E4M0060075U2

750V 60mΩ Automotive Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

Features

- Industry standard Top Side Cooled (TSC) Package
- High power dissipation capability
- Optimized package with separate driver source pin
- High creepage package design
- High-speed switching with low capacitances
- Fast intrinsic diode with low reverse recovery (Q_{rr})
- Halogen free, RoHS compliant
- Automotive Qualified (AEC-Q101) and PPAP Capable

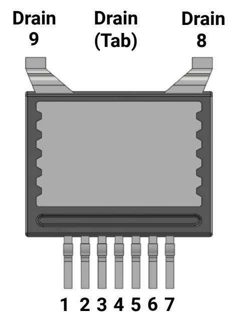
Benefits

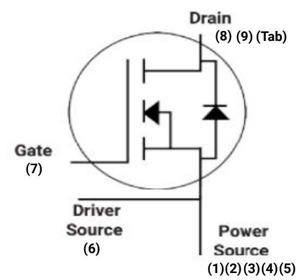
- Increase power density
- Reduce cooling requirements
- Reduce switching losses and minimize gate ringing
- Higher system efficiency
- Increase system switching frequency

Typical Applications

- Motor Control
- EV Battery Chargers
- High Voltage DC/DC Converters

Package





Part Number	Package	Marking
E4M0060075U2	U2 (TSC)	E4M0060075U2

Key Parameters

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions	Note
Drain - Source Voltage	V_{DS}			750	V	$T_C = 25°C$	
Maximum Gate - Source Voltage	$V_{GS(max)}$	-8		+19		Transient	
Operational Gate-Source Voltage	$V_{GS\ op}$		-4/15			Static	Note 1
DC Continuous Drain Current	I_D			36	A	V_{GS} = 15 V, T_C = 25 °C, T_J ≤175 °C	Fig. 19 Note 2
				27		V_{GS} = 15 V, T_C = 100 °C, T_J ≤175 °C	
Pulsed Drain Current	I_{DM}			101		t_{Pmax} limited by T_{jmax} V_{GS} = 15V, T_C = 25 °C	Fig. 22
Power Dissipation	P_D			150	W	T_C = 25 °C, T_J = 175 °C	Fig. 20
Operating Junction and Storage Temperature	T_J, T_{stg}			-55 to +175	°C		
Solder Temperature	T_L			260		According to JEDEC J-STD-020	

Note (1): Recommended turn-on gate voltage is 15V with ±5% regulation tolerance, see Application Note PRD-04814 for additional details
Note (2): Verified by design

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Electrical Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	750			V	V_{GS} = 0 V, I_D = 100 μA	
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.3	3.8	V	V_{DS} = V_{GS}, I_D = 3.67 mA	Fig. 11
			1.9		V	V_{DS} = V_{GS}, I_D = 3.67 mA, T_J = 175ºC	Fig. 11
I_{DSS}	Zero Gate Voltage Drain Current		1	50	μA	V_{DS} = 750 V, V_{GS} = 0 V	
I_{GSS}	Gate-Source Leakage Current		10	250	nA	V_{GS} = 15 V, V_{DS} = 0 V	
$R_{DS(on)}$	Drain-Source On-State Resistance		60	78	mΩ	V_{GS} = 15 V, I_D = 13.4 A	Fig. 4, 5, 6
			97		mΩ	V_{GS} = 15 V, I_D = 13.4 A, T_J = 175ºC	Fig. 4, 5, 6
g_{fs}	Transconductance		10		S	V_{DS}= 20 V, I_{DS}= 13.4 A	Fig. 7
			8		S	V_{DS}= 20 V, I_{DS}= 13.4 A, T_J = 175ºC	Fig. 7
C_{iss}	Input Capacitance		1203		pF	V_{GS} = 0 V, V_{DS} = 0V to 500 V F = 100 kHz V_{AC} = 25 mV	Fig. 17, 18
C_{oss}	Output Capacitance		69		pF		Fig. 17, 18
C_{rss}	Reverse Transfer Capacitance		7		pF		Fig. 17, 18
E_{oss}	C_{oss} Stored Energy		10		μJ		Fig. 16
$C_{o(er)}$	Effective Output Capacitance (Energy Related)		90		pF	V_{GS} = 0 V, V_{DS} = 0... 500V	Note: 3
$C_{o(tr)}$	Effective Output Capacitance (Time Related)		129		pF		Note: 3
E_{ON}	Turn-On Switching Energy (MOSFET FWD)		55		μJ	V_{DS}= 500 V, V_{GS}= -4 V/15 V, I_D= 13.4 A, $R_{G(ext)}$ = 2.5 Ω, L= 135 μH, T_J = 175ºC FWD = Internal Body Diode	Fig. 25, 27
E_{OFF}	Turn-Off Switching Energy (MOSFET FWD)		8		μJ		Fig. 25, 27
$t_{d(on)}$	Turn-On Delay Time		8		ns	V_{DD} = 500 V, V_{GS} = -4 V/15 V I_D = 13.4 A, $R_{G(ext)}$ = 2.5 Ω, Timing relative to V_{DS} Inductive load	Fig. 26, 27
t_r	Rise Time		7		ns		
$t_{d(off)}$	Turn-Off Delay Time		16		ns		
t_f	Fall Time		7		ns		
$R_{G(int)}$	Internal Gate Resistance		3.0		Ω	f = 1 MHz	
Q_{gs}	Gate to Source Charge		12		nC	V_{DS} = 500 V, V_{GS} = -4 V/15 V I_D = 13.4 A Per IEC60747-8-4 pg 21	Fig. 12
Q_{gd}	Gate to Drain Charge		13		nC		
Q_g	Total Gate Charge		45		nC		

Note (3): $C_{o(er)}$, a lumped capacitance that gives same stored energy as Coss while Vds is rising from 0 to 500V
$C_{o(tr)}$, a lumped capacitance that gives same charging time as Coss while Vds is rising from 0 to 500V

Reverse Diode Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.8		V	V_{GS} = -4 V, I_{SD} = 6.7 A, T_J = 25 °C	Fig. 8, 9, 10
		4.2			V_{GS} = -4 V, I_{SD} = 6.7 A, T_J = 175 °C	
I_S	Continuous Diode Forward Current		25	A	V_{GS} = -4 V, T_C = 25˚C	
I_{SM}	Diode pulse Current		101		V_{GS} = -4 V, pulse width t_P limited by T_{jmax}	
t_{rr}	Reverse Recovery time	11		ns	V_{GS} = -4 V, I_{SD} = 13.4 A, V_R = 500 V dif/dt = 8305 A/µs, T_J = 175 °C	
Q_{rr}	Reverse Recovery Charge	323		nC		
I_{rrm}	Peak Reverse Recovery Current	48		A		
t_{rr}	Reverse Recovery time	16		ns	V_{GS} = -4 V, I_{SD} = 13.4 A, V_R = 500 V dif/dt = 3075 A/µs, T_J = 175 °C	
Q_{rr}	Reverse Recovery Charge	222		nC		
I_{rrm}	Peak Reverse Recovery Current	23		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.77	1.00	°C/W		Fig. 21

Typical Performance

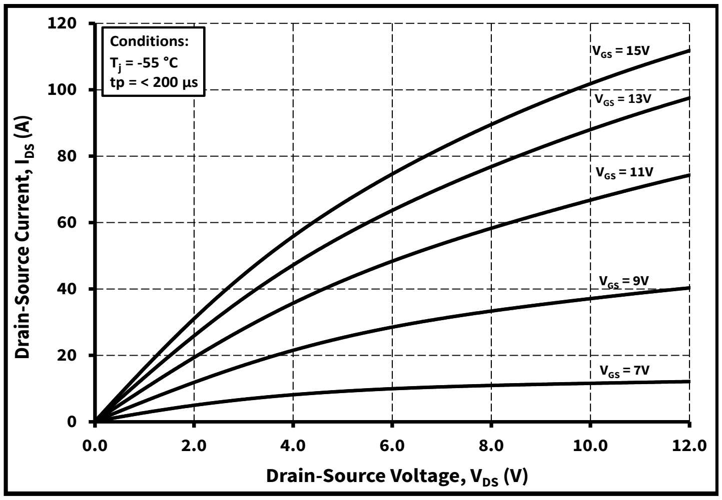


Figure 1. Output Characteristics T_J = -55 °C

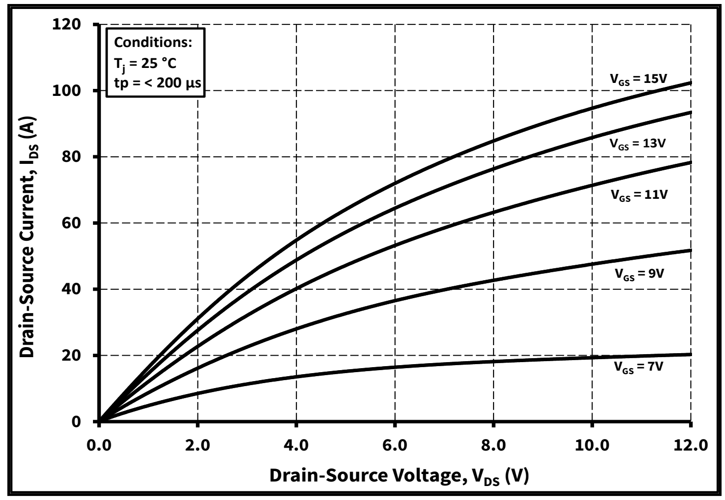


Figure 2. Output Characteristics T_J = 25 °C

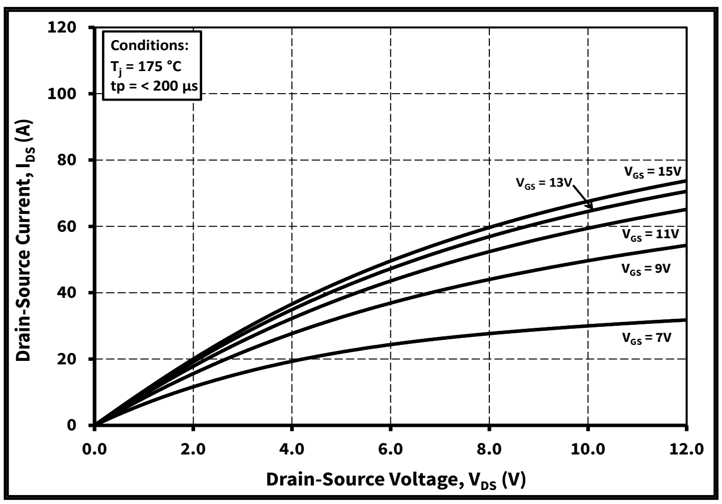


Figure 3. Output Characteristics T_J = 175 °C

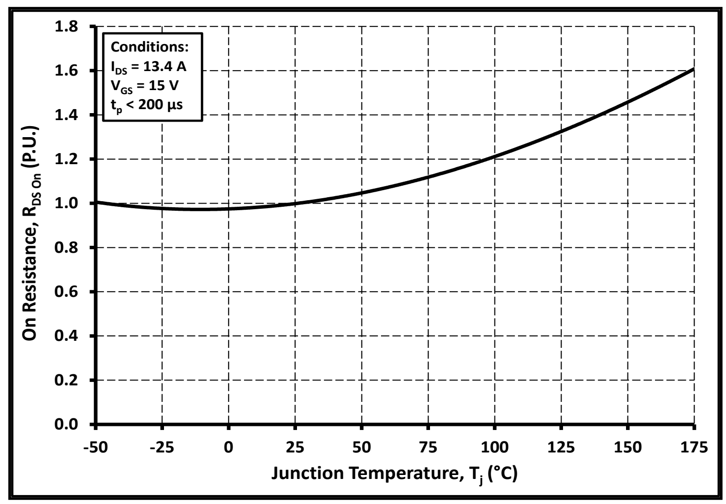


Figure 4. Normalized On-Resistance vs. Temperature

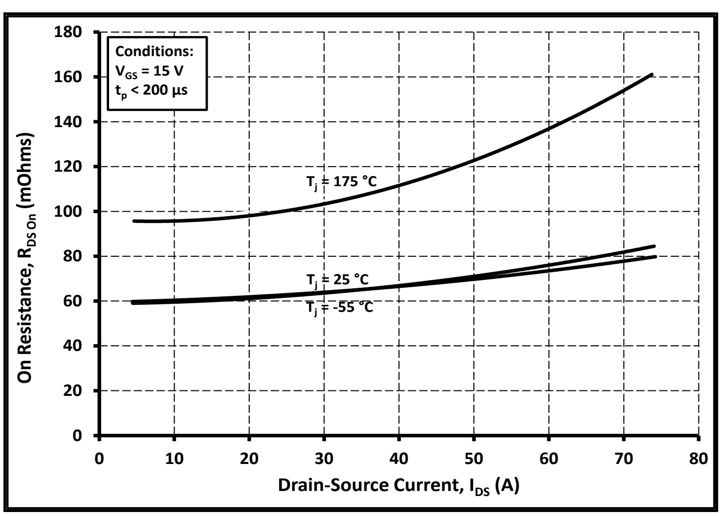


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

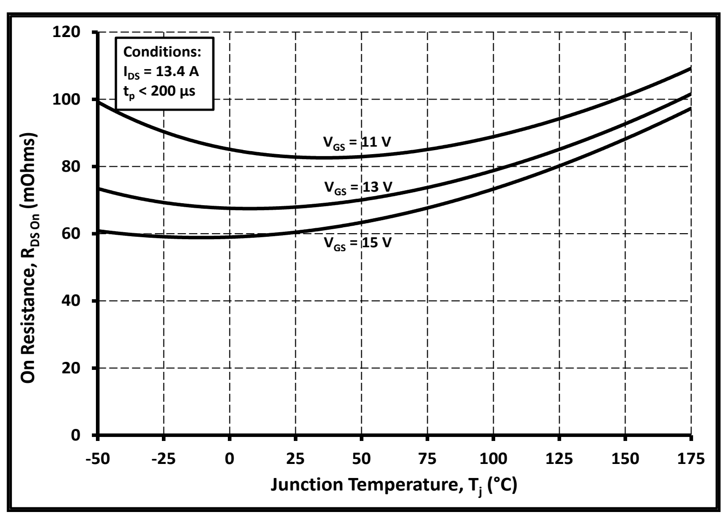


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

Typical Performance

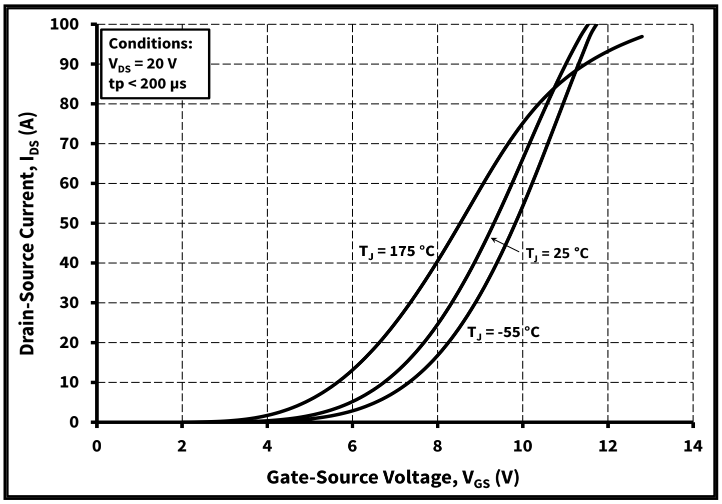


Figure 7. Transfer Characteristic for Various Junction Temperatures

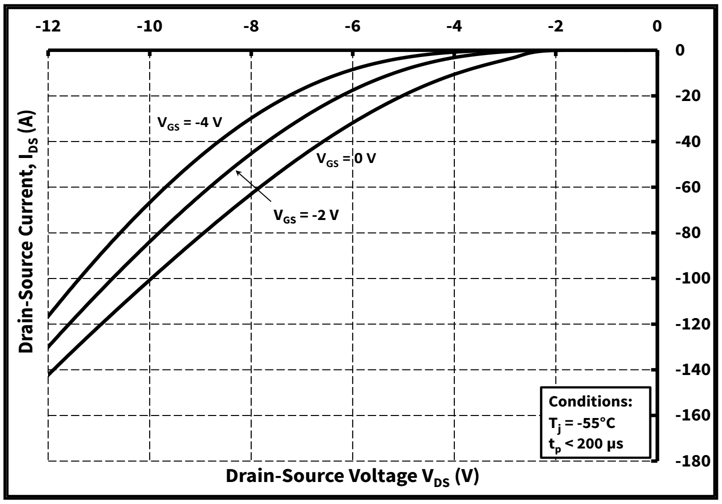


Figure 8. Body Diode Characteristic at -55 ºC

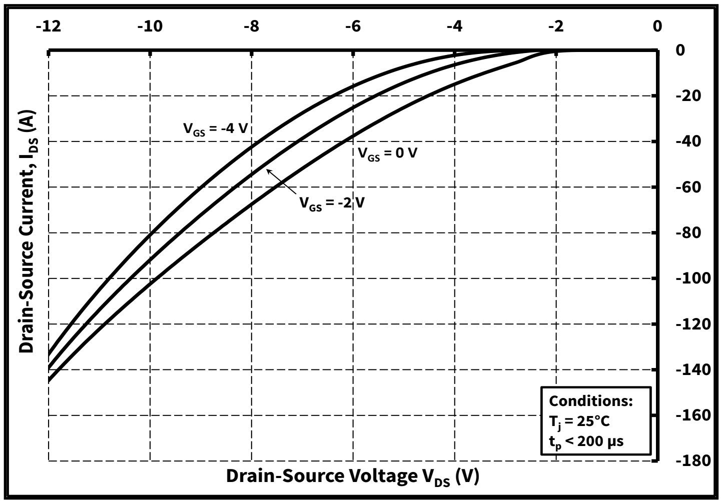


Figure 9. Body Diode Characteristic at 25 ºC

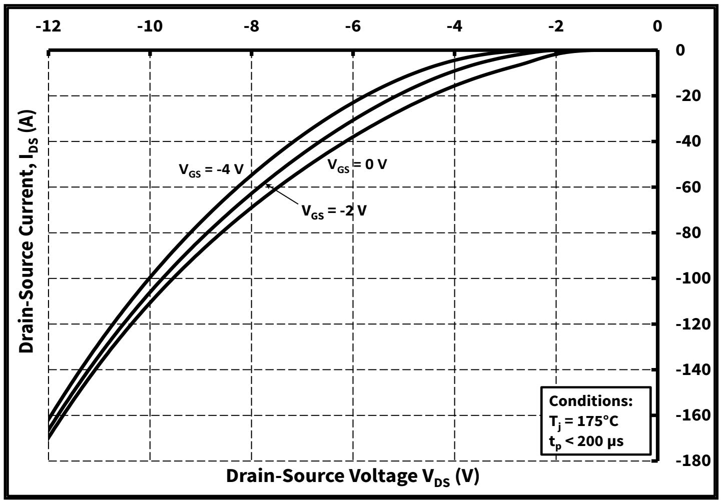


Figure 10. Body Diode Characteristic at 175 ºC

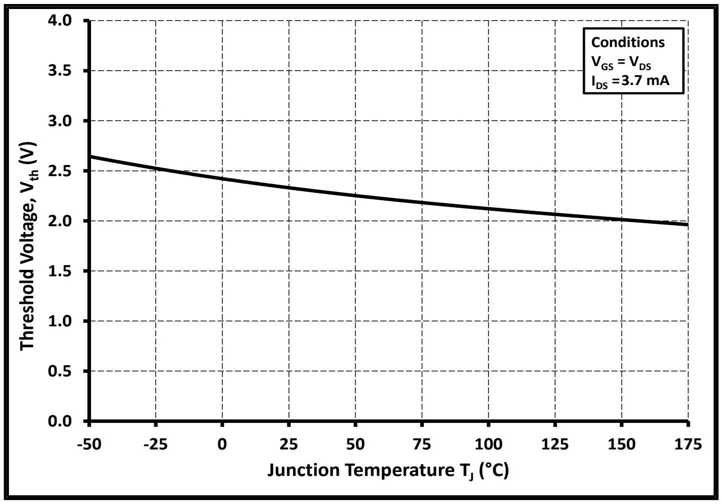


Figure 11. Threshold Voltage vs. Temperature

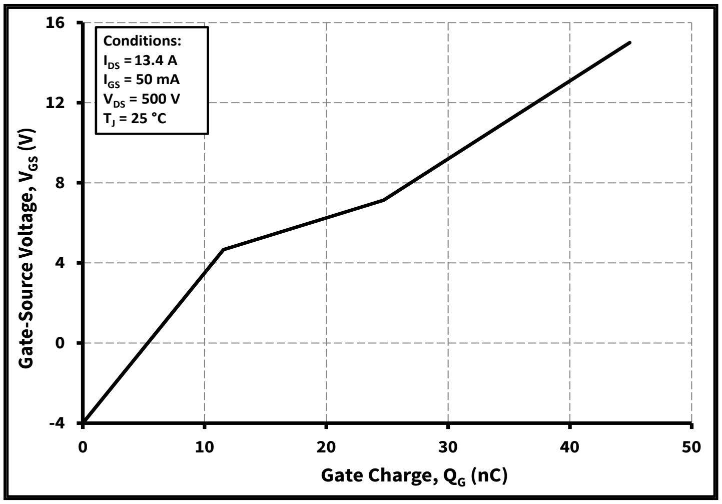


Figure 12. Gate Charge Characteristics

Typical Performance

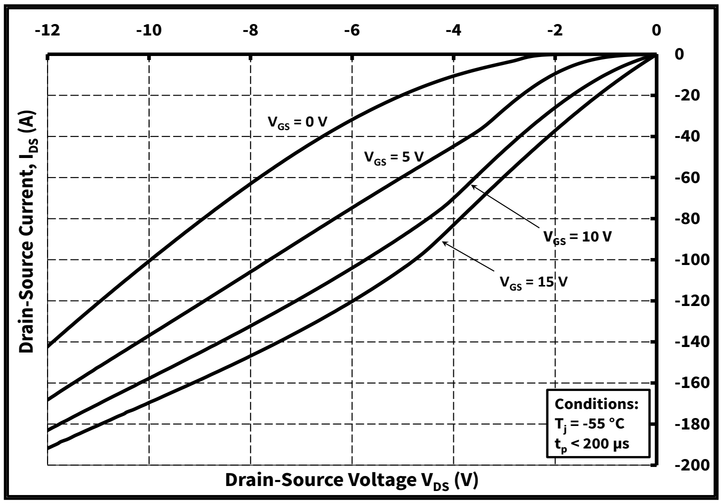


Figure 13. 3rd Quadrant Characteristic at -55 °C

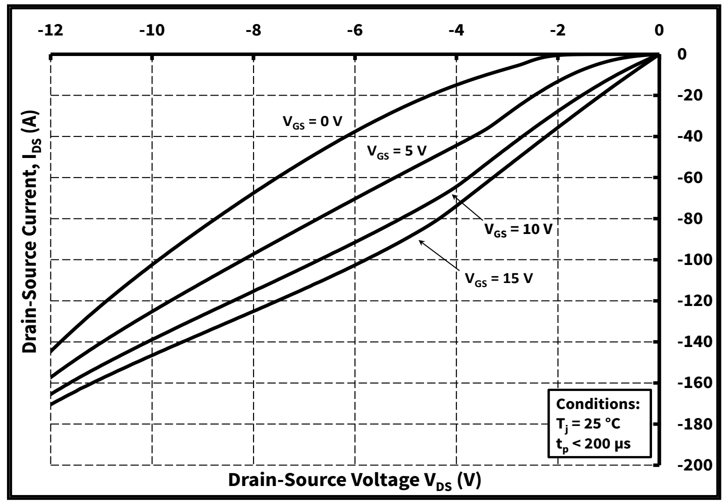


Figure 14. 3rd Quadrant Characteristic at 25 °C

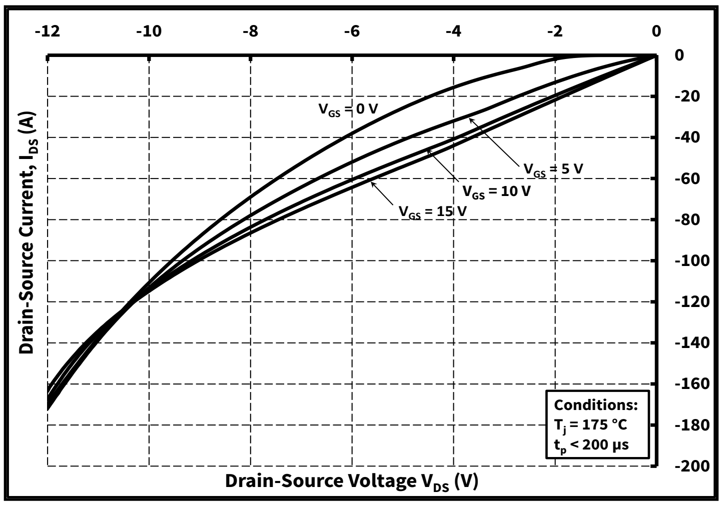


Figure 15. 3rd Quadrant Characteristic at 175 °C

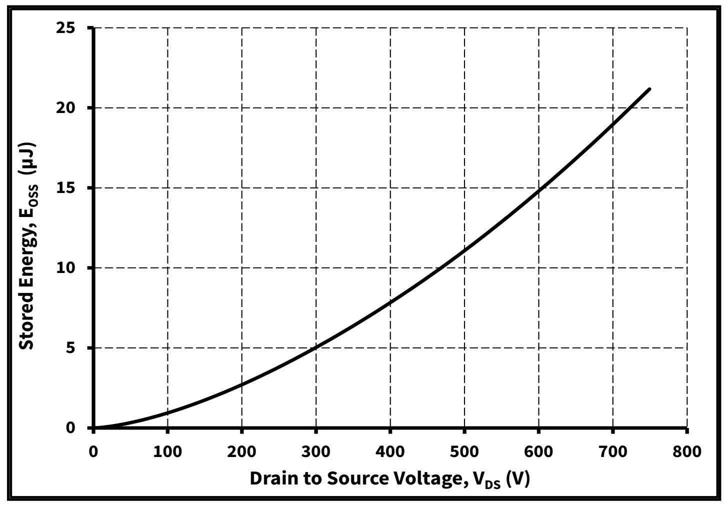


Figure 16. Output Capacitor Stored Energy

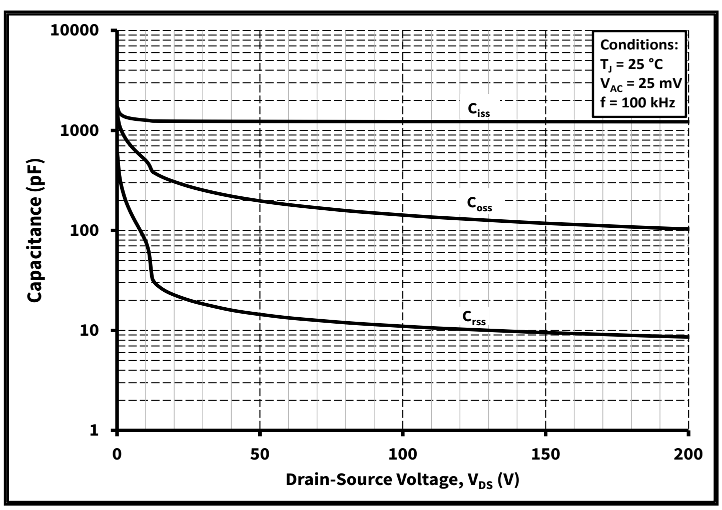


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

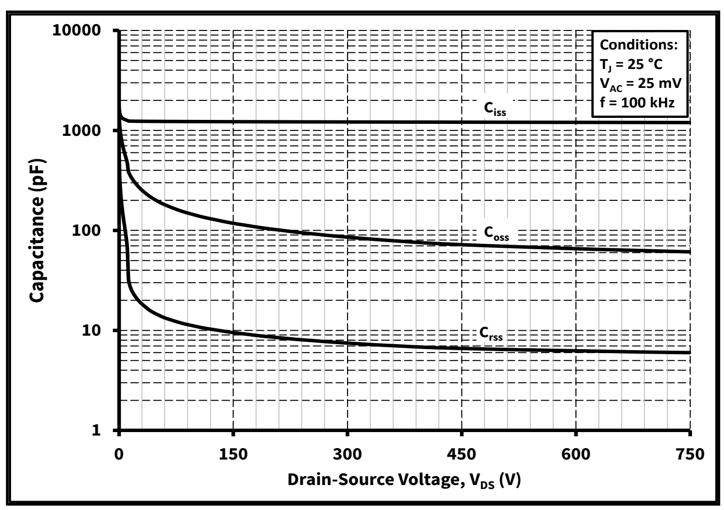


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 750V)

Typical Performance

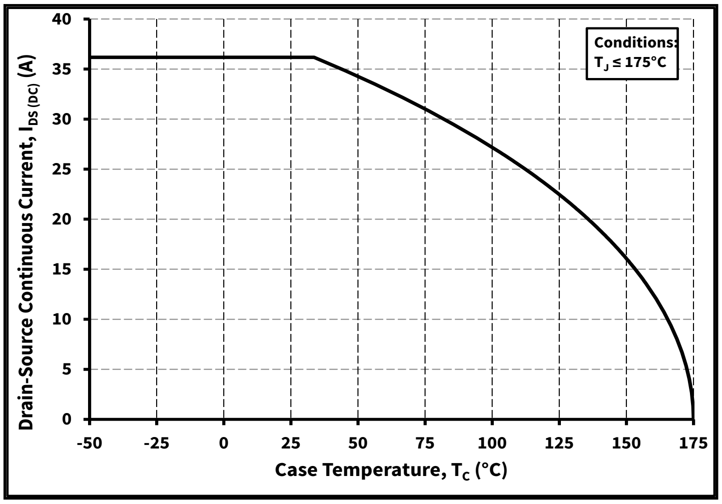


Figure 19. Continuous Drain Current Derating vs. Case Temperature

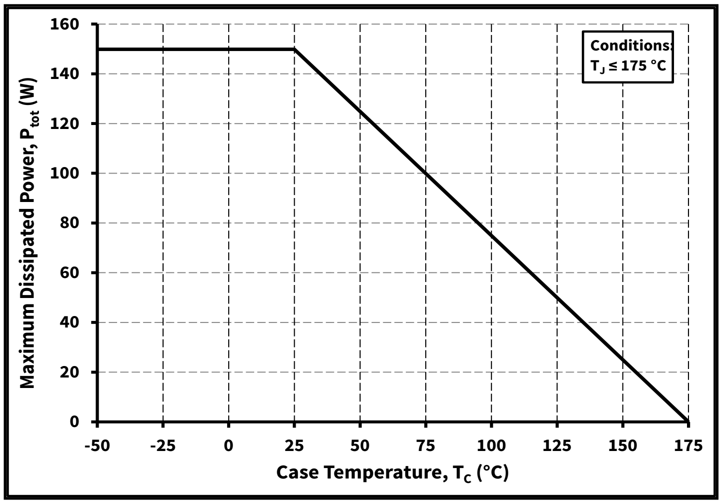


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

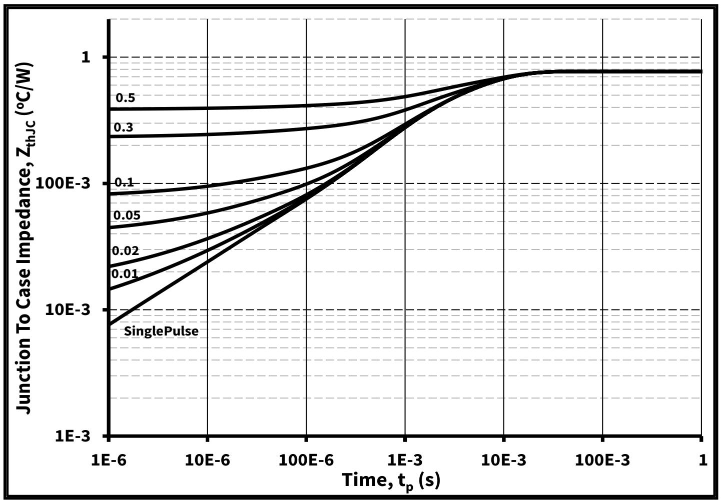


Figure 21. Transient Thermal Impedance (Junction - Case)

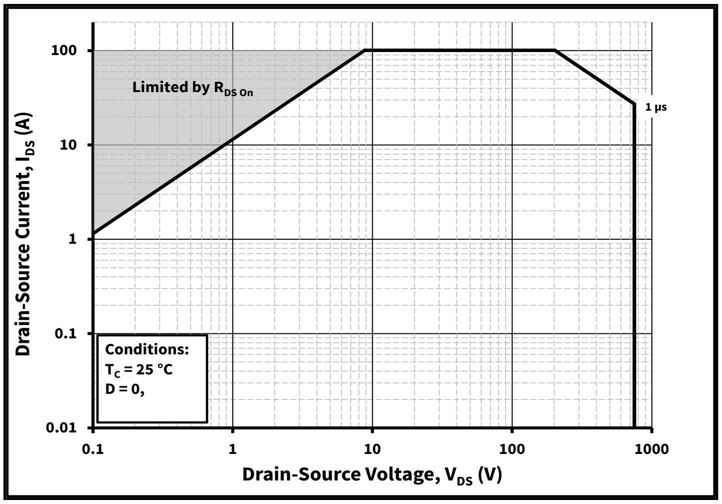


Figure 22. Safe Operating Area

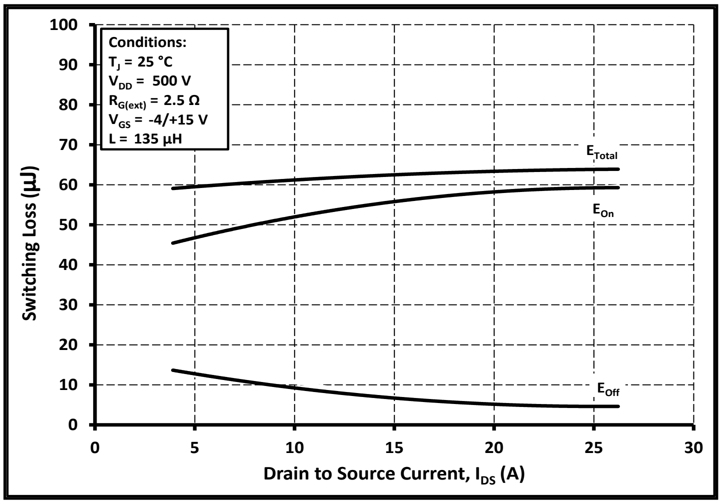


Figure 23. Clamped Inductive Switching Energy vs. Drain Current (V_{DD} = 500V)

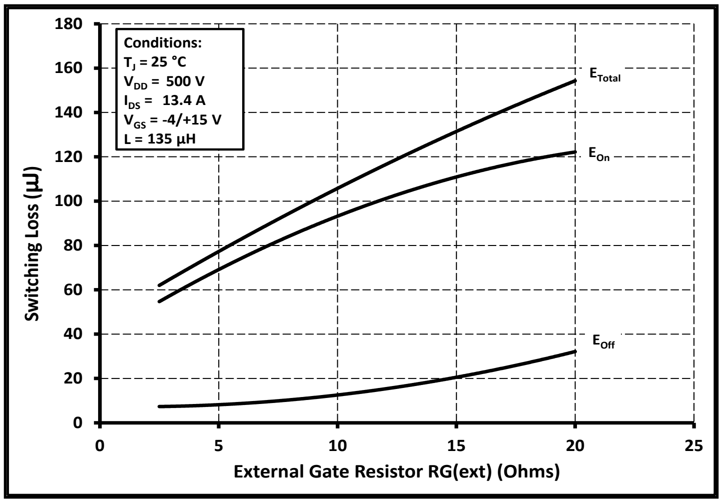


Figure 24. Clamped Inductive Switching Energy vs. $R_{G(ext)}$

Typical Performance

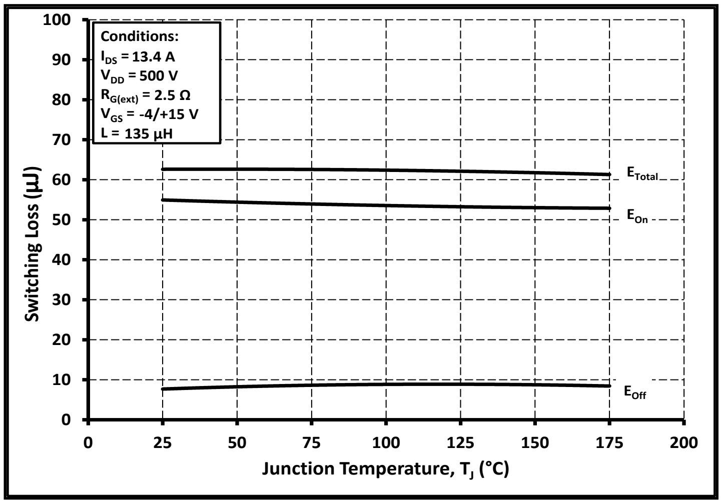


Figure 25. Clamped Inductive Switching Energy vs. Temperature

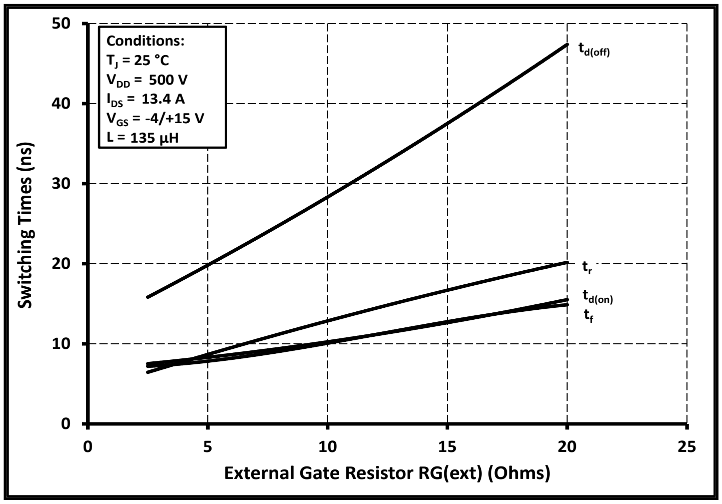


Figure 26. Switching Times vs. $R_{G(ext)}$

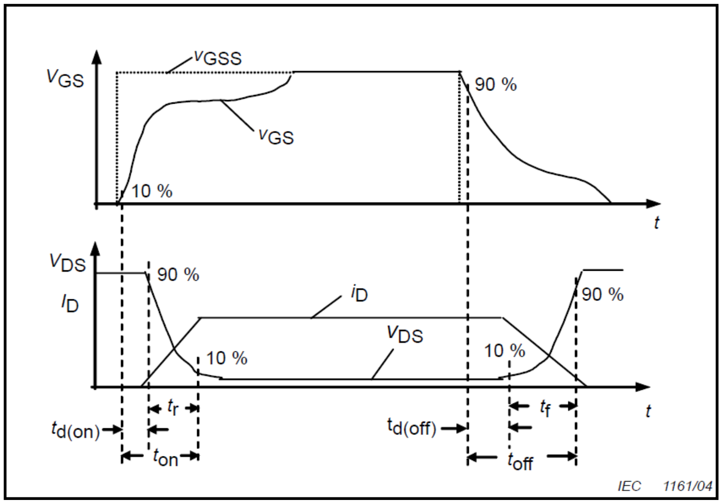


Figure 27. Switching Times Definition

Test Circuit Schematic

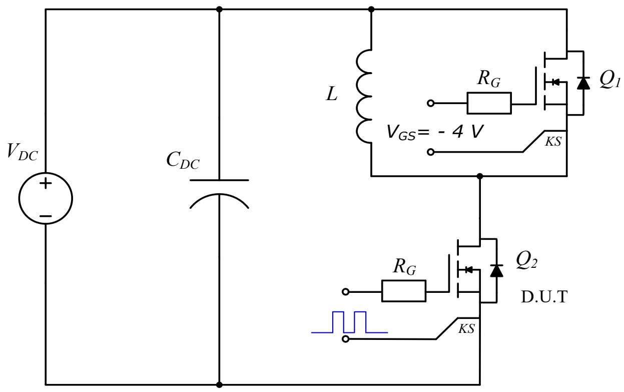
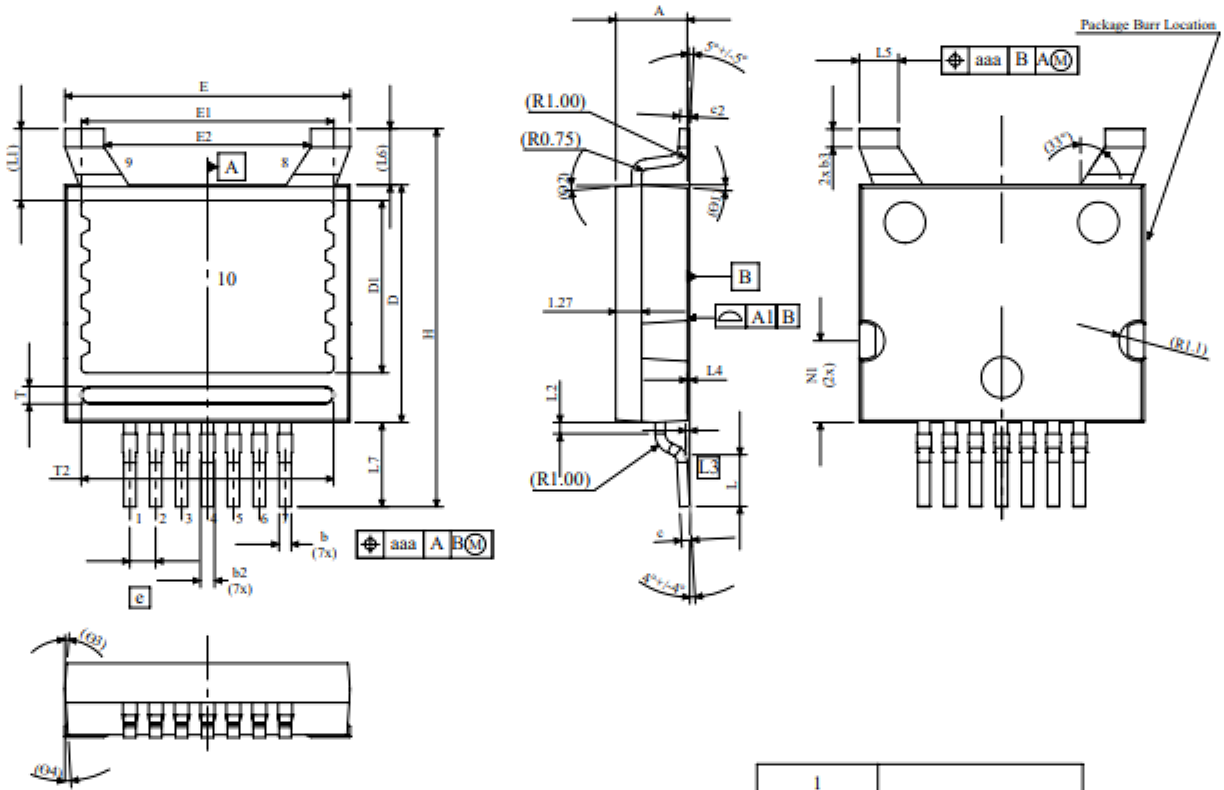


Figure 28. Clamped Inductive Switching Waveform Test Circuit

Package Dimensions



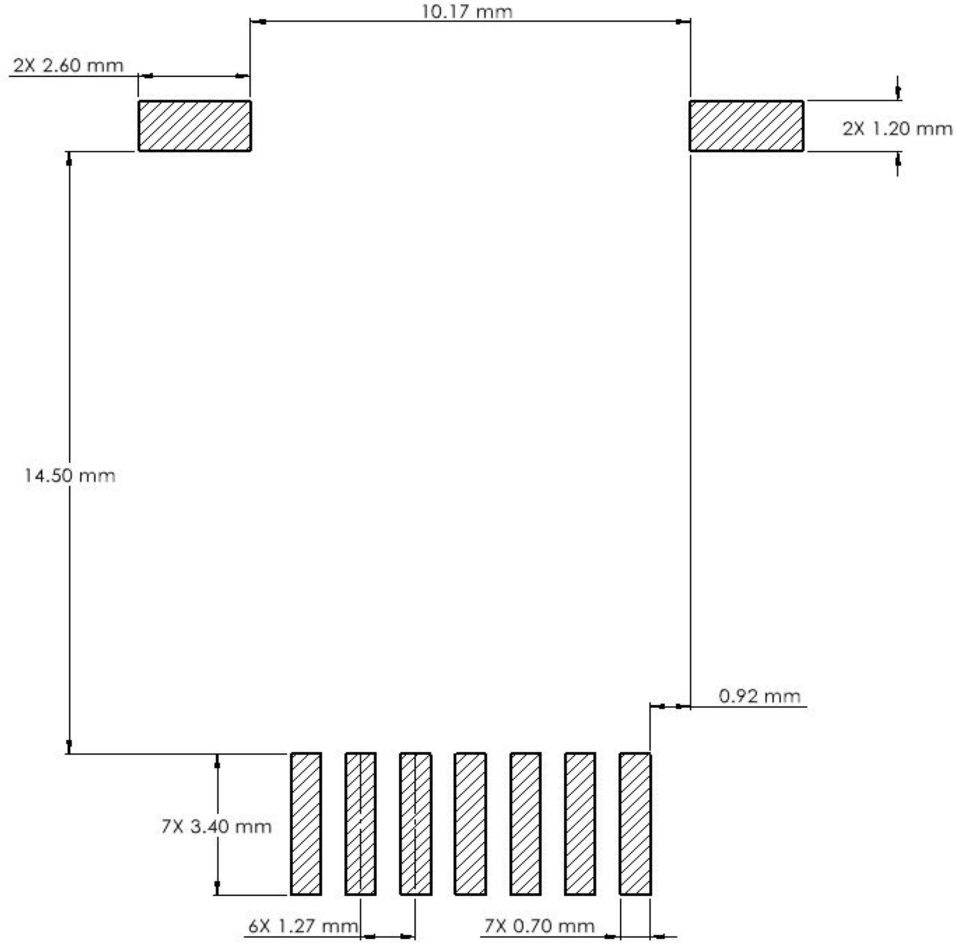
SYMBOL	MIN (mm)	MAX (mm)
A	3.40	3.60
A1	---	0.05
b	0.50	0.70
b2	0.50	1.00
b3	0.85	1.05
c	0.40	0.60
c2	0.40	0.60
D	11.55	11.75
D1	8.30	8.50
E	13.92	14.12
E1	12.22	12.42
E2	9.92	10.22
e	BSC 1.27	
H	18.00	19.00
L	2.47	2.67
L1	BSC 3.51	
L2	0.3	0.73
L3	BSC 0.26	
L4	0.09	0.2
L5	1.83	2.13
L6	BSC 2.75	
L7	4.03	4.23
T	0.75	0.95
T2	12.30	12.50
N1	3.90	4.10
ϴ1	0°	8°
ϴ2	0°	8°
ϴ3	0°	8°
ϴ4	0°	8°
aaa	---	0.10

1	SOURCE
2	
3	
4	
5	
6	DRIVER SOURCE
7	GATE
8	DRAIN
9	DRAIN
10	DRAIN

NOTE
1. ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. PACKAGE BURR FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS

Recommended Solder Pad Layout

All dimensions in mm



Revision history

Document Version	Date of release	Descriptiion of changes
1	October - 2025	Initial datasheet

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REACh Compliance

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact your Wolfspeed representative to ensure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

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