

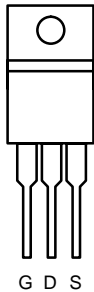


N-Channel 20-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
20	0.006 @ $V_{GS} = 4.5$ V	85
	0.009 @ $V_{GS} = 2.5$ V	85

175 °C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

TO-220AB

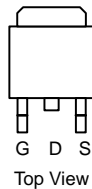


Top View

SUP85N02-06

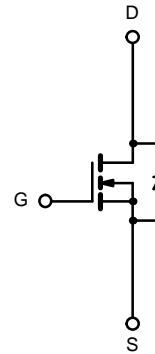
DRAIN connected to TAB

TO-263



Top View

SUB85N02-06



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	20	V	
Gate-Source Voltage	V_{GS}	± 12		
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	85 ^a	A
		$T_C = 100^\circ\text{C}$	75	
Pulsed Drain Current	I_{DM}	240		
Avalanche Current	I_{AR}	30		
Repetitive Avalanche Energy ^b	E_{AR}	L = 0.1 mH	45	mJ
Power Dissipation			$T_C = 25^\circ\text{C}$	120 ^a
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	R_{thJA}	PCB Mount (TO-263) ^c	40	$^\circ\text{C/W}$
		Free Air (TO-220AB)	62.5	
Junction-to-Case	R_{thJC}	1.25		

Notes:

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



MOSFET SPECIFICATIONS (T _J = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _{DS} = 250 μA	0.6			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 175°C			150	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 4.5 V	120			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 30 A			0.006	Ω
		V _{GS} = 4.5 V, I _D = 30 A, T _J = 125°C			0.009	
		V _{GS} = 4.5 V, I _D = 30 A, T _J = 175°C			0.0111	
		V _{GS} = 2.5 V, I _D = 20 A			0.009	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 30 A	20			S
Dynamic^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 20 V, f = 1 MHz		6600		pF
Output Capacitance	C _{oss}			1150		
Reverse Transfer Capacitance	C _{rss}			600		
Total Gate Charge ^c	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 85 A		65	130	nC
Gate-Source Charge ^c	Q _{gs}			13		
Gate-Drain Charge ^c	Q _{gd}			14		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 10 V, R _L = 0.12 Ω I _D = 85 A, V _{GEN} = 4.5 V, R _G = 2.5 Ω		25	40	ns
Rise Time ^c	t _r			120	180	
Turn-Off Delay Time ^c	t _{d(off)}			80	120	
Fall Time ^c	t _f			100	150	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)^b						
Pulsed Current	I _{SM}				240	A
Forward Voltage ^a	V _{SD}	I _F = 100 A, V _{GS} = 0 V		1.2	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		45	100	ns

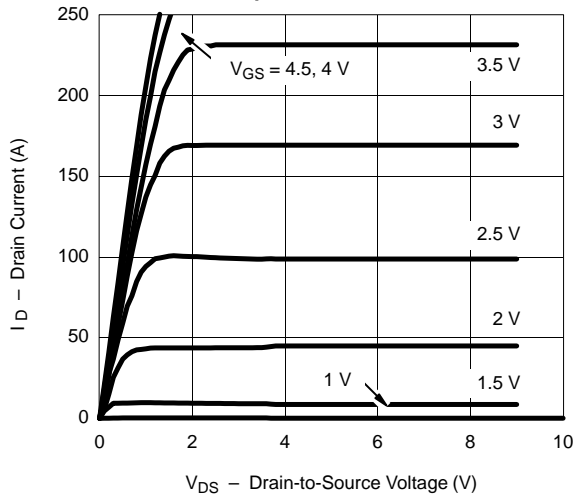
Notes:

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

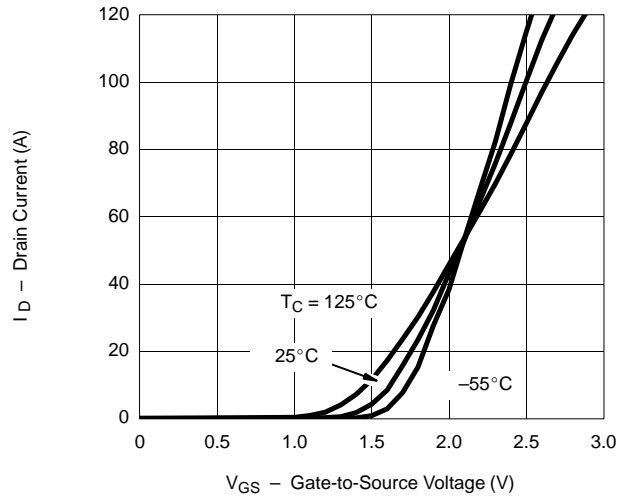


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

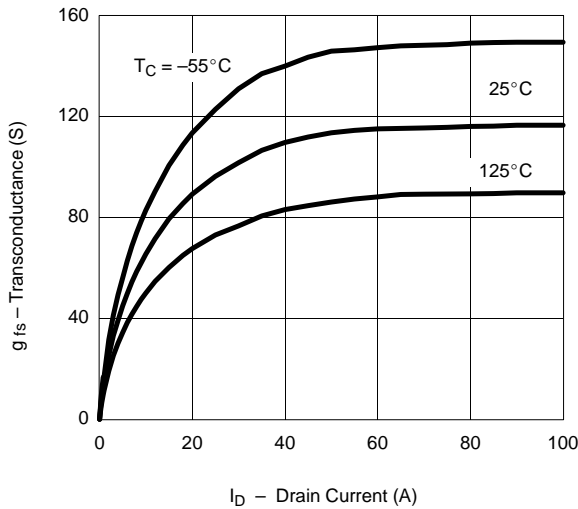
Output Characteristics



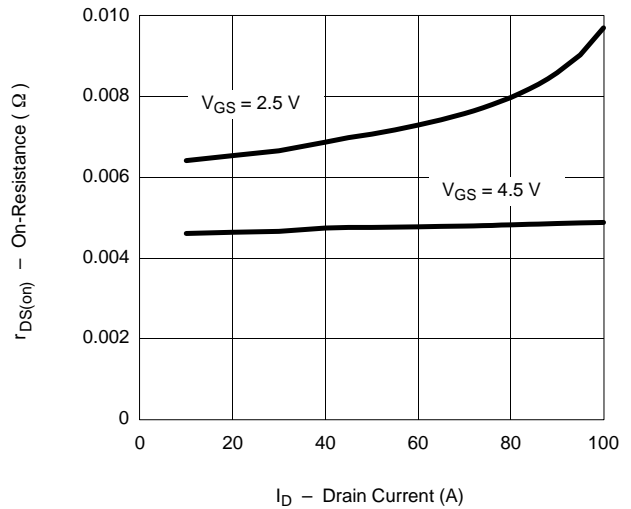
Transfer Characteristics



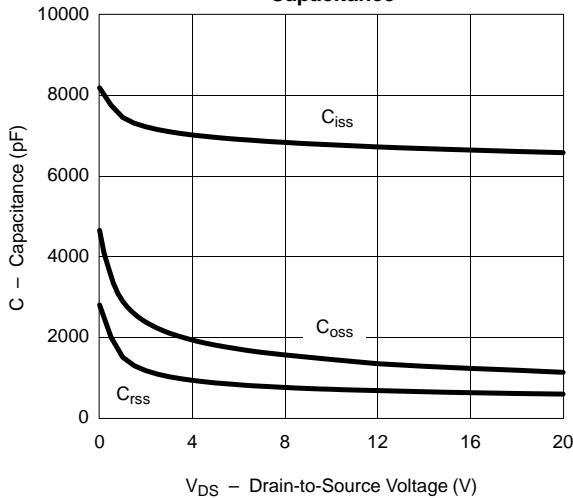
Transconductance



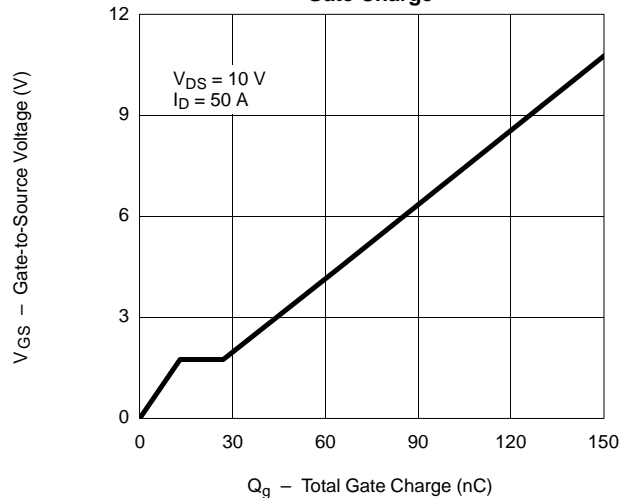
On-Resistance vs. Drain Current



Capacitance

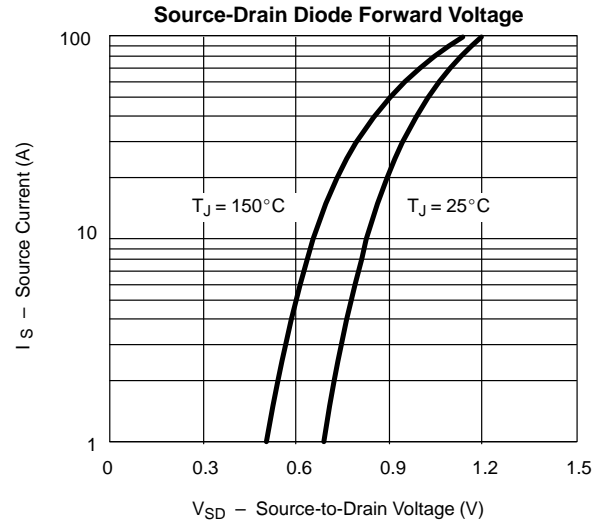
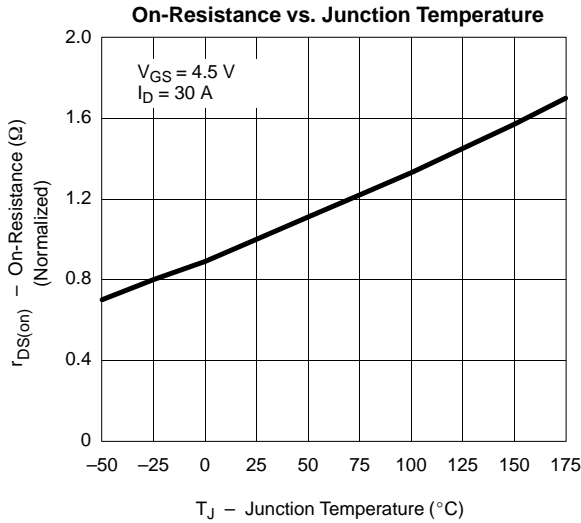


Gate Charge

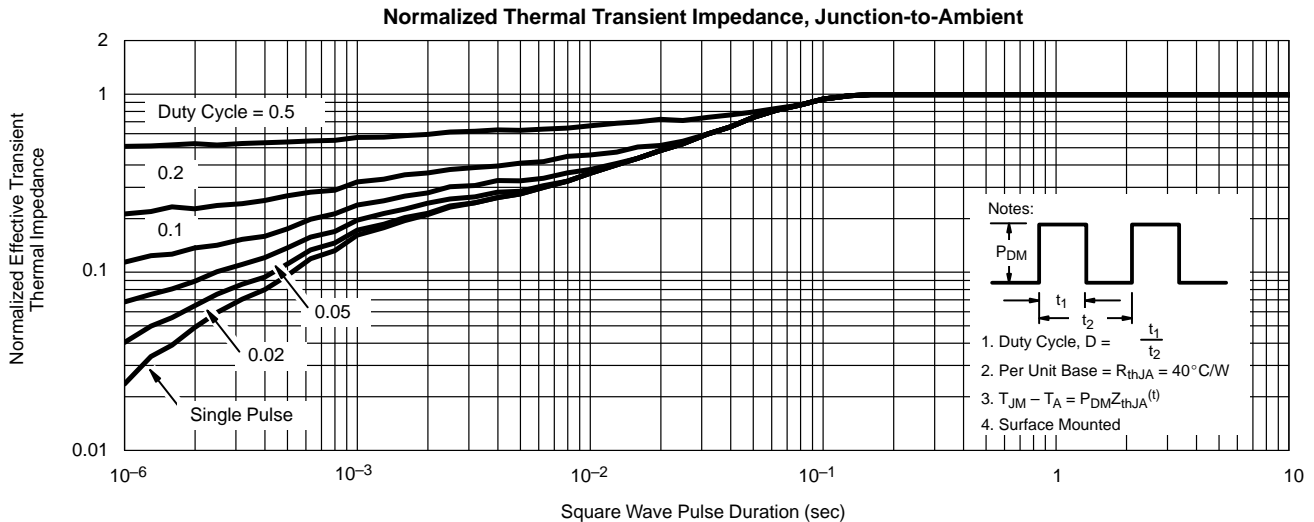
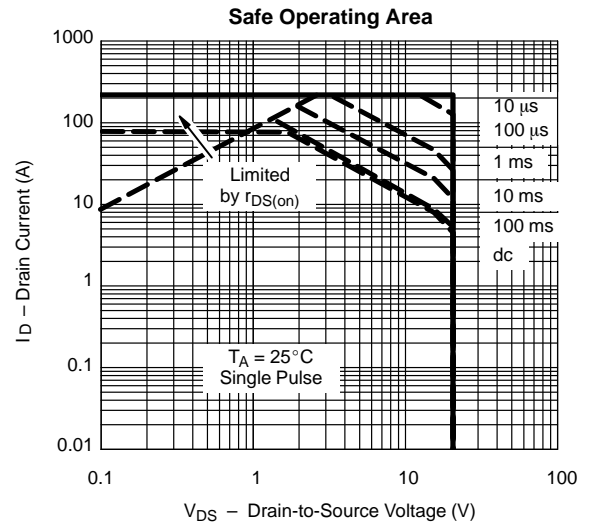
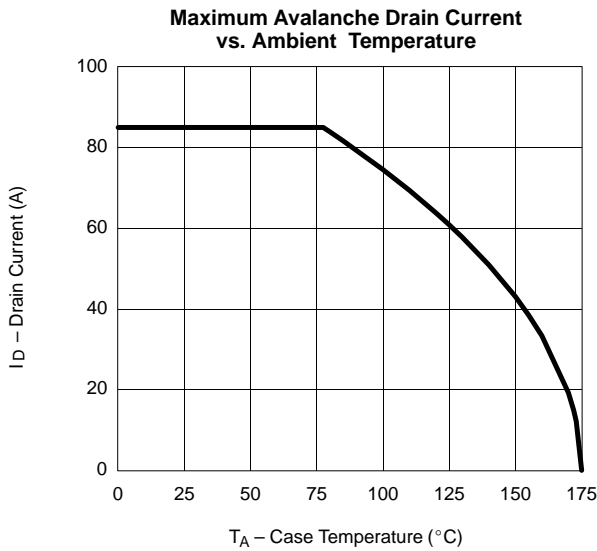




TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



THERMAL RATINGS





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