



N-channel Enhancement-mode Power MOSFET

- Ease of Paralleling**
- Simple Drive Requirement**
- Fast Switching Performance**
- RoHS-compliant, Halogen-free**

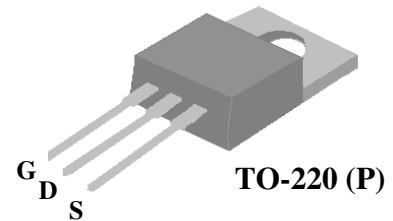


BV_{DSS}	500V
$R_{DS(ON)}$	0.85Ω
I_D	8A

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The IRF840P-HF-3 is in the TO-220 package, which is widely used for commercial and industrial applications, and is well-suited for high voltage applications such as switch mode power supplies, DC-AC converters and high-current high-speed switching circuits.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±20	V
I_D at $T_C=25^\circ C$	Continuous Drain Current	8	A
I_D at $T_C=100^\circ C$	Continuous Drain Current	5.1	A
I_{DM}	Pulsed Drain Current ¹	32	A
P_D at $T_C=25^\circ C$	Total Power Dissipation	125	W
	Linear Derating Factor	1	W/°C
E_{AS}	Single Pulse Avalanche Energy ²	320	mJ
I_{AR}	Avalanche Current	8	A
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance Junction-case	1.0	°C/W
Rthj-a	Maximum Thermal Resistance Junction-ambient	62	°C/W

Ordering Information

IRF840P-HF-3TB

RoHS-compliant halogen-free TO-220, shipped in tubes



Electrical Specifications at $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	500	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=4.8A$	-	-	0.85	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=4.8A$	-	4.2	-	S
I_{DSS}	Drain-Source Leakage Current ($T_j=25^\circ\text{C}$)	$V_{DS}=500V, V_{GS}=0V$	-	-	25	μA
	Drain-Source Leakage Current ($T_j=125^\circ\text{C}$)	$V_{DS}=400V, V_{GS}=0V$	-	-	250	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V$	-	-	± 100	nA
Q_g	Total Gate Charge ³	$I_D=8A$	-	45	72	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=400V$	-	7	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	25	-	nC
$t_{d(on)}$	Turn-on Delay Time ³	$V_{DD}=250V$	-	12	-	ns
t_r	Rise Time	$I_D=8A$	-	31	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=9.1\Omega, V_{GS}=10V$	-	48	-	ns
t_f	Fall Time	$R_D=31\Omega$	-	33	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	1250	2000	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$	-	270	-	pF
C_{riss}	Reverse Transfer Capacitance	$f=1.0MHz$	-	85	-	pF
R_g	Gate Resistance	$f=1.0MHz$	-	1.6	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ³	$T_j=25^\circ\text{C}, I_S=8A, V_{GS}=0V$	-	-	1.5	V
t_{rr}	Reverse Recovery Time ³	$I_S=8A, V_{GS}=0V$	-	515	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	8.6	-	μC

Notes:

1. Pulse width limited by maximum junction temperature.
2. Starting $T_j=25^\circ\text{C}$, $V_{DD}=50V$, $L=10mH$, $R_G=25\Omega$
2. Pulse test - pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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Typical Electrical Characteristics

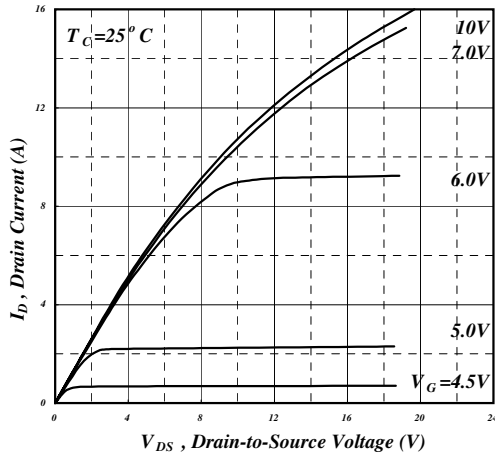


Fig 1. Typical Output Characteristics

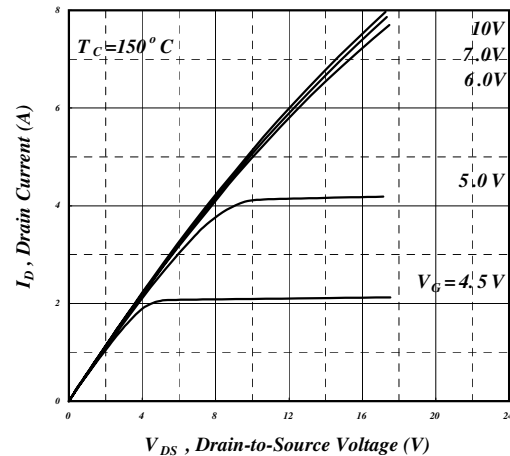


Fig 2. Typical Output Characteristics

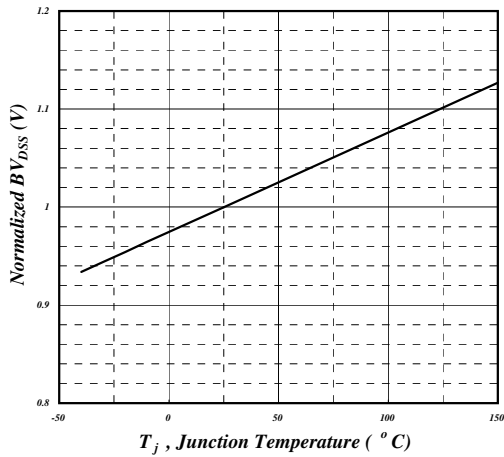


Fig 3. Normalized BV_{DSS} vs. Junction Temperature

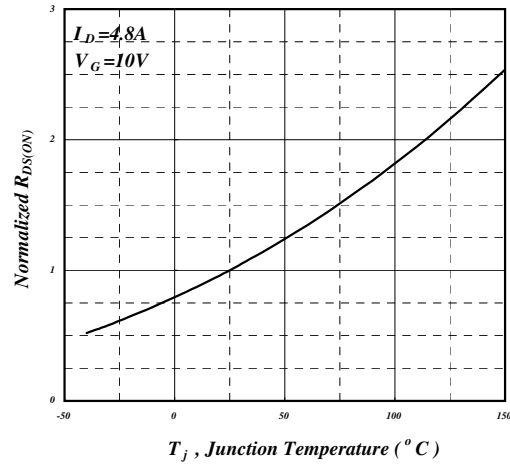


Fig 4. Normalized On-Resistance vs. Junction Temperature

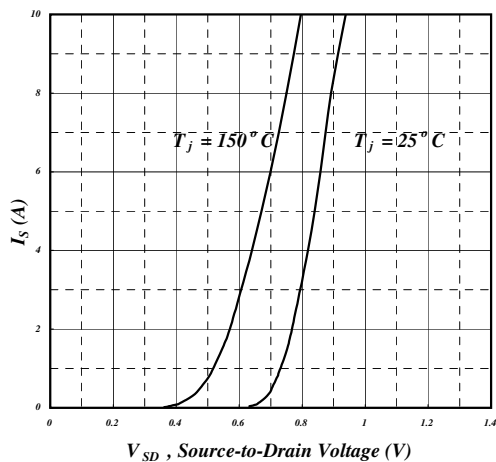


Fig 5. Forward Characteristic of the Reverse Diode

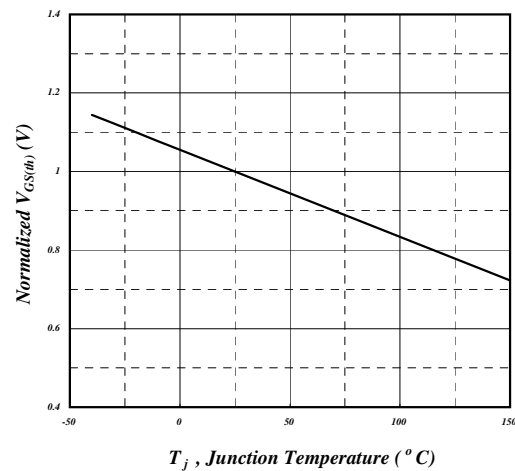


Fig 6. Gate Threshold Voltage vs. Junction Temperature



Typical Electrical Characteristics (cont.)

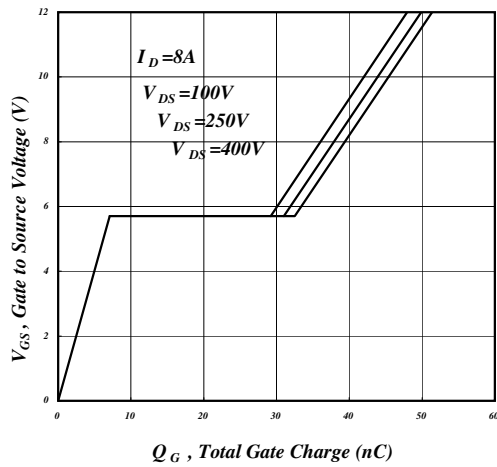


Fig 7. Gate Charge Characteristics

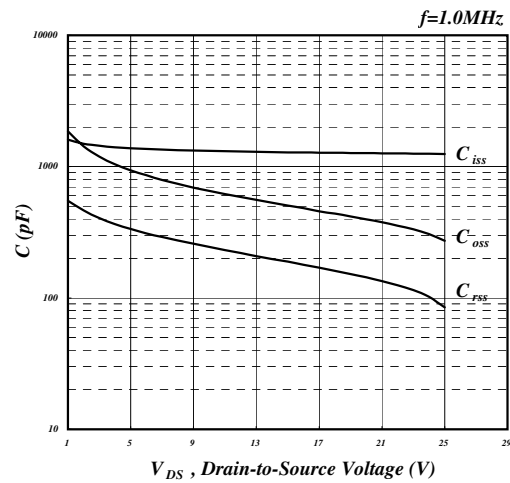


Fig 8. Typical Capacitance Characteristics

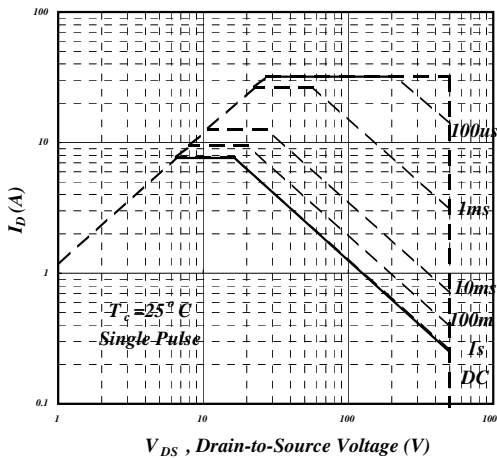


Fig 9. Maximum Safe Operating Area

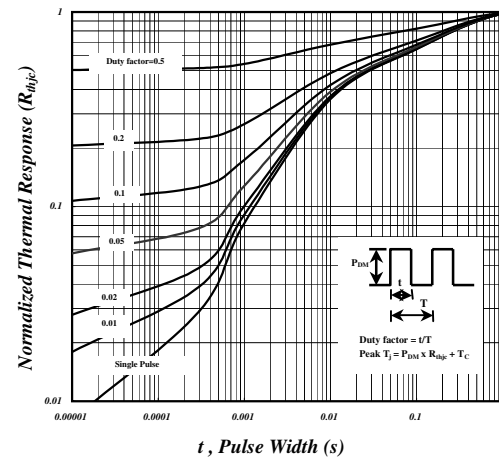


Fig 10. Effective Transient Thermal Impedance

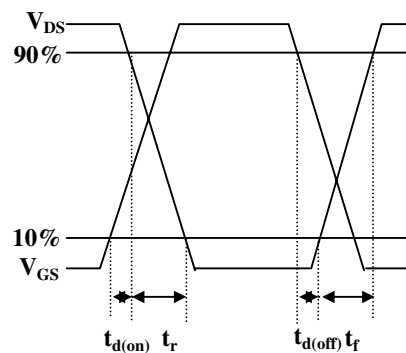


Fig 11. Switching Time Waveform

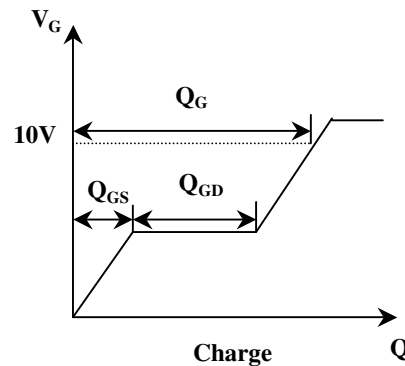
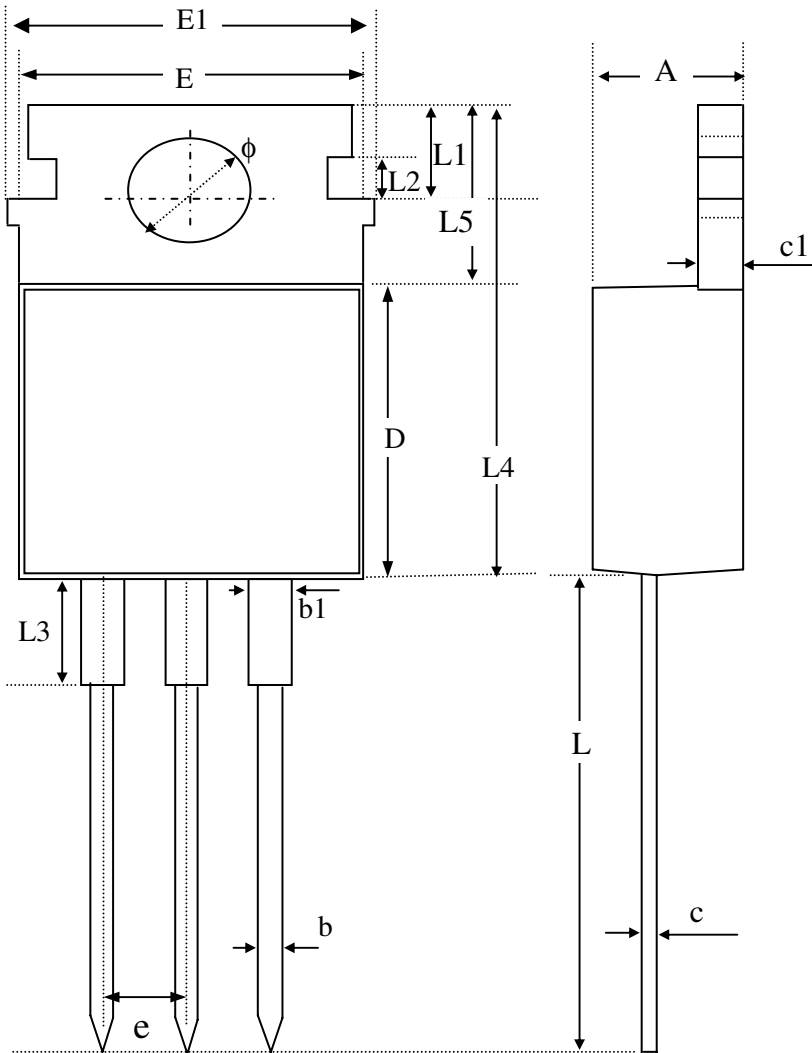


Fig 12. Gate Charge Waveform



Package Dimensions: TO-220



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.48	4.70
b	0.65	0.80	0.90
b1	1.15	1.38	1.60
c	0.40	0.50	0.60
c1	1.00	1.20	1.40
E	9.70	10.00	10.40
E1	---	---	11.50
e	----	2.54	----
L	12.70	13.60	14.50
L1	2.60	2.80	3.00
L2	1.00	1.40	1.80
L3	2.6	3.10	3.6
L4	14.70	15.50	16
L5	6.30	6.50	6.70
phi	3.50	3.60	3.70
D	8.40	8.90	9.40

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information: TO-220

