

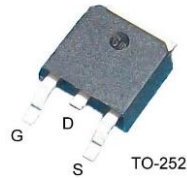
Features

- 60V, 50A
- $R_{DS(ON)} = 17m\Omega$ (Max.) @ $V_{GS} = 10V, I_D = 30A$
- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

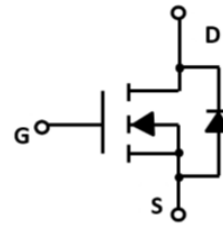
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

Package



TO-252
SFD50N06BT



Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise specified

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	50 A
		$T_C = 100^\circ C$	33 A
I_{DM}	Pulsed Drain Current ^{note1}	200	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	150	mJ
P_D	Power Dissipation ^{note4}	$T_C = 25^\circ C$ 100	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case ^{note1}	1.5	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

*Drain current limited by maximum junction temperature

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^{note3}	$V_{GS} = 10V, I_D = 15A$	-	12	17	m Ω
		$V_{GS} = 4.5V, I_D = 10A$	-	16	25	
g_{FS}	Forward Transconductance	$V_{DS} = 5V, I_D = 15A$	-	24	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 30V, V_{GS} = 0V,$ $f = 1.0MHz$	-	1920	-	pF
C_{oss}	Output Capacitance		-	155	-	pF
C_{rSS}	Reverse Transfer Capacitance		-	97	-	pF
Q_g	Total Gate Charge(4.5V)	$V_{DS} = 30V, I_D = 30A,$ $V_{GS} = 10V$	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	6	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	14	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 30V, R_L = 1.5\Omega$ $R_{GEN} = 3\Omega, V_{GS} = 10V$	-	7.4	-	ns
t_r	Turn-On Rise Time		-	5.1	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	28.2	-	ns
t_f	Turn-Off Fall Time		-	5.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I_{SM}	Pulsed Source Current		-	-	200	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 30A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$V_{GS} = 0V, I_F = 30A,$ $di/dt = 100A/\mu s$	-	34	-	ns
Q_{rr}	Body Diode Reverse Recovery Time Charge		-	46	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

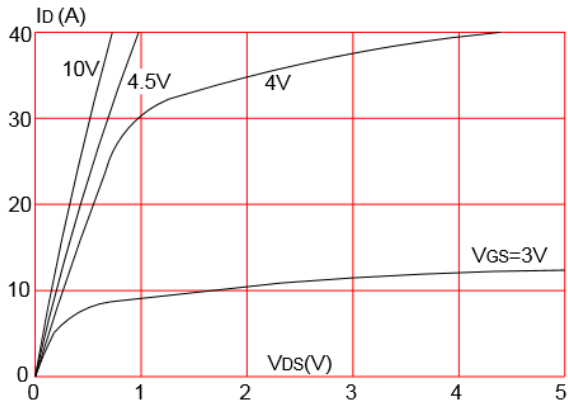


Figure 1. Output Characteristics

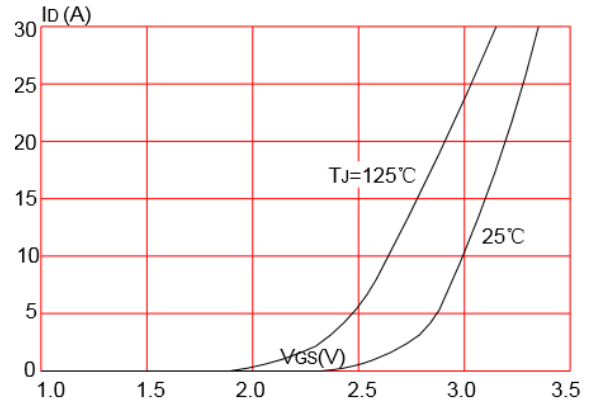


Figure 2. Typical Transfer Characteristics

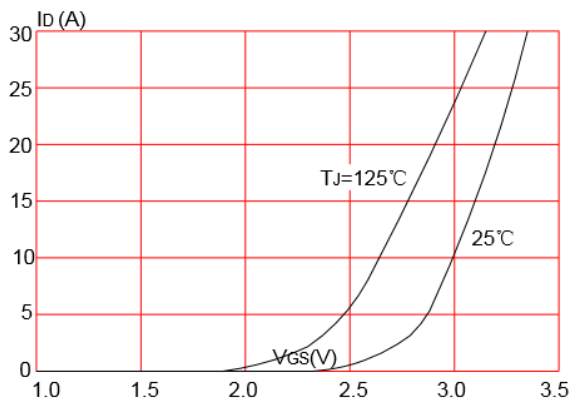


Figure 3. Forward Characteristics of Reverse

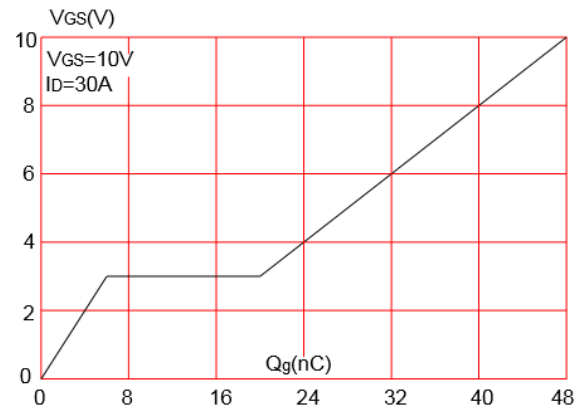


Figure 4. Gate-Charge Characteristics

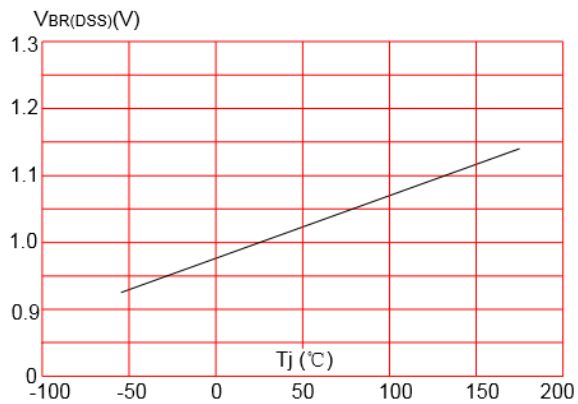


Figure 5. Maximum Safe Operating Area

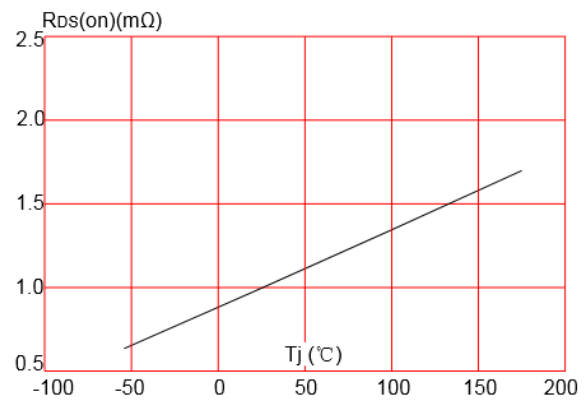


Figure 6. Normalized $R_{DS(on)}$ v.s T_J

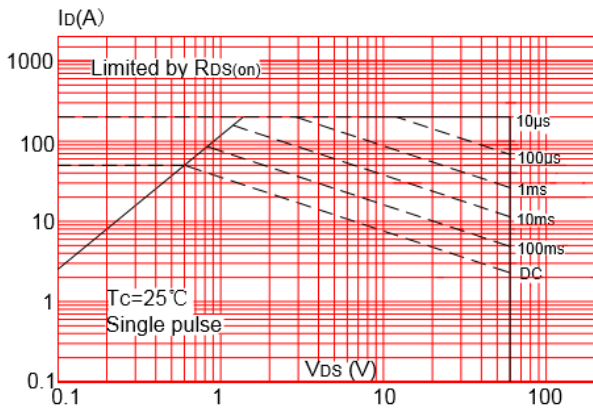


Figure 7. Maximum Safe Operating Area

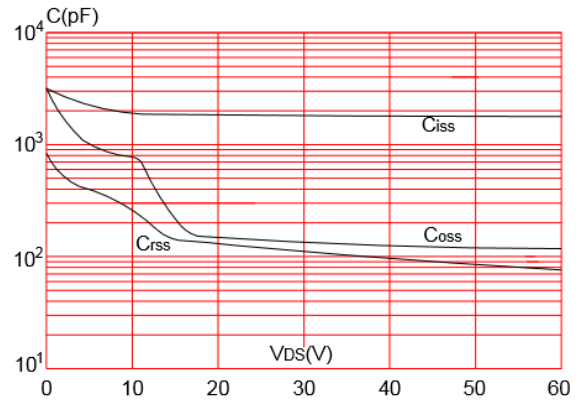


Figure 8. Typical Capacitance Characteristics

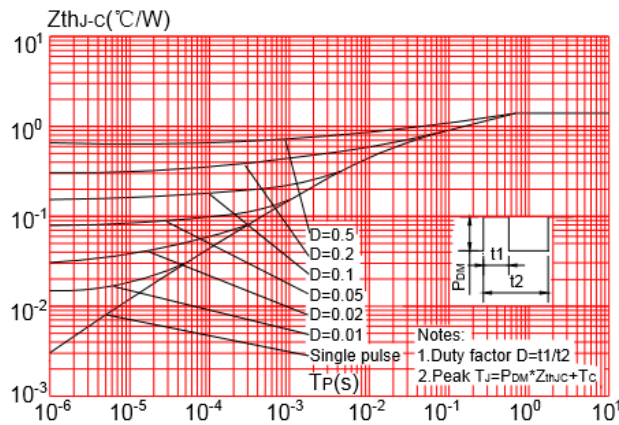


Figure 9 Effective Transient Thermal Impedance

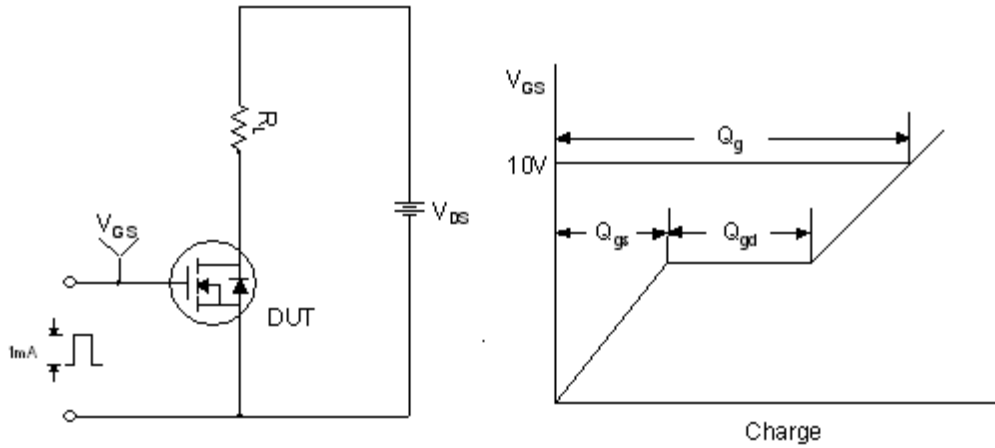


Figure 10. Gate Charge Test Circuit & Waveform

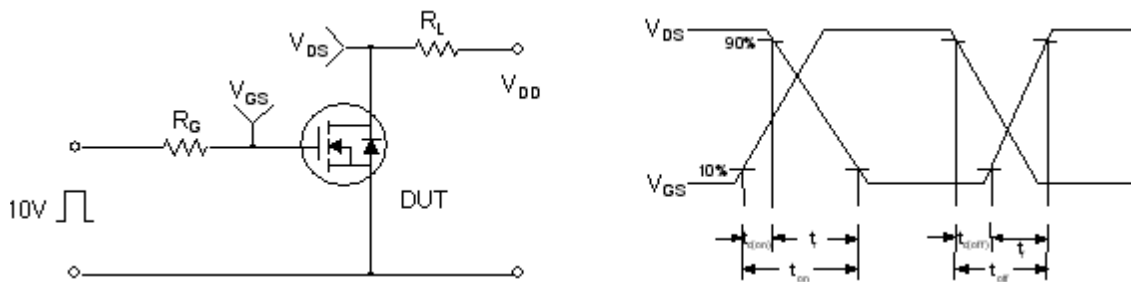


Figure 11. Resistive Switching Test Circuit & Waveforms

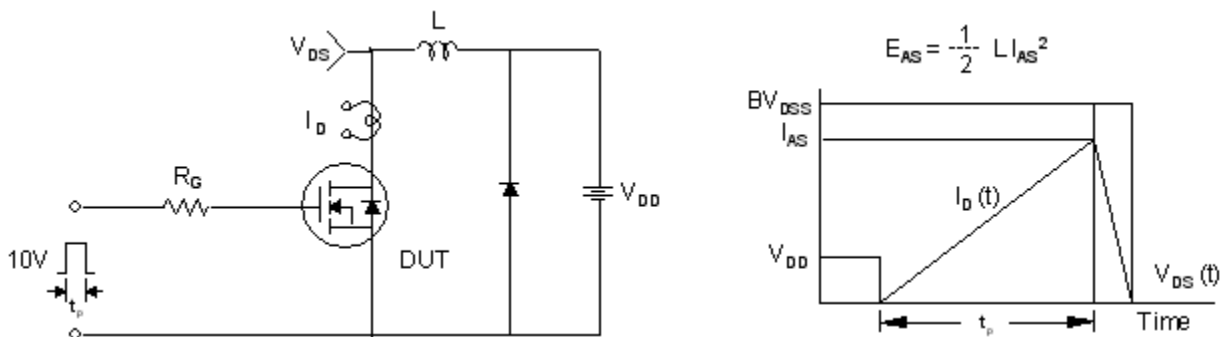


Figure 12. Unclamped Inductive Switching Test Circuit & Waveforms

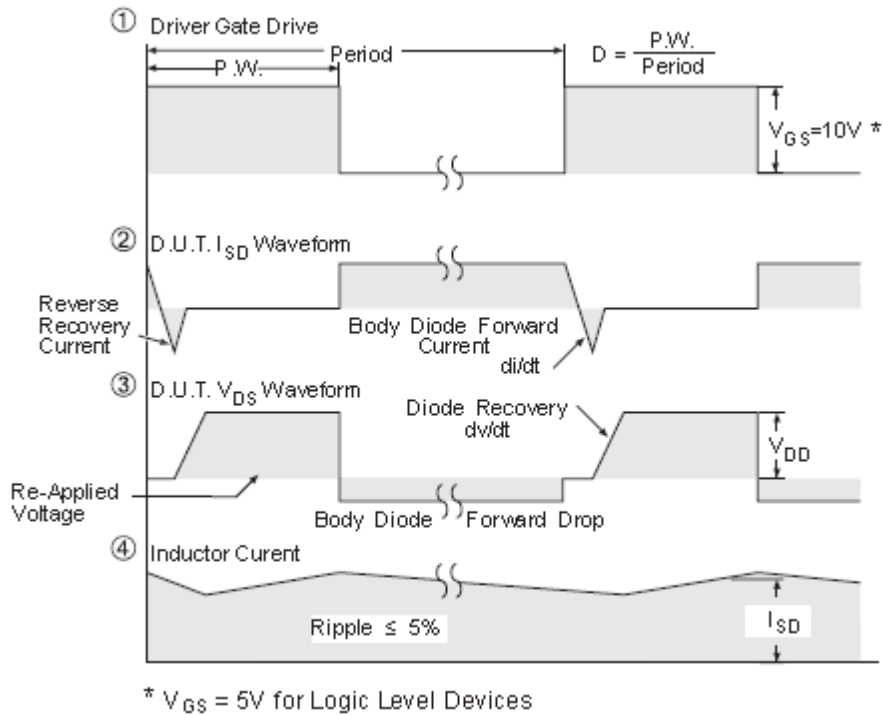
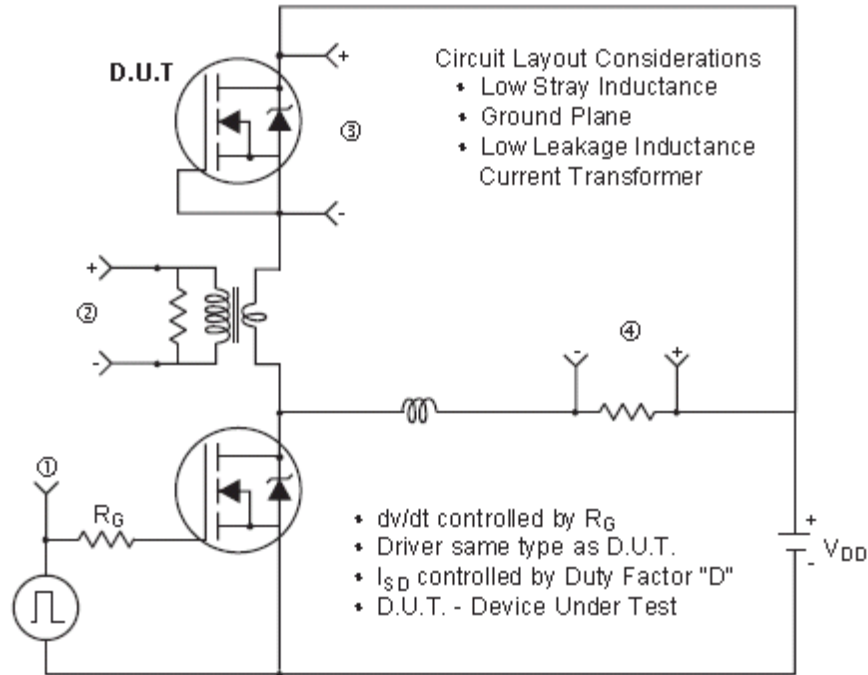
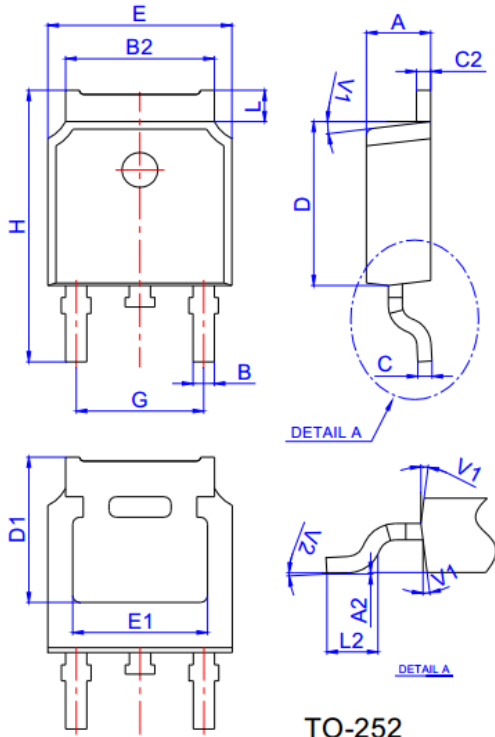


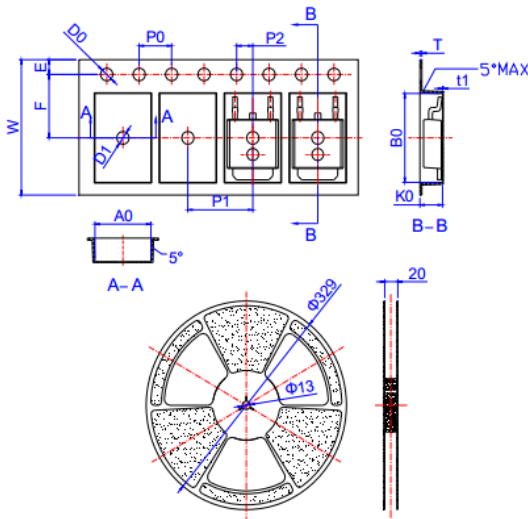
Figure 13. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package Mechanical Data



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

OUTLINE	REEL (PCS)	PER CARTON (PCS)	TAPE & REEL
TAPING	2,500	25,000	13inch

SFD50N06BT Product Description

Silicon N-Channel MOSFET



NOTE:

1. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
2. Please do not exceed the absolute maximum ratings of the device when circuit designing.
3. Winsemi Microelectronics Co., Ltd reserved the right to make changes in this specification sheet and is subject to change without prior notice.

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