

Automotive N-Channel 55 V (D-S) 175 °C MOSFET

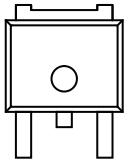
 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY	
V_{DS} (V)	55
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.020
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.026
I_D (A)	30
Configuration	Single

FEATURES

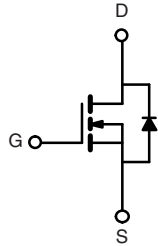
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- AEC-Q101 Qualified^d
- Compliant to RoHS Directive 2002/95/EC

TO-252


G D S

Top View

Drain Connected to Tab



N-Channel MOSFET

ORDERING INFORMATION	
Package	TO-252
Lead (Pb)-free and Halogen-free	SQD35N05-26L-GE3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	$T_C = 25$ °C ^a	I_D	30	A
	$T_C = 125$ °C		19	
Continuous Source Current (Diode Conduction) ^a		I_S	30	
Pulsed Drain Current ^b		I_{DM}	120	
Single Pulse Avalanche Energy	L = 0.1 mH	I_{AS}	20	
Single Pulse Avalanche Current		E_{AS}	20	
Maximum Power Dissipation ^b	$T_C = 25$ °C	P_D	50	W
	$T_C = 125$ °C		16	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	60	°C/W
Junction-to-Case (Drain)		R_{thJC}	3	

Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.



SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA		55	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		1.5	2	2.5	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 55 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 55 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 55 V, T _J = 175 °C	-	-	250	
On-State Drain Current ^a	I _{D(on)}	V _{GS} = 5 V	V _{DS} ≥ 5 V	30	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 20 A	-	0.016	0.020	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.035	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.043	
		V _{GS} = 4.5 V	I _D = 15 A	-	0.021	0.026	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A		-	34	-	S
Dynamic^b							
Input Capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	938	1175	pF
Output Capacitance	C _{oss}			-	203	255	
Reverse Transfer Capacitance	C _{rss}			-	86	110	
Total Gate Charge ^c	Q _g	V _{GS} = 5 V	V _{DS} = 25 V, I _D = 35 A	-	12	18	nC
Gate-Source Charge ^c	Q _{gs}			-	4.1	-	
Gate-Drain Charge ^c	Q _{gd}			-	4.8	-	
Gate Resistance	R _g	f = 1 MHz		1.3	2.6	4	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 25 V, R _L = 0.71 Ω I _D ≅ 35 A, V _{GEN} = 10 V, R _g = 1 Ω		-	7	11	ns
Rise Time ^c	t _r			-	10	15	
Turn-Off Delay Time ^c	t _{d(off)}			-	18	27	
Fall Time ^c	t _f			-	5	8	
Source-Drain Diode Ratings and Characteristics^b							
Pulsed Current ^a	I _{SM}			-	-	120	A
Forward Voltage	V _{SD}	I _F = 80 A, V _{GS} = 0 V		-	1.2	1.5	V

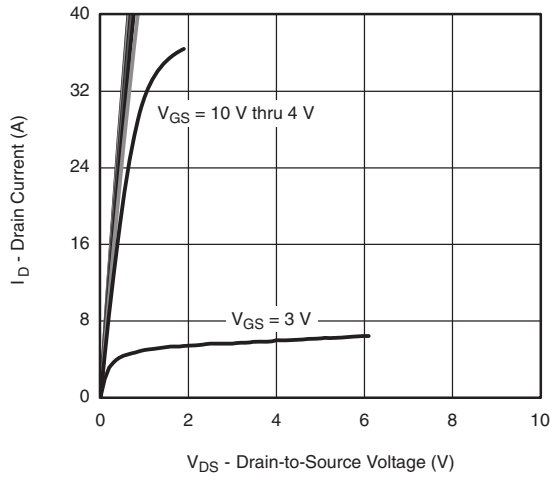
Notes

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

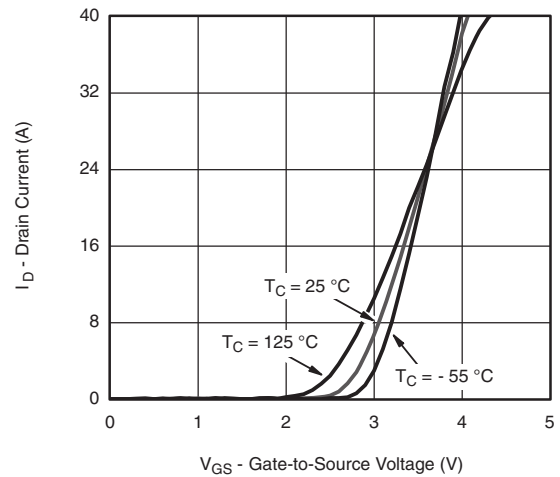
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



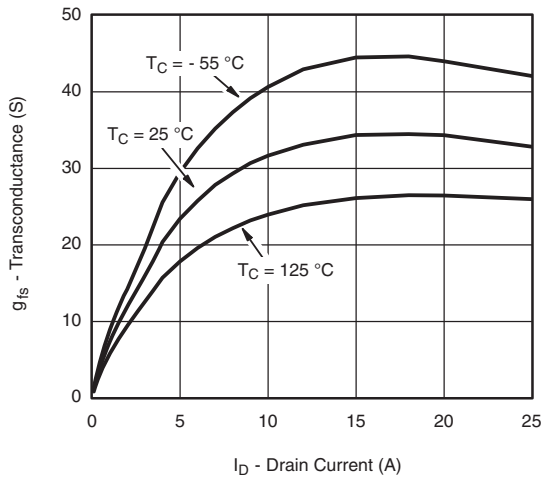
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



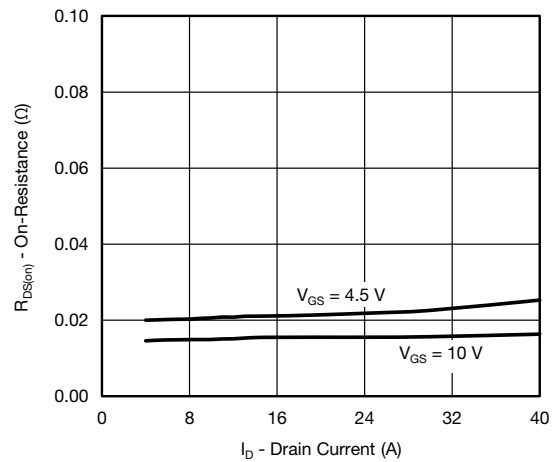
Output Characteristics



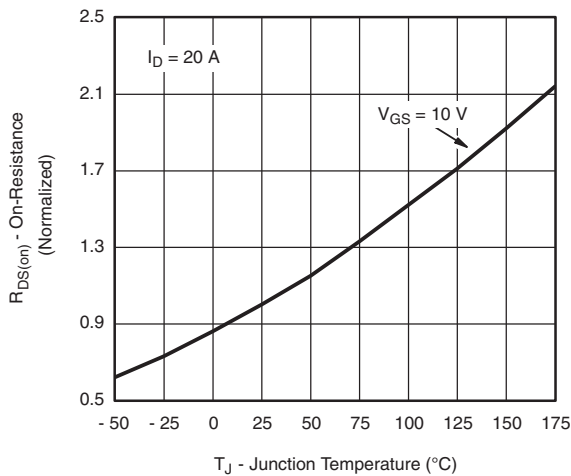
Transfer Characteristics



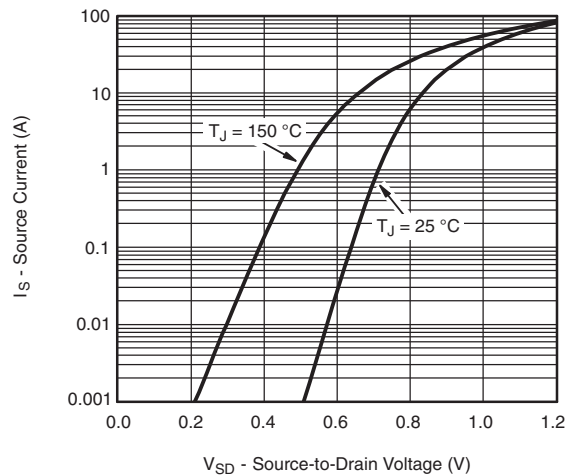
Transconductance



On-Resistance vs. Drain Current



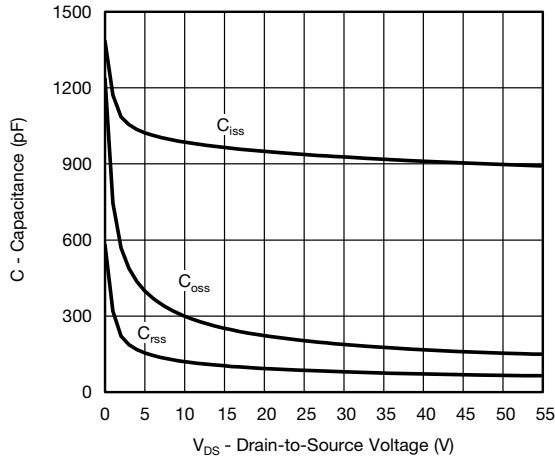
On-Resistance vs. Junction Temperature



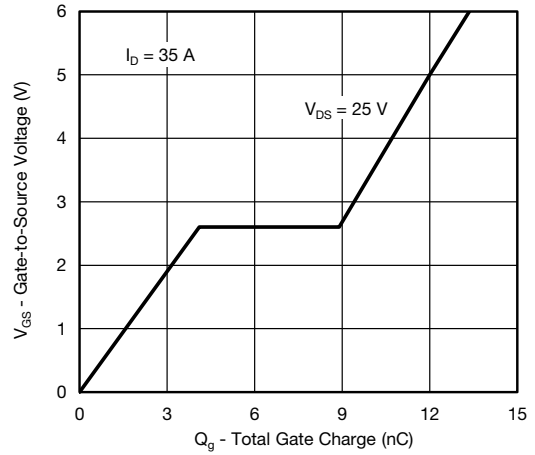
Source Drain Diode Forward Voltage



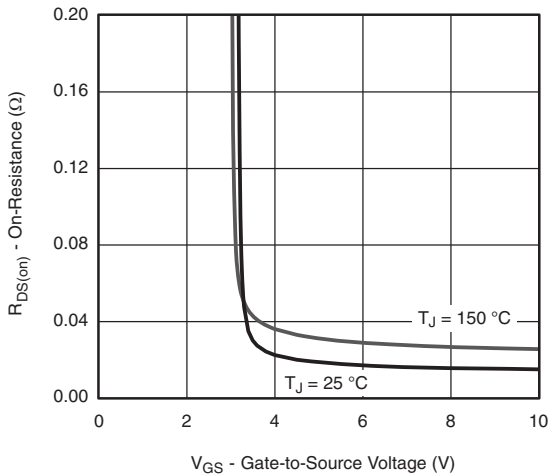
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



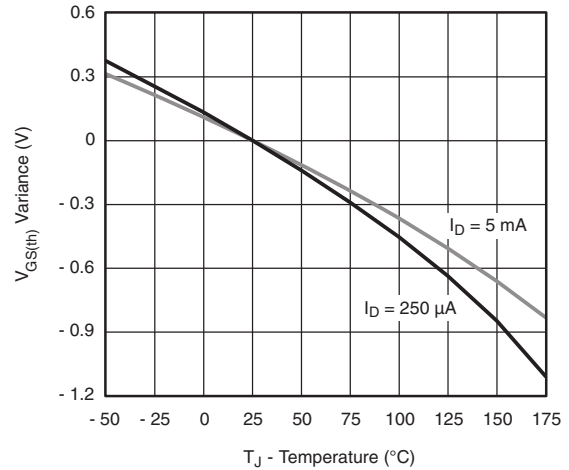
Capacitance



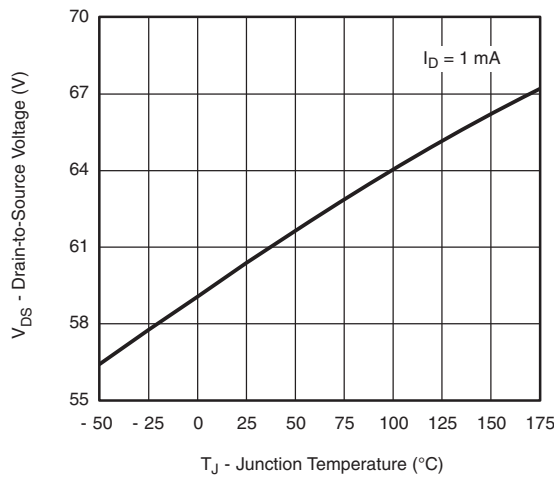
Gate Charge



On-Resistance vs. Gate-to-Source Voltage



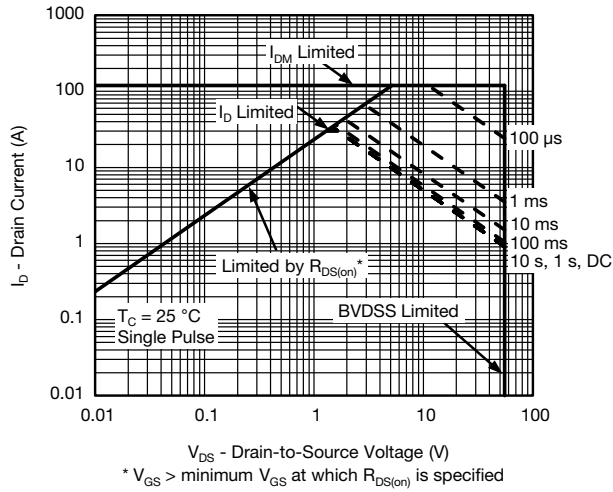
Threshold Voltage



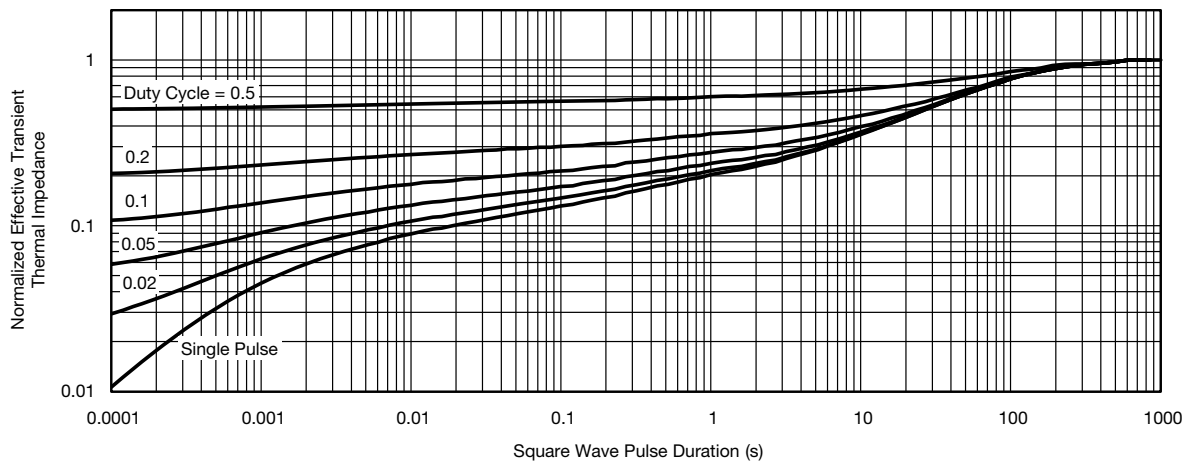
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



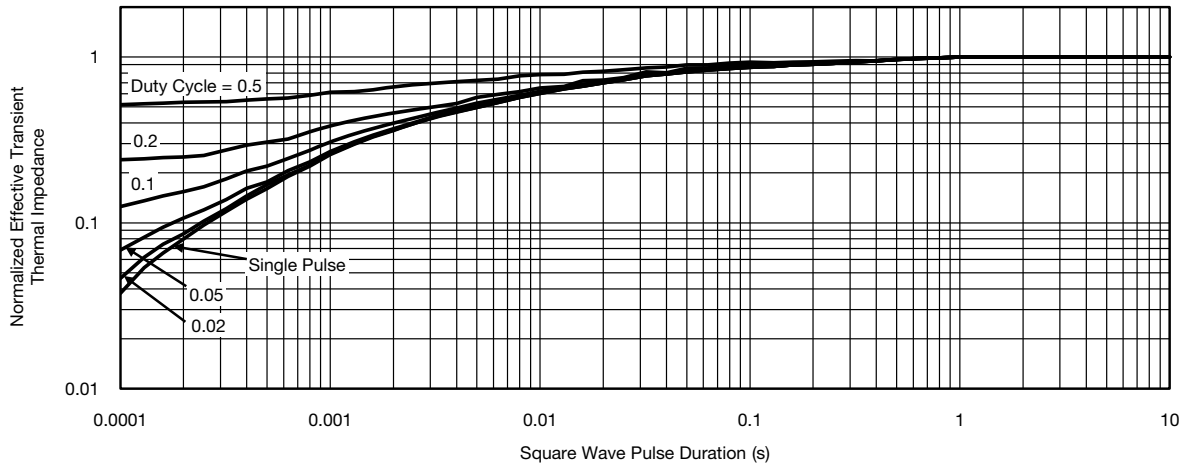
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Case (25 °C)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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