



N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0042 @ $V_{GS} = 10$ V	110
	0.0065 @ $V_{GS} = 4.5$ V	77

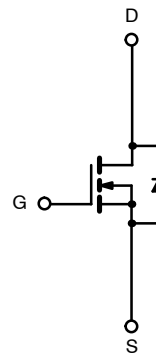
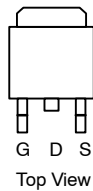
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- Optimized for Low-Side Synchronous Rectifier Operation
- New Package with Low Thermal Resistance
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
- Synchronous Rectifier

TO-263



N-Channel MOSFET

Ordering Information: SUM110N03-04P
SUM110N03-04P-E3 (Lead Free)

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 ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current	I_{DM}	300	
Avalanche Current	I_{AR}	55	
Repetitive Avalanche Energy ^a	E_{AR}	151	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25^\circ\text{C}$	120 ^b
		$T_A = 25^\circ\text{C}^c$	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	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case	R_{thJC}	1.25	

Notes

- 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	$V_{(BR)DSS}$	$V_{DS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1		3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	120			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0033	0.0042	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125^\circ\text{C}$			0.0063	
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 175^\circ\text{C}$			0.0076	
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0052	0.0065	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		5100		μF
Output Capacitance	C_{oss}			860		
Reverse Transfer Capacitance	C_{rss}			430		
Gate-Resistance	R_g		0.5	1.0	1.7	Ω
Total Gate Charge ^b	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 50\text{ A}$		40	60	nC
Gate-Source Charge ^b	Q_{gs}			18		
Gate-Drain Charge ^b	Q_{gd}			16		
Turn-On Delay Time ^b	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.3\ \Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\ \Omega$		12	20	ns
Rise Time ^b	t_r			12	20	
Turn-Off Delay Time ^b	$t_{d(off)}$			40	60	
Fall Time ^b	t_f			10	15	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)^c						
Continuous Current	I_S				100	A
Pulsed Current	I_{SM}				300	
Forward Voltage ^a	V_{SD}	$I_F = 30\text{ A}, V_{GS} = 0\text{ V}$		1.2	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		40	80	ns

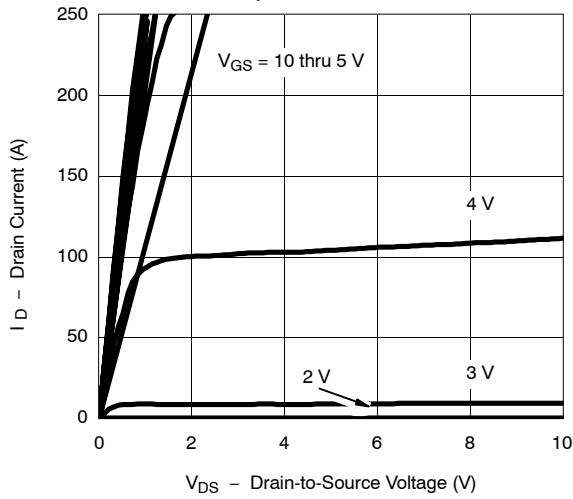
Notes

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

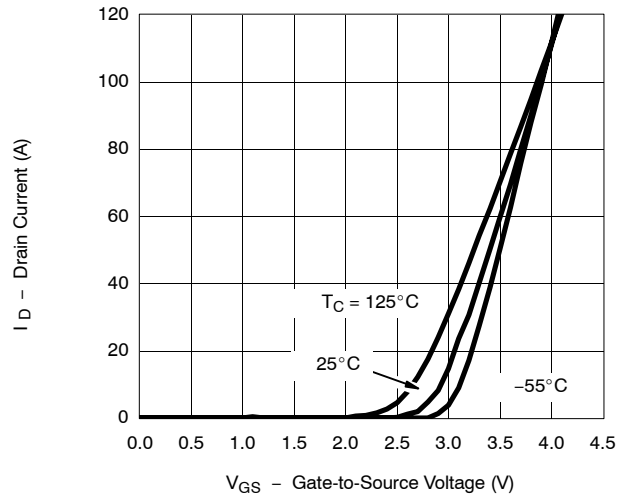


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

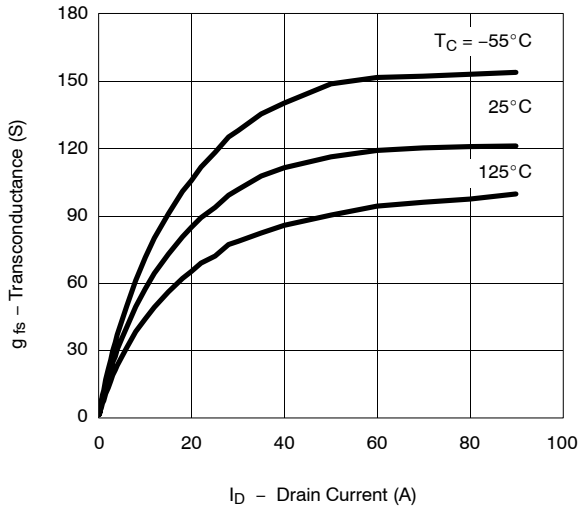
Output Characteristics



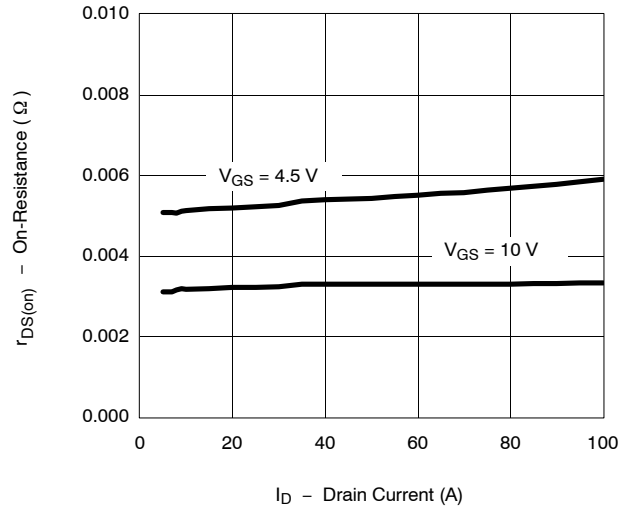
Transfer Characteristics



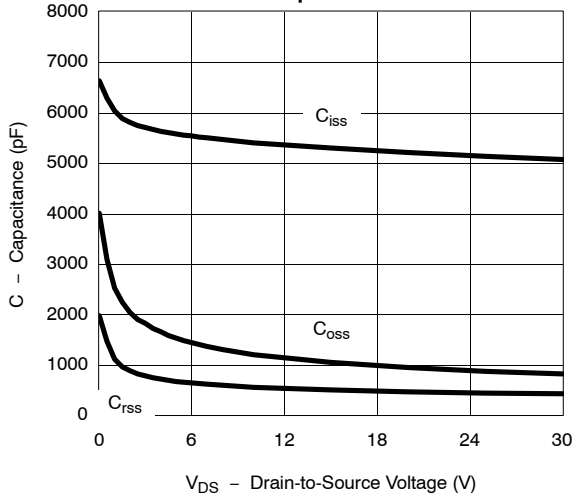
Transconductance



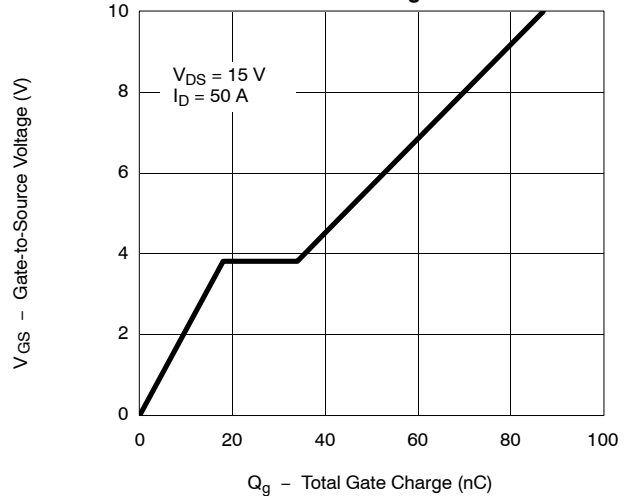
On-Resistance vs. Drain Current



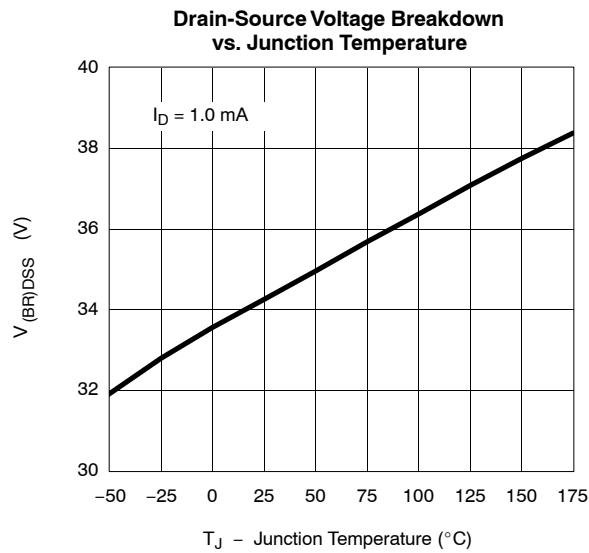
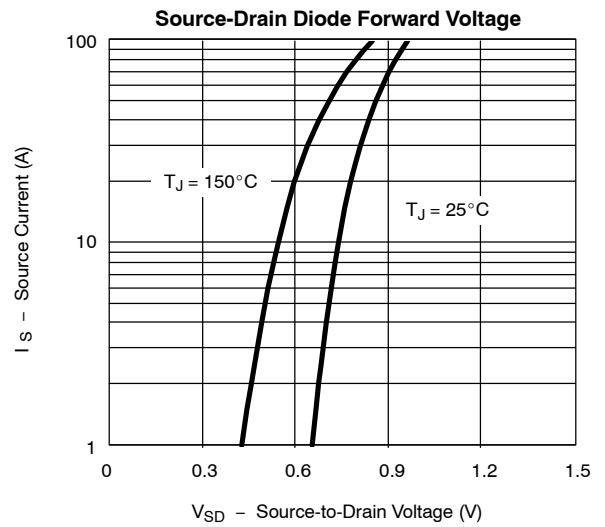
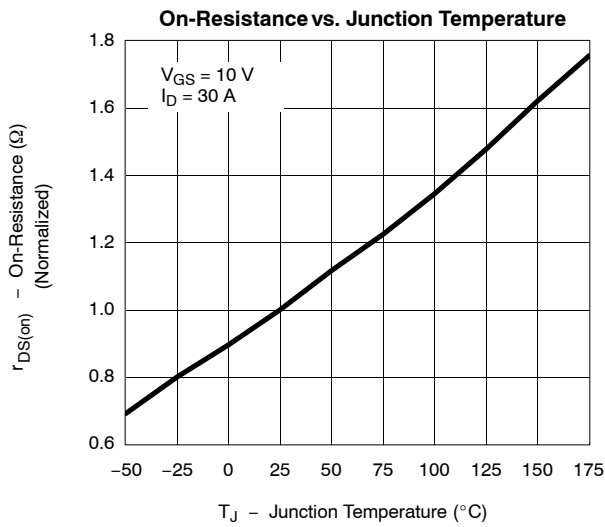
Capacitance



Gate Charge



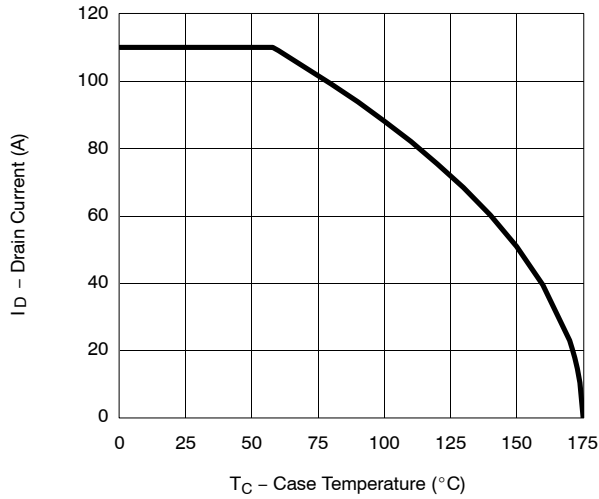
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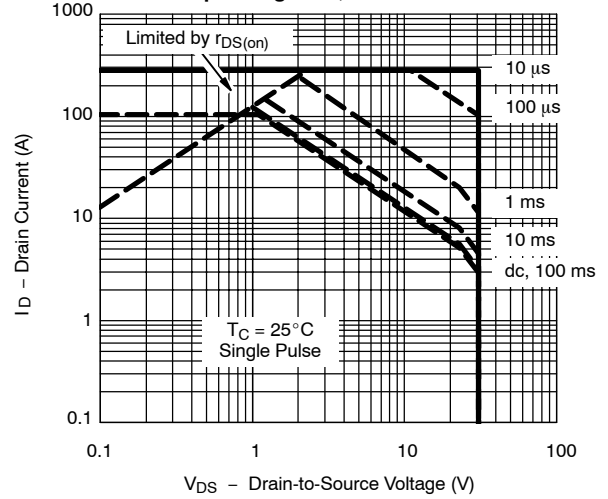


THERMAL RATINGS

Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case

