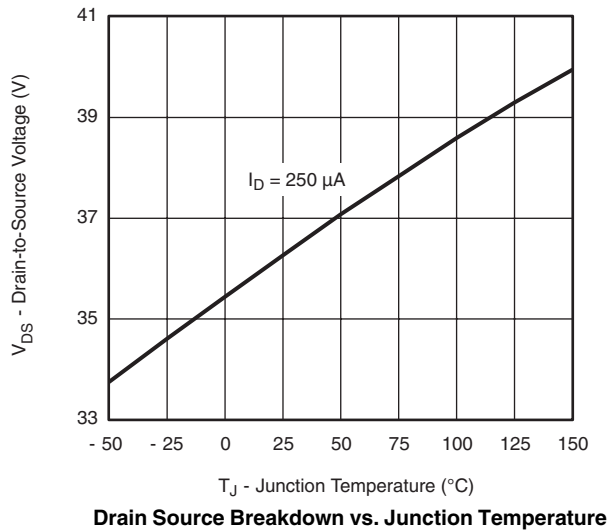
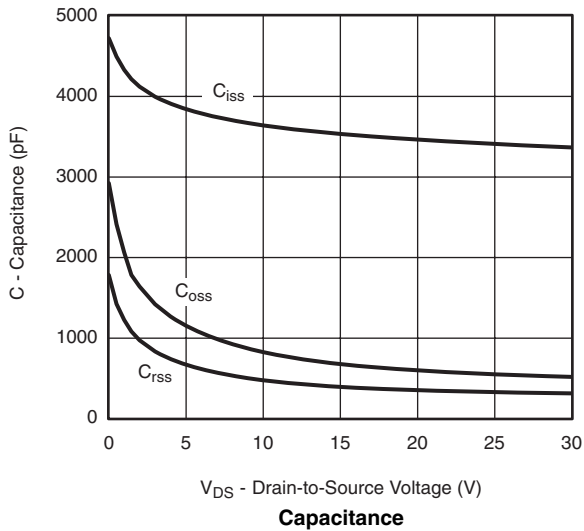
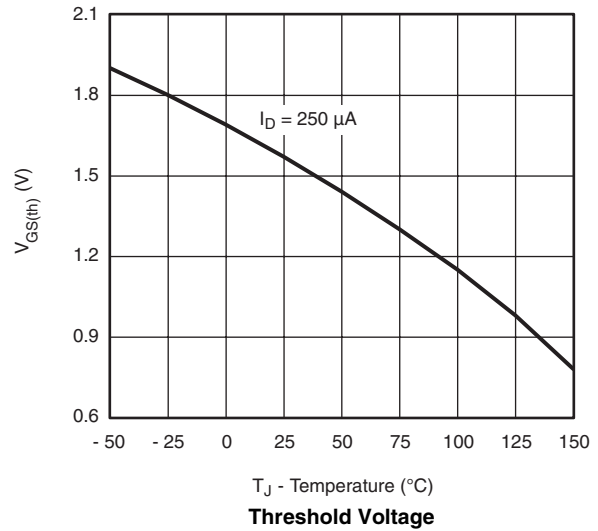
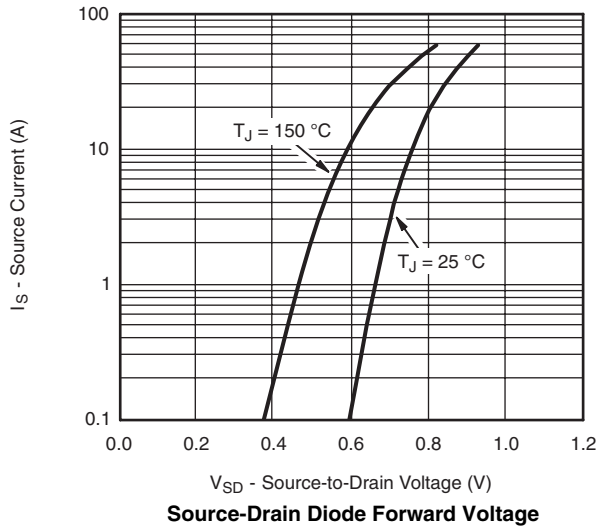
Notes:

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

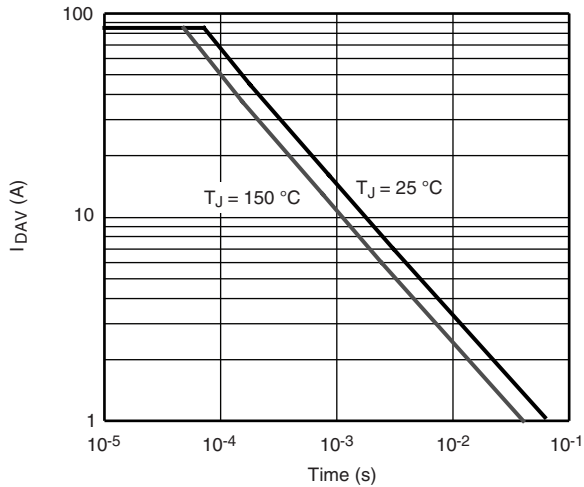
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

On-Resistance vs. Drain Current

Transfer Characteristics

On-Resistance vs. Gate-to-Source Voltage

Transconductance

Gate Charge

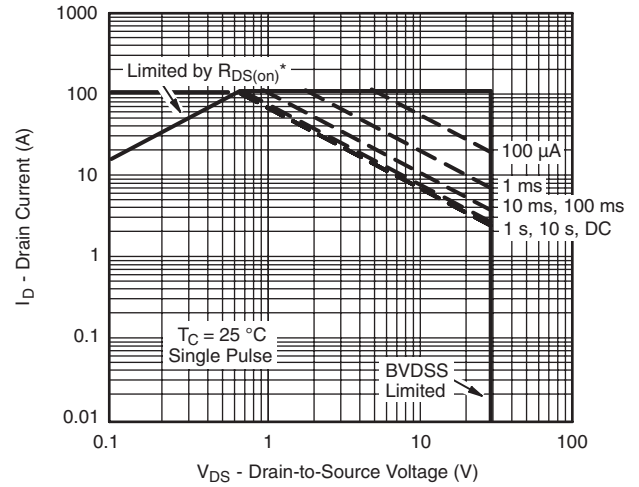
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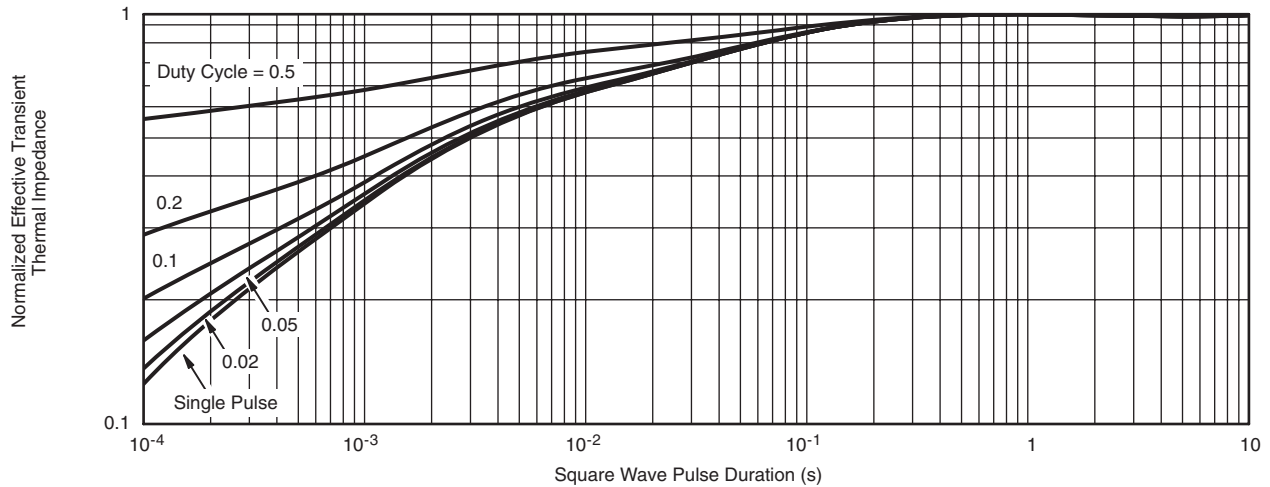
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Single Pulse Avalanche Current Capability vs. Time



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



Normalized Thermal Transient Impedance, Junction-to-Case

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