



N-Channel 250-V (D-S) 175°C MOSFET



RoHS
COMPLIANT

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
250	0.058 @ $V_{GS} = 10$ V	45
	0.062 @ $V_{GS} = 6$ V	43

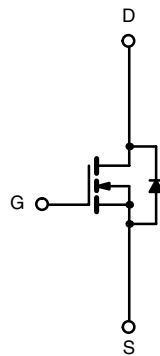
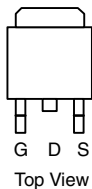
FEATURES

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

APPLICATIONS

- Primary Side Switch
- Plasma Display Panel Sustainer Function

TO-263



Ordering Information: SUM45N25-58-E3 (Lead (Pb)-Free)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	250	V	
Gate-Source Voltage	V_{GS}	± 30		
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	45	A
		$T_C = 125^\circ\text{C}$	25	
Pulsed Drain Current	I_{DM}	90		
Avalanche Current	I_{AR}	35		
Repetitive Avalanche Energy ^a	E_{AR}	$L = 0.1$ mH	61	mJ
Maximum Power Dissipation ^a			$T_C = 25^\circ\text{C}$	375 ^b
	$T_A = 25^\circ\text{C}$	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) ^c	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes

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

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 _{DS} = 0 V, I _D = 250 μA	250			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} = ±30 V			±250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 250 V, V _{GS} = 0 V			1	μA
		V _{DS} = 250 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 250 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	70			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.047	0.058	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.121	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C			0.163	
		V _{GS} = 6 V, I _D = 15 A,		0.049	0.062	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 20 A		70		S
Dynamic^b						
Input Capacitance	C _{iSS}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		5000		pF
Output Capacitance	C _{oss}			300		
Reverse Transfer Capacitance	C _{rSS}			170		
Total Gate Charge ^c	Q _g	V _{DS} = 125 V, V _{GS} = 10 V, I _D = 45 A		95	140	nC
Gate-Source Charge ^c	Q _{gs}			28		
Gate-Drain Charge ^c	Q _{gd}			34		
Gate Resistance	R _g	f = 1 MHz		1.6		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 100 V, R _L = 2.78 Ω I _D ≅ 45 A, V _{GEN} = 10 V, R _g = 2.5 Ω		22	35	ns
Rise Time ^c	t _r			220	330	
Turn-Off Delay Time ^c	t _{d(off)}			40	60	
Fall Time ^c	t _f			145	220	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b						
Continuous Current	I _S				45	A
Pulsed Current	I _{SM}				70	
Forward Voltage ^a	V _{SD}	I _F = 45 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 45 A, di/dt = 100 A/μs		150	225	ns
Peak Reverse Recovery Current	I _{RM(REC)}			12	18	A
Reverse Recovery Charge	Q _{rr}			0.9	2	μC

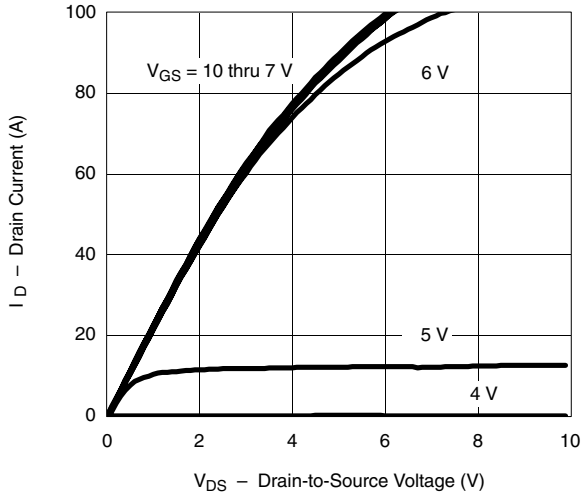
Notes

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

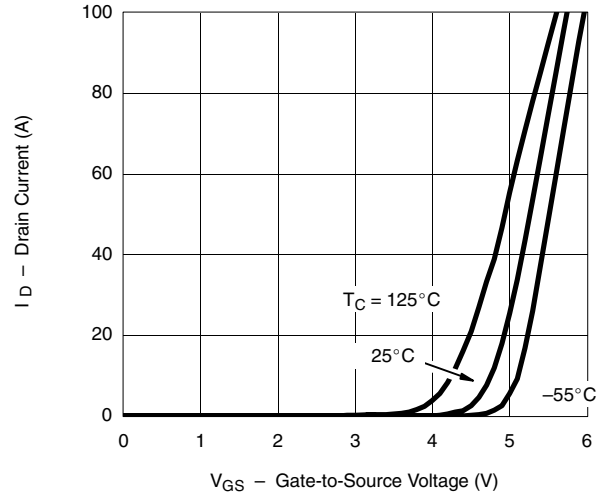


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

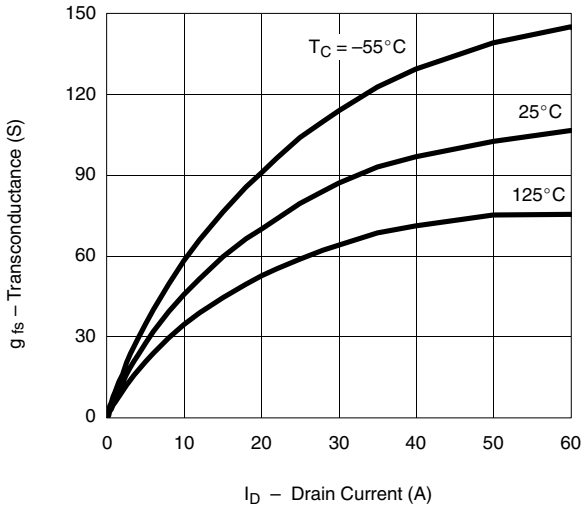
Output Characteristics



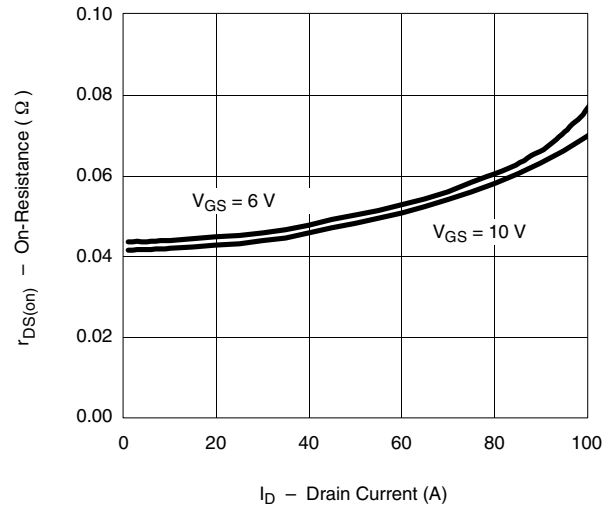
Transfer Characteristics



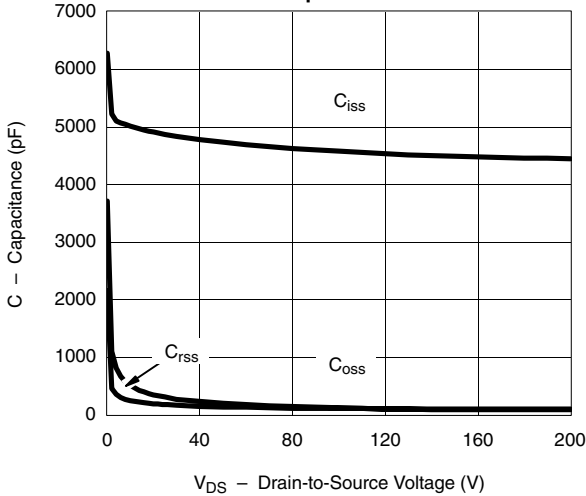
Transconductance



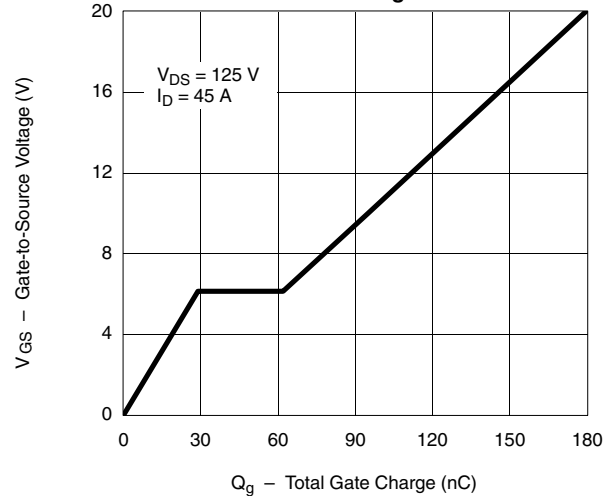
On-Resistance vs. Drain Current



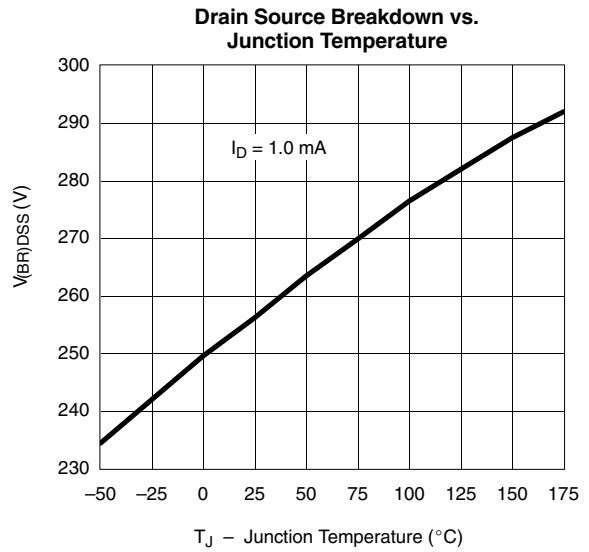
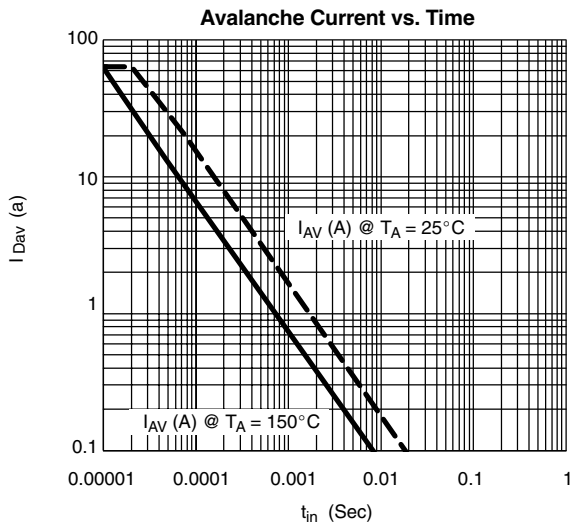
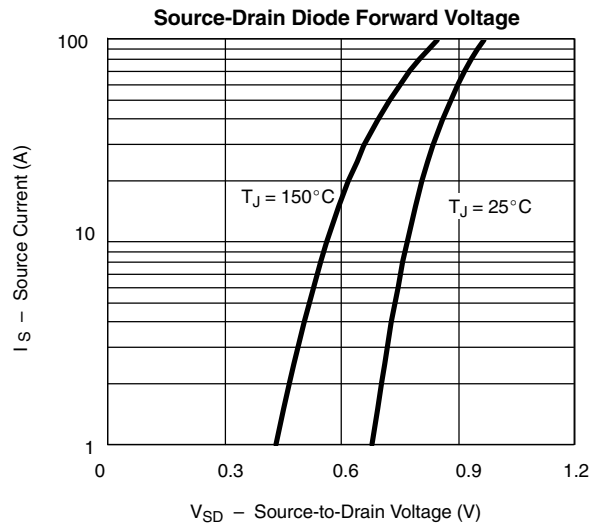
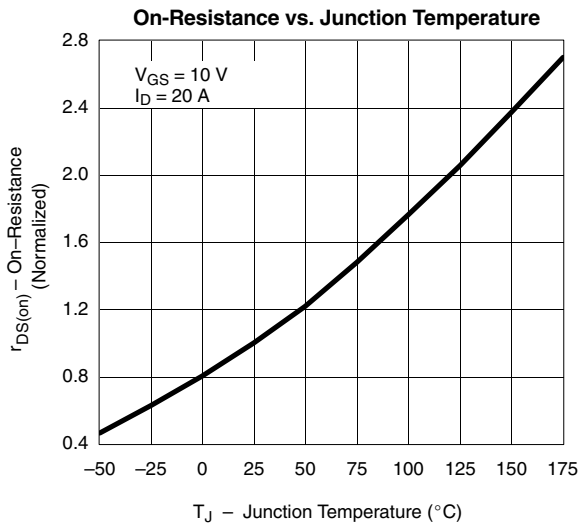
Capacitance



Gate Charge



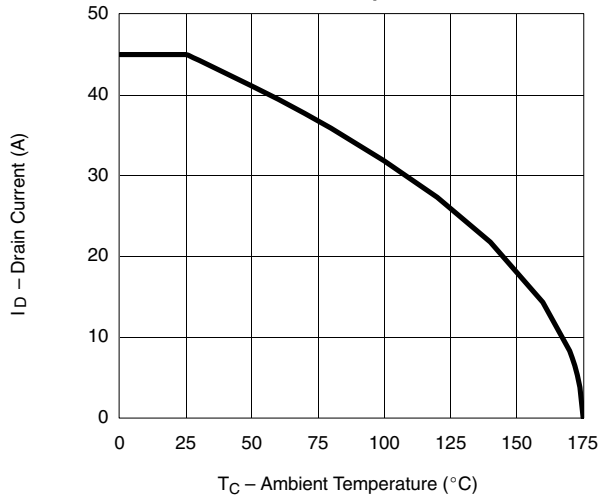
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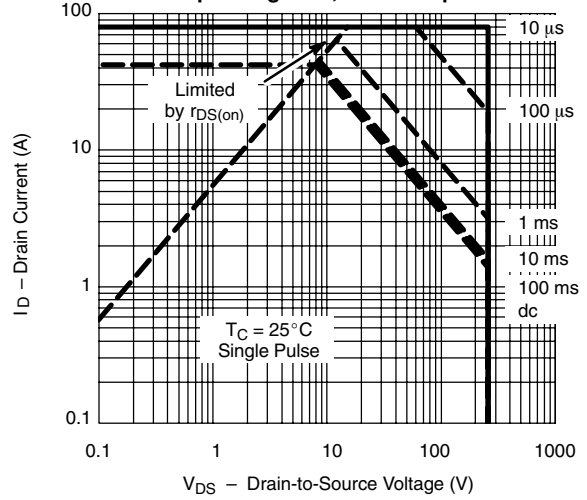


THERMAL RATINGS

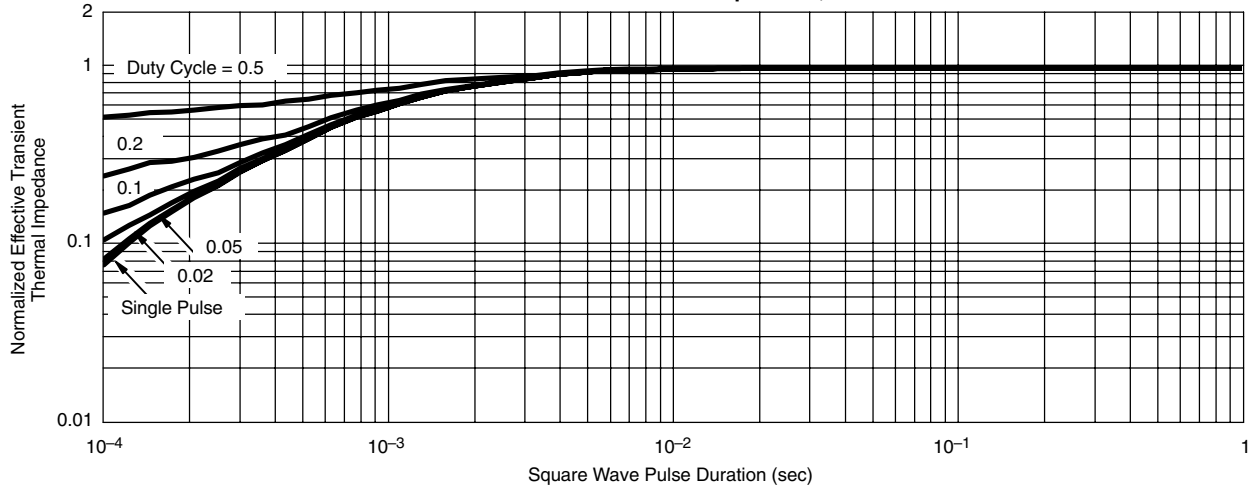
Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area, Case Temperature



Normalized Thermal Transient Impedance, Junction-to-Case





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