



## N-Channel 150-V (D-S) 175°C MOSFET

## PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
150	0.073 @ $V_{GS} = 10$ V	23
	0.077 @ $V_{GS} = 6$ V	22.5

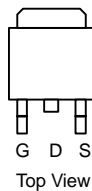
## FEATURES

- TrenchFET® Power MOSFETS
- 175°C Junction Temperature
- New Low Thermal Resistance Package
- PWM Optimized

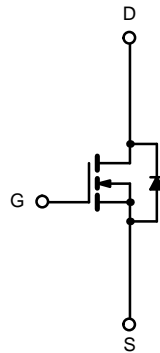
## APPLICATIONS

- Primary Side Switch

TO-263



Ordering Information: SUM23N15-73



N-Channel MOSFET

SUM23N15-73

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	150	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$T_C = 25^\circ\text{C}$	$I_D$	23	A
	$T_C = 125^\circ\text{C}$		13.4	
Pulsed Drain Current		$I_{DM}$	35	
Avalanche Current		$I_{AR}$	25	
Repetitive Avalanche Energy <sup>a</sup>		$E_{AR}$	31	mJ
Maximum Power Dissipation <sup>a</sup>	$T_C = 25^\circ\text{C}$	$P_D$	100 <sup>b</sup>	W
	$T_A = 25^\circ\text{C}^c$		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 (PCB Mount) <sup>c</sup>	$R_{thJA}$	40	$^\circ\text{C/W}$
Junction-to-Case (Drain)	$R_{thJC}$	1.5	

## Notes

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

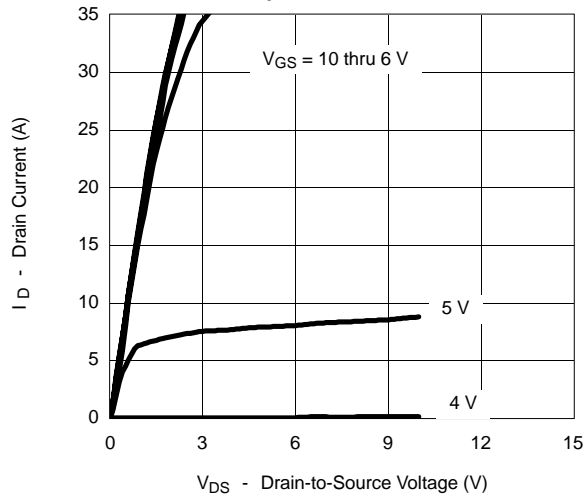
SPECIFICATIONS (T <sub>J</sub> =25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>DS</sub> = 0 V, I <sub>D</sub> = 250 μA	150			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2		4	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 120 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 120 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C			50	
		V <sub>DS</sub> = 120 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C			250	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	35			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		0.059	0.073	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 125°C			0.140	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 175°C			0.168	
		V <sub>GS</sub> = 6 V, I <sub>D</sub> = 10 A		0.062	0.077	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 25 A	10			S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		1290		pF
Output Capacitance	C <sub>oss</sub>			160		
Reverse Transfer Capacitance	C <sub>rss</sub>			70		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 75 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 23 A		22	35	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			6		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			7.5		
Gate Resistance	R <sub>G</sub>			4.0		Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 75 V, R <sub>L</sub> = 3.26 Ω I <sub>D</sub> ≅ 23 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		10	15	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			60	90	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			30	43	
Fall Time <sup>c</sup>	t <sub>f</sub>			45	70	
Source-Drain Diode Ratings and Characteristics (T <sub>C</sub> = 25 °C) <sup>b</sup>						
Continuous Current	I <sub>S</sub>				35	A
Pulsed Current	I <sub>SM</sub>				23	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 23 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 23 A, di/dt = 100 A/μs		100	150	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			5	8	A
Reverse Recovery Charge	Q <sub>rr</sub>				0.25	0.6

## Notes

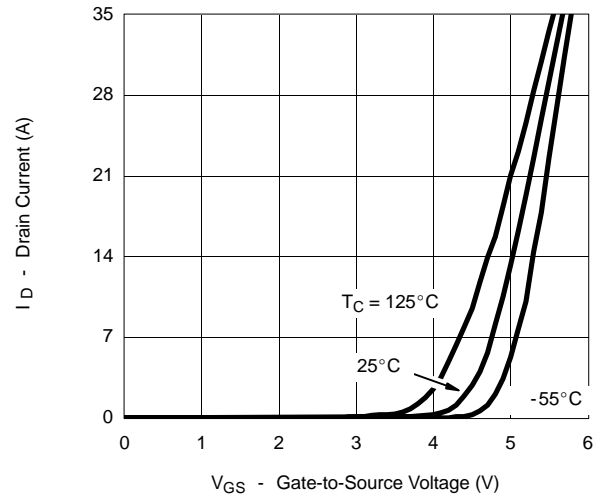
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.  
c. Independent of operating temperature.

### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

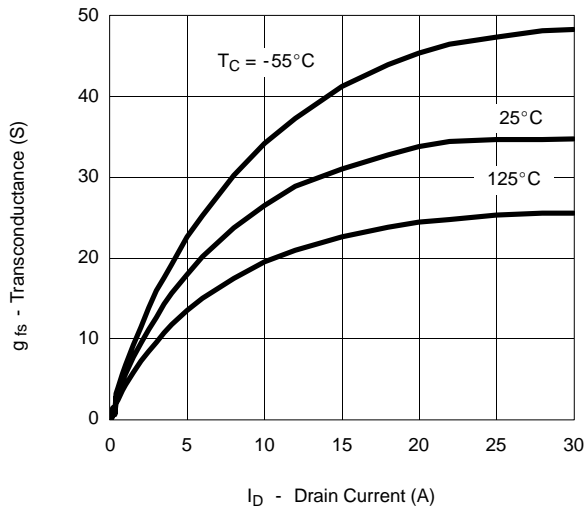
Output Characteristics



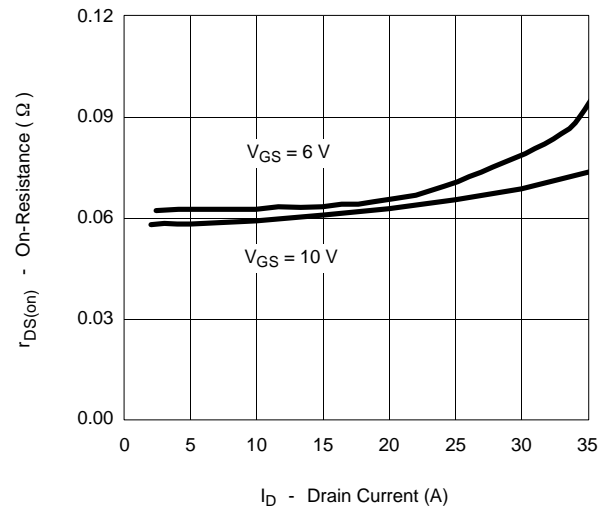
Transfer Characteristics



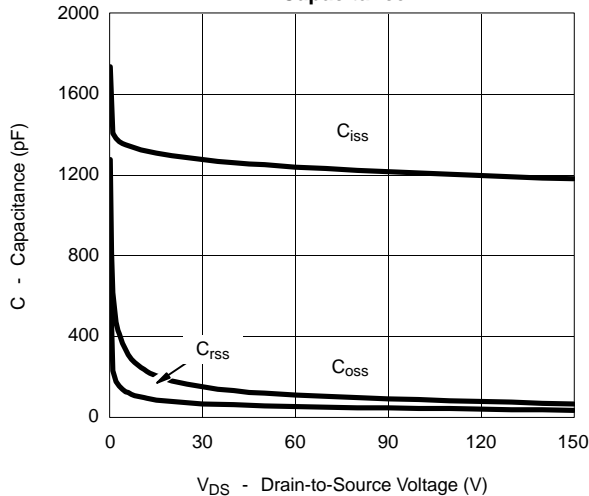
Transconductance



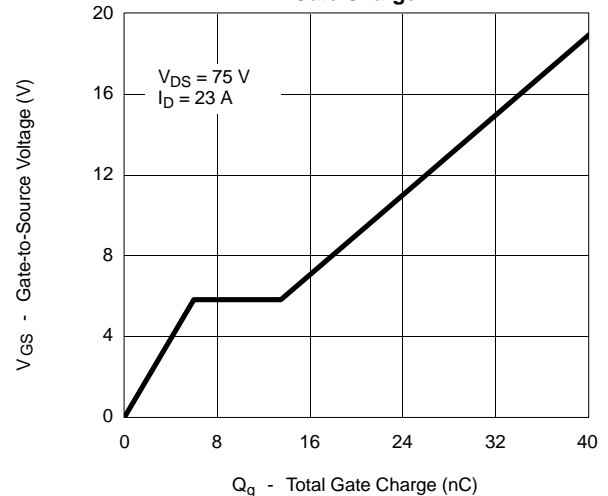
On-Resistance vs. Drain Current



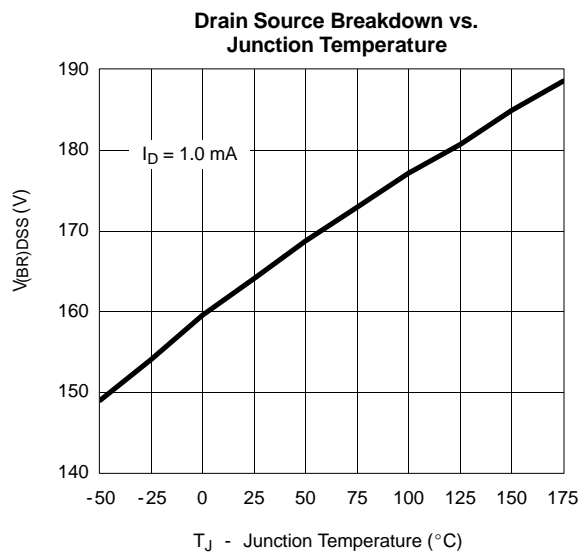
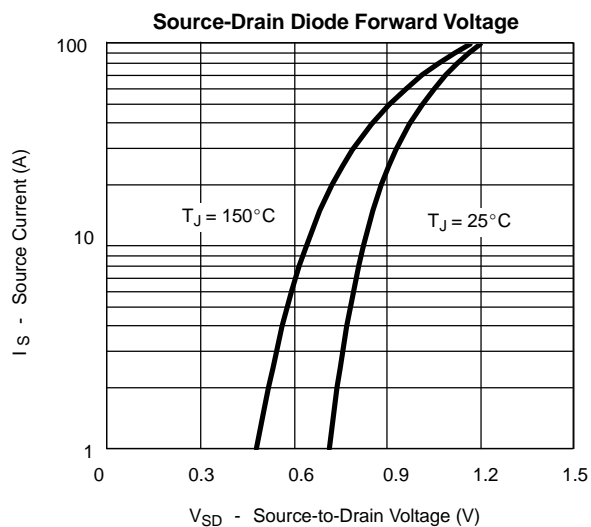
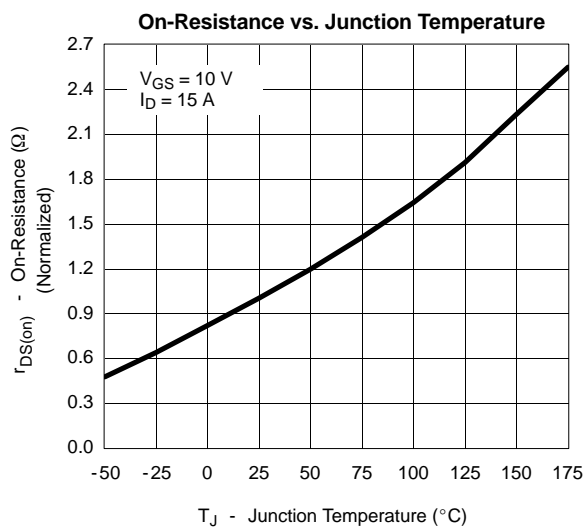
Capacitance

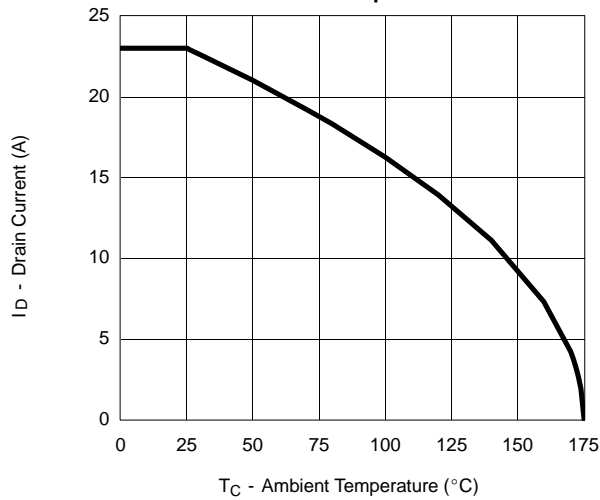
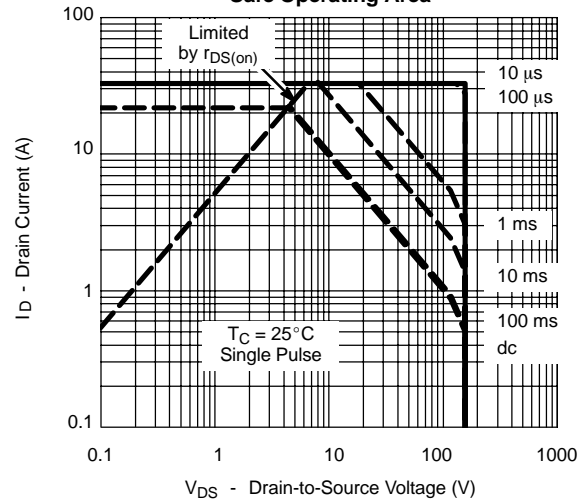


Gate Charge



## TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



**THERMAL RATINGS****Maximum Avalanche and Drain Current  
vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**