

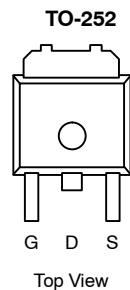


## N-Channel 40-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
40	0.010 @ $V_{GS} = 10$ V	30 <sup>a</sup>
	0.014 @ $V_{GS} = 4.5$ V	30 <sup>a</sup>

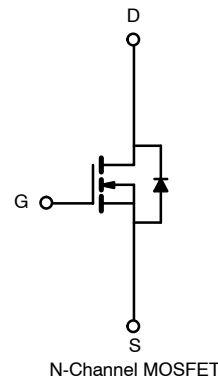
### FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100%  $R_g$  Tested



Drain Connected to Tab

Order Number:  
SUD30N04-10



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	40	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	30 <sup>a</sup>	A
		$T_C = 100^\circ\text{C}$	30 <sup>a</sup>	
Pulsed Drain Current	$I_{DM}$	120		
Avalanche Current	$I_{AR}$	50		
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	125	mJ	
Power Dissipation	$P_D$	97 <sup>c</sup>	W	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient	$R_{thJA}$	45	55	$^\circ\text{C/W}$	
		110	125		
Junction-to-Case	$R_{thJC}$	1.5	1.8		

Notes:

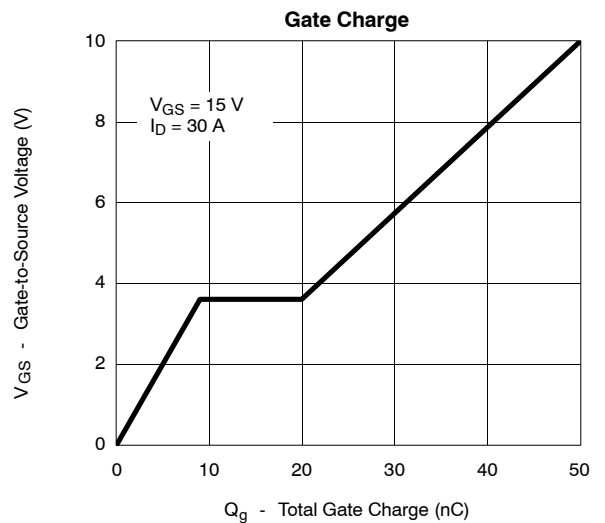
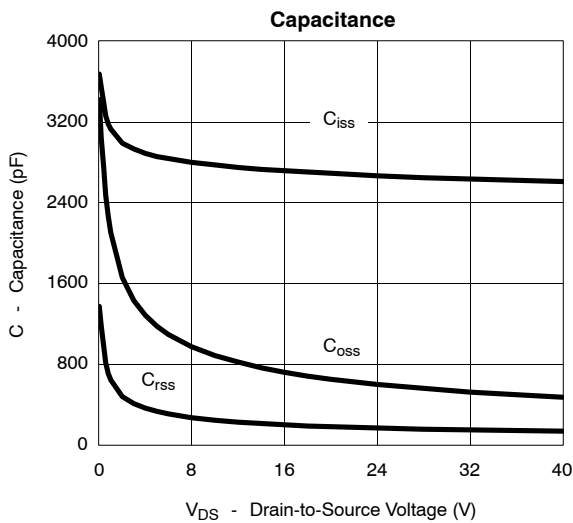
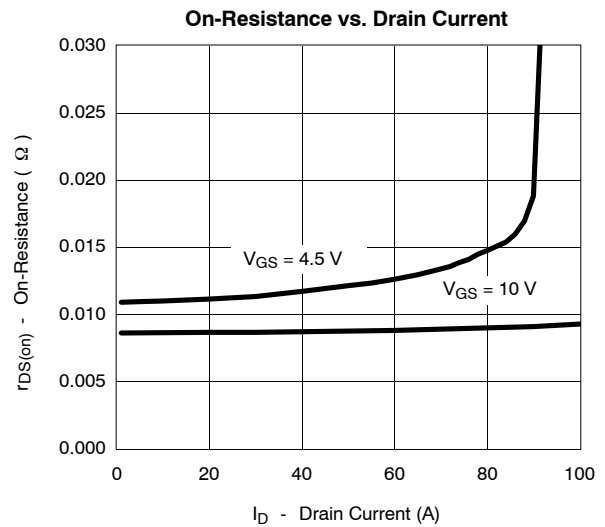
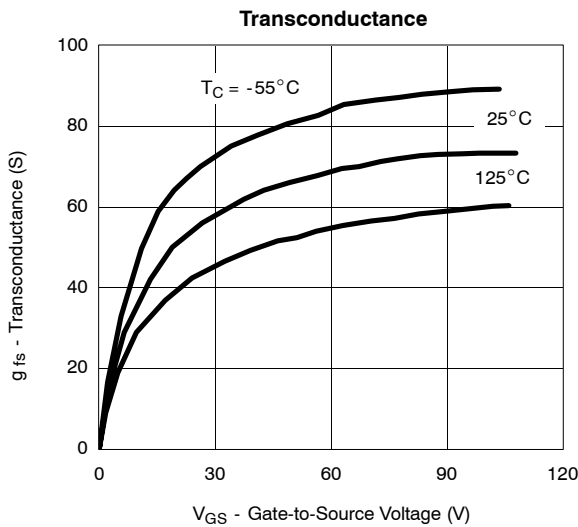
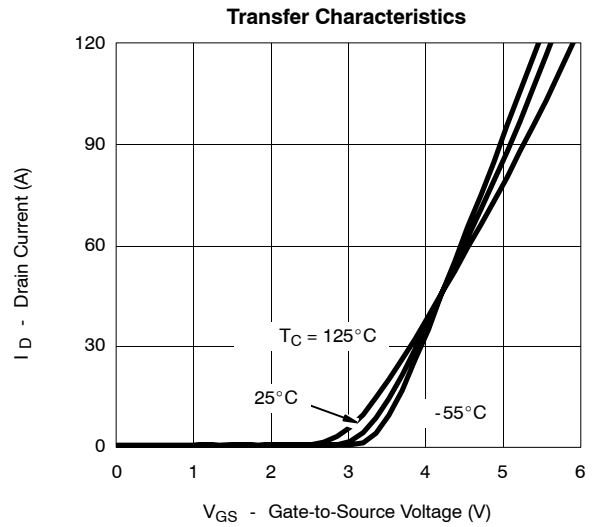
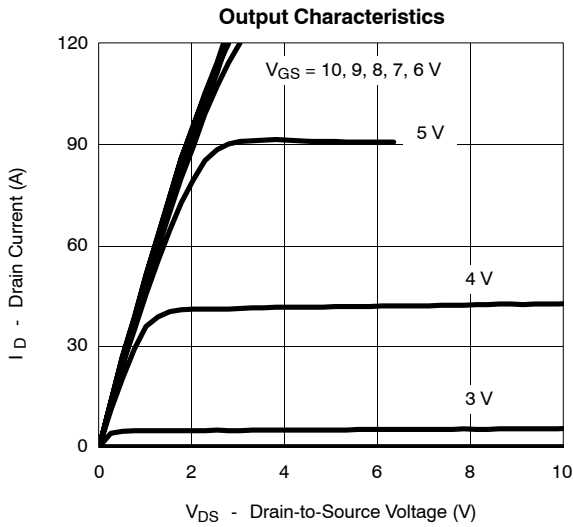
- Package limited.
- Duty cycle  $\leq 1\%$ .
- See SOA curve for voltage derating.
- Surface mounted on 1" FR4 board.

SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{DS} = 250\ \mu\text{A}$	1		3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			150	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.085	0.010	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 125^\circ\text{C}$		0.014	0.017	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 175^\circ\text{C}$		0.0185	0.022	
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		0.0115	0.014	
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}, T_J = 125^\circ\text{C}$		0.0195	0.024	
$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}, T_J = 175^\circ\text{C}$		0.025	0.031			
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	20	57		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2700		pF
Output Capacitance	$C_{oss}$			600		
Reversen Transfer Capacitance	$C_{rss}$			160		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		50	100	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			9		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			11		
Gate Resistance	$R_g$		1		3.6	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.5\ \Omega$ $I_D \approx 30\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		14	30	ns
Rise Time <sup>c</sup>	$t_r$			13	30	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			45	90	
Fall Time <sup>c</sup>	$t_f$			25	50	
<b>Source-Drain Ciode Ratings and Characteristics (<math>T_C = 25^\circ\text{C}</math>)<sup>b</sup></b>						
Continuous Current	$I_S$				30	A
Pulsed Current	$I_{SM}$				120	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 30\text{ A}, V_{GS} = 0\text{ V}$		0.90	1.50	V
Reverse Recovery Time	$t_{rr}$	$I_F = 30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50	100	ns

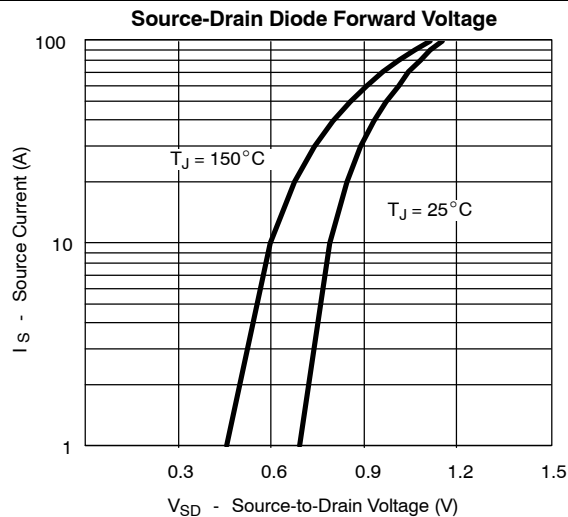
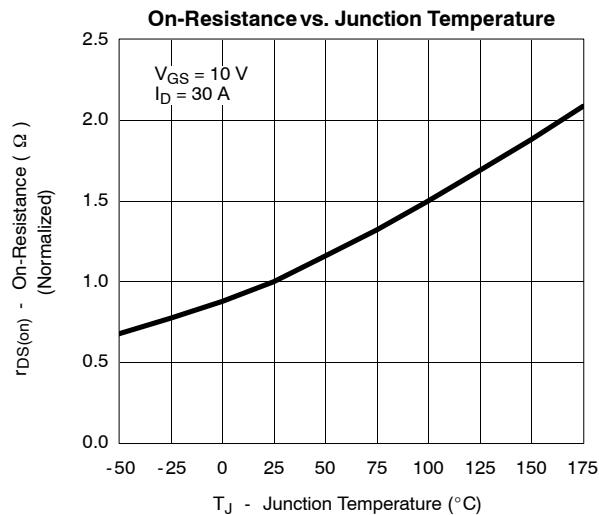
## Notes:

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

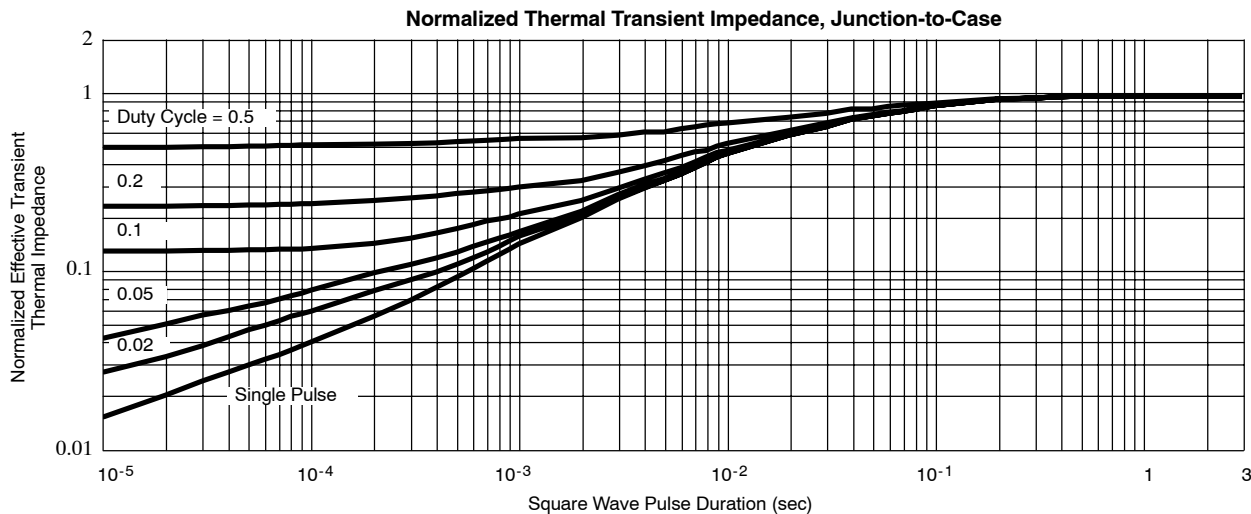
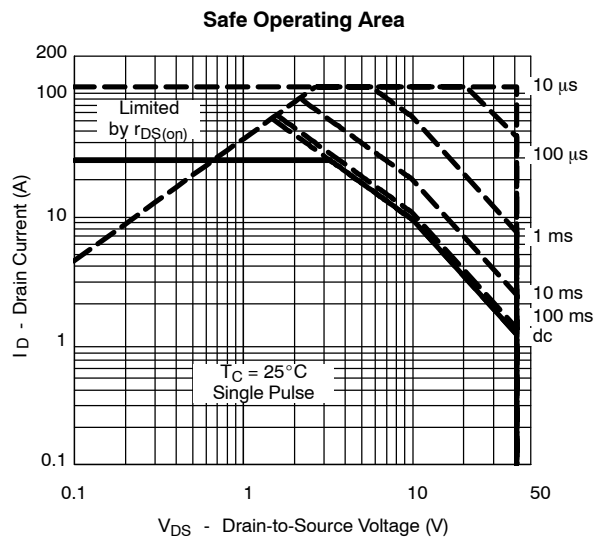
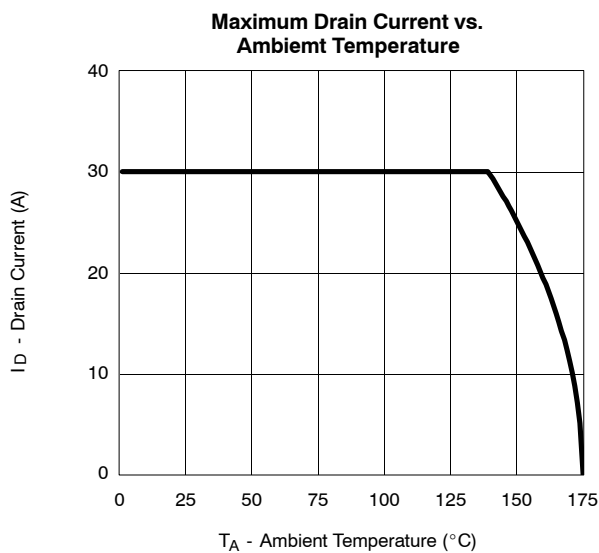
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



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



### THERMAL RATINGS





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