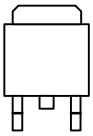
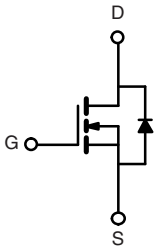
Automotive N-Channel 100 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.0105
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.012
I_D (A)	100
Configuration	Single

TO-263



Top View



N-Channel MOSFET

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance
- AEC-Q101 Qualified[d]
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

ORDERING INFORMATION	
Package	TO-263
Lead (Pb)-free and Halogen-free	SQM85N10-10-GE3

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	T_C = 25 °C[a]	I_D	100	A
	T_C = 125 °C		70	
Continuous Source Current (Diode Conduction)[a]		I_S	100	
Pulsed Drain Current[b]		I_{DM}	400	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	75	
Single Pulse Avalanche Energy		E_{AS}	280	mJ
Maximum Power Dissipation[b]	T_C = 25 °C	P_D	375	W
	T_C = 125 °C		125	
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}	40	°C/W
Junction-to-Case (Drain)		R_{thJC}	0.4	

Notes

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

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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, I_D = 250 µA		100	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		1.5	2.0	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} = 100 V	-	-	1.0	µA
		V_{GS} = 0 V	V_{DS} = 100 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 100 V, T_J = 175 °C	-	-	500	
On-State Drain Current[a]	$I_{D(on)}$	V_{GS} = 10 V	V_{DS} ≥ 5 V	120	-	-	A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 30 A	-	0.007	0.0105	Ω
		V_{GS} = 10 V	I_D = 30 A, T_J = 125 °C	-	-	0.02	
		V_{GS} = 10 V	I_D = 30 A, T_J = 175 °C	-	-	0.026	
		V_{GS} = 4.5 V	I_D = 20 A	-	0.008	0.012	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 30 A		-	115	-	S
Dynamic[b]							
Input Capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 25 V, f = 1 MHz	-	6440	8050	pF
Output Capacitance	C_{oss}			-	655	820	
Reverse Transfer Capacitance	C_{rss}			-	315	395	
Total Gate Charge[c]	Q_g	V_{GS} = 10 V	V_{DS} = 50 V, I_D = 85 A	-	122	185	nC
Gate-Source Charge[c]	Q_{gs}			-	23	-	
Gate-Drain Charge[c]	Q_{gd}			-	28	-	
Gate Resistance	R_g	f = 1 MHz		0.8	1.7	2.6	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 0.6 Ω I_D ≅ 85 A, V_{GEN} = 10 V, R_g = 2.5 Ω		-	13	20	ns
Rise Time[c]	t_r			-	14	21	
Turn-Off Delay Time[c]	$t_{d(off)}$			-	44	66	
Fall Time[c]	t_f			-	10	15	
Source-Drain Diode Ratings and Characteristics[b]							
Pulsed Current[a]	I_{SM}			-	-	400	A
Forward Voltage	V_{SD}	I_F = 85 A, V_{GS} = 0		-	0.9	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.

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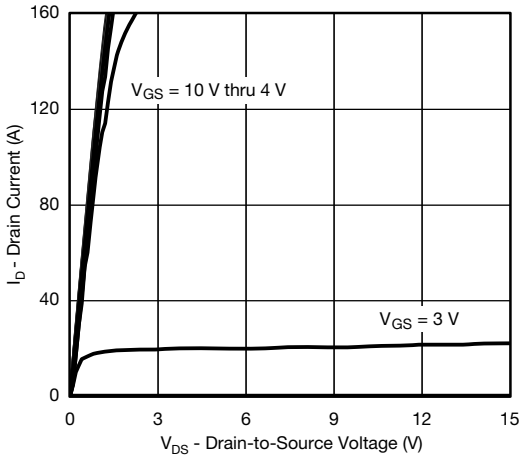
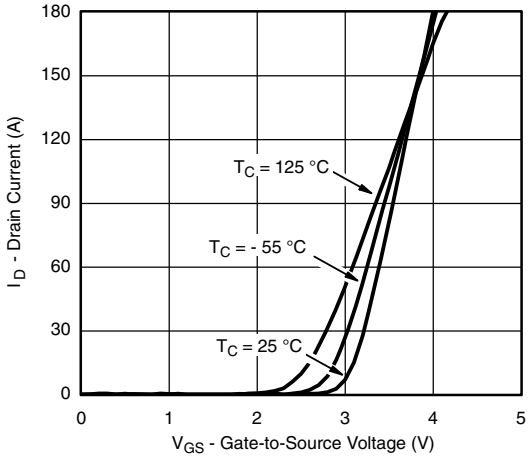
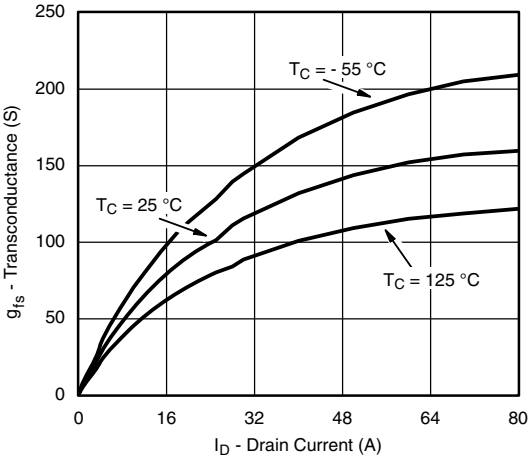


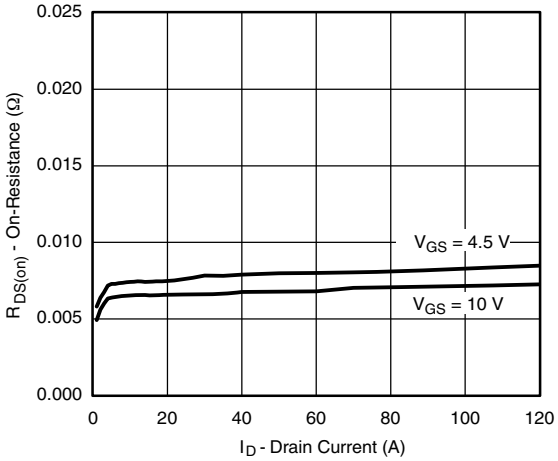
Output Characteristics



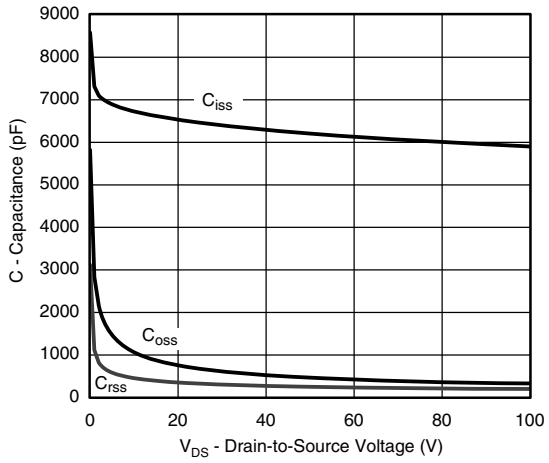
Transfer Characteristics



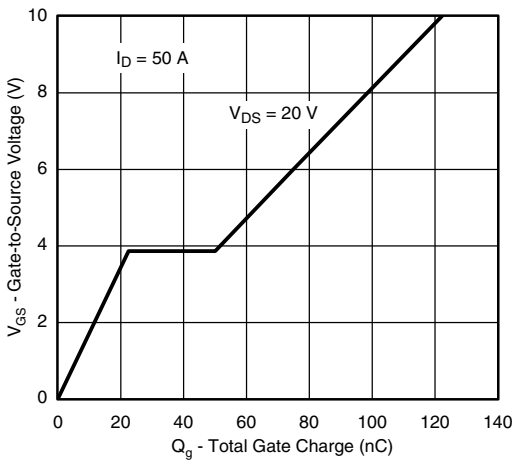
Transconductance



On-Resistance vs. Drain Current



Capacitance



Gate Charge

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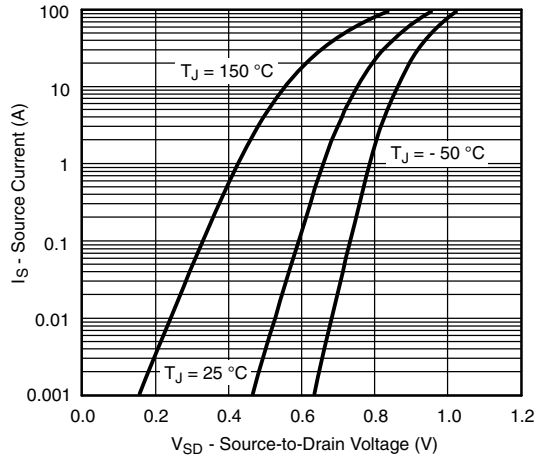
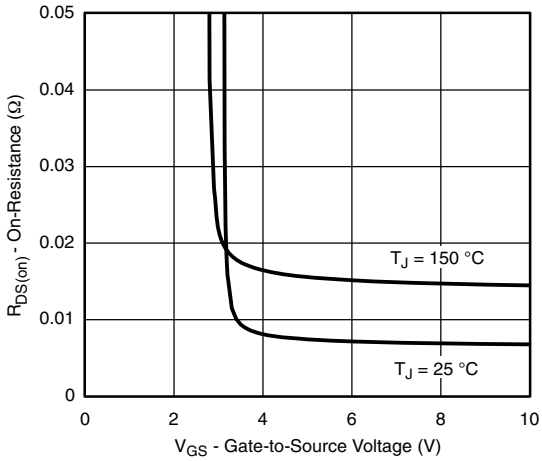
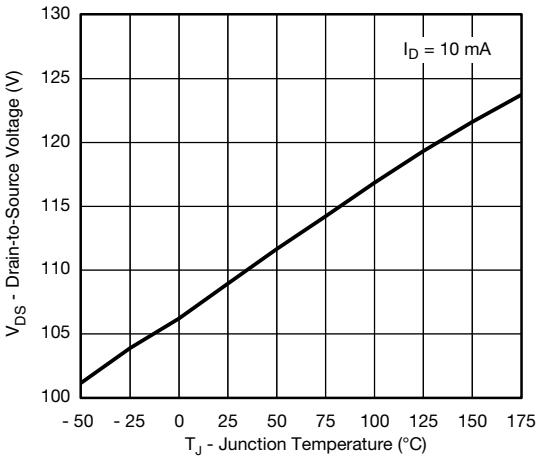


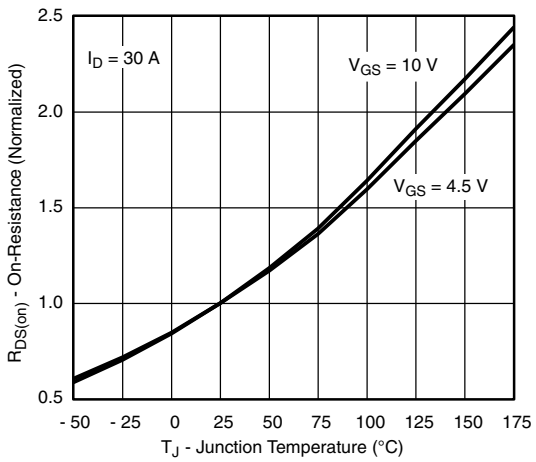
Source Drain Diode Forward Voltage



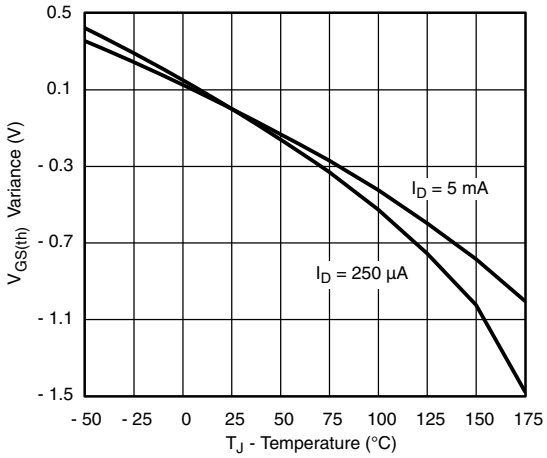
On-Resistance vs. Gate-to-Source Voltage



Breakdown Voltage vs. Junction Temperature



Normalized On-Resistance vs. Junction Temperature



Threshold Voltage Variance vs. Junction Temperature

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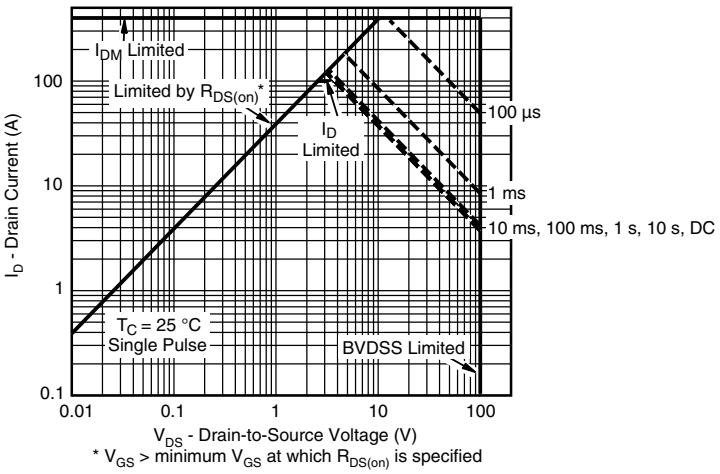
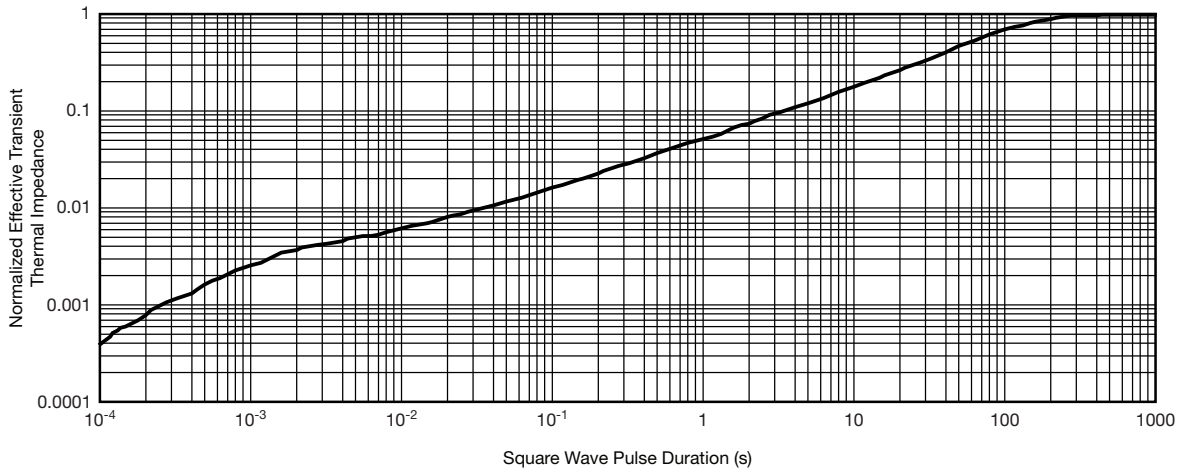


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

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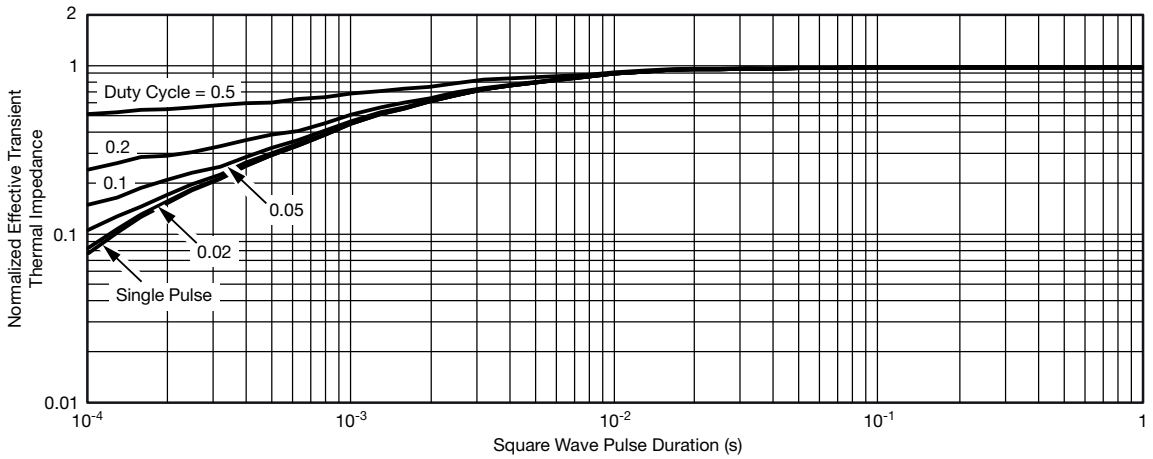

Normalized Thermal Transient Impedance, Junction-to-Case

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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