

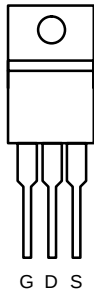


N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

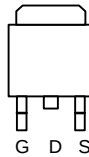
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
30	0.0043 @ $V_{GS} = 10$ V	85 ^a
	0.007 @ $V_{GS} = 4.5$ V	85 ^a

TO-220AB

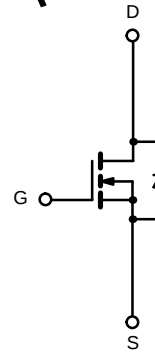
Top View
SUP85N03-04P

DRAIN connected to TAB

TO-263

Top View
SUB85N03-04P

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	85 ^a	A
	$T_C = 100^\circ\text{C}$		85 ^a	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current		I_{AR}	75	mJ
Repetitive Avalanche Energy ^b		E_{AR}	280	
Maximum Power Dissipation ^b	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	P_D	166 ^c	W
	$T_A = 25^\circ\text{C}$ (TO-263) ^d		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount (TO-263) ^d	R_{thJA}	40	$^\circ\text{C/W}$
	Free Air (TO-220AB)		62.5	
Junction-to-Case		R_{thJC}	0.9	

Notes

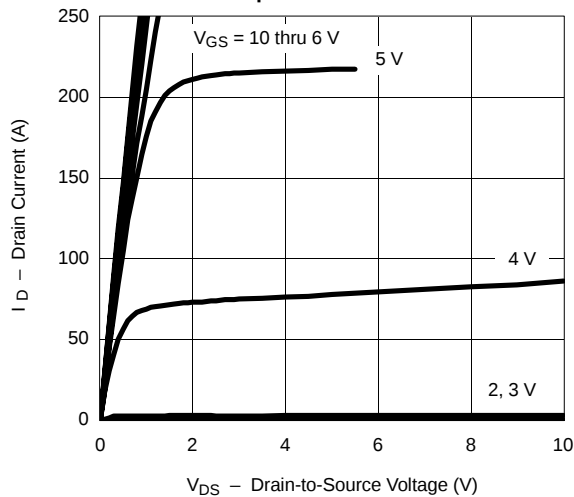
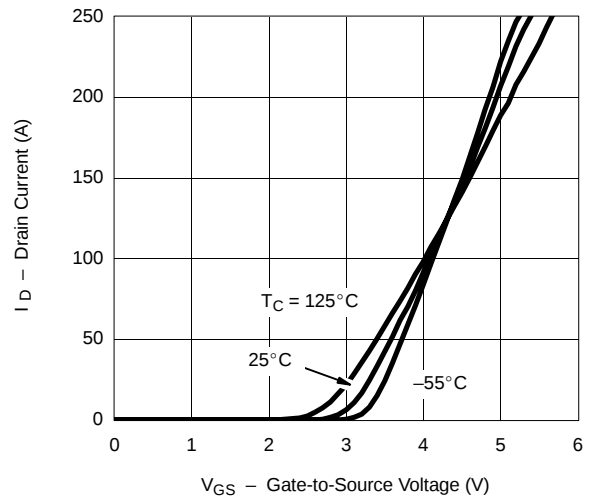
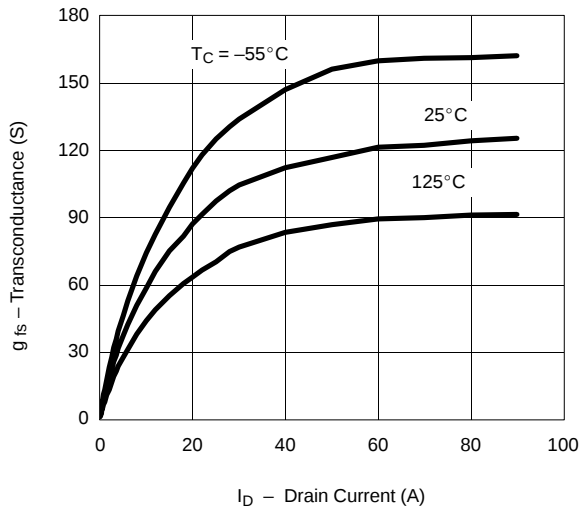
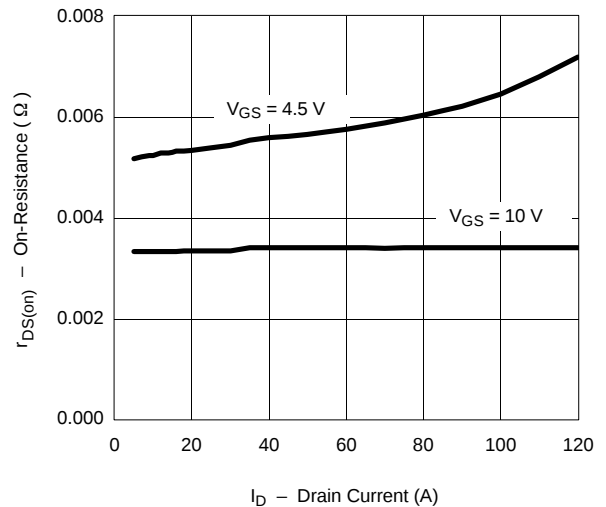
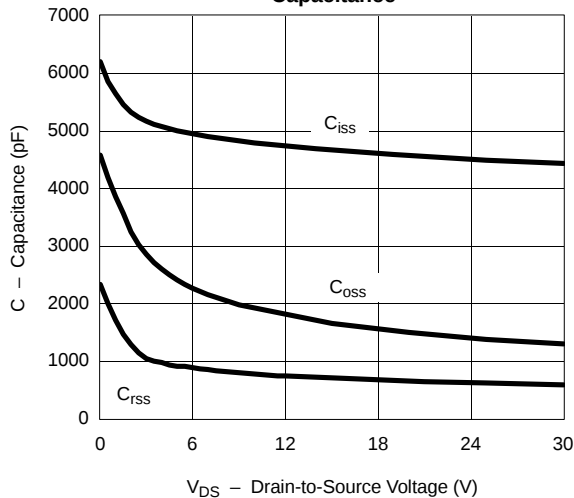
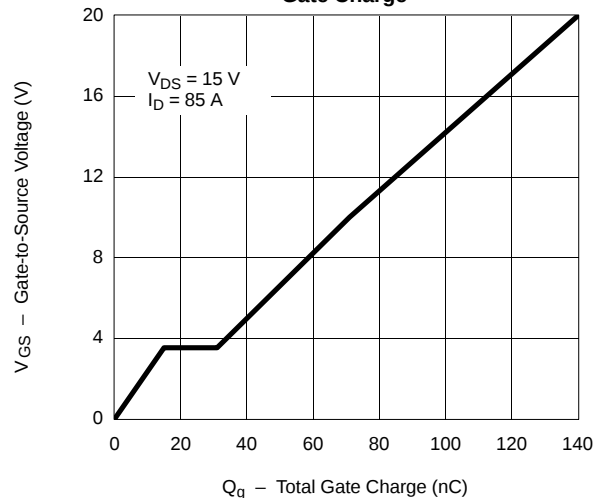
- Package limited.
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

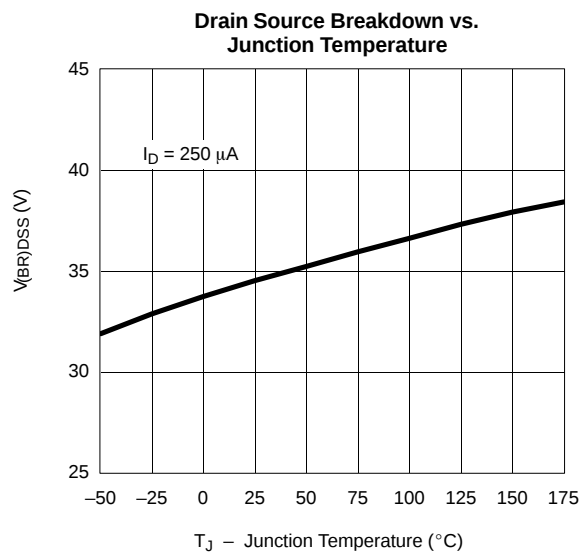
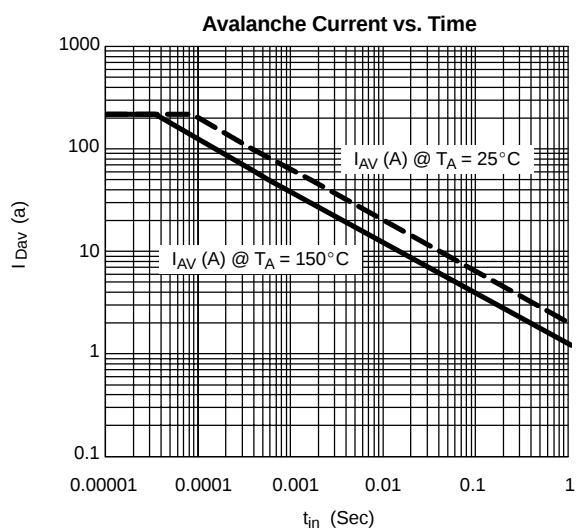
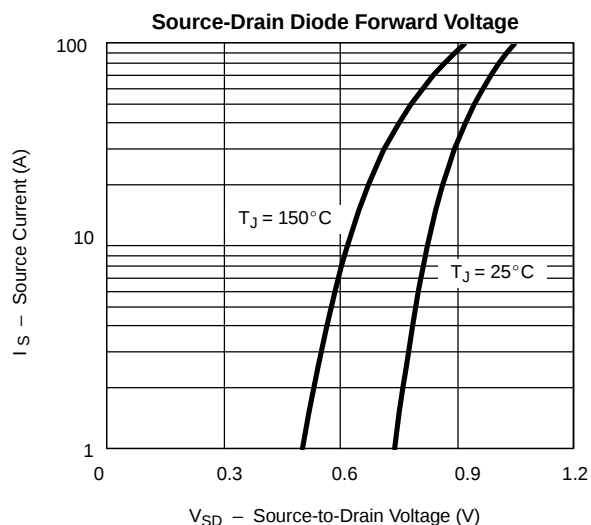
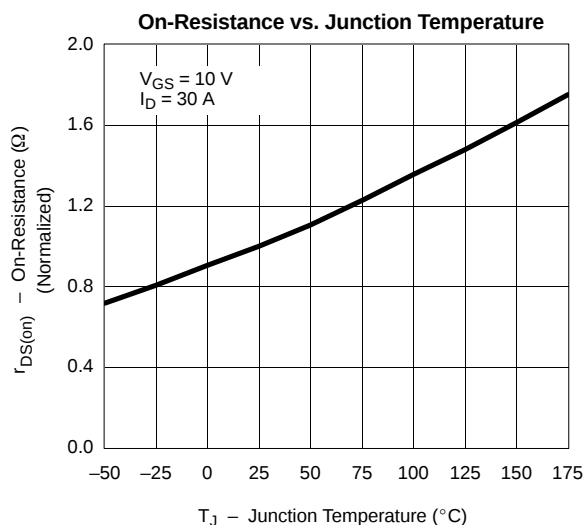
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	30			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1	2		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V			1	μA
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 175°C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	120			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		0.0035	0.0043	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125°C			0.0065	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175°C			0.008	
		V _{GS} = 4.5 V, I _D = 20 A		0.0055	0.007	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	30			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		4500		pF
Output Capacitance	C _{oss}			1380		
Reverse Transfer Capacitance	C _{rss}			615		
Total Gate Charge ^b	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 85 A		71	90	nC
Gate-Source Charge ^b	Q _{gs}			15		
Gate-Drain Charge ^b	Q _{gd}			16		
Turn-On Delay Time ^b	t _{d(on)}	V _{DD} = 15 V, R _L = 0.18 Ω I _D ≅ 85 A, V _{GEN} = 10 V, R _G = 2.5 Ω		15	23	ns
Rise Time ^b	t _r			12	18	
Turn-Off Delay Time ^b	t _{d(off)}			50	75	
Fall Time ^b	t _f			22	35	
Source-Drain Diode Ratings and Characteristics (T _C = 25°C) ^c						
Continuous Current	I _S				85	A
Pulsed Current	I _{SM}				240	
Forward Voltage ^a	V _{SD}	I _F = 85 A, V _{GS} = 0 V		1.1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 85 A, di/dt = 100 A/μs		42	70	ns
Peak Reverse Recovery Current	I _{RM}			1.4	2.1	A
Reverse Recovery Charge	Q _{rr}				0.03	0.06

Notes

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

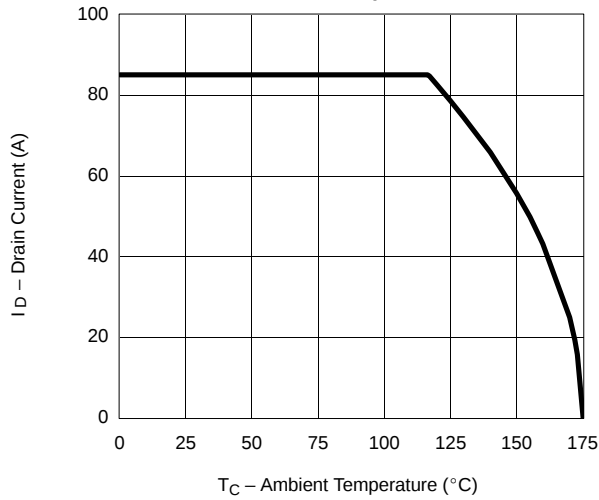
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

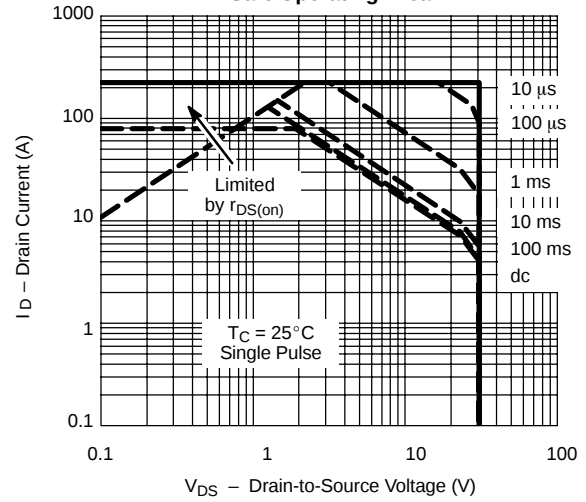


THERMAL RATINGS

Maximum Avalanche and Drain Current
vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

