

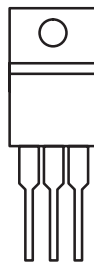
N-Channel 60-V (D-S), 175 °C MOSFET, Logic Level

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

FEATURES

- TrenchFET[®] Power MOSFETs
- Maximum Junction Temperature: 175 °C Rated


 Available
RoHS*
 COMPLIANT

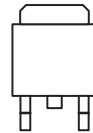
TO-220AB


G D S

Top View

SUP40N06-25L

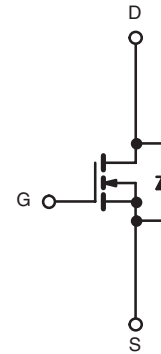
DRAIN connected to TAB

TO-263


G D S

Top View

SUB40N06-25L



N-Channel MOSFET

Ordering Information: TO-220AB:

TO-263:

SUP40N06-25L

SUP40N06-25L-E3 (Lead (Pb)-free)

SUB40N06-25L

SUB40N06-25L-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	40
		$T_C = 100$ °C	25
Pulsed Drain Current	I_{DM}	100	A
Avalanche Current	I_{AR}	40	
Repetitive Avalanche Energy ^a	E_{AR}	80	mJ
Power Dissipation	P_D	$T_C = 25$ °C (TO-220AB and TO-263)	90 ^c
		$T_A = 25$ °C (TO-263) ^c	3.7
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R_{thJA}	PCB Mount (TO-263) ^c	40
		Free Air (TO-220AB)	80
Junction-to-Case	R_{thJC}	1.6	°C/W

Notes:

 a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

 c. Surface Mounted on FR4 Board, $t \leq 10$ sec.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

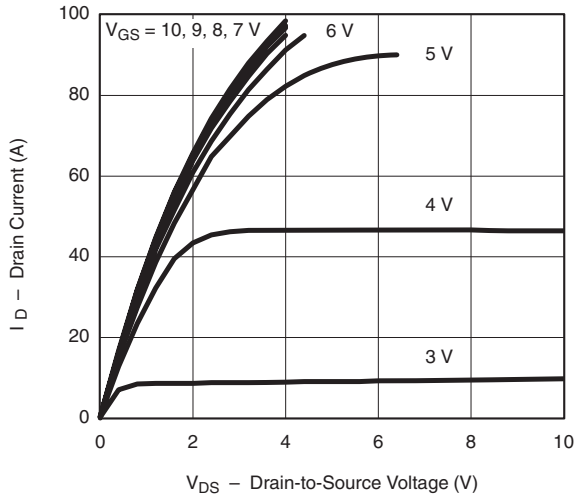
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	40			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$			0.022	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.043	
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.053	
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$			0.025	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$				S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1800		μF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			100		
Total Gate Charge ^c	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		40	60	nC
Gate-Source Charge ^c	Q_{gs}			9		
Gate-Drain Charge ^c	Q_{gd}			10		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.8\text{ }\Omega$ $I_D \cong 40\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\text{ }\Omega$		10	20	ns
Rise Time ^c	t_r			9	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			28	50	
Fall Time ^c	t_f			7	15	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				40	A
Pulsed Current	I_{SM}				100	
Forward Voltage ^a	V_{SD}	$I_F = 40\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 40\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		48	100	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			6		A
Reverse Recovery Charge	Q_{rr}				0.15	

Notes:

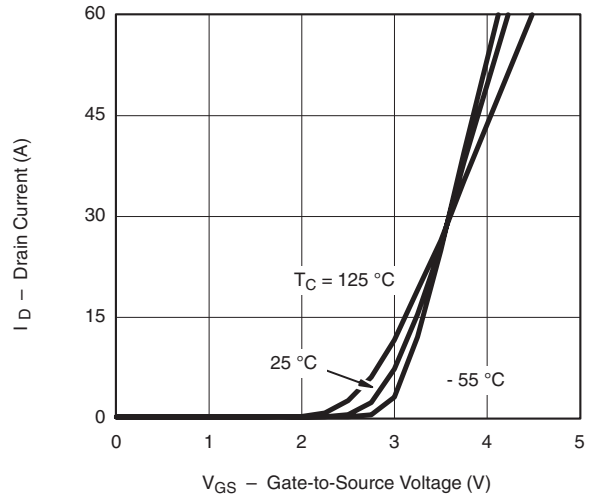
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

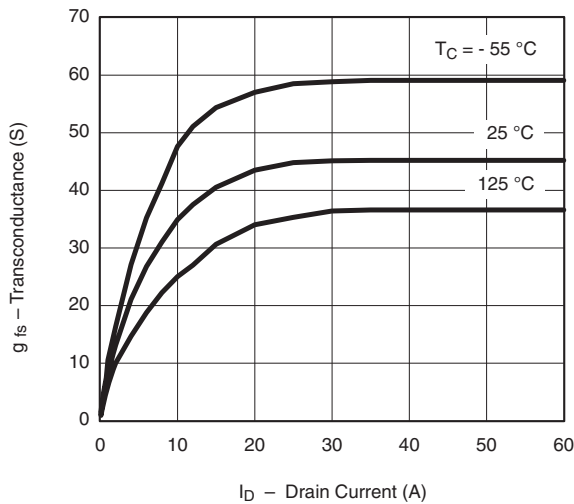
TYPICAL CHARACTERISTICS 25 °C unless noted



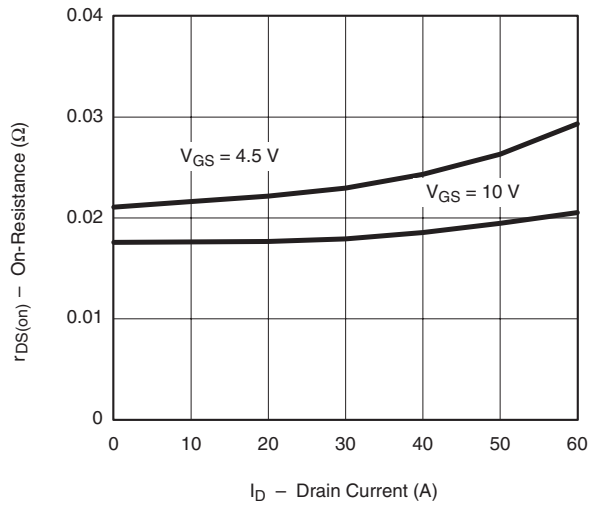
Output Characteristics



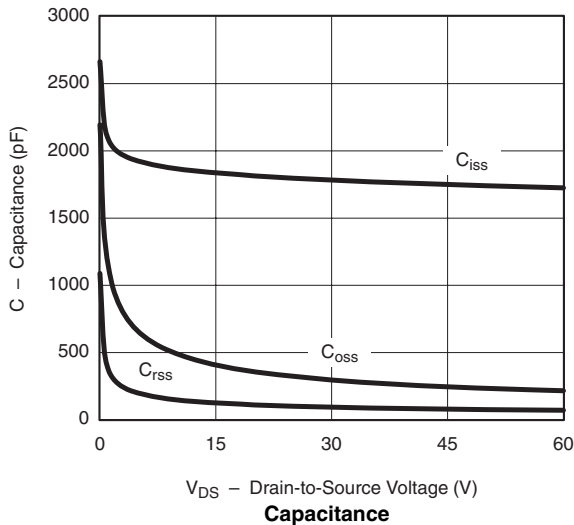
Transfer Characteristics



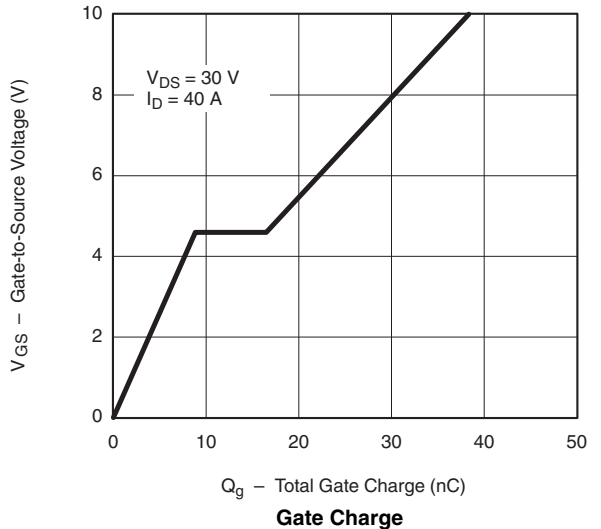
Transconductance



On-Resistance vs. Drain Current

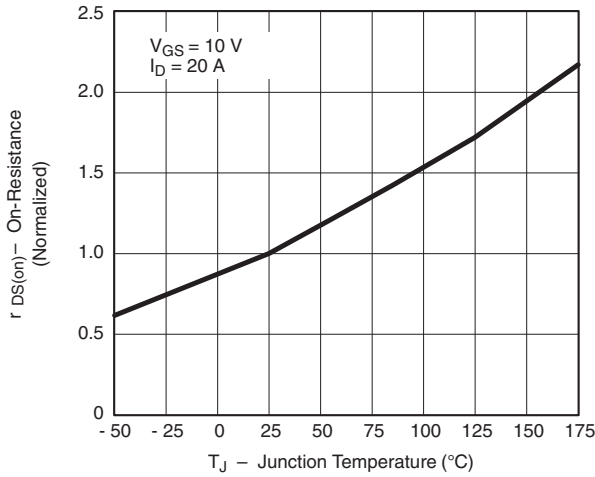


Capacitance

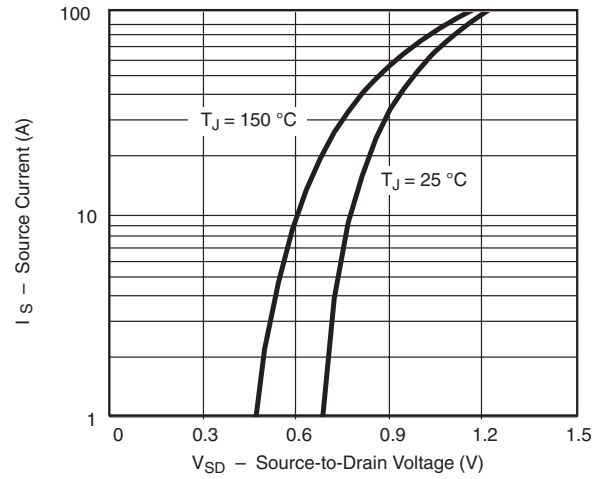


Gate Charge

TYPICAL CHARACTERISTICS 25 °C unless noted

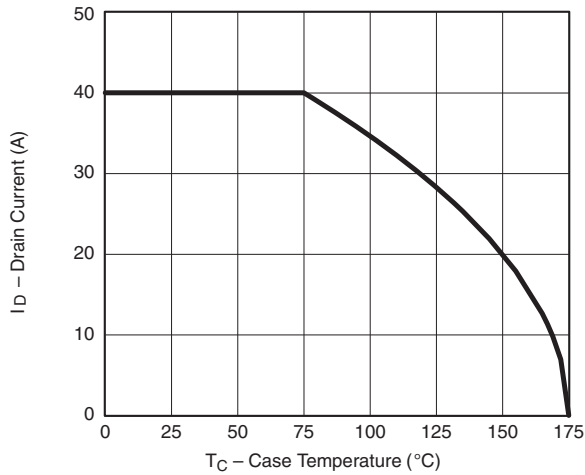


On-Resistance vs. Junction Temperature

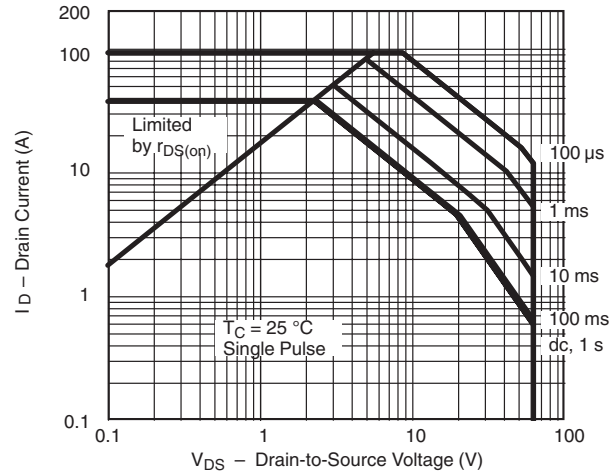


Source-Drain Diode Forward Voltage

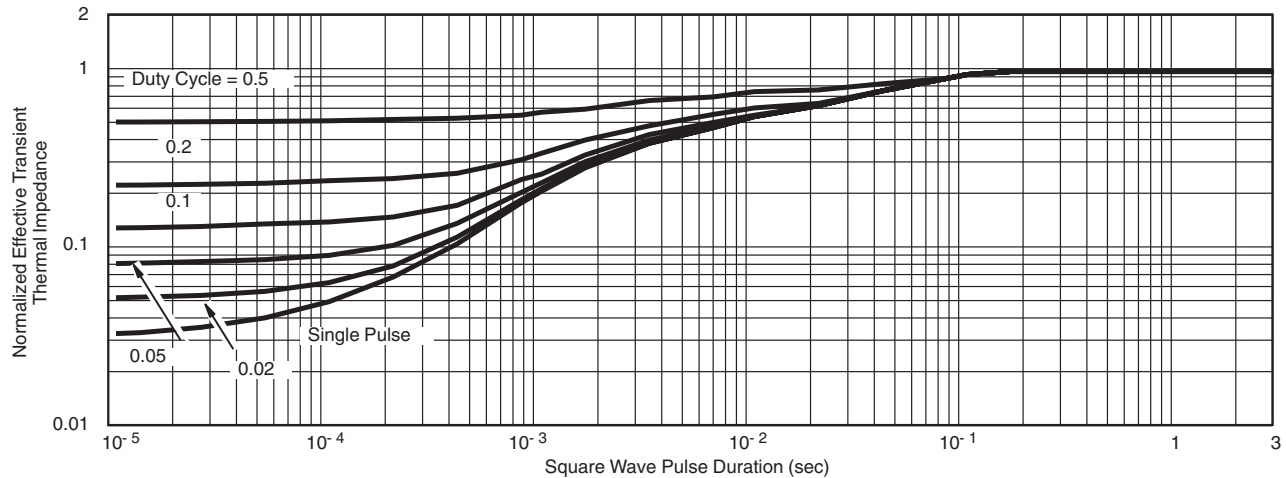
THERMAL RATINGS



Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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