



## N-Channel 60-V (D-S) 200°C MOSFET

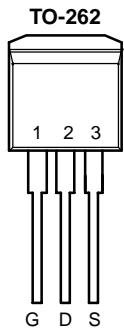
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.0052 @ $V_{GS} = 10$ V	90 <sup>a</sup>
	0.0072 @ $V_{GS} = 4.5$ V	

### FEATURES

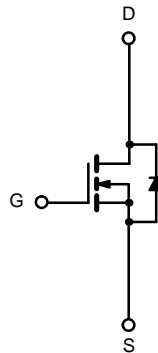
- TrenchFET® Power MOSFETS
- 200°C Junction Temperature
- PWM Optimized

### APPLICATIONS

- Isolated DC/DC Converters
  - Primary-Side Switch
- Automotive
  - Fan Motors
  - 12-V Boardnet
  - Motor Drives



Top View  
SUV90N06-05



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	90 <sup>a</sup>
		$T_C = 125^\circ\text{C}$	90 <sup>a</sup>
Pulsed Drain Current	$I_{DM}$	240	A
Avalanche Current	$I_{AR}$	75	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	280	mJ
Maximum Power Dissipation <sup>b</sup>	$P_D$	$T_C = 25^\circ\text{C}$	350 <sup>c</sup>
		$T_A = 25^\circ\text{C}^d$	4.3
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 200	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) <sup>d</sup>	$R_{thJA}$	40	$^\circ\text{C/W}$
Junction-to-Case	$R_{thJC}$	0.5	

Notes

- Package limited.
- 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
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{DS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	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	$I_{DSS}$	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			50	
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 200^\circ\text{C}$				10
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	120			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.0044	0.0052	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0059	0.0072	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 125^\circ\text{C}$			0.0085	
		$V_{GS} = 10\text{ V}, I_D = 30\text{ A}, T_J = 200^\circ\text{C}$			0.0105	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	30			S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		7560		$\mu\text{F}$
Output Capacitance	$C_{oss}$			1050		
Reverse Transfer Capacitance	$C_{rss}$			570		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 90\text{ A}$		155	220	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			28		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			44		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.4\ \Omega$ $I_D \cong 90\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\ \Omega$		15	25	ns
Rise Time <sup>c</sup>	$t_r$			90	130	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			95	140	
Fall Time <sup>c</sup>	$t_f$			105	150	
<b>Source-Drain Diode Ratings and Characteristics (<math>T_C = 25^\circ\text{C}</math>)<sup>b</sup></b>						
Continuous Current	$I_S$				75	A
Pulsed Current	$I_{SM}$				240	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 90\text{ A}, V_{GS} = 0\text{ V}$		1.1	1.4	V
Reverse Recovery Time	$t_{rr}$	$I_F = 90\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50	85	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.7	5	A
Reverse Recovery Charge	$Q_{rr}$			0.067	0.21	$\mu\text{C}$

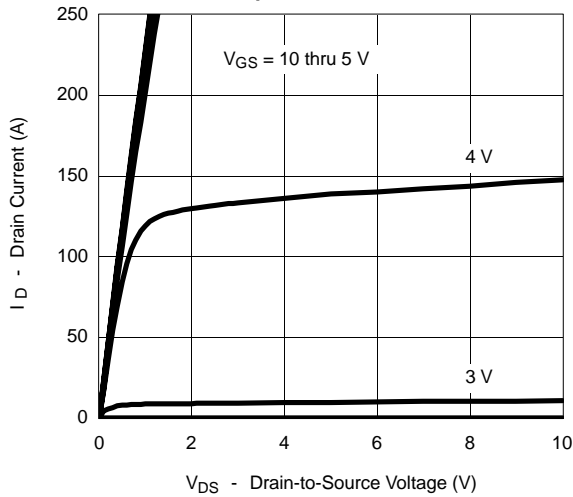
## Notes

- 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.

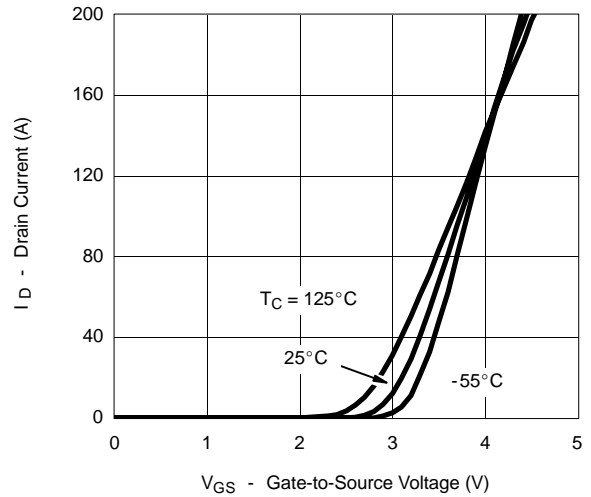


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

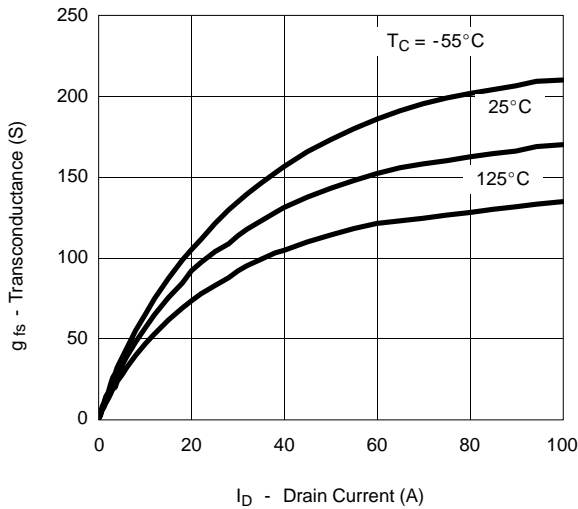
**Output Characteristics**



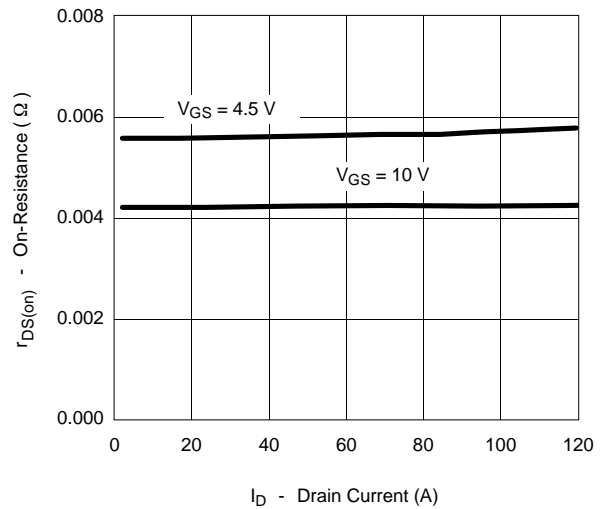
**Transfer Characteristics**



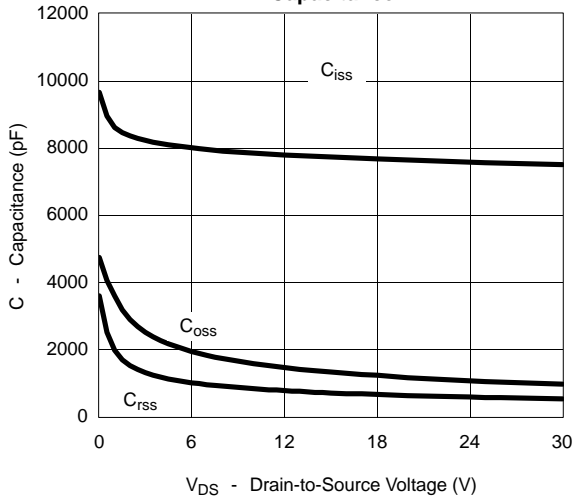
**Transconductance**



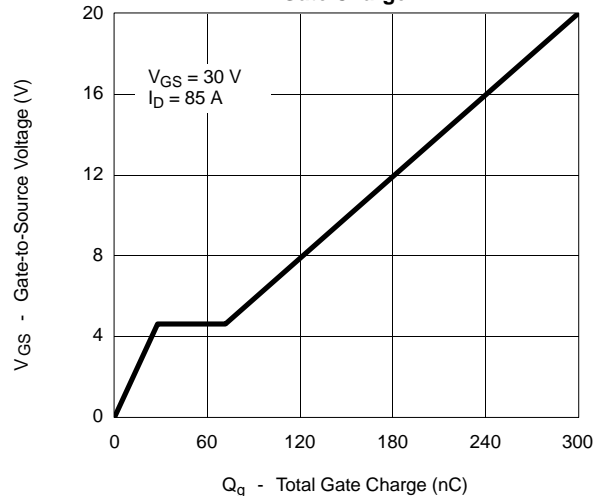
**On-Resistance vs. Drain Current**



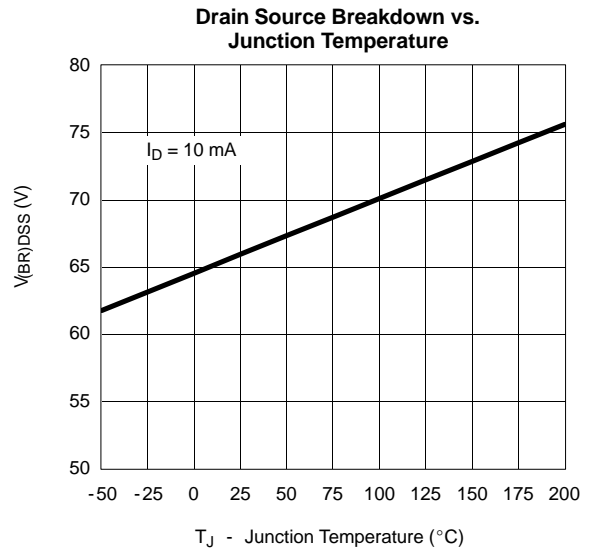
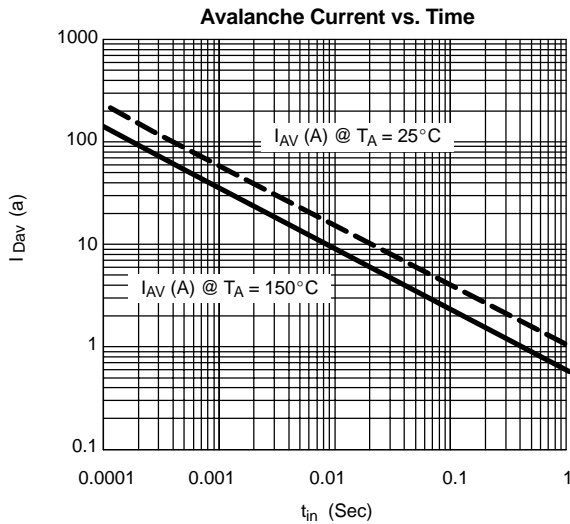
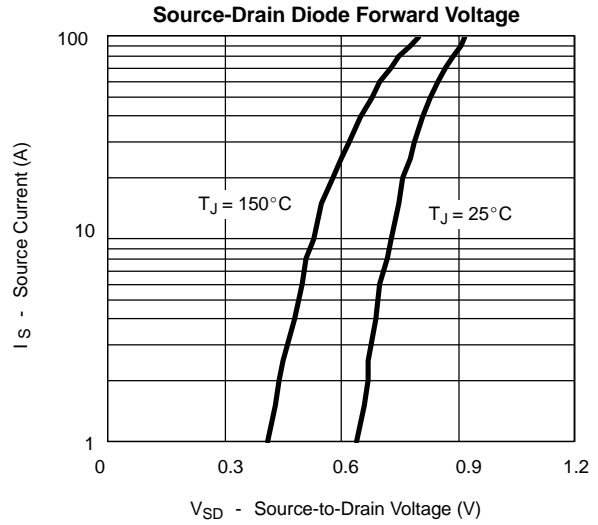
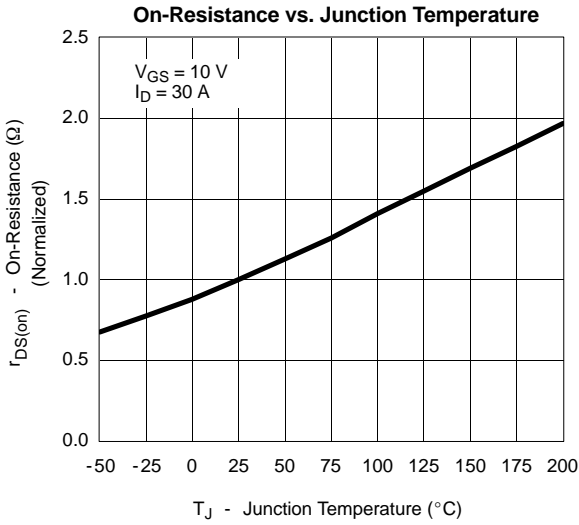
**Capacitance**



**Gate Charge**



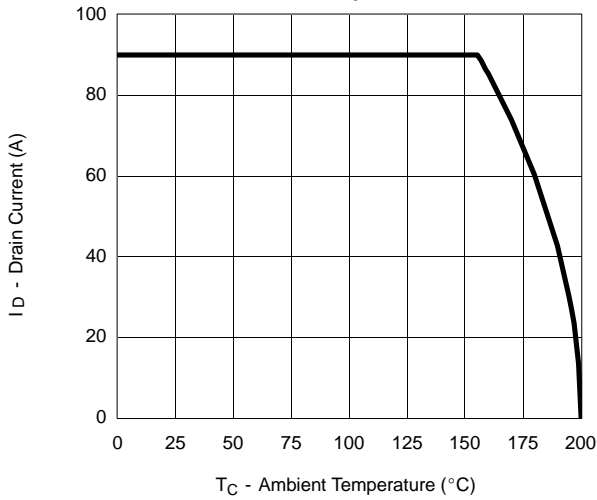
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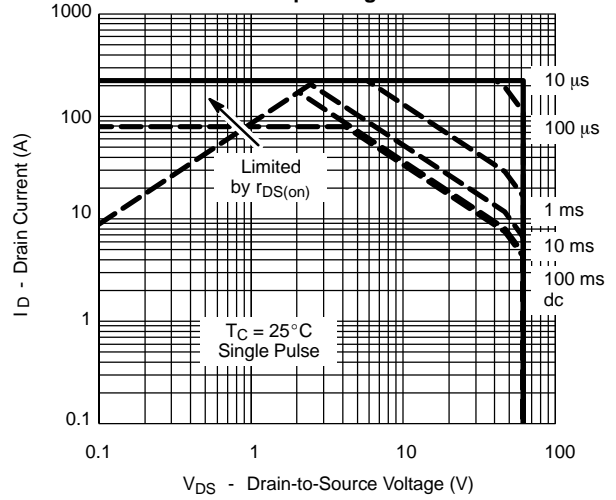


**THERMAL RATINGS**

Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

