

General Description

FSMOS[®] MOSFET is based on Oriental Semiconductor's unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The high V_{th} series is specially designed to use in motor control systems with driving voltage of more than 10V.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent reliability and uniformity
- Fast switching and soft recovery



Applications

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC convertor
- Switching mode power supply

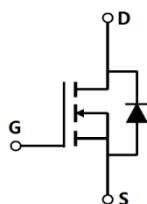
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	100	V
I_D , pulse	712	A
$R_{DS(ON)}$, max @ $V_{GS}=10V$	3.5	m Ω
Q_g	75.7	nC
PD	200	W

Marking Information

Product Name	Package	Marking
SFS10R035HNF	TO247	SFS10R035HN

Package & Pin information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_D	178	A
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, \text{pulse}}$	712	A
Continuous diode forward current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_S	178	A
Diode pulsed current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{S, \text{pulse}}$	712	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	200	W
Single pulsed avalanche energy ⁴⁾	E_{AS}	867	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.62	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	100			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2		4	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		2.3	3.5	$\text{m}\Omega$	$V_{GS}=10\text{ V}, I_D=50\text{ A}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=20\text{ V}$
				-100		$V_{GS}=-20\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$
Gate resistance	R_G		2		Ω	$f=1\text{ MHz}$, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		5680		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oss}		2207		pF	
Reverse transfer capacitance	C_{rss}		30.1		pF	
Turn-on delay time	$t_{d(on)}$		21.6		ns	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $R_G=2\ \Omega$, $I_D=50\text{ A}$
Rise time	t_r		14.4		ns	
Turn-off delay time	$t_{d(off)}$		38.2		ns	
Fall time	t_f		16		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		75.7		nC	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $I_D=50\text{ A}$
Gate-source charge	Q_{gs}		25.7		nC	
Gate-drain charge	Q_{gd}		14.4		nC	
Gate plateau voltage	$V_{plateau}$		4.8		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	$I_S=50\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		54.1		ns	$V_R=50\text{ V}$, $I_S=50\text{ A}$, $di/dt=400\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		195		nC	
Peak reverse recovery current	I_{rrm}		6.8		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $L=0.3\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

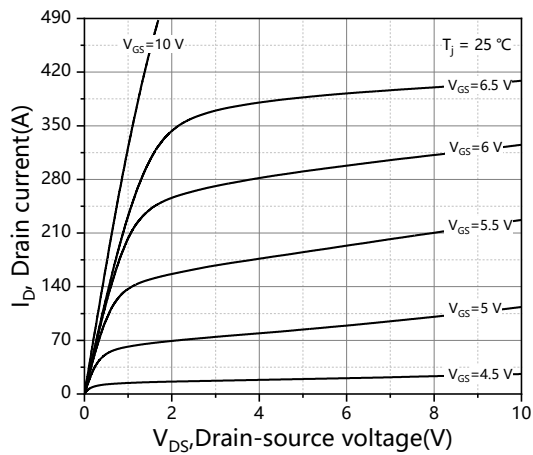


Figure 1. Typ. output characteristics

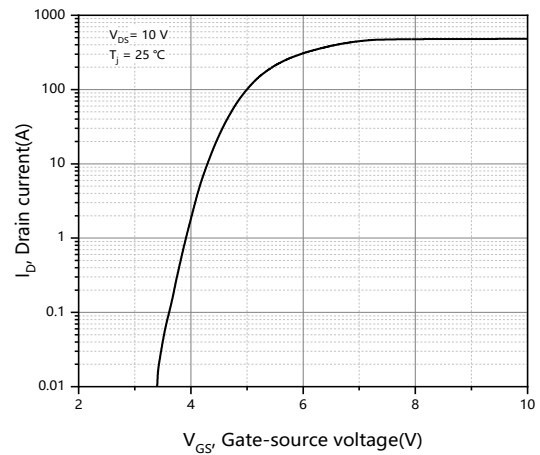


Figure 2. Typ. transfer characteristics

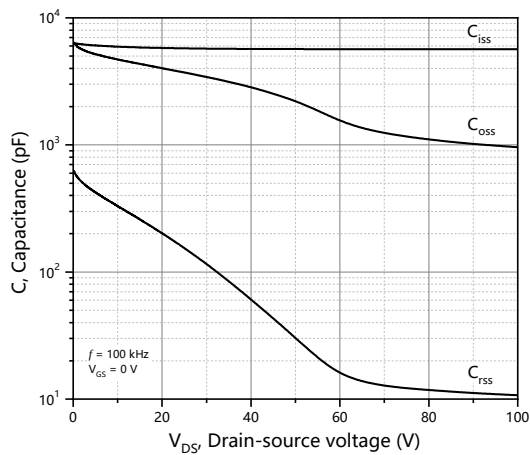


Figure 3. Typ. capacitances

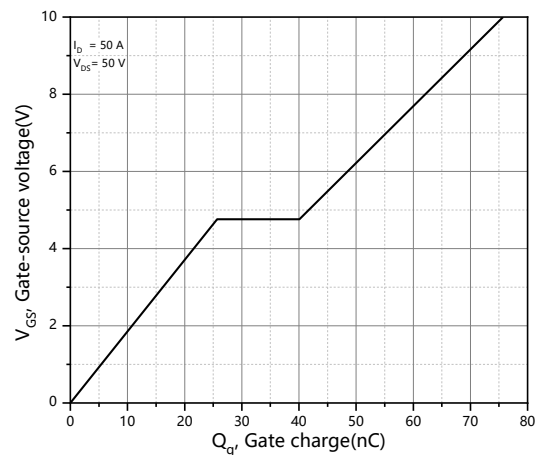


Figure 4. Typ. gate charge

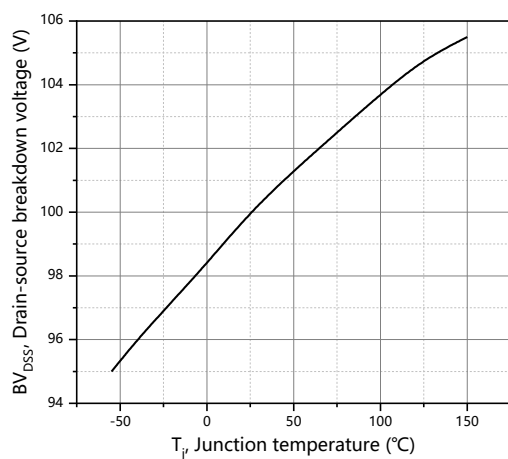


Figure 5. Drain-source breakdown voltage

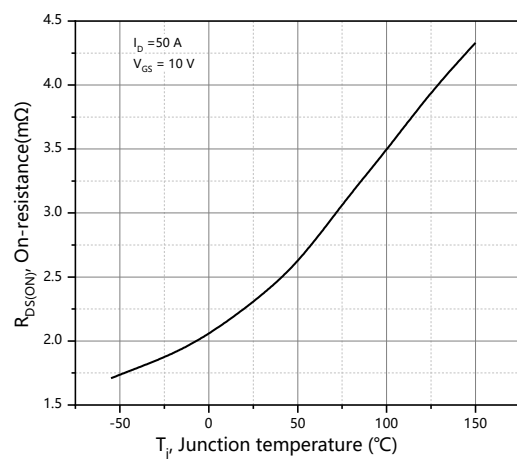


Figure 6. Drain-source on-state resistance

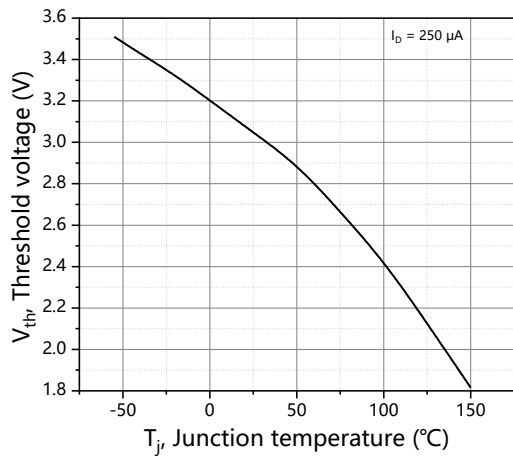


Figure 7. Threshold voltage

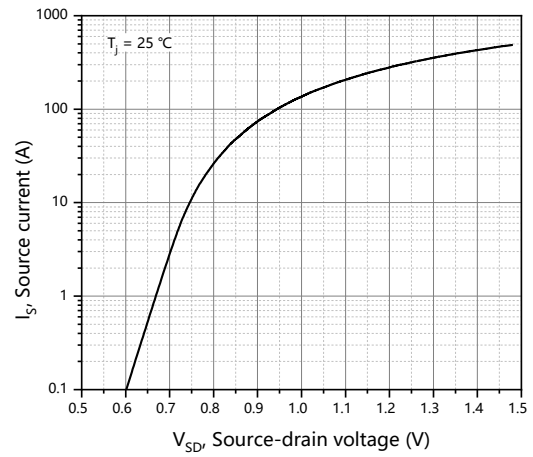


Figure 8. Forward characteristic of body diode

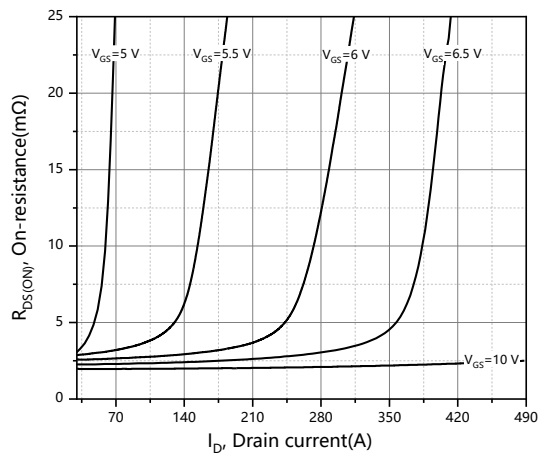


Figure 9. Drain-source on-state resistance

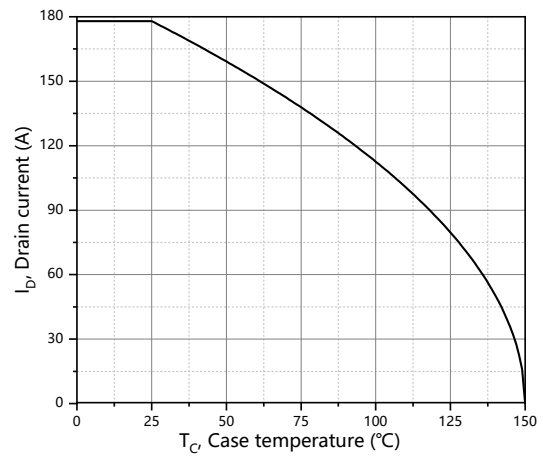


Figure 10. Drain current

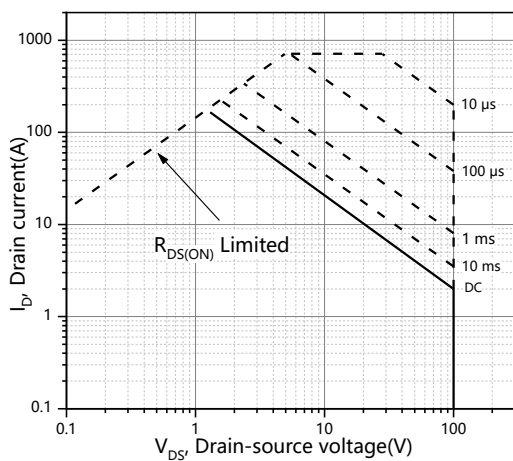


Figure 11. Safe operation area $T_C=25^{\circ}\text{C}$

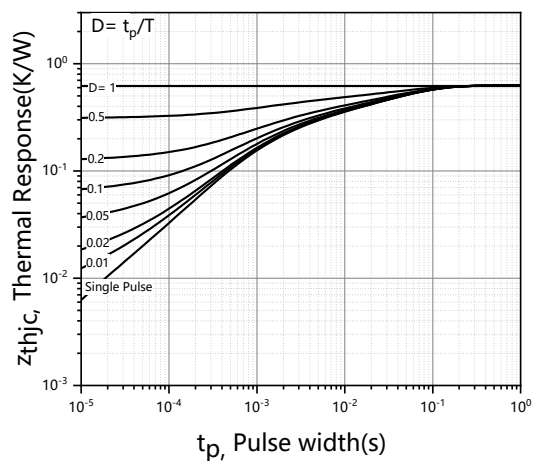


Figure 12. Max. transient thermal impedance

Test circuits and waveforms

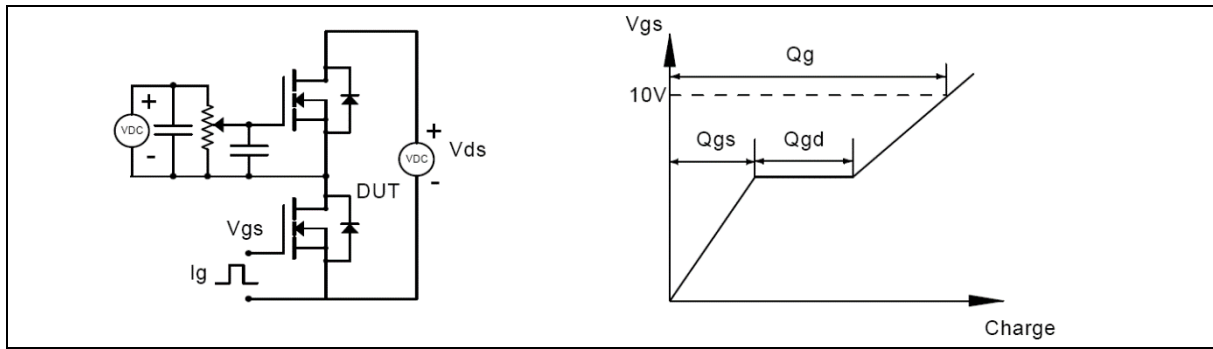


Figure 1. Gate charge test circuit & waveform

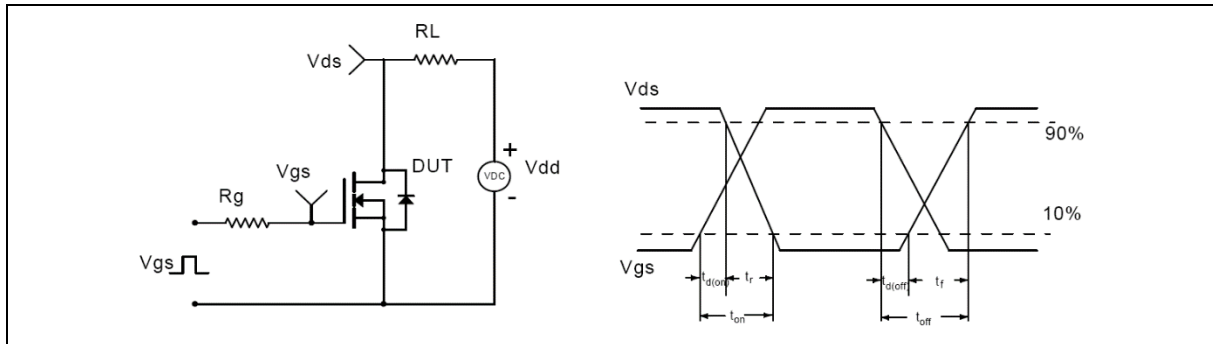


Figure 2. Switching time test circuit & waveforms

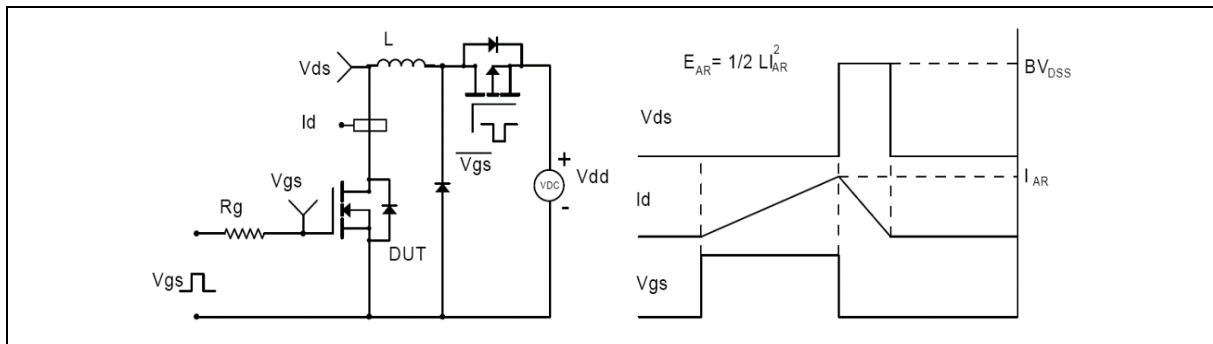


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

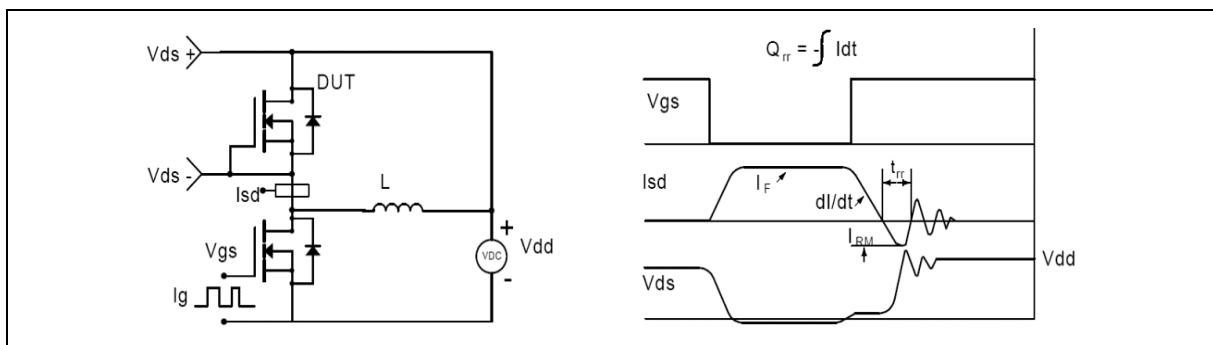
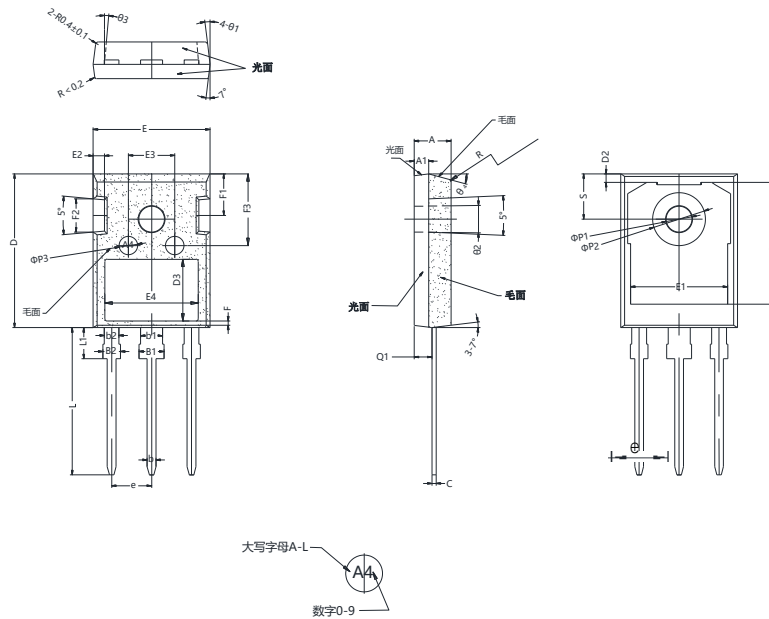


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm			Symbol	mm		
	Min	Nom	Max		Min	Nom	Max
A	4.90	5.00	5.10	F1	5.70	5.80	5.90
A1	1.90	2.00	2.10	F2	4.90	5.00	5.10
b	1.15	1.20	1.25	F3	9.90	10.00	10.10
b1	2.95	3.00	3.05	e	5.44 BSC		
b2	1.95	2.00	2.05	L	19.72	19.92	20.12
B1	3.00	3.10	3.20	L1	4.03	4.13	4.23
B2	1.90	2.00	2.10	θ1	5°	7°	9°
c	0.55	0.60	0.65	θ2	1°	2°	3°
D	20.90	21.00	21.10	θ3	4°	5°	6°
D1	16.45	16.55	16.65	θ4	13°	15°	17°
D2	1.07	1.17	1.27	ΦP1	3.50	3.60	3.70
D3	8.15	8.20	8.25	ΦP2	7.09	7.19	7.29
E	15.70	15.80	15.90	ΦP3	2.40	2.50	2.60
E1	13.16	13.26	13.36	Q1	2.31	2.41	2.51
E2	2.40	2.50	2.60	S	6.05	6.15	6.25
E3	6.10	6.20	6.30	R	0.30	0.40	0.50
E4	12.70	12.80	12.90	F	0.75	0.85	0.95

Version: TO247-G package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO247-G	30	15	450	5	2250

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS10R035HNF	TO247	yes	yes	yes

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Revision History

Version	Revision History	Date
V1.0	Initial release	2025-08-07