NCH75R260F

N-Channel Silicon Carbide MOSFET

Pb Pb-Free RoHS COMPLIANT

Voltage:	750 Volts		**Current:**	10.0 Ampers		**Package:**	TO-220FP

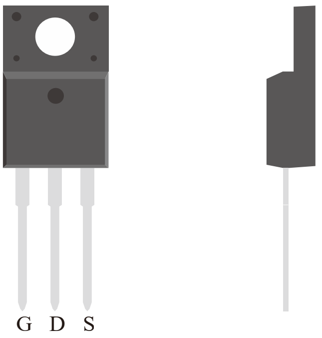
Features

- NH'S Advanced Silicon Carbide MOSFET Technology
- High Blocking Voltage And Low Capacitances
- High-Speed Switching For Very Low Switching Losses
- Excellent Qg*Rds(on) Product(FOM）

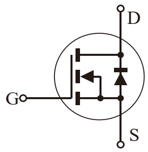
Typical Applications

- High Voltage DC/DC Converters
- Adaptor And Charger
- Battery Chargers And Motor Drives
- LED Drives And LED Lighting

Diagram:



Polarity:



Product Summary

VDS Min.@T_j	750	**V**
I_D Min.@Ta	10.0	**A**
RDS(ON)(TYP)@18V,Tj=25°C	260	**mΩ**

***100% UIS TESTED**

***100% ΔVDS TESTED**

Absolute Maximum Ratings (Ta=25℃ Unless Otherwise Specified)

Parameter	**Test Conditions**	**Symbol**	**Ratings**	**Unit**
Drain-Source Voltage		V_{DS}	750	**V**
Gate-Source Voltage		$V_{GS\ MAX.}$ $V_{GS\ O.P.}$	-10/+22 0/+15 or 18	**V**
Continuous Drain Current (Note 1)	Ta= 25 ℃ Ta= 100 ℃	I_D	10.0 8.0	**A**
Drain Current-Pulse(Note 1)	T_j< 175 ℃	I_{DM}	18	**A**
Maximum Power Dissipation Power Dissipation Derating Factor Above 25℃	Ta= 25 ℃ Ta= 100 ℃	P_D	68 34	W
Derating Factor		D_F	0.45	W/°C
Avalanche Current,Single Pulse (Note 1)	L= 0.5 mH	I_{AS}	8.2	**A**
Single Pulse Avalanche Energy (Note 1) Test Circuit & Waveform See Fig.22	L= 0.5 mH IAS= 8.2 A,RG= 10.0 Ω Starting Tj=25 ℃,VG = 18.0 V	E_{AS}	16.8	**mJ**

Thermal Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	**Test Conditions**	**Symbol**	**Typ.**	**Unit**
Junction Temperature		T_J	-55 to 175	℃
Storage Temperature Range		T_{STD}	-55 to 175	℃
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With Ta=25℃	$R_{\theta JA}$	50	**℃/W**
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 75mm x 45mm x 2.5mm Alu. Heat.	$R_{\theta JC}$	2.2	

Notes: 1.Pulse Width Limited By Max. Junction Temperature. (See Fig. 19).

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Electrical Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions		Symbol	Min.	Typ.	Max.	Unit
Static Off Characteristics							
Drain-Source Breakdown Voltage	VGS=0V,ID=100uA		BV_{DSS}	750	--	--	V
Zero Gate Voltage Drain Current	VDS= 0 V,VGS=0V,Tj=25℃ VDS= 750 V,VGS=0V,Tj=175℃		I_{DSS}	-- --	0.1 3	20 --	uA
Gate To Source Leakage Current	VGS= 22 V,VDS=0V		I_{GSS}	--	--	250	nA
Source To Gate Leakage Current	VGS= -10 V,VDS=0V		I_{SGS}	--	--	250	nA
Forward Transconductance	ID= 4.0 A,VDS= 20 V		gfs	--	2.9	--	S
Static On Characteristics							
Gate Threshold Voltage	VGS= VDS, ID=10mA ,Tj=25℃ VGS= VDS, ID=10mA ,Tj=175℃		$V_{GS(TH)}$	3 --	3.7 2.7	5 --	V
Drain-Source On Resistance	ID= 4.0 A,VGS= 18.0 V,Tj=25℃ ID= 4.0 A,VGS= 18.0 V,Tj=175℃ ID= 4.0 A,VGS= 15.0 V,Tj=25℃ ID= 4.0 A,VGS= 15.0 V,Tj=175℃		$R_{DS(ON)}$	-- -- -- --	260 302 338 365	300 330 450 486	mΩ
Dynamic Characteristics							
Input Capacitance	VDS= 650 V		C_{iss}	--	223	--	pF
Output Capacitance	VGS= 0 V		C_{oss}	--	22	--	pF
Reverse Transfer Capacitance	F= 1 MHZ		C_{rss}	--	3.5	--	pF
Gate Resistance	VGS=0V,VDS=0V,Freq.=1MHz		R_g	--	26	--	Ω
Switching Paramters (Test Circuit & Waveform See Fig.20)							
Turn-On Delay Time	VDS= 400 V ID= 4.0 A VGS= 0/+18 V RG= 10.0 Ω L= 600 μH	Tj=25℃ Tj=175℃	$t_{d(on)}$	-- --	11 10.5	-- --	ns
Turn-On Rise Time		Tj=25℃ Tj=175℃	t_r	-- --	7.5 7.1	-- --	ns
Turn-Off Delay Time		Tj=25℃ Tj=175℃	$t_{d(off)}$	-- --	8 7.6	-- --	ns
Turn-Off Rise Time		Tj=25℃ Tj=175℃	t_f	-- --	5 4.3	-- --	ns
Turn−On Switching Loss		Tj=25℃ Tj=175℃	E_{on}	-- --	14.8 14.0	-- --	μJ
Turn−Off Switching Loss		Tj=25℃ Tj=175℃	E_{off}	-- --	10.4 9.5	-- --	μJ
Total Switiching Energy		Tj=25℃ Tj=175℃	E_{tot}	-- --	25.1 23.5	-- --	μJ

Electrical Characteristcs (Ta=25℃ Unless Otherwise Specified)							
Parameter	**Test Conditions**		**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**
Gate Charge Paramters (Test Circuit & Waveform See Fig.21)							
Total Gate Charge	VDS= 400 V		Q_g	--	9	--	**nC**
Gate-Source Charge	VGS= 0/+18 V		Q_{gs}	--	3.5	--	**nC**
Gate-Drain Charge	ID= 4.0 A		Q_{gd}	--	1.2	--	**nC**
Drain-Source Diode Characteristics And Maximum Ratings (Test Circuit & Waveform See Fig.23)							
Max. Diode Forward Cuurent tp Limited by T_J(max)	Tj= 25 ℃ Tj= 100 ℃		I_S	-- --	-- --	10.0 8.0	**A**
Max. Pulsed Forward Cuurent			I_{SM}	--	--	15	**A**
Diode Forward Voltage	ID= 3.0 A,VGS=-0V	Tj=25°C Tj=175°C	V_{SD}	-- --	3.5 3.0	-- --	**V**
Reverse Recovery Time	IS= 5.0 A di/dt= 1000.0 A/us VGS= 0.0 V VDS= 400 V	Tj=25°C Tj=175°C	t_{rr}	-- --	9.2 10.4	-- --	**ns**
Reverse Recovery Charge		Tj=25°C Tj=175°C	Q_{rr}	-- --	25 28.8	-- --	**nC**
Reverse Recovery Current		Tj=25°C Tj=175°C	I_{rrm}	-- --	5.0 5.5	-- --	**A**
Reverse Recovery Energy		Tj=25°C Tj=175°C	E_{rr}	-- --	9.2 11.5	-- --	**μJ**

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Typical Characteristics Curves

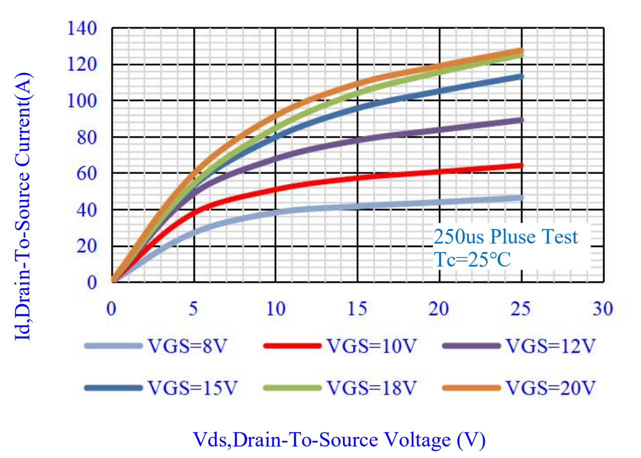

Fig.1-Output Characteritsics@Tj=25°C

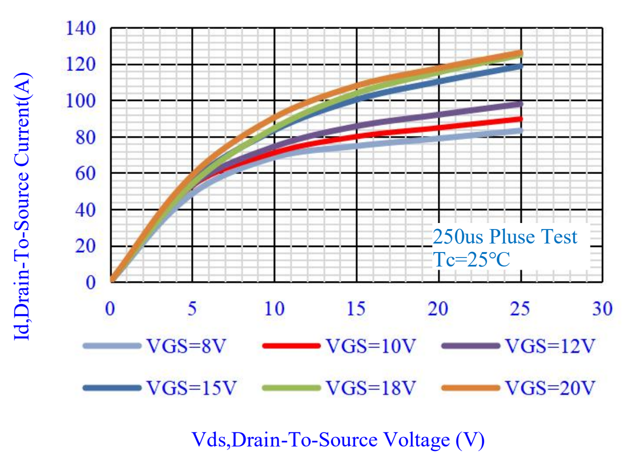

Fig.2-Output Characteritsics@Tj=175°C

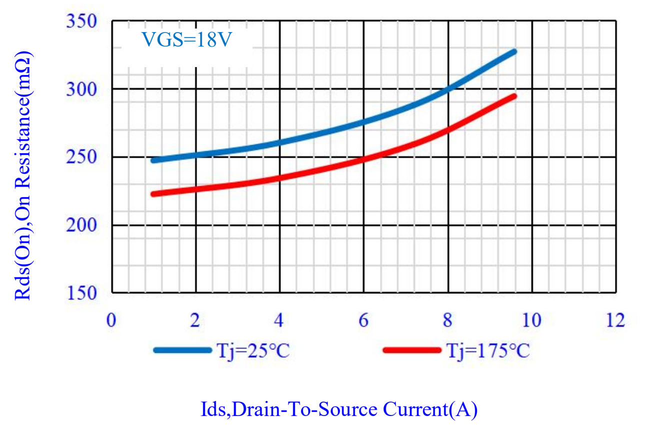

Fig.3-On Resistance Vs. Drain Current

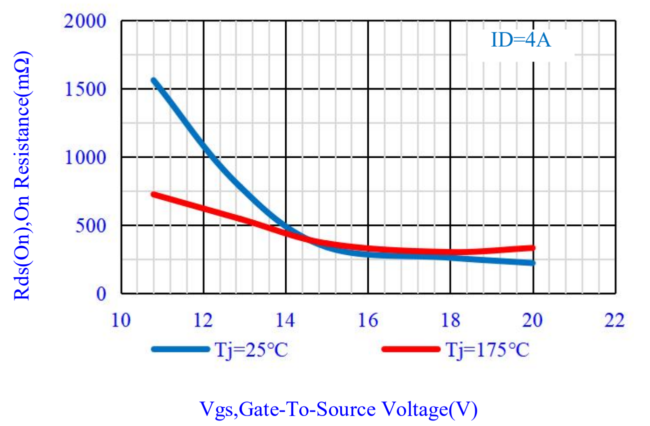

Fig.4-On Resistance Vs. Gate Source Voltage

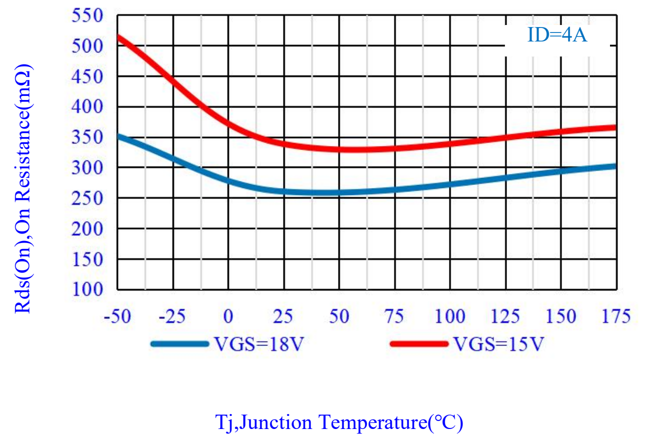

Fig.5-On Resistance Vs. Junction Temperature

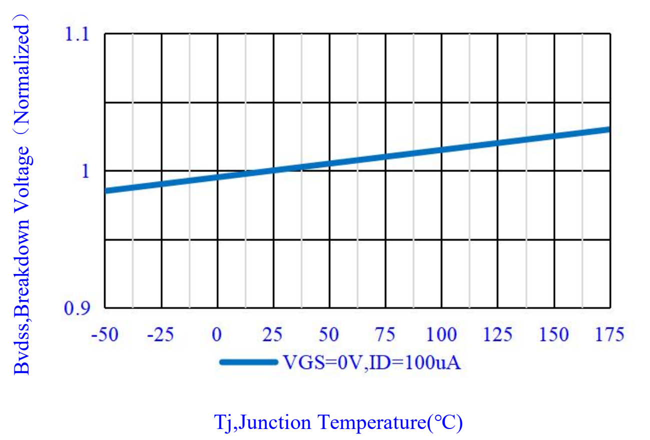

Fig.6-Breakdown Voltage Vs. Junction Temperature

Typical Characteristics Curves

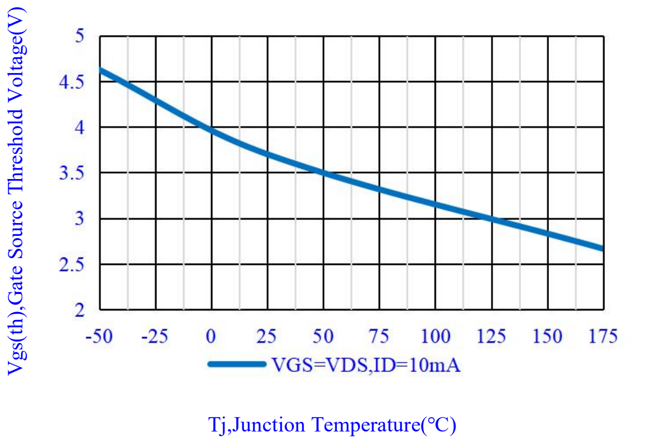

Fig.7-Gate Source Threshold Voltage Vs. Junction Temperature

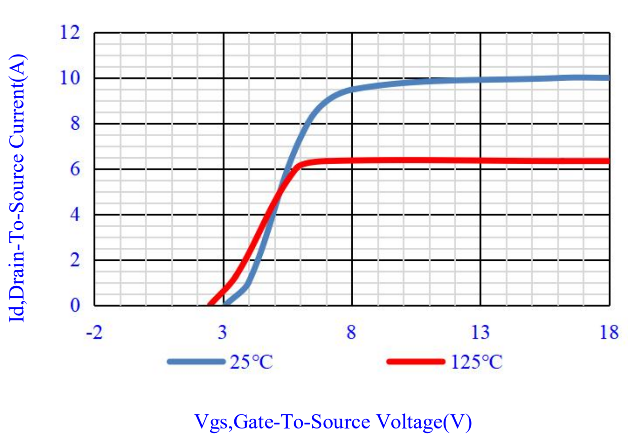

Fig.8-Transfer Characteritsics

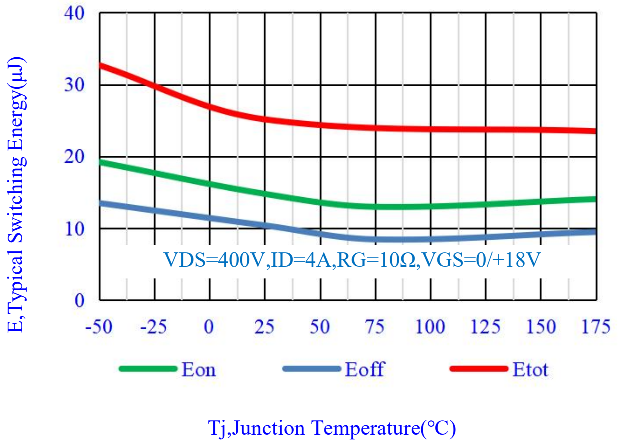

Fig.9-Typical Switching Energy Vs. Junction Temperature

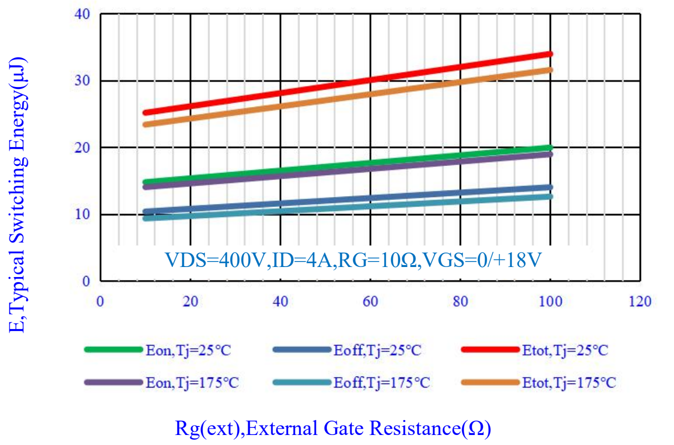

Fig.10-Typical Switching Energy Vs. External Gate Resistance

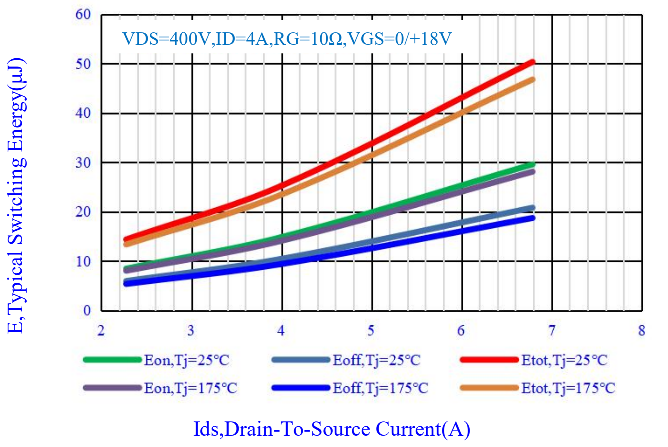

Fig.11-Typical Switching Energy Vs. Drain Source Current

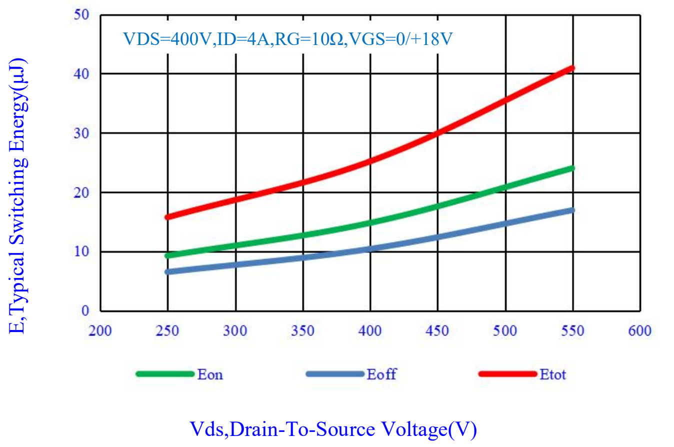

Fig.12-Typical Switching Energy Vs. Drain Source Voltage

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Typical Characteristics Curves

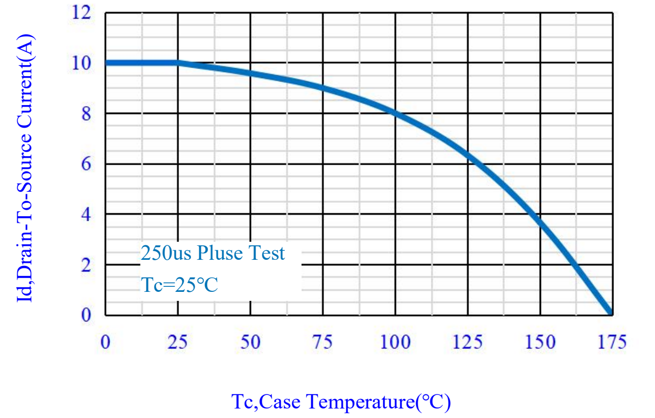

Fig.13-Maximum Continuous Drain Current Vs. Case Temperature

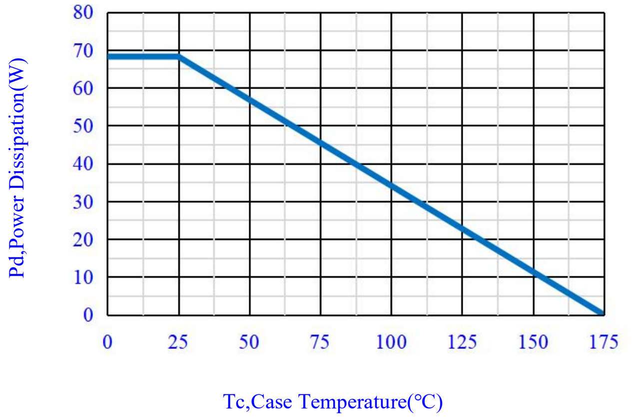

Fig.14-Maximum Power Dissipation Vs. Case Temperature

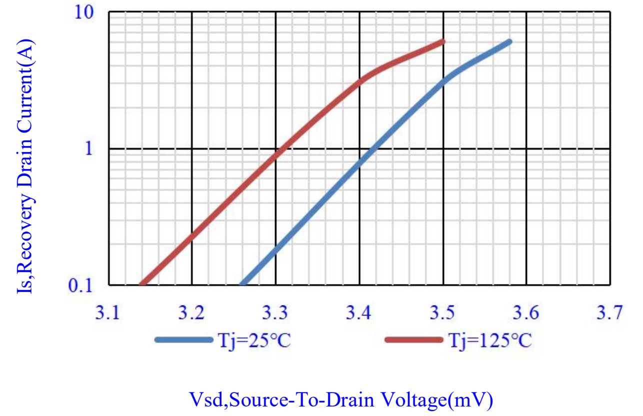

Fig.15-Source-To-Drain Diode Forward Voltage

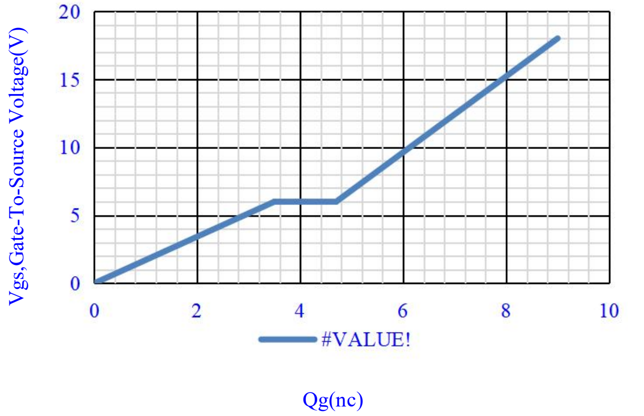

Fig.16-Gate Charge Waveform

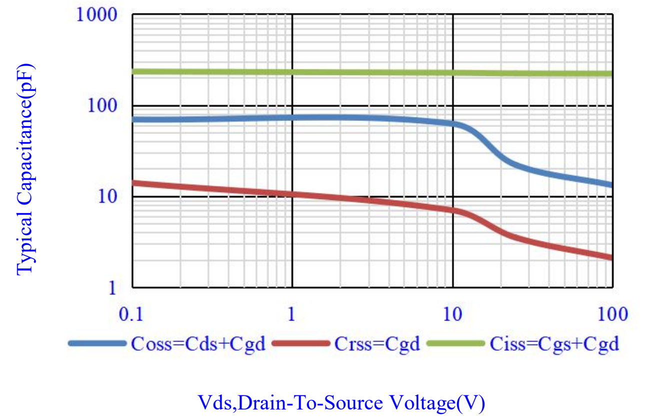

Fig.17-Typical Capacitance Vs. Drain-To-Source Voltage

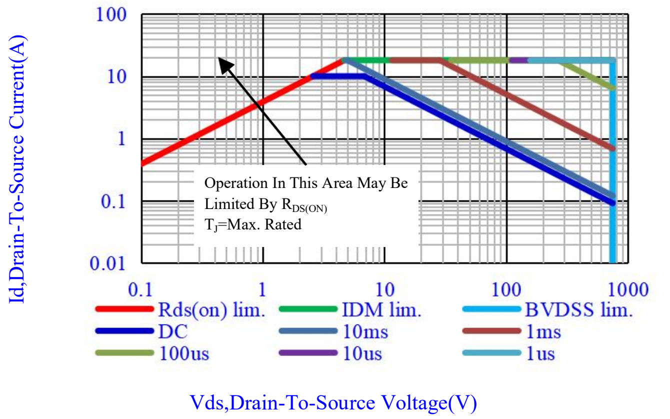

Fig.18-Maximum Safe Operating Area(SOA)

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Typical Characteristics Curves

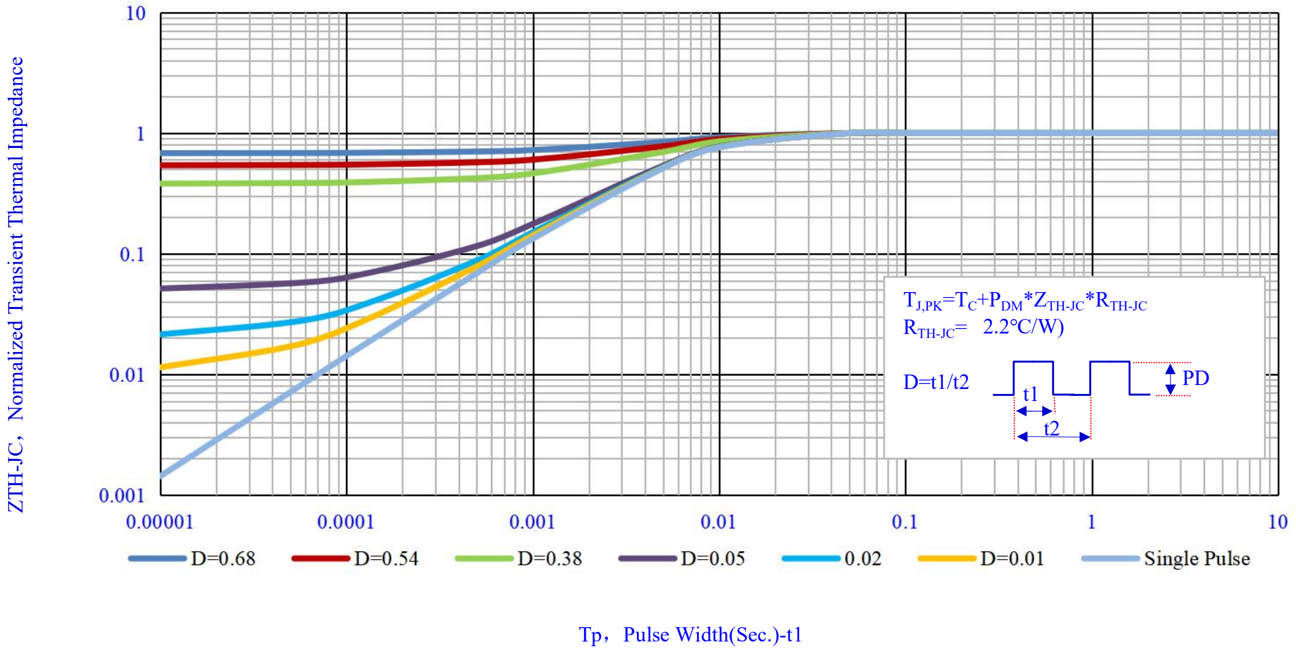

Fig.19- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

Test Circuit & Waveform

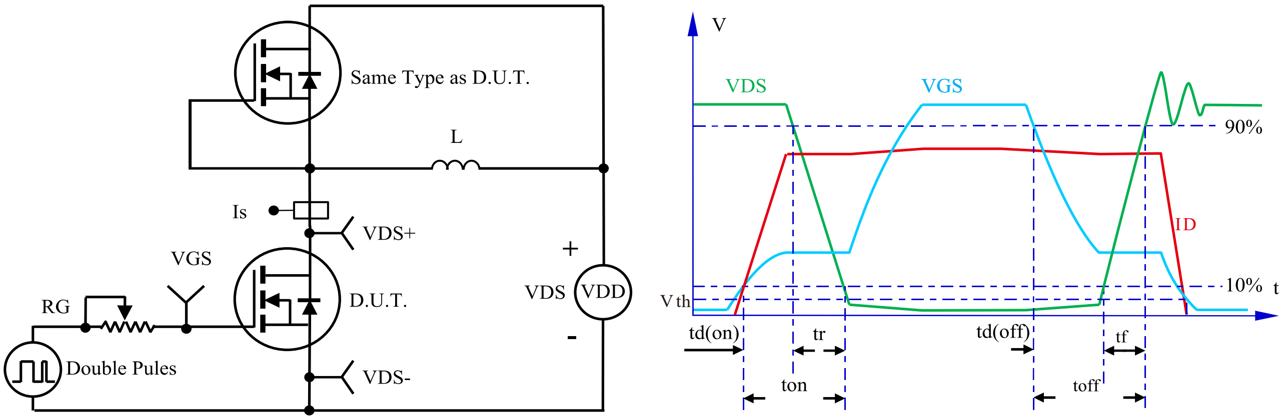

Fig.20- Inductive Switching Test Circuit & Waveform

Test Circuit & Waveform

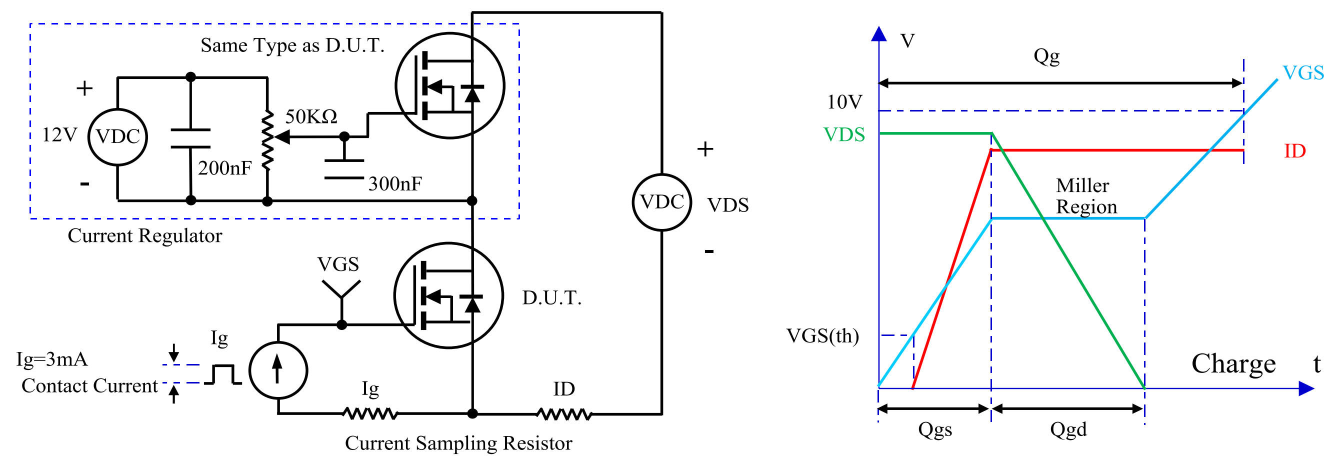

Fig.21-Gate Charge Test Circuit & Waveform

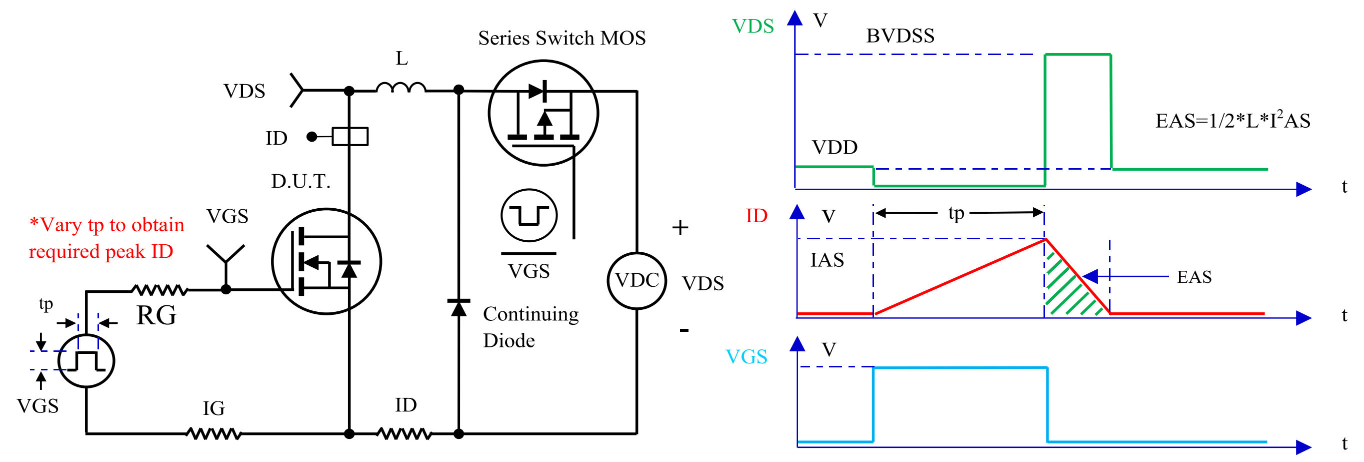

Fig.22- Unclamped Inductive Switching (UIS) Test Circuit & Waveform

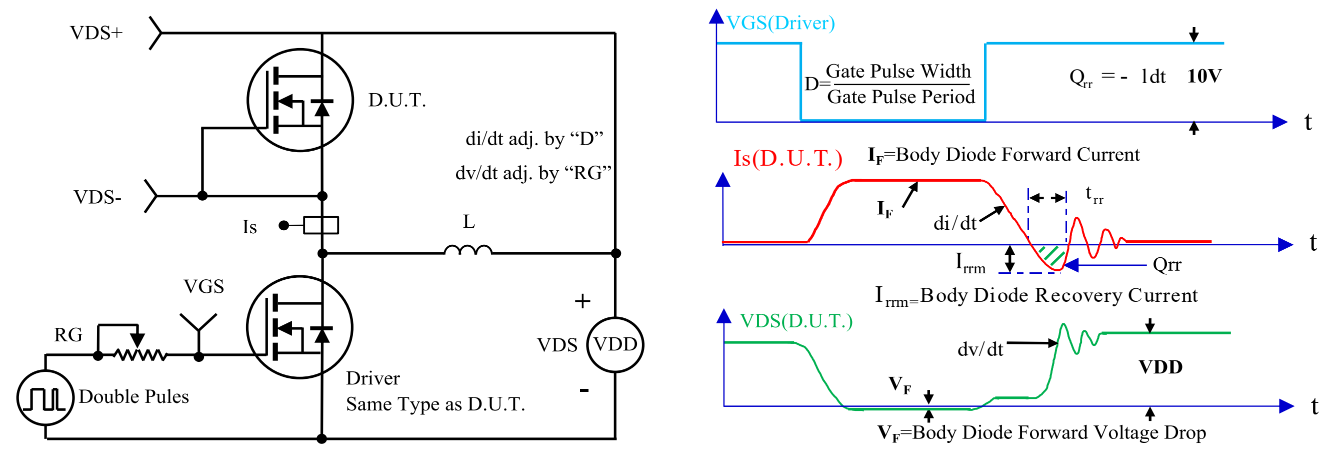

Fig.23- Diode Recovery Test Circuit & Waveform

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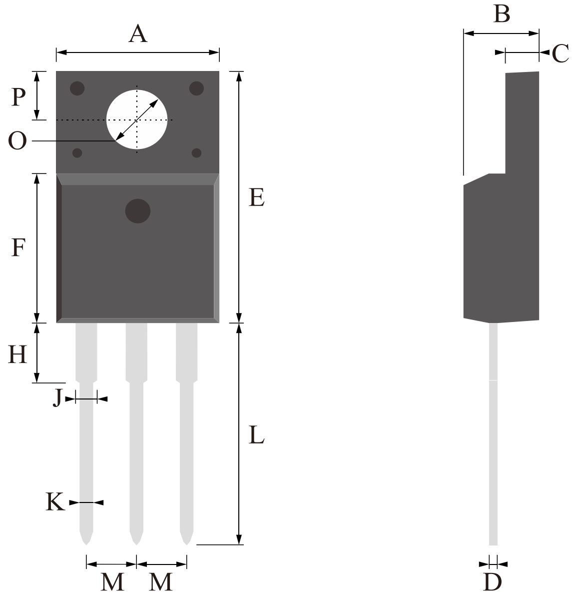
OUTLINE DRAWINGS

TO-220FP

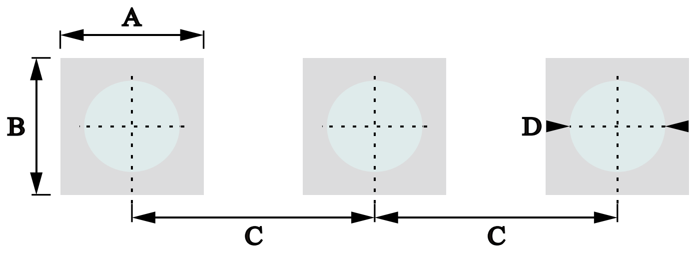


OUTLINE DIMENSIONS

Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.25	-	10.75	0.3642	-	0.4232
B	4.20	-	5.20	0.1654	-	0.2047
C	2.30	-	2.90	0.0906	-	0.1142
D	0.35	-	0.75	0.0138	-	0.0295
E	14.80	-	16.80	0.5827	-	0.6614
F	8.25	-	9.75	0.3248	-	0.3839
L	12.15	-	14.15	0.4783	-	0.5571
H	2.60	-	3.30	0.1024	-	0.1299
J	1.10	-	1.60	0.0433	-	0.0630
K	0.60	-	1.00	0.0236	-	0.0394
M	2.20	-	3.00	0.0866	-	0.1181
O	2.70	-	3.50	0.1063	-	0.1378
P	3.20	-	3.80	0.1260	-	0.1496

RECOMMEDNED LAYOUT DRAWINGS

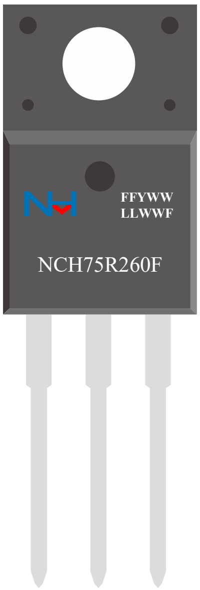
TO-220FP



OUTLINE DIMENSIONS

Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	1.60	-	-	0.0630	-
B	-	1.60	-	-	0.0630	-
C	-	2.54	-	-	0.1000	-
D	-	1.00	-	-	0.0394	-

MARKING INFORMATION



MARKING INSTRUCTIONS

NH=Niuhang Trademark

FF=Product Line Code,According To Actual Changes

YWW=Date Code,According To Actual Changes

LLWWF=Inernal Code,According To Actual Changes

NCH75R260F=Model

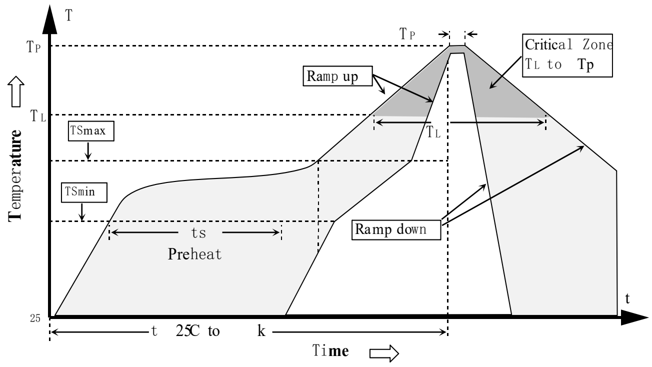
PACKING INFORMATION

Package Type	Package Code	Productor Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-220FP	P1	2.048	Tube	50	1000	5000

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat−Temperature Min (TS min) −Temperature Max (TS max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature (tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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Specification Revision History

Rev.	Date	Changed Items	Pre-Changed Content	Changed Content
A/1	2025-10-20	First Issue		
		Blank Below		