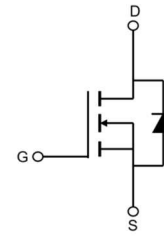


AP90N04K
N-Channel Power MOSFET

Features

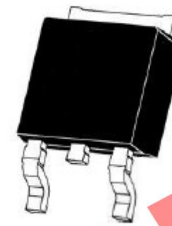
- 40V,80A
 $R_{DS(ON)} < 5.5m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 10m\Omega @ V_{GS} = 4.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power management



TO-252-2L top view

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

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	80
		$T_C = 100^\circ C$	52
I_{DM}	Pulsed Drain Current ^{note1}	320	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	104	mJ
P_D	Power Dissipation	$T_C = 25^\circ C$	77
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.0	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

AP90N04K
N-Channel Power MOSFET
Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V,$	-	-	1.0	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	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=30A$	-	4.2	5.5	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	6.5	10	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V,$ $f=1.0MHz$	-	3042	-	pF
C_{oss}	Output Capacitance		-	386	-	pF
C_{rss}	Reverse Transfer Capacitance		-	232	-	pF
Q_g	Total Gate Charge	$V_{DS}=20V, I_D=30A,$ $V_{GS}=10V$	-	57	-	nC
Q_{gs}	Gate-Source Charge		-	9	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	11	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=20V, I_D=30A,$ $R_L=1\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	8	-	ns
t_r	Turn-on Rise Time		-	18	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	24	-	ns
t_f	Turn-off Fall Time		-	14	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	80	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	320	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	$T_J=25^{\circ}\text{C},$ $I_F=20A, di/dt=100A/\mu s$	-	22	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	11	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=20V, R_G=25\Omega, L=0.5mH, I_{AS}=20.4A$

 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

AP90N04K

N-Channel Power MOSFET

Figure 1: Output Characteristics

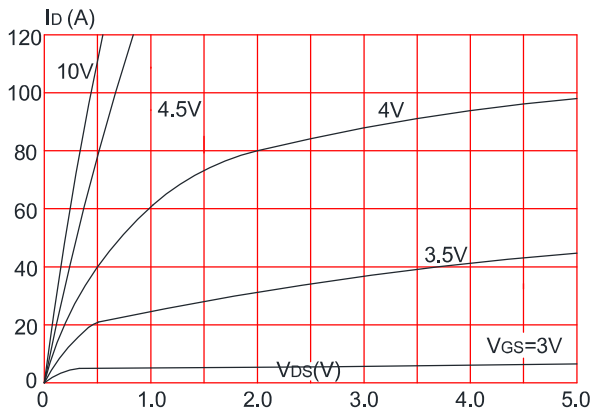


Figure 2: Typical Transfer Characteristics

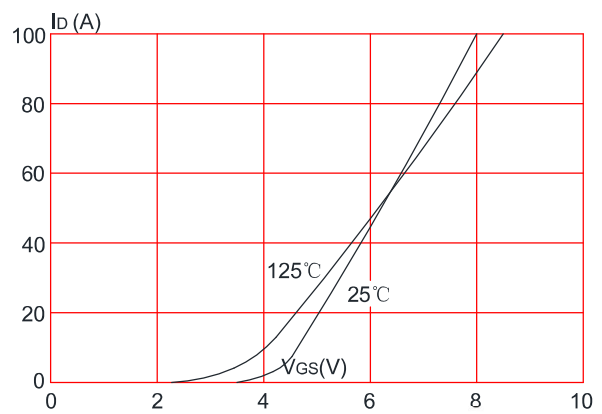


Figure 3: On-resistance vs. Drain Current

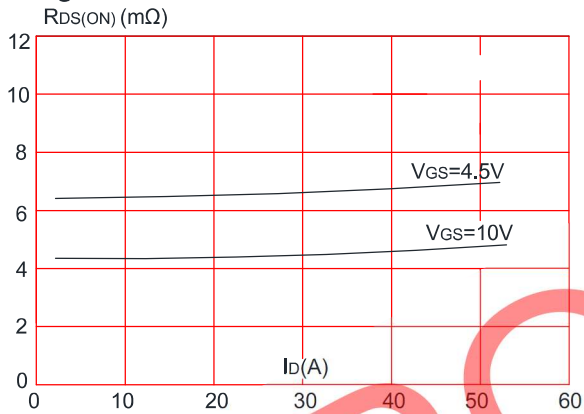


Figure 4: Body Diode Characteristics

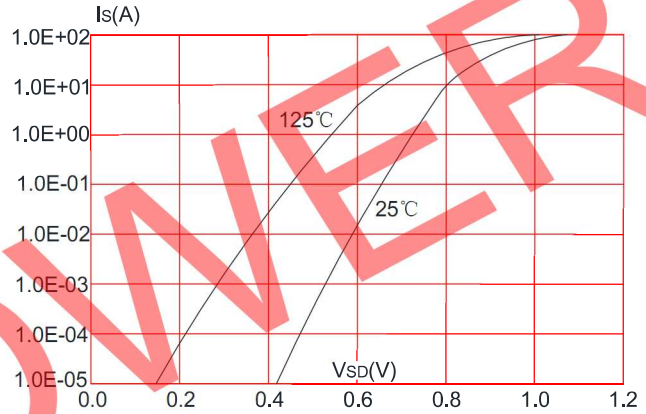


Figure 5: Gate Charge Characteristics

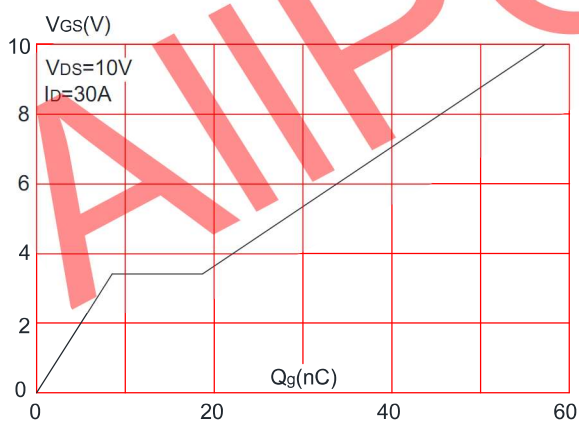
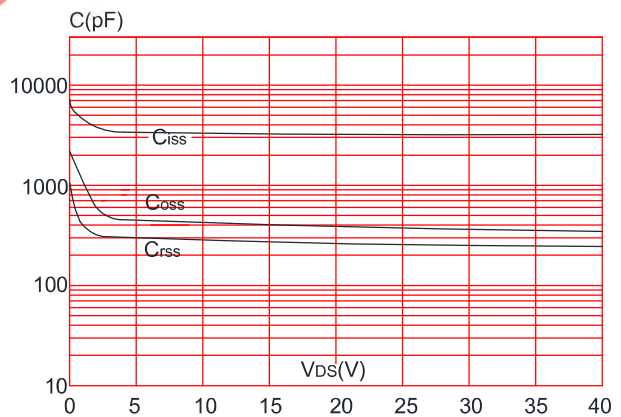


Figure 6: Capacitance Characteristics



AP90N04K
N-Channel Power MOSFET

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

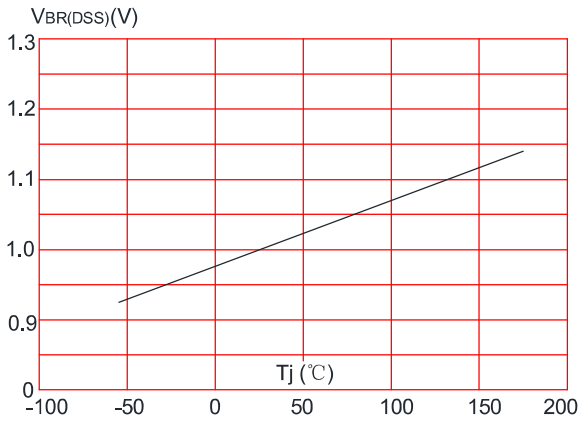


Figure 8: Normalized on Resistance vs. Junction Temperature

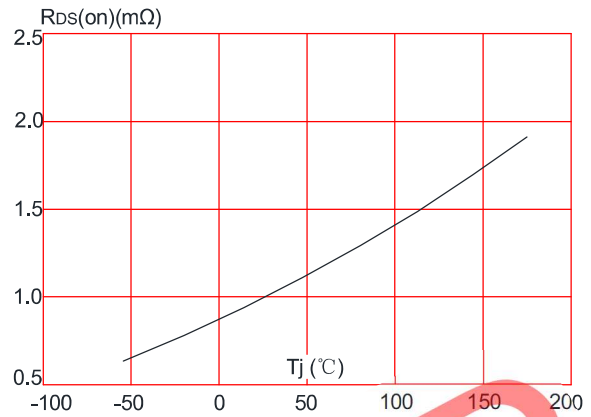


Figure 9: Maximum Safe Operating Area

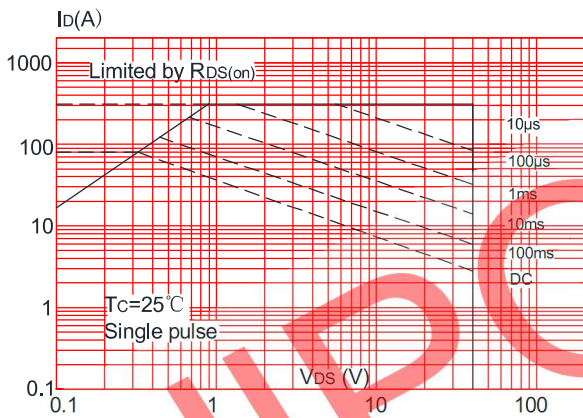


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

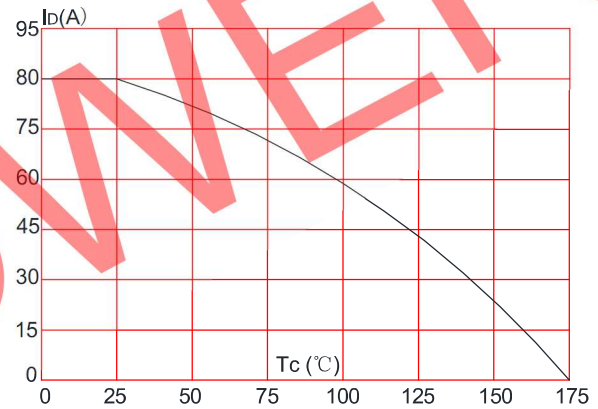
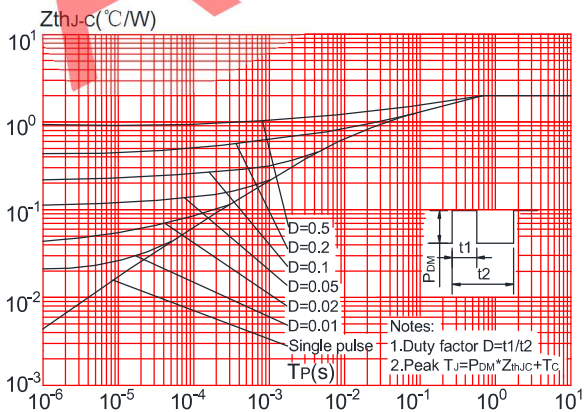


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

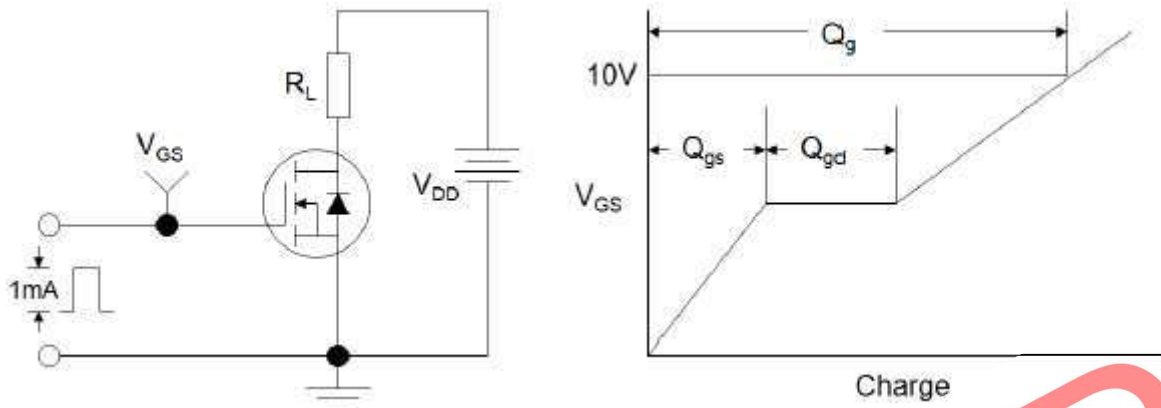


Figure 1: Gate Charge Test Circuit & Waveform

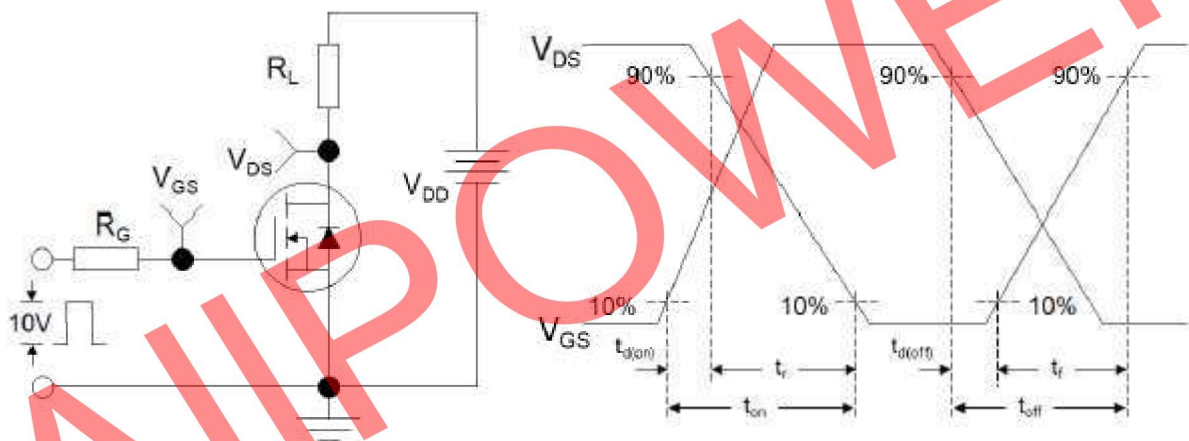


Figure 2: Resistive Switching Test Circuit & Waveforms

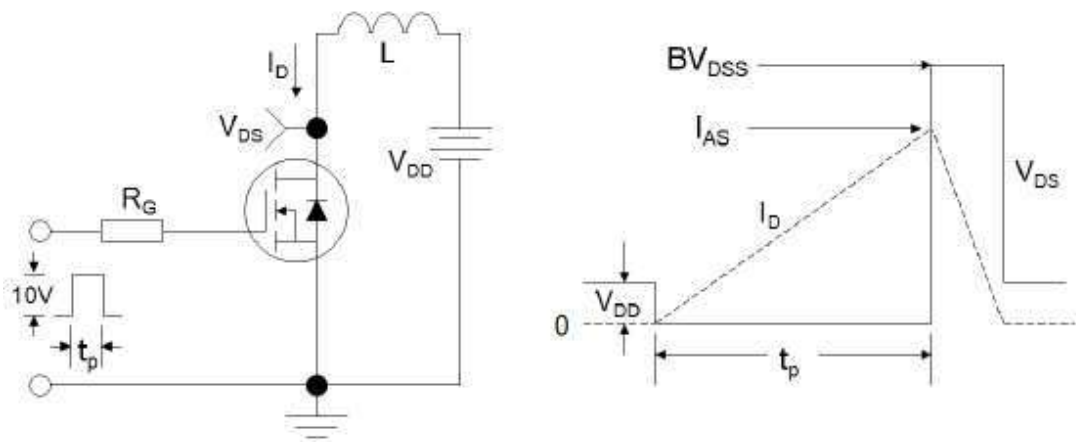
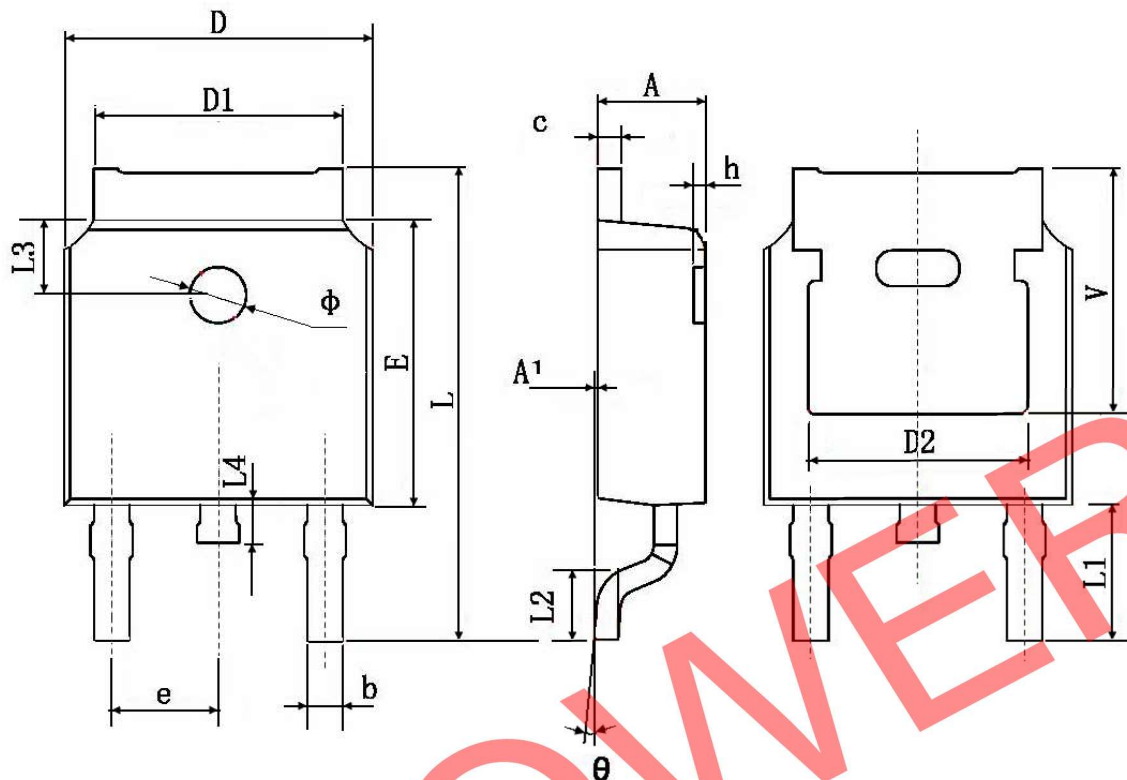


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

AP90N04K
N-Channel Power MOSFET
TO-252 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

AP90N04K**N-Channel Power MOSFET**

Information furnished in this document is believed to be accurate and reliable. However, Shenzhen All Power Semiconductor Co.,Ltd assumes no responsibility for the consequences of use without consideration for such information nor use beyond it.

Information mentioned in this document is subject to change without notice, apart from that when an agreement is signed, All Power complies with the agreement.

Products and information provided in this document have no infringement of patents. All Power assumes no responsibility for any infringement of other rights of third parties which may result from the use of such products and information.

This document supersedes and replaces all information previously supplied.

AIPOWER

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [Quan Li](#) manufacturer:

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [2SK2267\(Q\)](#) [BUK455-60A/B](#) [TK100A10N1,S4X\(S](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#)
[IRS2092STRPBF-EL](#) [IPS70R2K0CEAKMA1](#) [TK31J60W5,S1VQ\(O](#) [TK31J60W,S1VQ\(O](#) [TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#)
[DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [P85W28HP2F-7071](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#)
[US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#)
[IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [IPS60R360PFD7SAKMA1](#)
[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1_T0_00201](#) [PJMF380N65E1_T0_00201](#)
[PJMF280N60E1_T0_00201](#) [PJMF600N65E1_T0_00201](#) [PJMF900N65E1_T0_00201](#) [PJMF900N60E1_T0_00201](#)