

N-Channel 150 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
150	0.073 at $V_{GS} = 10$ V	23
	0.077 at $V_{GS} = 6$ V	22.5

FEATURES

- TrenchFET® Power MOSFETS
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- PWM Optimized
- Compliant to RoHS Directive 2002/95/EC

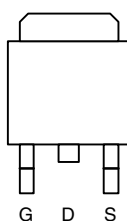


RoHS
COMPLIANT

APPLICATIONS

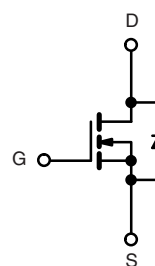
- Primary Side Switch

TO-263



Top View

Ordering Information: SUM23N15-73-E3 (Lead (Pb) free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 125$ °C	
Pulsed Drain Current	I_{DM}	35	
Avalanche Current	I_{AR}	25	
Repetitive Avalanche Energy ^a	E_{AR}	31	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	W
		$T_A = 25$ °C ^c	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°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}	1.5	

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

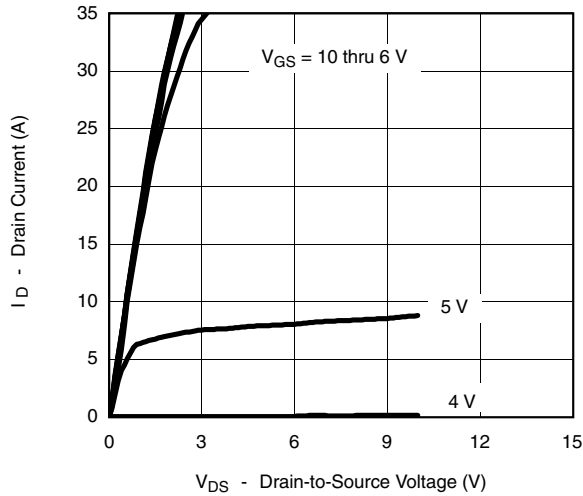
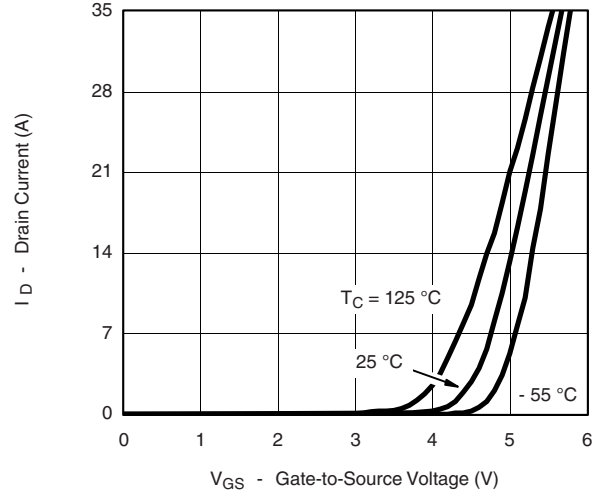
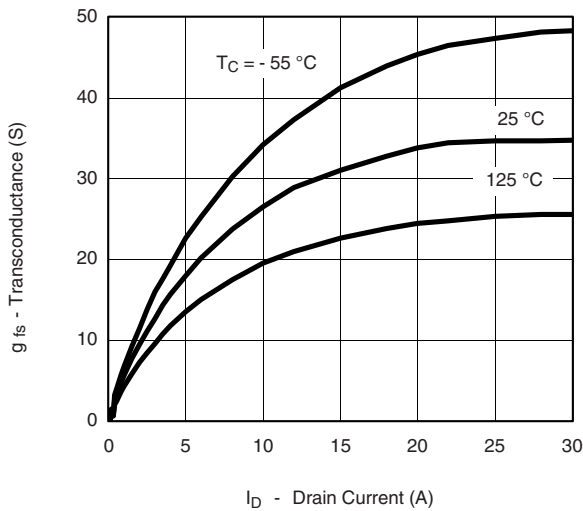
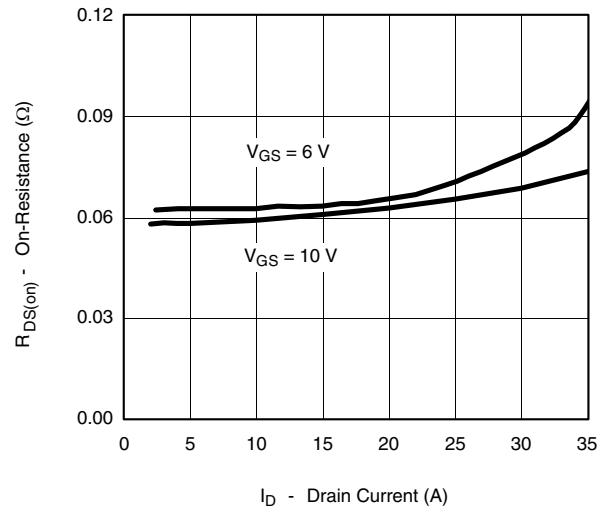
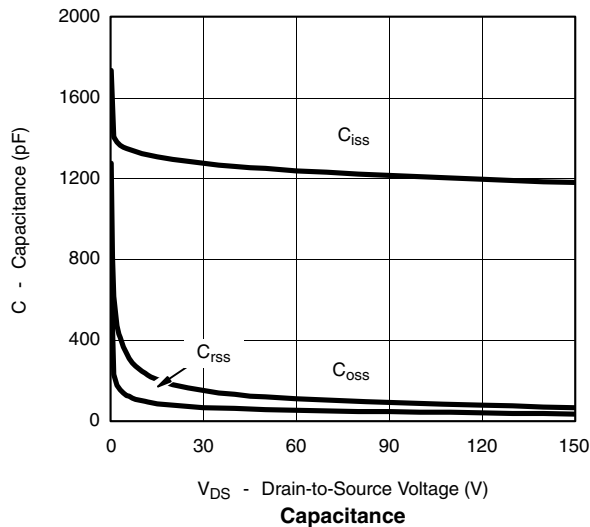
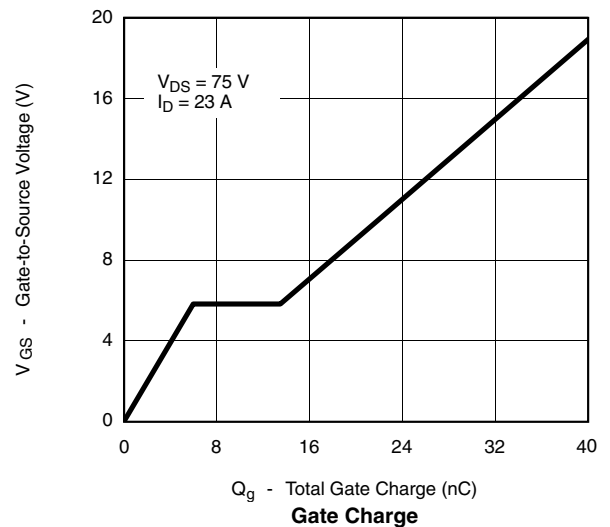
c. When mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2		4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 120 V, V _{GS} = 0 V			1	μA
		V _{DS} = 120 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 120 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	35			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 15 A		0.059	0.073	Ω
		V _{GS} = 10 V, I _D = 15 A, T _J = 125 °C			0.140	
		V _{GS} = 10 V, I _D = 15 A, T _J = 175 °C			0.168	
		V _{GS} = 6 V, I _D = 10 A		0.062	0.077	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 25 A	10			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1290		pF
Output Capacitance	C _{oss}			160		
Reverse Transfer Capacitance	C _{rss}			70		
Total Gate Charge ^c	Q _g	V _{DS} = 75 V, V _{GS} = 10 V, I _D = 23 A		22	35	nC
Gate-Source Charge ^c	Q _{gs}			6		
Gate-Drain Charge ^c	Q _{gd}			7.5		
Gate Resistance	R _G			4		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 75 V, R _L = 3.26 Ω I _D ≅ 23 A, V _{GEN} = 10 V, R _G = 2.5 Ω		10	15	ns
Rise Time ^c	t _r			60	90	
Turn-Off Delay Time ^c	t _{d(off)}			30	43	
Fall Time ^c	t _f			45	70	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C) ^b						
Continuous Current	I _S				35	A
Pulsed Current	I _{SM}				23	
Forward Voltage ^a	V _{SD}	I _F = 23 A, V _{GS} = 0 V		1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 23 A, dI/dt = 100 A/μs		100	150	ns
Peak Reverse Recovery Charge	I _{RM(REC)}			5	8	A
Reverse Recovery Charge	Q _{rr}				0.25	0.6

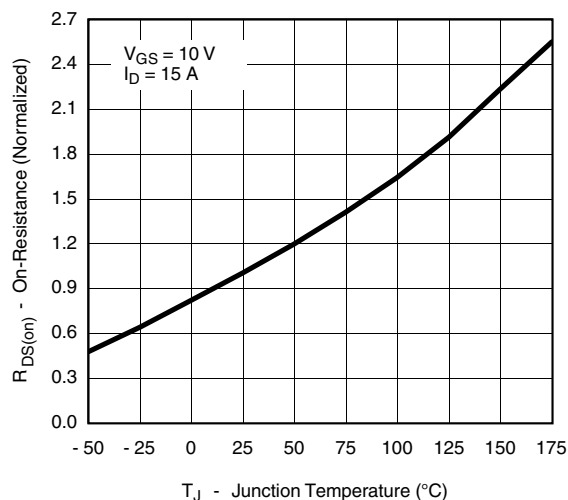
Notes:

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

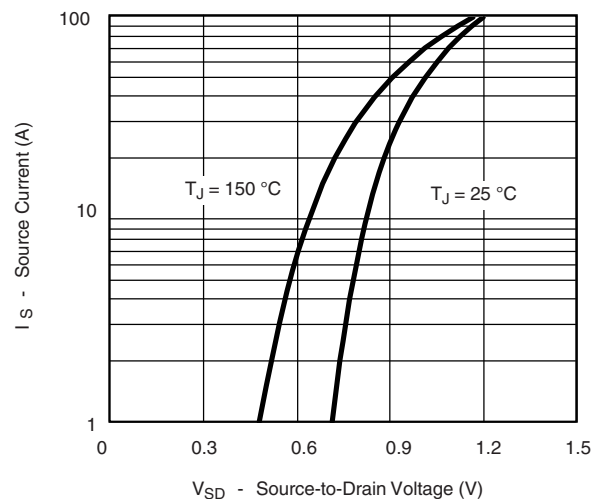
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C unless noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

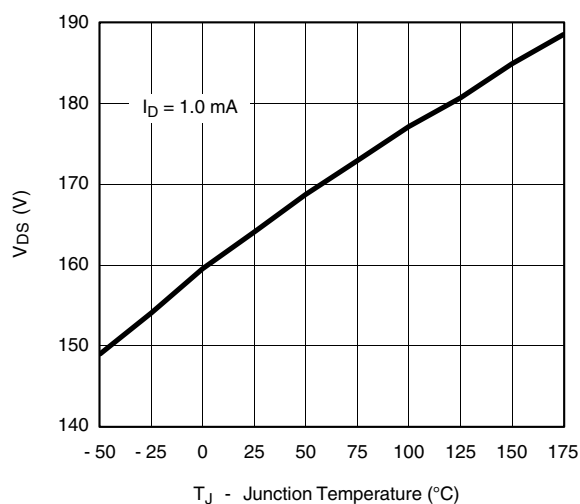
TYPICAL CHARACTERISTICS (25 °C unless noted)



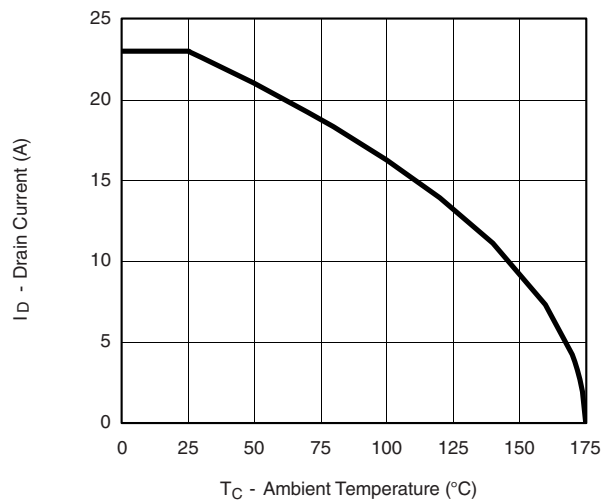
On-Resistance vs. Junction Temperature



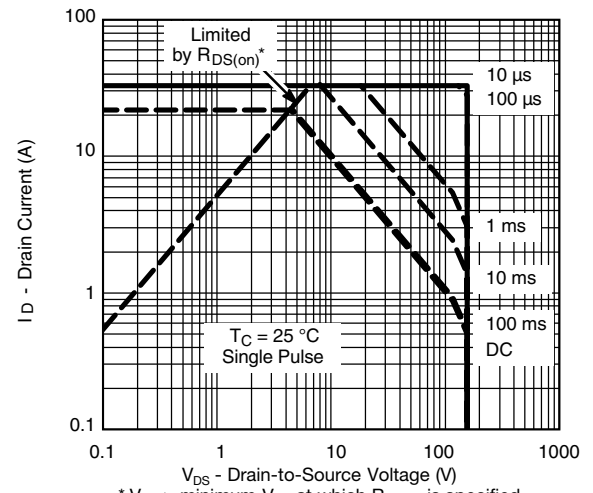
Source-Drain Diode Forward Voltage



Drain Source Breakdown vs. Junction Temperature

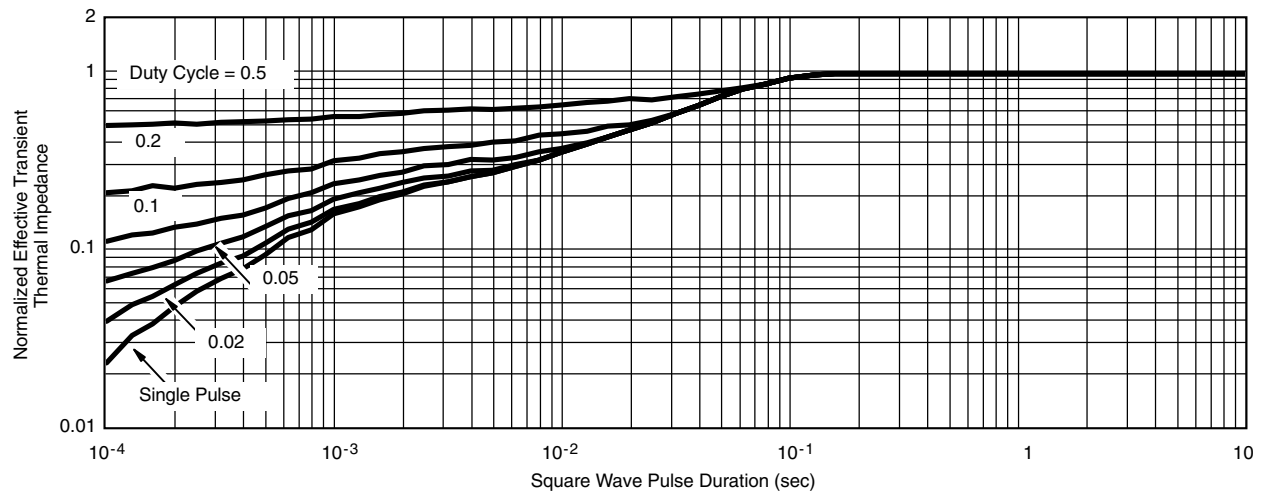
**THERMAL RATINGS**

**Maximum Avalanche and Drain Current
vs. Case Temperature**



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

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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