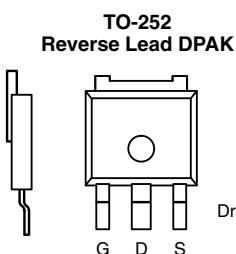
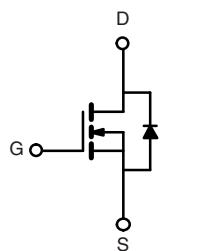


PRODUCT SUMMARY	
V_{DS} (V)	30
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0060
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.0085
I_D (A)	50
Configuration	Single



Top View



N-Channel MOSFET

FEATURES

- TrenchFET® Power MOSFET
- AEC-Q101 Qualified
- 100 % R_g and UIS Tested
- Material categorization:
For definitions of compliance please see www.freescale.net.cn


ORDERING INFORMATION

Package	TO-252 Reverse Lead DPAK
Lead (Pb)-free and Halogen-free	SQR50N03-06P-GE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^a	I_D	50	A
		50	
Continuous Source Current (Diode Conduction) ^a	I_S	50	
Pulsed Drain Current ^b	I_{DM}	200	
Single Pulse Avalanche Current	I_{AS}	45	mJ
Single Pulse Avalanche Energy	E_{AS}	101	
Maximum Power Dissipation ^b	P_D	83	W
		27	
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}	50	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.8	

Notes

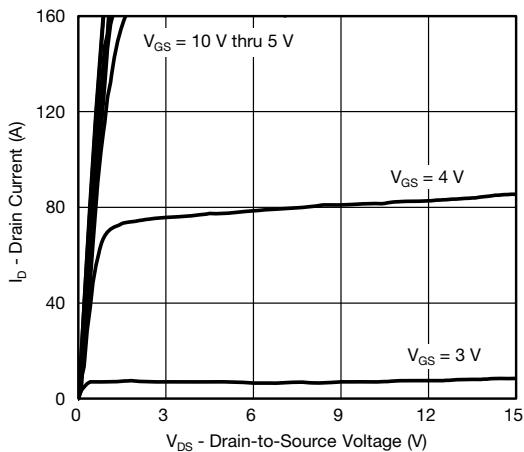
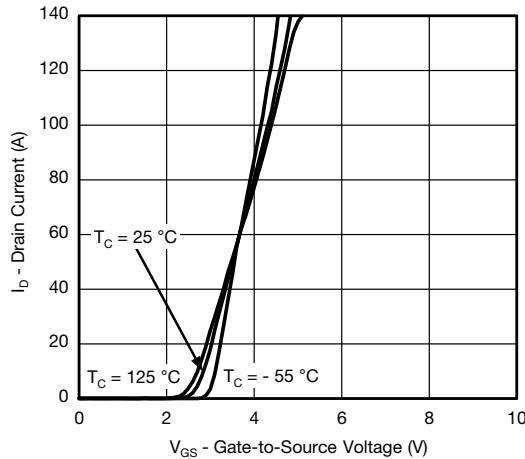
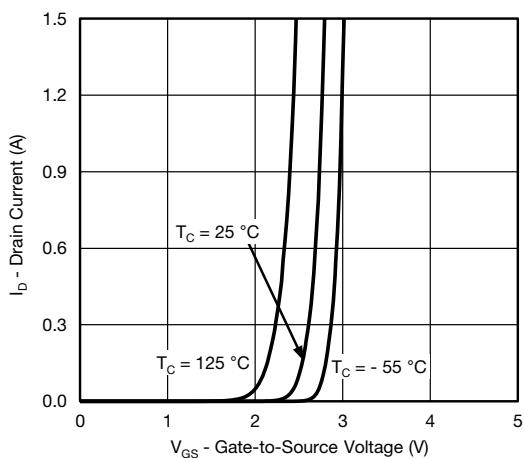
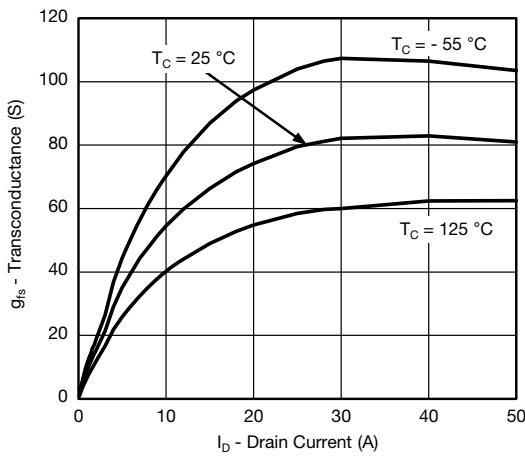
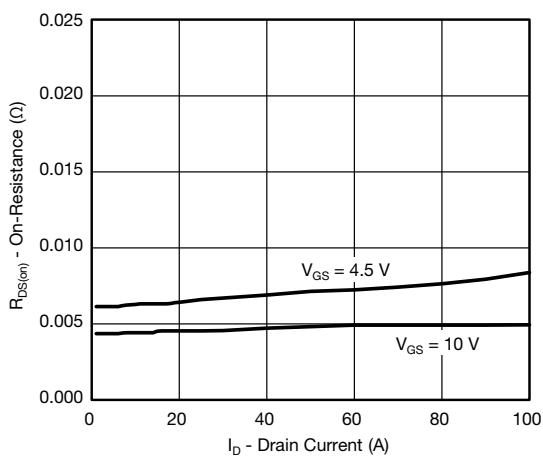
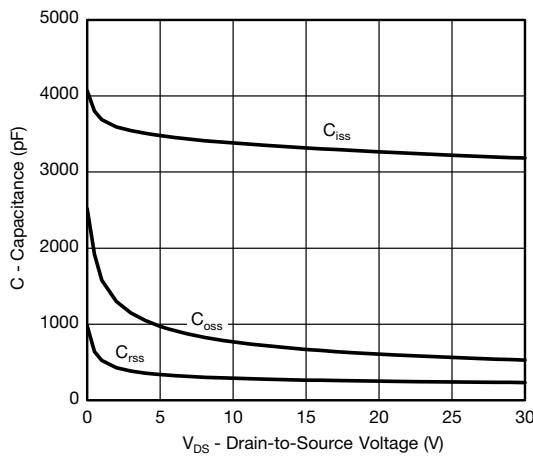
- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).

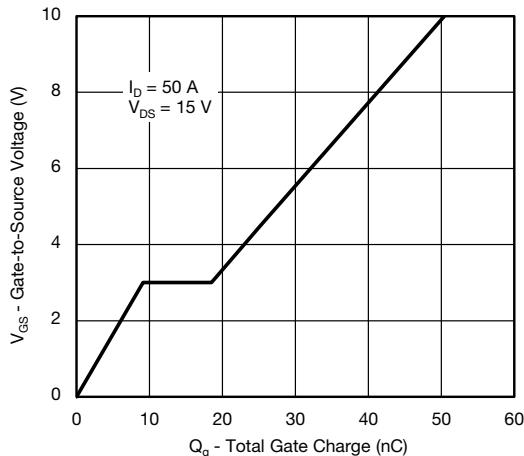
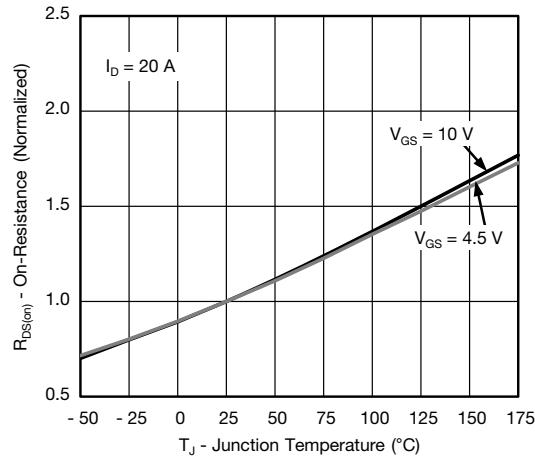
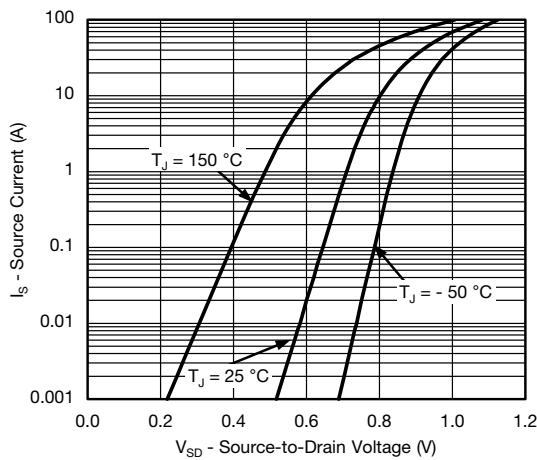
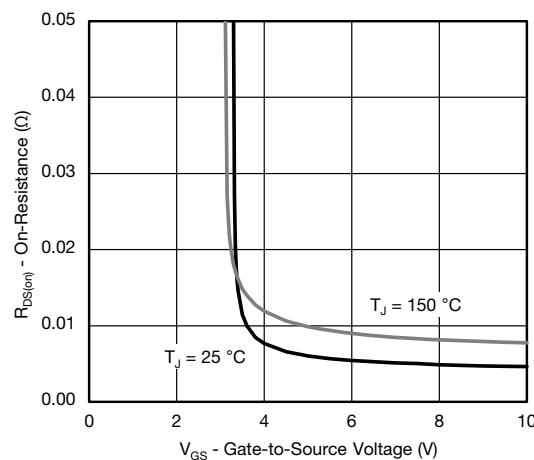
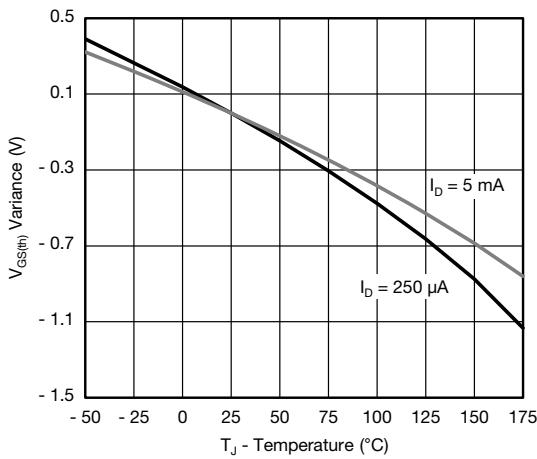
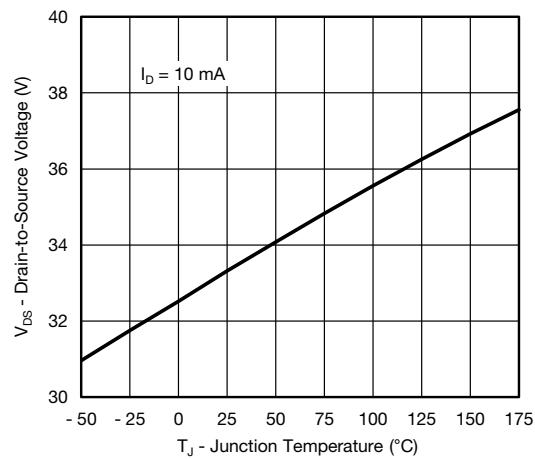
SPECIFICATIONS ($T_C = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$		30	-	-	V	
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$		1.5	2.0	2.5		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}$	-	-	1	μA	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}$, $T_J = 125^\circ\text{C}$	-	-	50		
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}$, $T_J = 175^\circ\text{C}$	-	-	250		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	50	-	-	A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$	-	0.0047	0.0060	Ω	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$, $T_J = 125^\circ\text{C}$	-	-	0.0090		
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$, $T_J = 175^\circ\text{C}$	-	-	0.0107		
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	-	0.0067	0.0085		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 20\text{ A}$		-	74	-	S	
Dynamic								
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	-	3222	4030	pF	
Output Capacitance	C_{oss}			-	563	705		
Reverse Transfer Capacitance	C_{rss}			-	241	300		
Total Gate Charge ^c	Q_g	$V_{GS} = 4.5\text{ V}$	$V_{DS} = 15\text{ V}$, $I_D = 50\text{ A}$	-	25.2	38	nC	
Gate-Source Charge ^c	Q_{gs}			-	9.1	-		
Gate-Drain Charge ^c	Q_{gd}			-	9.4	-		
Gate Resistance	R_g	$f = 1\text{ MHz}$		0.5	1.6	2.8	Ω	
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 15\text{ V}$, $R_L = 0.3\text{ }\Omega$ $I_D \geq 50\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\text{ }\Omega$		-	10	15	ns	
Rise Time ^c	t_r			-	10	15		
Turn-Off Delay Time ^c	$t_{d(\text{off})}$			-	26	39		
Fall Time ^c	t_f			-	9	14		
Source-Drain Diode Ratings and Characteristics^b								
Pulsed Current ^a	I_{SM}			-	-	200	A	
Forward Voltage	V_{SD}	$I_F = 85\text{ A}$, $V_{GS} = 0\text{ V}$		-	1	1.5	V	

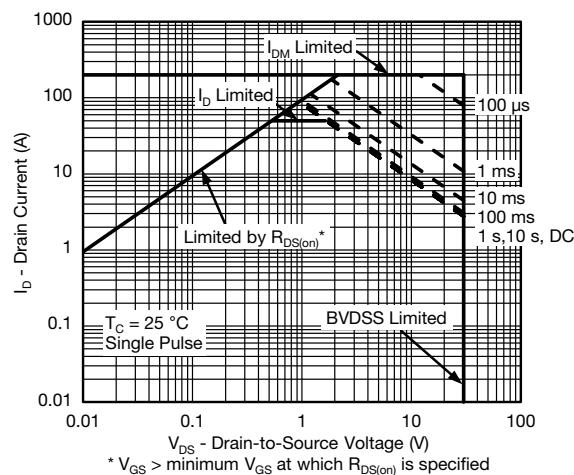
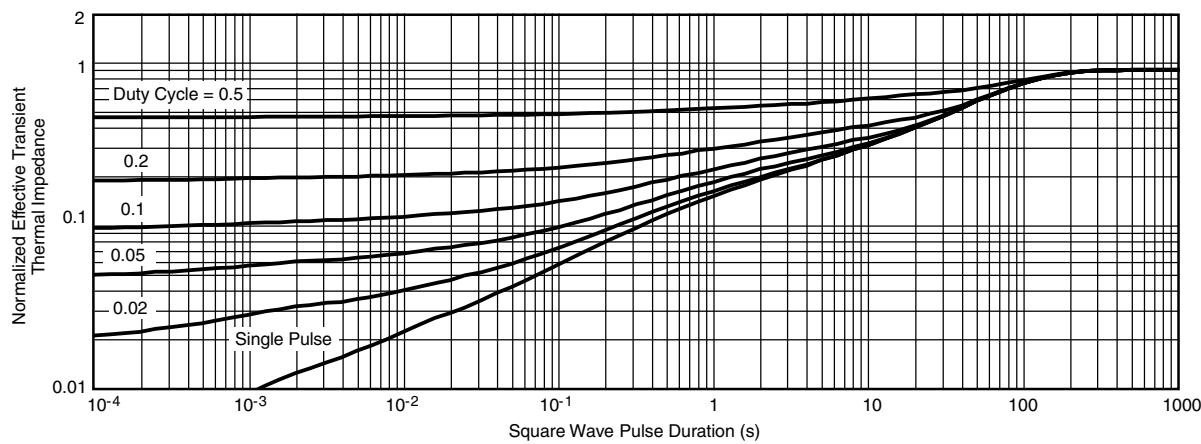
Notes

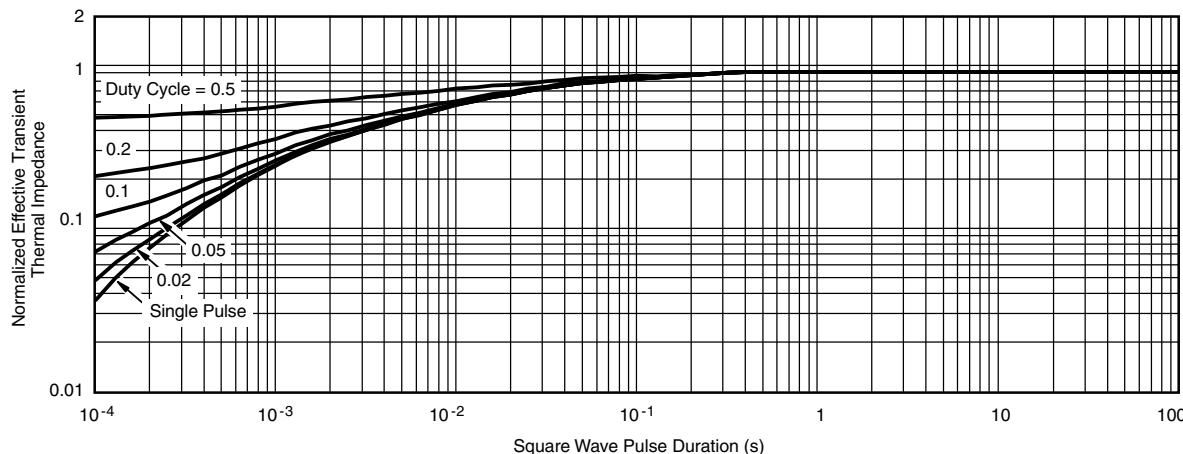
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\text{ \%}$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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

Output Characteristics

Transfer Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

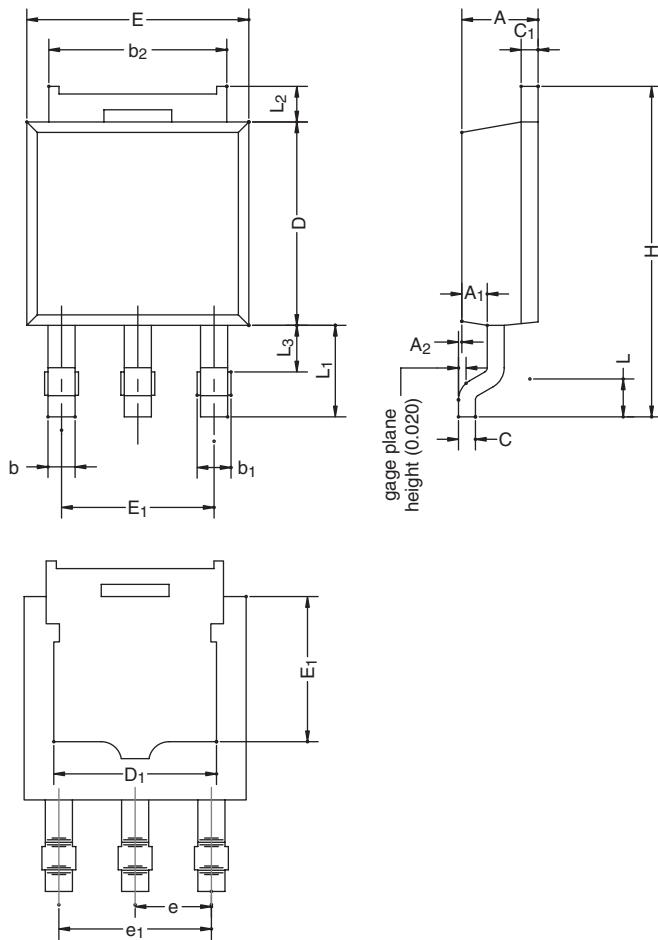
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Gate Charge

On-Resistance vs. Junction Temperature

Source Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS ($T_A = 25$ °C, unless otherwise noted)

Safe Operating Area

Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS ($T_A = 25$ °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.

TO-252 REVERSE LEAD CASE OUTLINE


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.23	2.33	0.088	0.092
A ₁	0.64	0.89	0.025	0.035
A ₂	0.03	0.23	0.001	0.009
b	0.71	0.88	0.028	0.035
b ₁	0.76	1.14	0.030	0.045
b ₂	5.23	5.44	0.206	0.214
C	0.46	0.58	0.018	0.023
C ₁	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D ₁	4.49	5.00	0.177	0.197
E	6.48	6.73	0.255	0.265
E ₁	4.32	-	0.170	-
e	2.28 BSC		0.090 BSC	
e ₁	4.57 BSC		0.180 BSC	
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L ₁	2.74 BSC		0.108 BSC	
L ₂	0.89	1.27	0.035	0.050
L ₃	1.15	1.52	0.040	0.060

ECN: T-08706-Rev. B, 29-Sep-08
 DWG: 5894

Note

 Dimension L₃ for reference only.

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