

General Description

These N-channel MOSFET are produced using advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

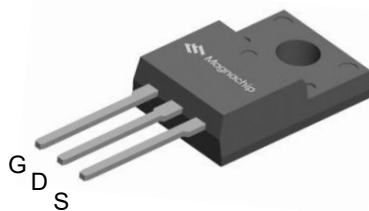
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

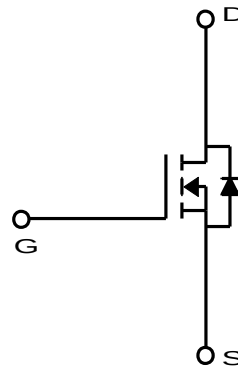
- $V_{DS} = 600V$
- $I_D = 10A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.75\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- High Current, High Speed Switching



TO-220FT



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	10.0*	A
	$T_C = 100^\circ C$		6.33*	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	40*	A
Power Dissipation	$T_C = 25^\circ C$	P_D	48.6	W
	Derate above 25 °C		0.39	W/°C
Repetitive Avalanche Energy ⁽¹⁾		E_{AR}	4.86	mJ
Peak Diode Recovery dv/dt ⁽³⁾		dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	580	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

* Id limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	2.57	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDFS10N60DTH	-55~150°C	TO-220FT	Tube	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 5.0A$		0.62	0.75	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 30V, I_D = 5.0A$	-	13	-	S

Dynamic Characteristics

Total Gate Charge	Q_g	$V_{DS} = 480V, I_D = 10A, V_{GS} = 10V^{(2)}$	-	42.9	-	nC
Gate-Source Charge	Q_{gs}		-	7.7	-	
Gate-Drain Charge	Q_{gd}		-	18.7	-	
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	1595	-	pF
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Output Capacitance	C_{oss}		-	168	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 300V, I_D = 10A^{(2)}, R_G = 25\Omega$	-	22	-	ns
Rise Time	t_r		-	26	-	
Turn-Off Delay Time	$t_{d(off)}$		-	160	-	
Fall Time	t_f		-	43.5	-	

Drain-Source Body Diode Characteristics

Maximum Continuous Drain to Source Diode Forward Current	I_S		-	-	10	A
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 10A, V_{GS} = 0V$	-	-	1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 10A, di/dt = 100A/\mu s^{(3)}$	-	319	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	2.65	-	μC

Note :

- Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ C$.
- $I_{SD} \leq 10.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$
- $L = 10.7mH$, $I_{AS} = 10.0A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$,

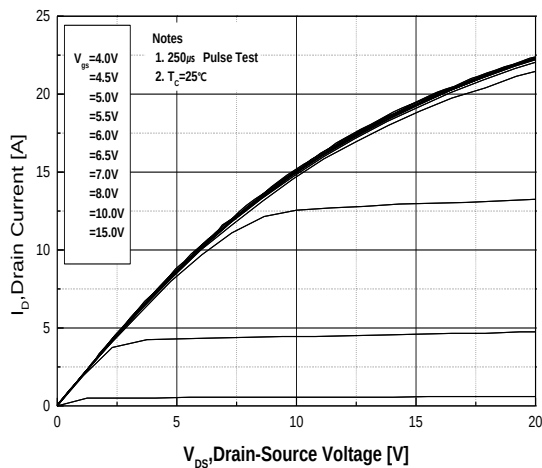


Fig.1 On-Region Characteristics

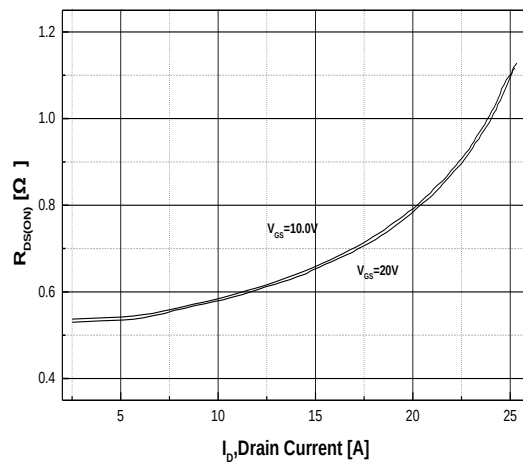


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

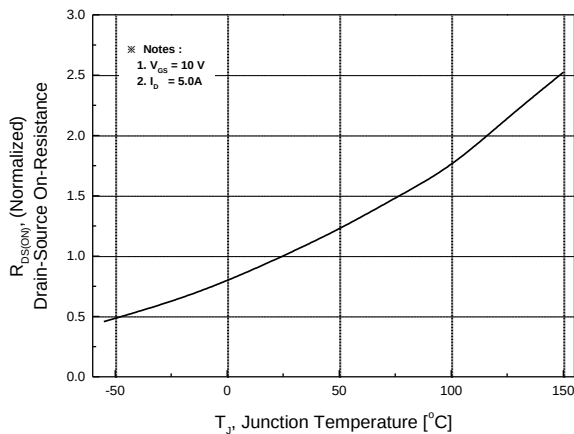


Fig.3 On-Resistance Variation with Temperature

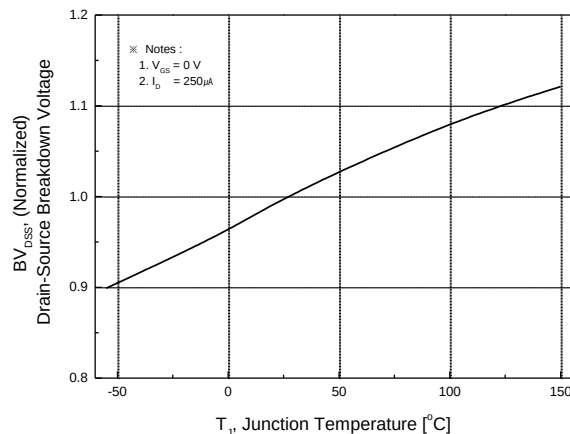


Fig.4 Breakdown Voltage Variation vs. Temperature

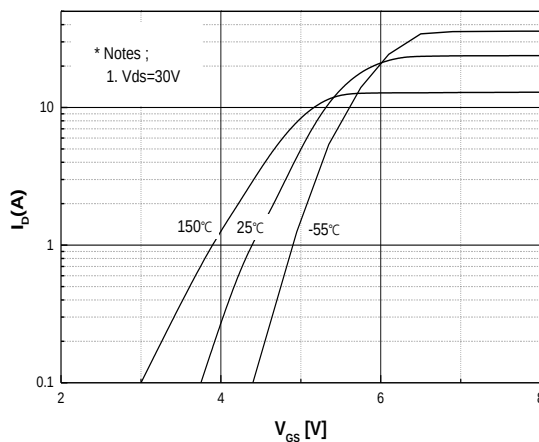


Fig.5 Transfer Characteristics

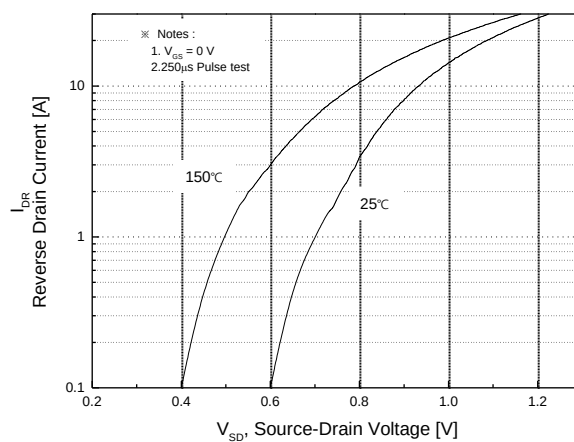
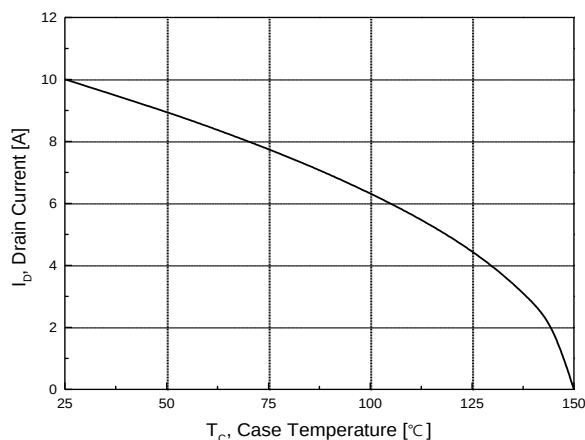
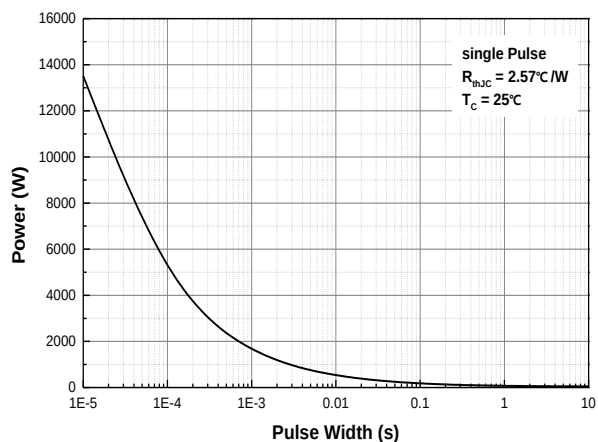
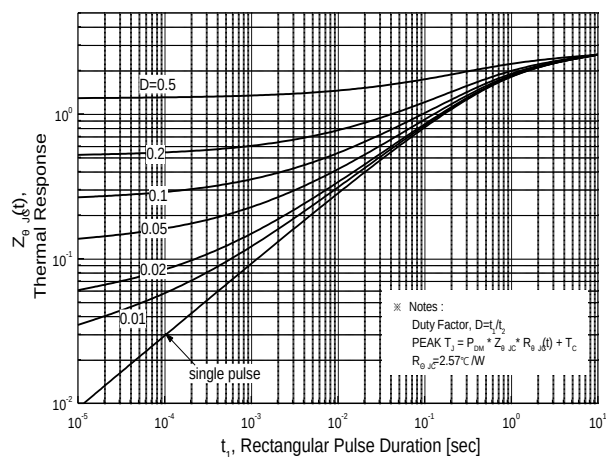
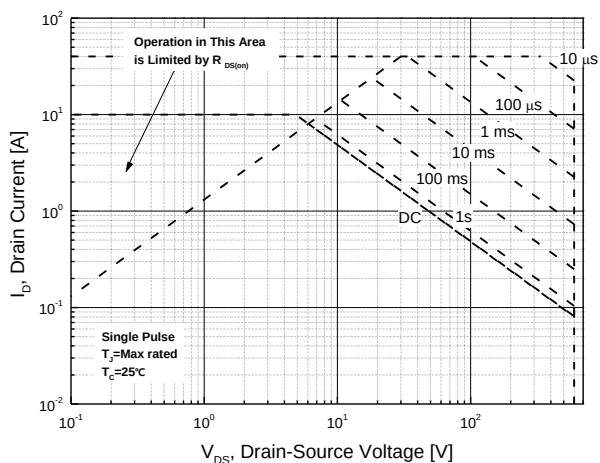
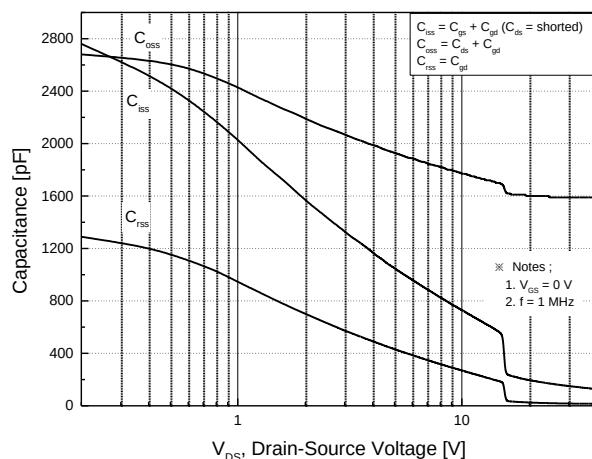
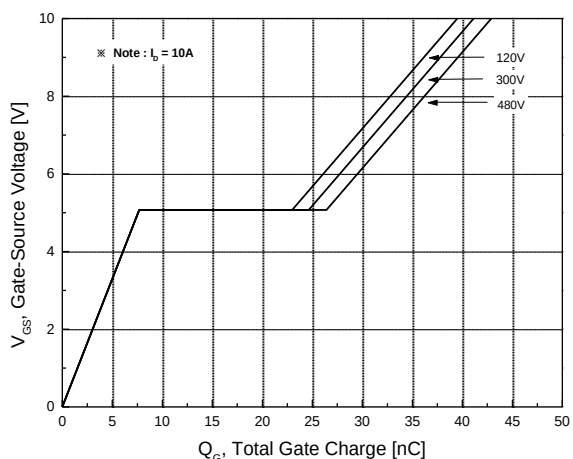
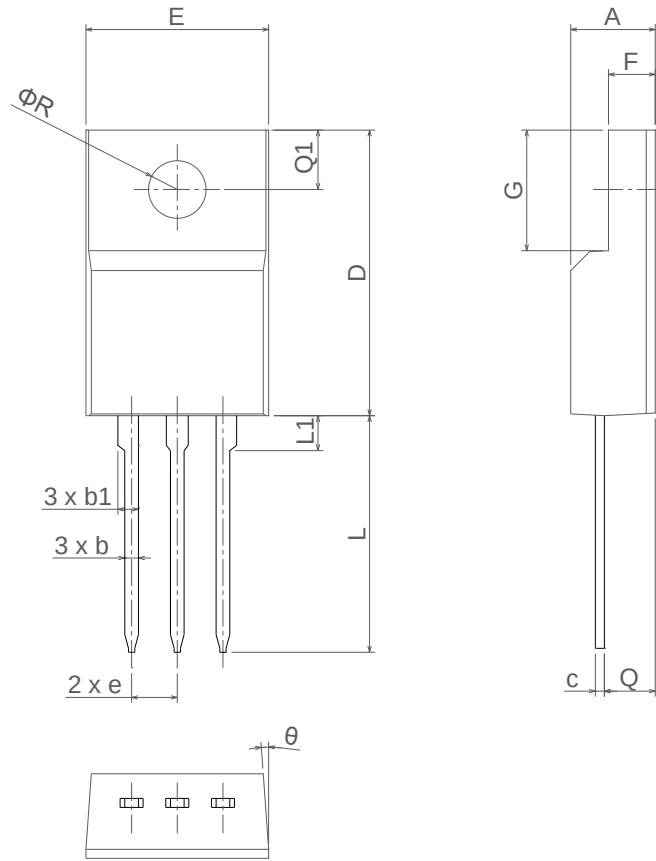


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimensions

3 Leads, TO-220FT



[Unit:mm]

Symbol	Dimension [mm]		
	Min	Nom	Max
A	4.30	-	4.70
b	0.54	-	0.84
b1	0.99	-	1.29
c	0.49	-	0.79
D	14.70	-	15.30
E	9.70	-	10.30
e	2.29	-	2.79
F	2.50	-	2.90
G	6.70	-	7.10
L	12.50	-	13.50
L1	1.80	-	-
Q	2.50	-	2.70
Q1	2.70	-	3.30
ΦR	3.05	-	3.40
θ	(5°)		

Note : Package body size, length and width do not include mold flash, protrusions and gate burrs.

DISCLAIMER:

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