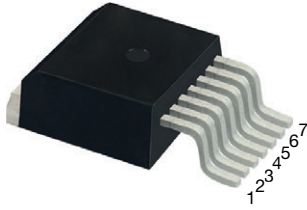
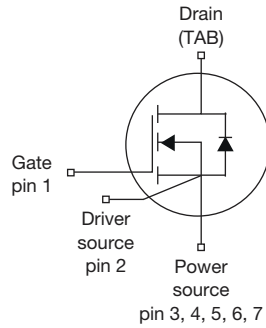


MaxSiC[®] 1200 V N-Channel SiC MOSFET

D²PAK 7L (TO-263 7L)


Top View


FEATURES

- Fast switching speed
- Short circuit withstand time 3 μ s
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE
APPLICATIONS

- Solar inverters
- Energy storage systems
- UPS (uninterruptible power supplies)

Marking Code: 120A080SE

PRODUCT SUMMARY	
V_{DS} (V) at T_J max.	1200
$R_{DS(on)}$ typ. ($m\Omega$) at 25 °C	$V_{GS} = 18$ V 80
Q_g typ. (nC)	47
I_D (A)	32
C_{oss} typ. (pF)	55
P_D (W)	185
Configuration	Single

ORDERING INFORMATION	
Package	D ² PAK 7L (TO-263 7L)
Lead (Pb)-free and halogen-free	MXP120A080SE-T1GE3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	1200	V
Gate-source voltage		V_{GS}	-10 / +22	
Recommended operation voltage of gate-source		V_{GSOP}	-5 to -3 / +18	
Continuous drain current	$T_C = 25$ °C	I_D	32	A
Pulsed drain current ^a		I_{DM}	64	
Short-circuit withstand time ^b		T_{SC}	3	μ s
Maximum power dissipation	$T_C = 25$ °C	P_D	185	W
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature)	For 10 s		260	°C
Single pulse avalanche energy ^c		E_{AS}	113	mJ

Notes

- Repetitive rating; pulse width limited by maximum junction temperature
- $V_{GS} = 18$ V, $V_{DS} = 800$ V, $R_{g(ext)} = 20$ Ω , verified by the design / characterization
- $T_J = 25$ °C, $V_{DD} = 120$ V, $L = 1$ mH, $V_{GS} = 18$ V, $I_{AS} = 15$ A, verified by the design / characterization



THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum junction-to-ambient	R_{thJA}	-	42	°C/W
Maximum junction-to-case (drain)	R_{thJC}	-	0.81	

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_{DS}	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	1200	-	-	V	
Gate-source threshold voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 2.8\text{ mA}$	-	2.9	-	V	
		$V_{DS} = V_{GS}, I_D = 2.8\text{ mA}, T_J = 175\text{ }^\circ\text{C}$	-	2.0	-	V	
Gate-source leakage	I_{GSS}	$V_{GS} = 22\text{ V}, V_{DS} = 0\text{ V}$	-	-	100	nA	
		$V_{GS} = -10\text{ V}, V_{DS} = 0\text{ V}$	-	-	-100		
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$	-	-	10	μA	
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 15\text{ V}, I_D = 14\text{ A}$	-	97	121	m Ω	
		$V_{GS} = 18\text{ V}, I_D = 14\text{ A}$	-	80	100		
		$V_{GS} = 18\text{ V}, I_D = 14\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	144	-		
Transconductance	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 14\text{ A}$	-	6	-	S	
Dynamic							
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 800\text{ V}, f = 100\text{ KHz}$	-	1381	-	pF	
Output capacitance	C_{oss}		-	55	-		
Reverse transfer capacitance	C_{rss}		-	2	-		
Total gate charge	Q_g	$V_{GS} = -5\text{ V} \sim 18\text{ V}, I_D = 14\text{ A}, V_{DS} = 800\text{ V}$	-	47	-	nC	
Gate-source charge	Q_{gs}		-	13	-		
Gate-drain charge	Q_{gd}		-	13	-		
Gate Resistance	R_g		$V_{DS} = 0\text{ V}, f = 1\text{ MHz}$	-	3.5		-
Switching Characteristics							
Turn-on delay time	$t_{d(on)}$	$V_{GS} = -5\text{ V} \sim 18\text{ V}, I_D = 14\text{ A}, V_{DS} = 800\text{ V}, R_{g(ext)} = 4.4\text{ }\Omega$	$T_J = 25\text{ }^\circ\text{C}$	-	16	-	ns
			$T_J = 175\text{ }^\circ\text{C}$	-	16	-	
Rise time	t_r		$T_J = 25\text{ }^\circ\text{C}$	-	9	-	
			$T_J = 175\text{ }^\circ\text{C}$	-	7	-	
Turn-off delay time	$t_{d(off)}$		$T_J = 25\text{ }^\circ\text{C}$	-	18	-	
			$T_J = 175\text{ }^\circ\text{C}$	-	19	-	
Fall time	t_f		$T_J = 25\text{ }^\circ\text{C}$	-	10	-	
			$T_J = 175\text{ }^\circ\text{C}$	-	10	-	
Turn-on switching energy	E_{on}		$T_J = 25\text{ }^\circ\text{C}$	-	141	-	μJ
			$T_J = 175\text{ }^\circ\text{C}$	-	119	-	
Turn-off switching energy	E_{off}		$T_J = 25\text{ }^\circ\text{C}$	-	40	-	
			$T_J = 175\text{ }^\circ\text{C}$	-	47	-	
Body Diode Ratings and Characteristic							
Forward diode voltage	V_{SD}	$V_{GS} = -5\text{ V}, I_{SD} = 7\text{ A}, T_J = 25\text{ }^\circ\text{C}$	-	4.7	-	V	
Continuous diode forward current	I_{SD}	$V_{GS} = -5\text{ V}, T_J = 25\text{ }^\circ\text{C}$	-	-	26	A	
Pulsed diode forward current	I_{SDM}		-	-	64		
Reverse recovery time	t_{rr}	$V_{GS} = -5\text{ V}, I_{SD} = 14\text{ A}, V_R = 800\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}$	-	16	-	ns	
Reverse recovery charge	Q_{rr}		-	47	-	nC	
Reverse recovery current	I_{RRM}		-	5	-	A	

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

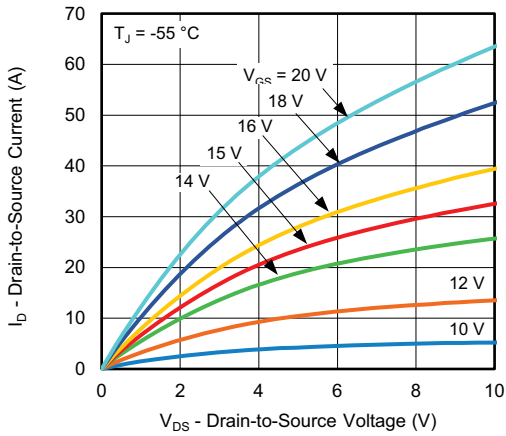


Fig. 1 Typical Output Characteristics

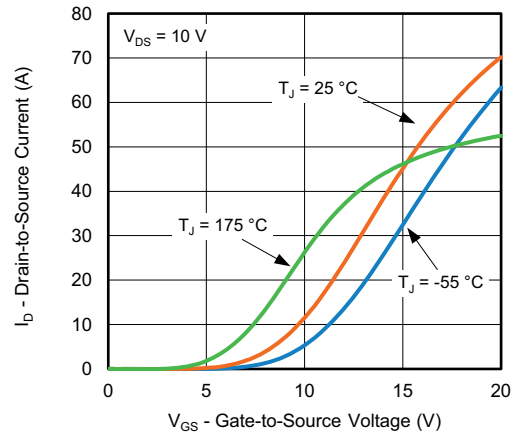


Fig. 4 Typical Transfer Characteristics

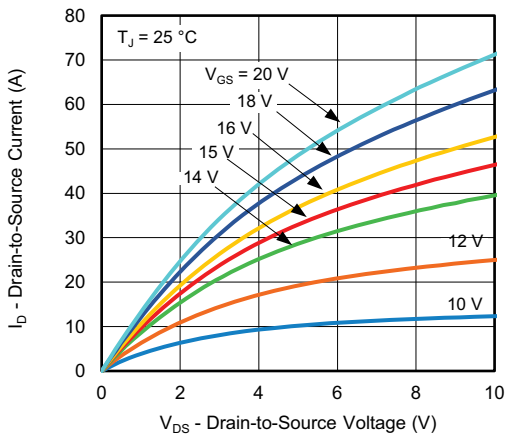


Fig. 2 Typical Output Characteristics

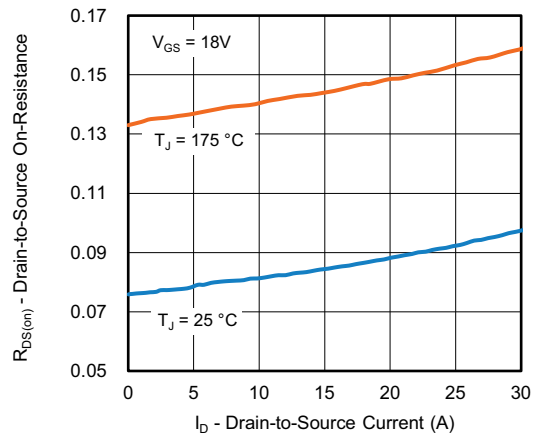


Fig. 5 Normalized On-Resistance vs. Drain Current

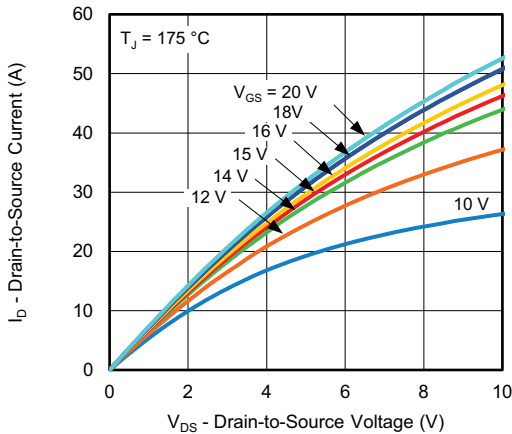


Fig. 3 Typical Output Characteristics

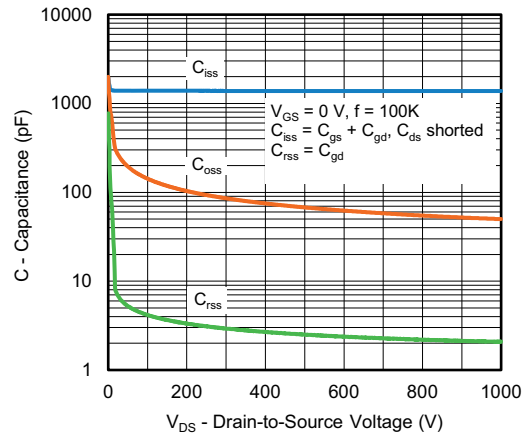


Fig. 6 Typical Capacitance vs. Drain-to-Source Voltage

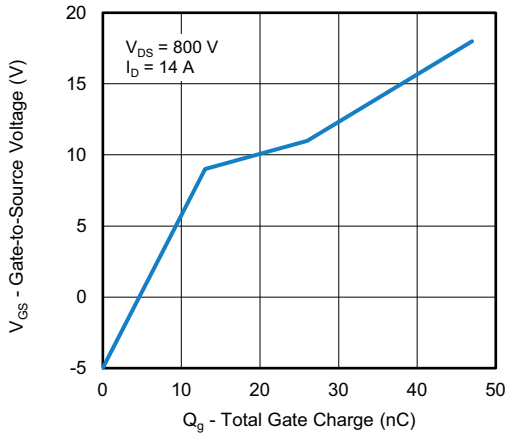


Fig. 7 Typical Gate Charge vs. Gate-to-Source Voltage

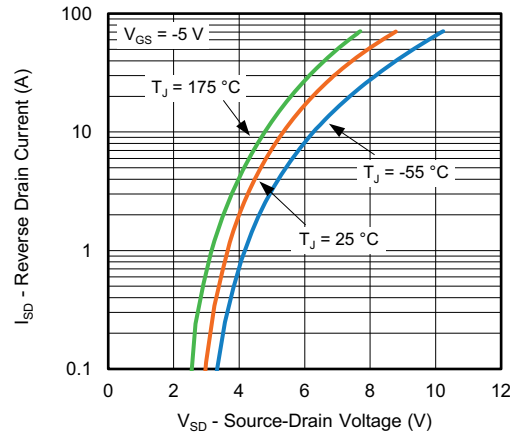


Fig. 10 Typical Source-Drain Diode Forward Voltage

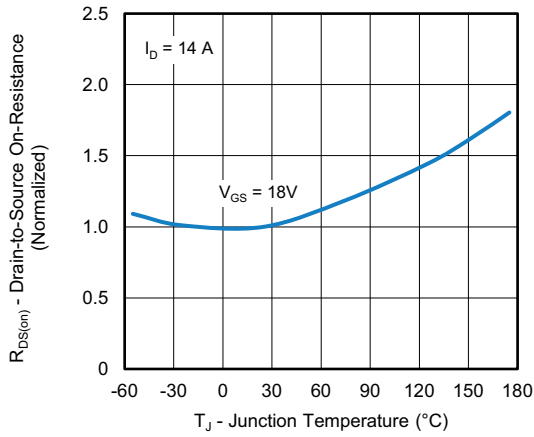


Fig. 8 Normalized On-Resistance vs. Temperature

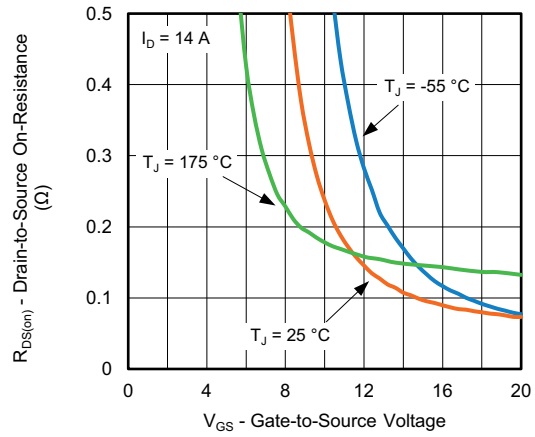


Fig. 11 On-Resistance vs. Gate-to-Source Voltage

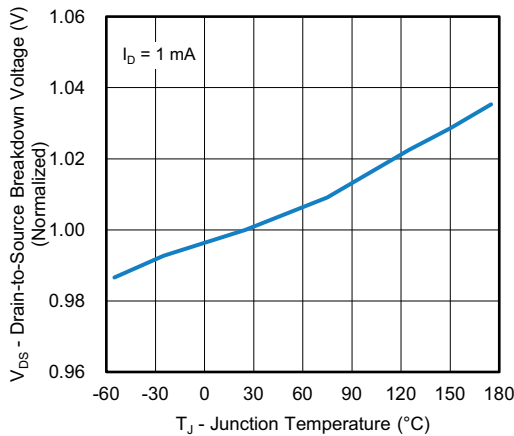


Fig. 9 Drain-to-Source Voltage vs. Temperature

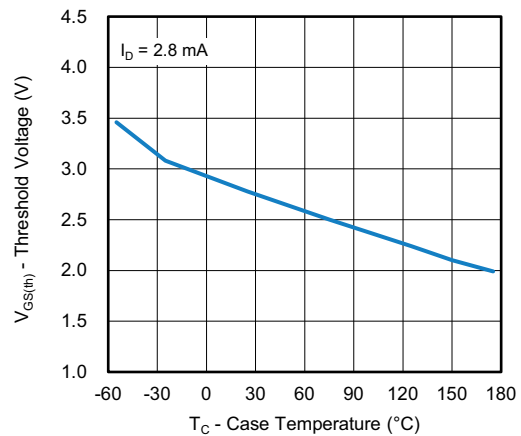


Fig. 12 Threshold Voltage vs. Case Temperature

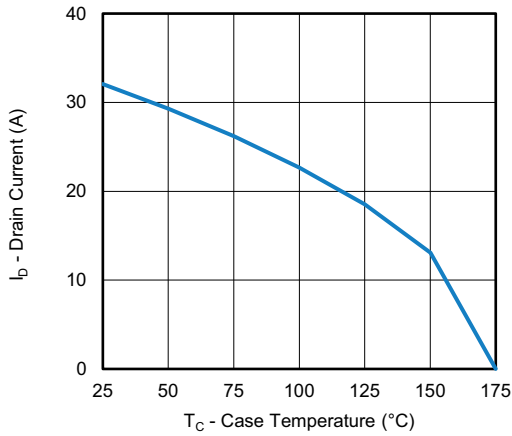


Fig. 13 Drain Current vs. Case Temperature

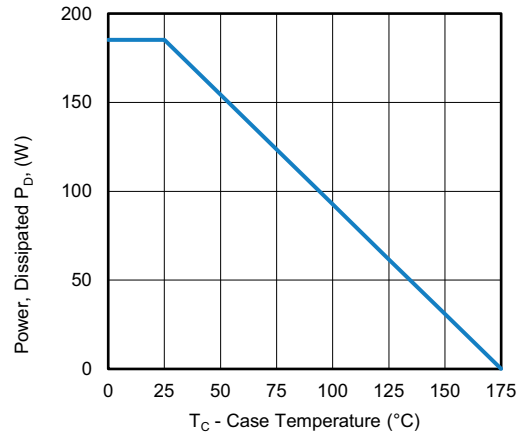


Fig. 15 Power, Dissipated P_D vs. Case Temperature

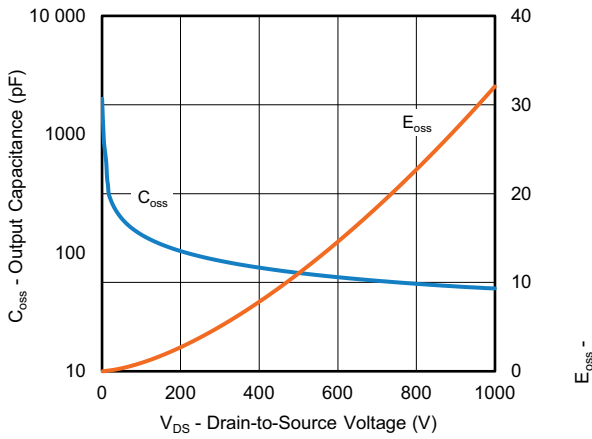


Fig. 14 Output Capacitance and its Stored Energy vs. Drain-to-Source Voltage

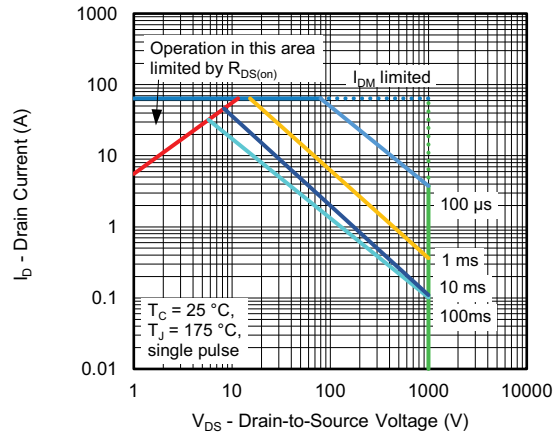


Fig. 16 Safe Operating Area

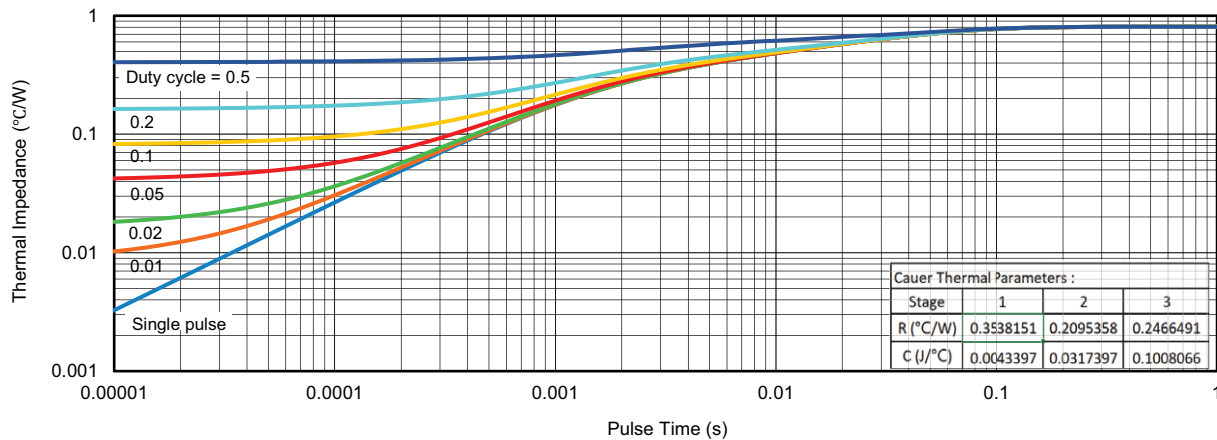


Fig. 17 Transient Thermal Impedance

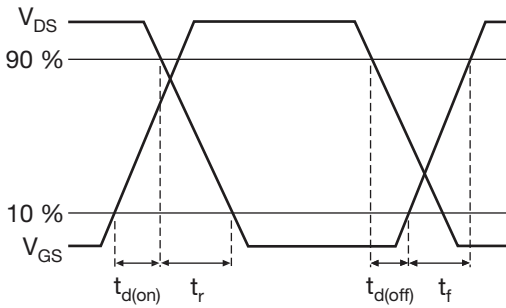


Fig. 18 Waveforms of Switching Time

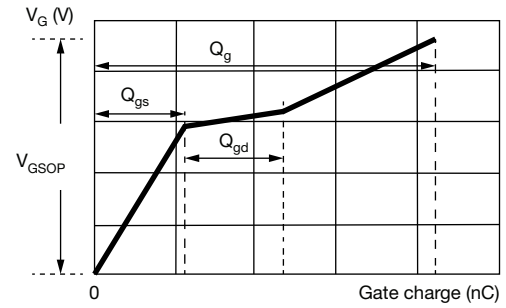


Fig. 21 Waveforms for Gate Charge

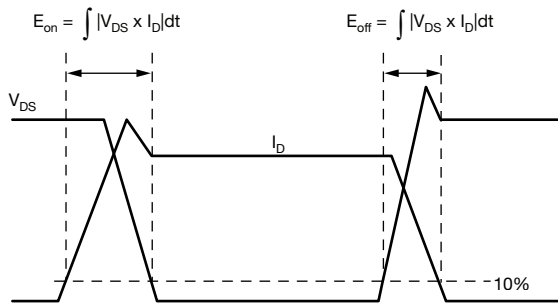


Fig. 19 Waveforms for Switching Energy

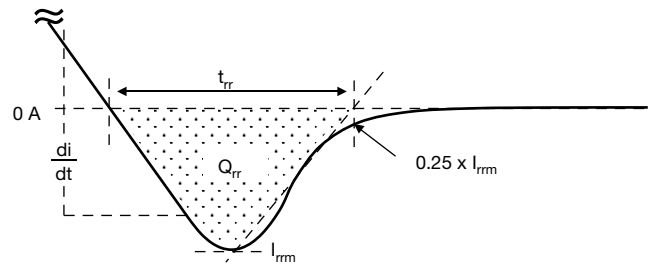


Fig. 22 Waveforms for Reverse Recovery

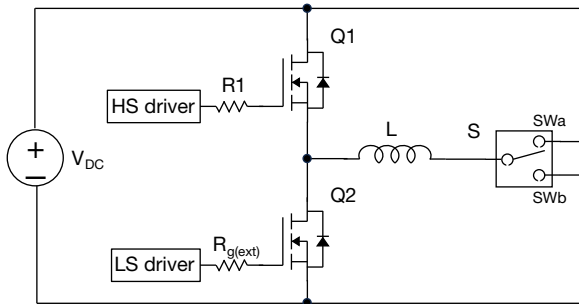


Fig. 20 Switching and Reverse Diode Characteristics Measurement Circuit

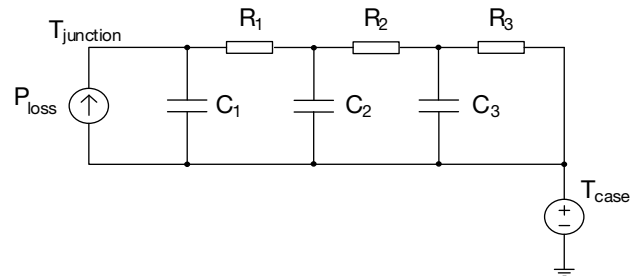
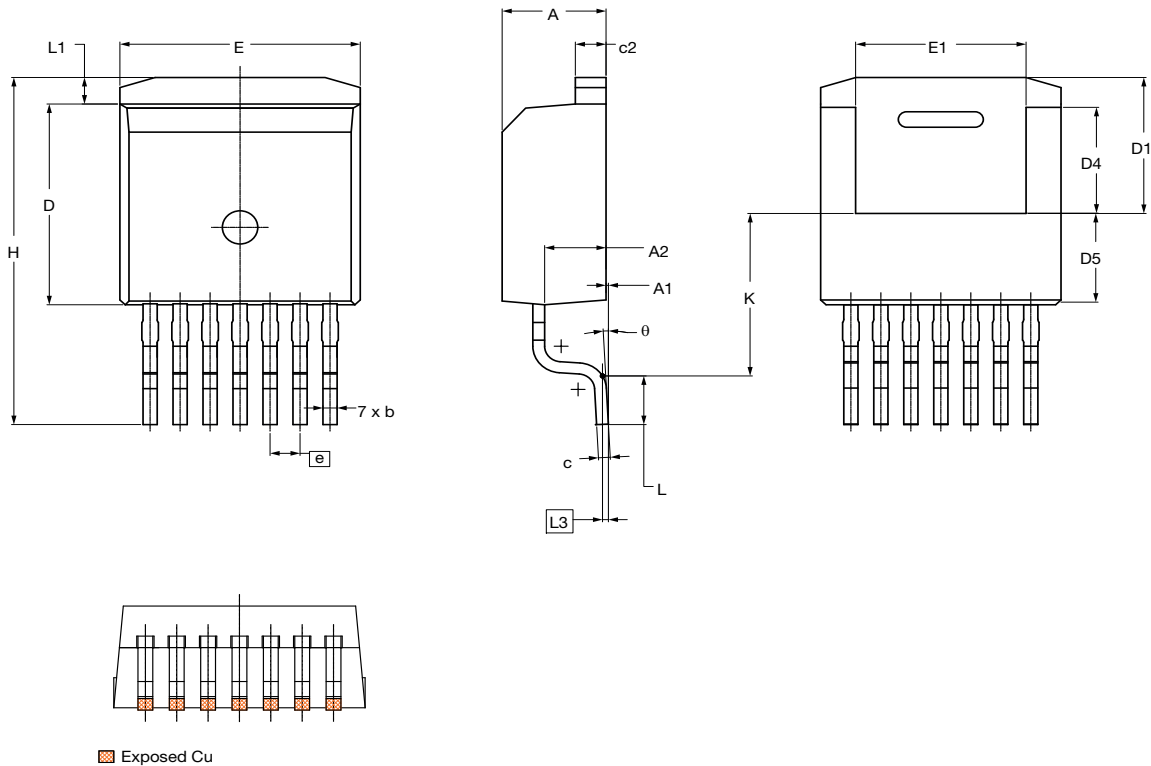


Fig. 23 Thermal Equivalent Circuit

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Case Outline for TO-263 7L Package

FACILITY CODE: 9



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	4.30	4.40	4.50
A1	0.00	0.10	0.25
A2	2.45	2.60	2.75
b	0.50	0.60	0.70
c	0.45	0.50	0.60
c2	1.20	1.30	1.40
D	8.93	9.08	9.23
D1	6.15 ref.		
D4	4.65	4.80	4.95
D5	3.83	4.13	4.43
E	10.08	10.18	10.28
E1	6.82	7.22	7.62
e	1.27 BSC.		
H	15.00	15.70	16.00
K	7.30		
L	1.90	2.20	2.50
L1	1.00	1.20	1.40
L3	0.25 BSC.		
θ	0 °	3 °	7 °

ECN: S25-0851-Rev. C, 18-Jul-2025
DWG: 6119

Notes

- All dimensions are in mm and angles are in degrees
- Dimension D and E do not include mold flash. These dimensions are measured at the outermost extreme of the plastic body
- Thermal pad contour optional within Dimensions E, L1, D4 and E1
- Dimension D4 and E1 establish a minimum mounting surface for the thermal pad
- There is exposed Cu and molding flash bleeding at the pin which is close to package



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