

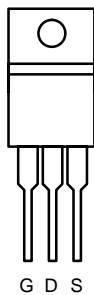


N-Channel 60-V (D-S), 175 °C MOSFET, Logic Level

**175 °C Rated**  
Maximum Junction Temperature  
**TrenchFET®**  
Power MOSFETs

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.022 @ $V_{GS} = 10$ V	40
	0.025 @ $V_{GS} = 4.5$ V	40

TO-220AB

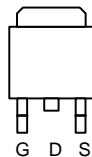


Top View

SUP40N06-25L

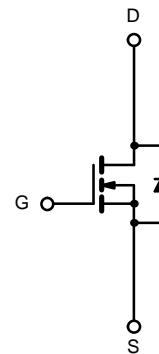
DRAIN connected to TAB

TO-263



Top View

SUB40N06-25L



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 ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current	$I_{DM}$	100	
Avalanche Current	$I_{AR}$	40	
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	80	mJ
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	90 <sup>c</sup>
		$T_A = 25^\circ\text{C}$ (TO-263) <sup>c</sup>	3.7
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	$R_{thJA}$	PCB Mount (TO-263) <sup>c</sup>	40
		Free Air (TO-220AB)	80
Junction-to-Case	$R_{thJC}$	1.6	$^\circ\text{C}/\text{W}$

Notes:

- a. Duty cycle  $\leq 1\%$ .
- b. See SOA curve for voltage derating.
- c. Surface Mounted on FR4 Board,  $t \leq 10$  sec.



SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA	1.0	2.0	3.0	
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> = 60 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	40			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A			0.022	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C			0.043	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C			0.053	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A			0.025	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A				S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		1800		pF
Output Capacitance	C <sub>oss</sub>			350		
Reverse Transfer Capacitance	C <sub>rss</sub>			100		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 40 A		40	60	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			9		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			10		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 0.8 Ω I <sub>D</sub> = 40 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		10	20	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			9	20	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			28	50	
Fall Time <sup>c</sup>	t <sub>f</sub>			7	15	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>s</sub>				40	A
Pulsed Current	I <sub>SM</sub>				100	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 40 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 40 A, di/dt = 100 A/μs		48	100	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			6		A
Reverse Recovery Charge	Q <sub>rr</sub>			0.15		μC

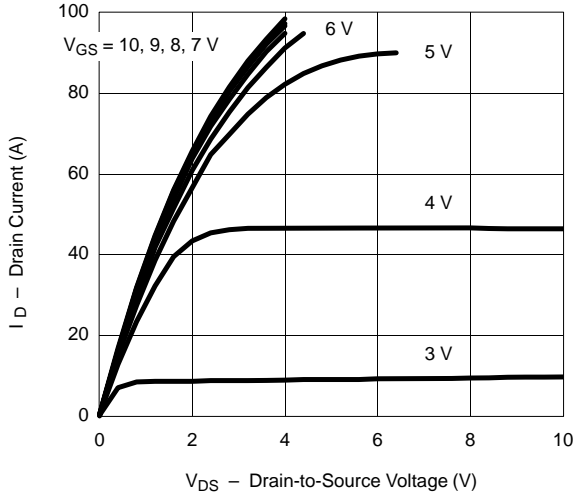
Notes:

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

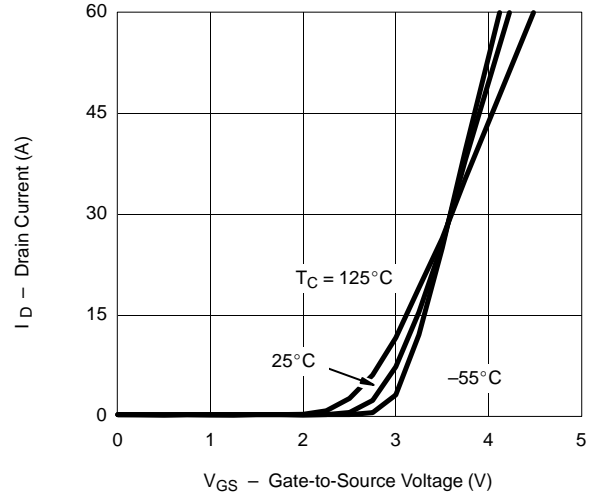


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

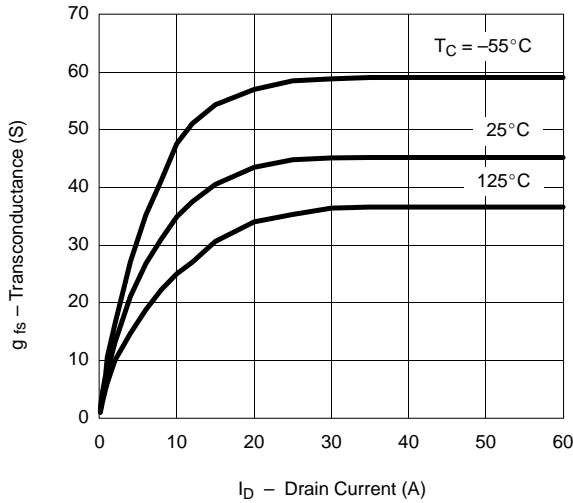
**Output Characteristics**



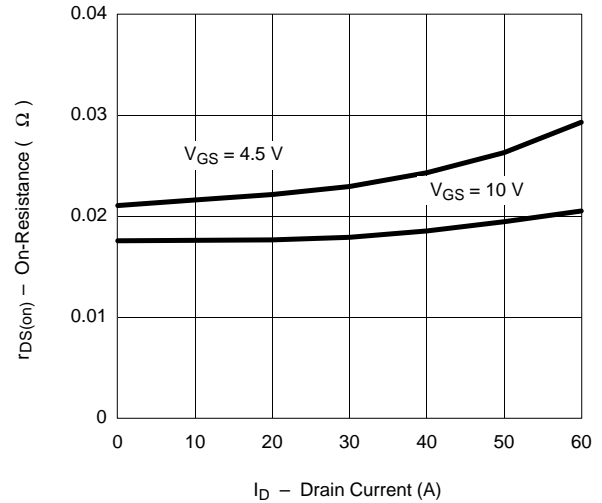
**Transfer Characteristics**



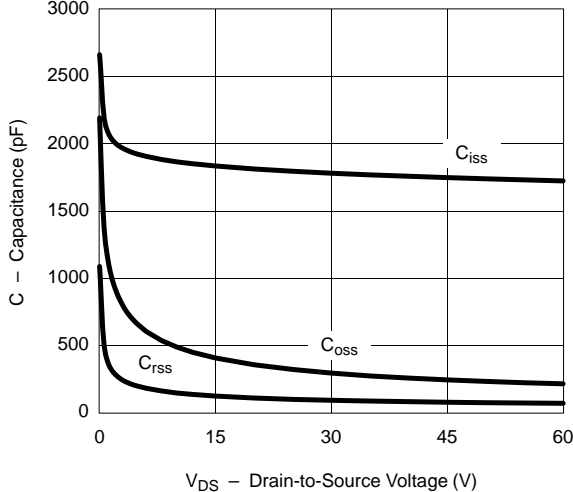
**Transconductance**



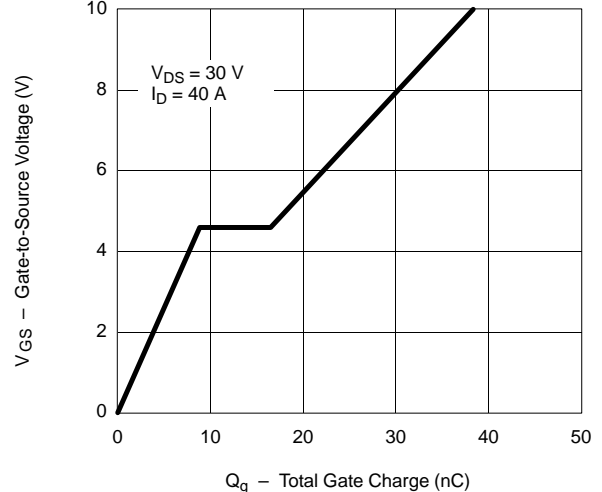
**On-Resistance vs. Drain Current**



**Capacitance**

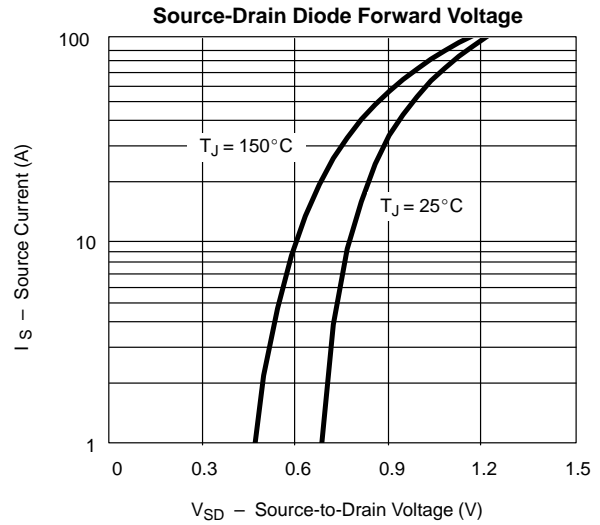
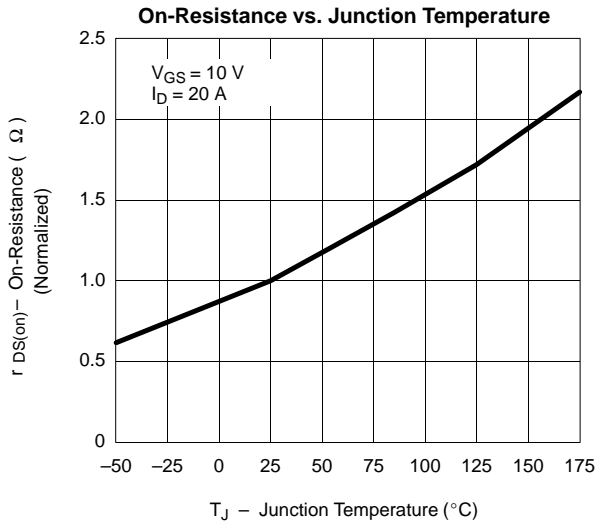


**Gate Charge**





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



### THERMAL RATINGS

