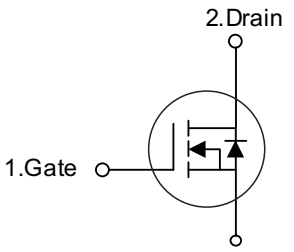
■ PRODUCT CHARACTERISTICS

VDSS	30V
R_{DS}(on)Typ(@V_{GS}=10V)	4.2mΩ
R_{DS}(on)Typ(@V_{GS}=4.5 V)	6.5mΩ
ID	90A

Symbol

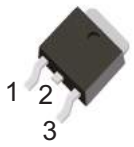


■ DESCRIPTION

This is suitable for the most demanding DC-DC converter application where high efficiency is to be achieved.

■ FEATURES

* $R_{DS(on)}$*Q_g industry's benchmark
* Conduction losses reduced
* Switching losses reduced
* Low threshold device



TO-252

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■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT90N03D	TO-252	2500 pieces /Reel
N/A	MOT90N03C	TO-251	70 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-source voltage (V_{GS}= 0)	V_{DS}	30	V
Gate-source voltage	V_{GS}	±20	V
Drain current (continuous) at T_C = 25°C	I_D(1)	90	A
Drain current (continuous) at T_C=100°C	I_D	72	A
Drain current (pulsed)	I_{DM}(2)	320	A
Total dissipation at T_C = 25°C	P_{TOT}	95	W
Derating factor		0.63	W/°C
Single pulse avalanche energy	E_{AS}(3)	350	mJ
Operating and Storage junction temperature	T_J T_{stg}	-55 to 150	°C

■ THERMAL DATA

Parameter	Symbol	Value	Unit
Thermal resistance junction-case max	$R_{thj\text{-}case}$	1.58	°C/W
Thermal resistance junction-ambient max	$R_{thj\text{-}amb}$	100	°C/W

1. Value limited by wire bonding
2. Pulse width limited by safe operating area
3. Starting T_j = 25°C, I_D =40A, V_{DD} =15V

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source breakdown voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS}= 0	30	-	-	V
Zero gate voltage drain current (V_{GS} = 0)	I_{DSS}	V_{DS} = 30V	-	-	1	μA
		V_{DS} = 30V, Tc=125°C	-	-	10	μA
Gate body leakage current (V_{DS} = 0)	I_{GSS}	V_{GS} = ±20V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D = 250μA	1	-	-	V
Static drain-source on resistance	$R_{DS(on)}$	V_{GS}= 10V, I_D= 40A	-	4.2	5.5	mΩ
		V_{GS}= 4.5V, I_D= 40A	-	6.5	8	
Input capacitance	C_{iss}	V_{DS} =25V, f=1MHz, V_{GS}=0	-	2805	-	pF
Output capacitance	C_{oss}		-	549	-	pF
Reverse transfer capacitance	C_{rss}		-	76	-	pF
Total gate charge	Q_g	V_{DD}=15V, I_D = 80A	-	22	32	nC
Gate-source charge	Q_{gs}	V_{GS} =5V	-	10	-	nC
Gate-drain charge	Q_{gd}	*(see Figure 13)*	-	7	-	nC
Gate input resistance	R_G	f=1MHz Gate Bias Bias=0 Test Signal	-	1.2	-	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V, I_D=40A, R_G=4.7Ω, V_{GS}=5V *(see Figure 12)*	-	19	-	ns
Rise time	t_r		-	135	-	ns
Turn-off delay time	$t_{d(off)}$		-	24	-	ns
Fall time	t_f		-	33	-	ns
Source-drain current	I_{SD}		-	-	80	A
Source-drain current (pulsed)	I_{SDM}(1)		-	-	320	A
Forward on voltage	V_{SD}(2)	I_{SD}=40A, V_{GS}=0	-	-	1.3	V
Reverse recovery time	t_{rr}	I_{SD}=80A, di/dt = 100A/μs,	-	36	-	ns
Reverse recovery charge	Q_{rr}	V_{DD}=19 V, Tj= 150°C	-	32	-	μC
Reverse recovery current	I_{RRM}	*(see Figure 15)*	-	1.8	-	A

1. Pulse width limited by safe operating area
2. Pulsed: pulse duration=300μs, duty cycle 1.5%

■ TYPICAL CHARACTERISTICS

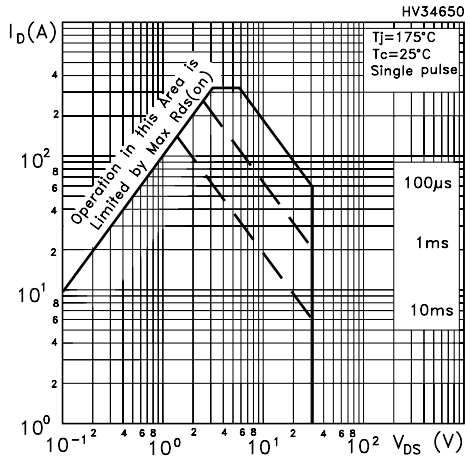


Figure 1. Safe operating area

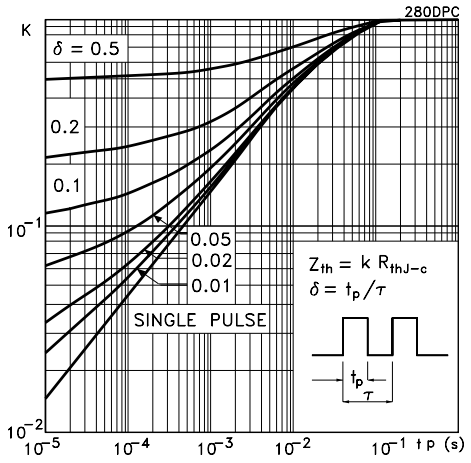


Figure 2. Thermal impedance

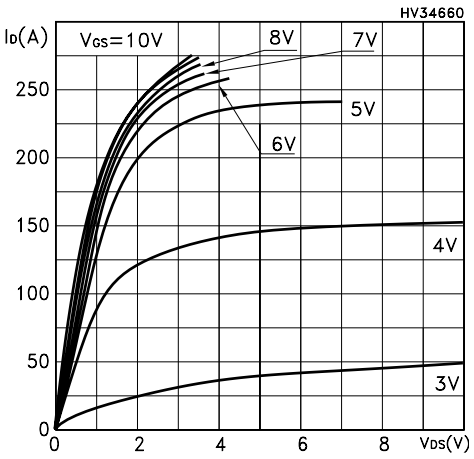


Figure 3. Output characteristics

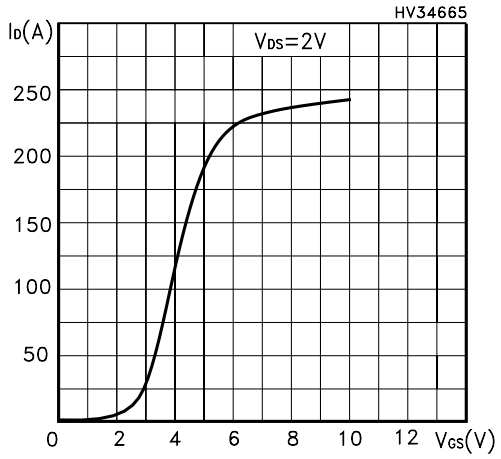


Figure 4. Transfer characteristics

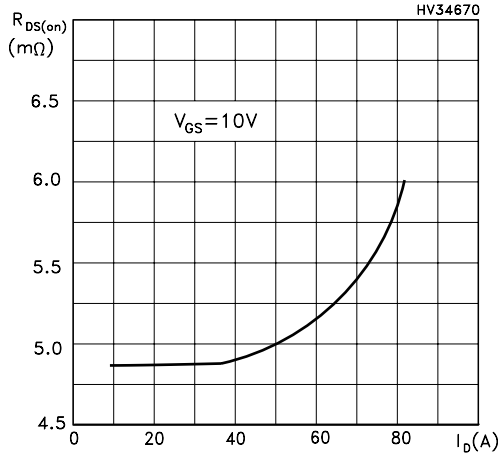


Figure 5. Static drain-source on resistance

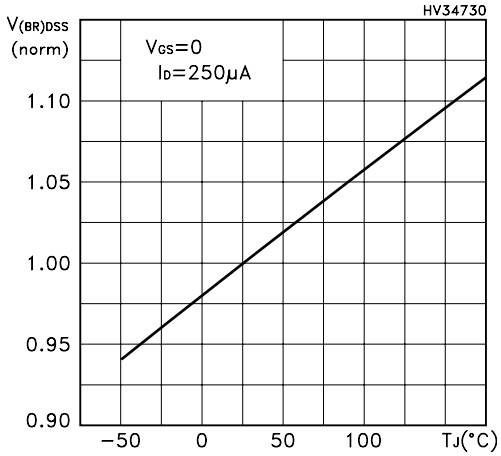


Figure 6. Normalized B_{VDSS} vs temperature

■ TYPICAL CHARACTERISTICS(Cont.)

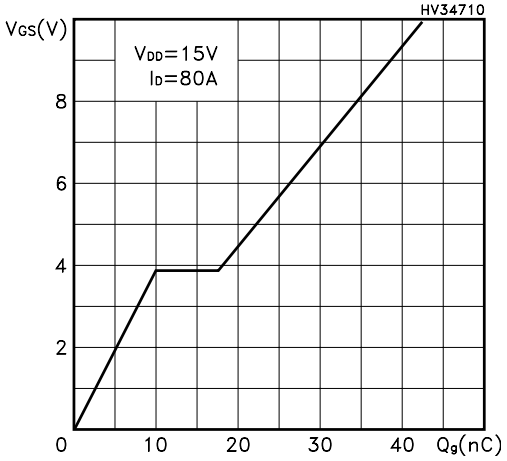


Figure 7. Gate charge vs gate-source voltage

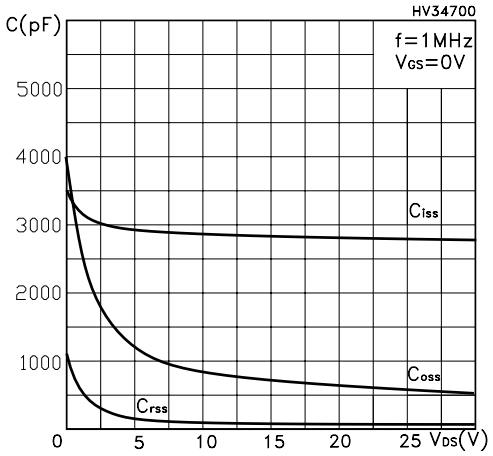


Figure 8. Capacitance variations

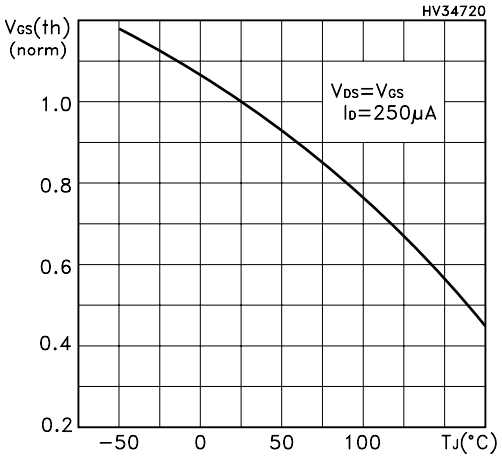


Figure 9. Normalized gate threshold voltage vs temperature

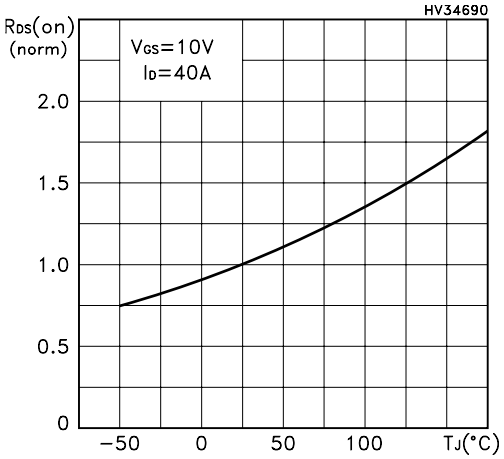


Figure 10. Normlaized on resistance vs temperature

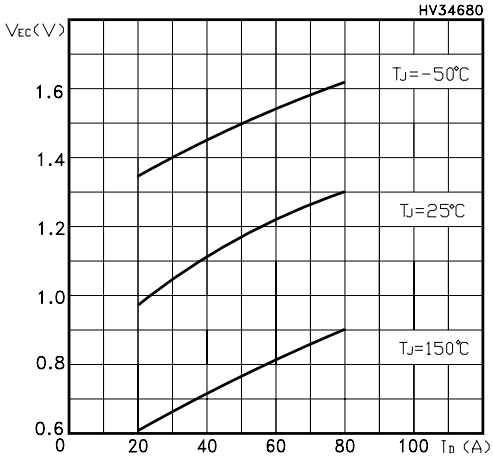
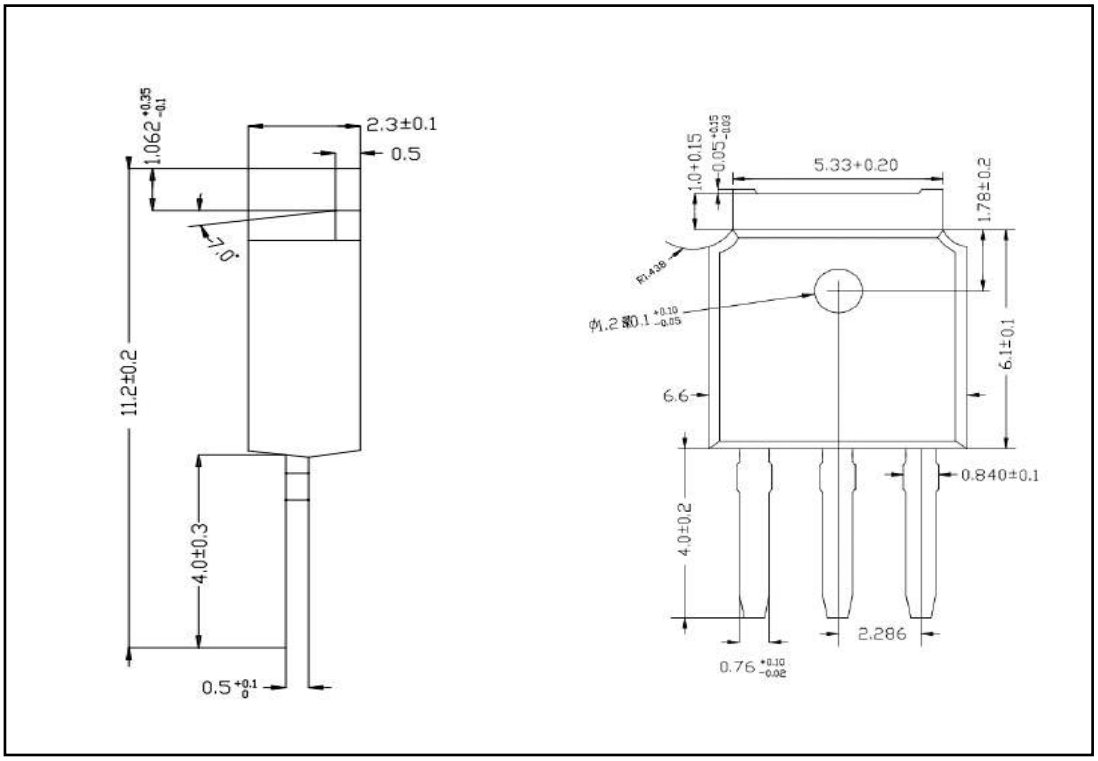


Figure 11. Source-drain diode forward characteristics

■ TO-251 PACKAGE OUTLINE DIMENSIONS



■ TO-252 PACKAGE OUTLINE DIMENSIONS