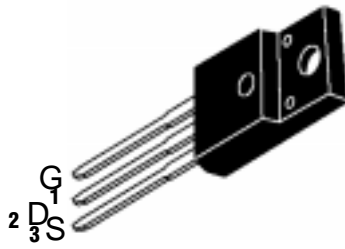




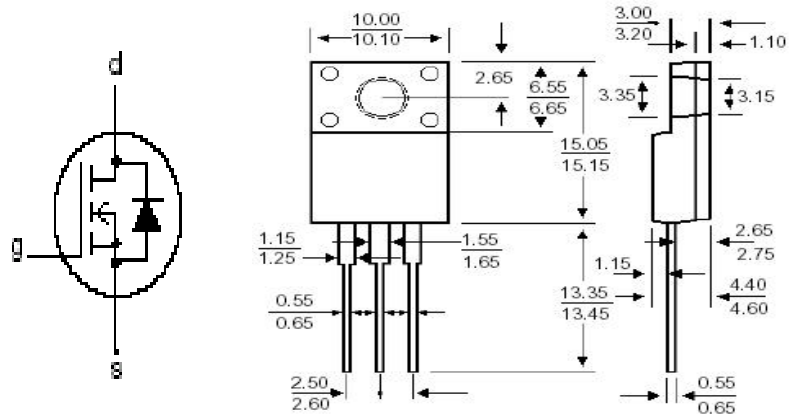
Description

IRF840FP



ITO-220AB

Mechanical Dimensions



DIMENSION IN MM

FEATURES

- Repetitive Avalanche Rated
- Fast switching
- High thermal cycling performance
- Low thermal resistance

GENERAL DESCRIPTION

N-channel, enhancement mode field-effect power transistor, intended for use in off-line switched mode power supplies, T.V. and computer monitor power supplies, d.c. to d.c. converters, motor control circuits and general purpose switching applications.

The IRF840 is supplied in the SOT78 (TO220AB) conventional leaded package.

LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	Drain-source voltage	$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$	-	500	V
V_{DGR}	Drain-gate voltage	$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$; $R_{CS} = 20\text{ k}\Omega$	-	500	V
V_{GS}	Gate-source voltage		-	± 30	V
I_D	Continuous drain current	$T_{mb} = 25\text{ }^\circ\text{C}$; $V_{GS} = 10\text{ V}$	-	8.5	A
		$T_{mb} = 100\text{ }^\circ\text{C}$; $V_{GS} = 10\text{ V}$	-	5.4	A
I_{DM}	Pulsed drain current	$T_{mb} = 25\text{ }^\circ\text{C}$	-	34	A
P_D	Total dissipation	$T_{mb} = 25\text{ }^\circ\text{C}$	-	147	W
T_j, T_{stg}	Operating junction and storage temperature range		-55	150	$^\circ\text{C}$

AVALANCHE ENERGY LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E_{AS}	Non-repetitive avalanche energy	Unclamped inductive load, $I_{AS} = 7.4\text{ A}$; $t_b = 0.22\text{ ms}$; T_j prior to avalanche = $25\text{ }^\circ\text{C}$; $V_{DD} \leq 50\text{ V}$; $R_{CS} = 50\text{ }\Omega$; $V_{GS} = 10\text{ V}$; refer to fig:17	-	531	mJ
E_{AR}	Repetitive avalanche energy ¹	$I_{AR} = 8.5\text{ A}$; $t_b = 2.5\text{ }\mu\text{s}$; T_j prior to avalanche = $25\text{ }^\circ\text{C}$; $R_{CS} = 50\text{ }\Omega$; $V_{GS} = 10\text{ V}$; refer to fig:18	-	13	mJ
I_{AS}, I_{AR}	Repetitive and non-repetitive avalanche current		-	8.5	A

¹ pulse width and repetition rate limited by T_j max.

**THERMAL RESISTANCES**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th(j-mb)}$	Thermal resistance junction to mounting base		-	-	0.85	K/W
$R_{th(j-a)}$	Thermal resistance junction to ambient	in free air	-	60	-	K/W

ELECTRICAL CHARACTERISTICS $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

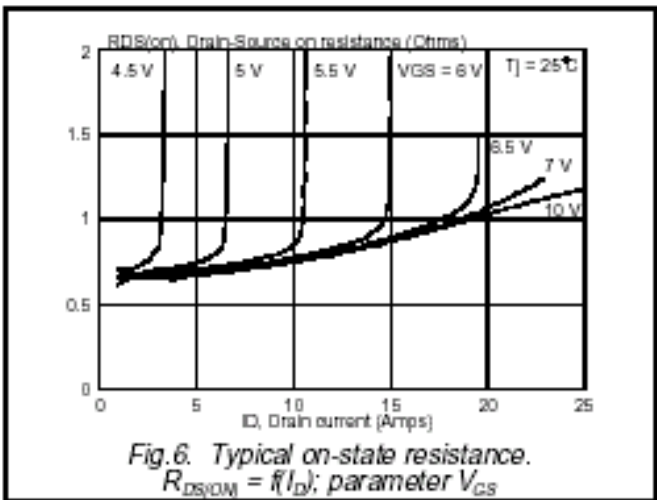
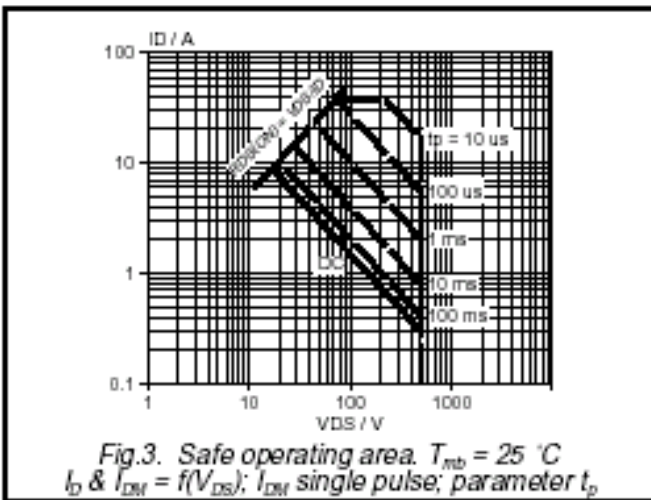
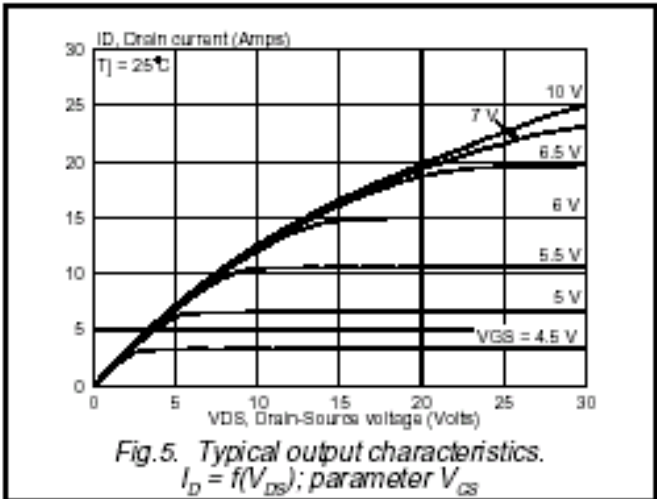
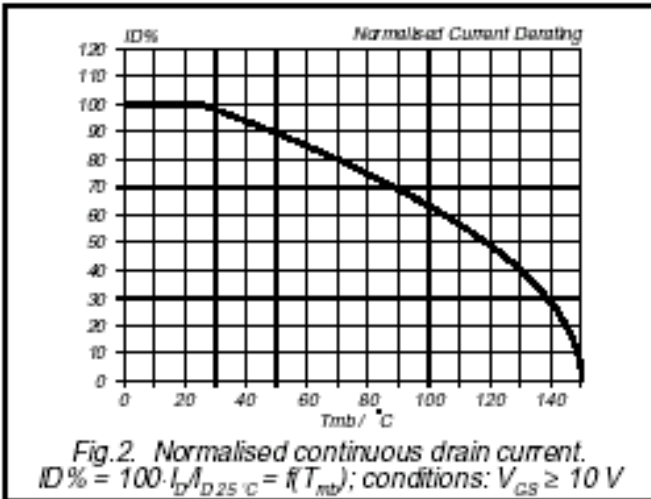
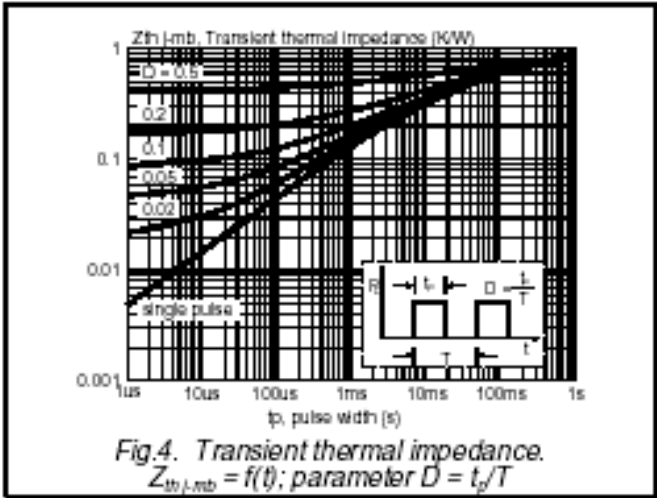
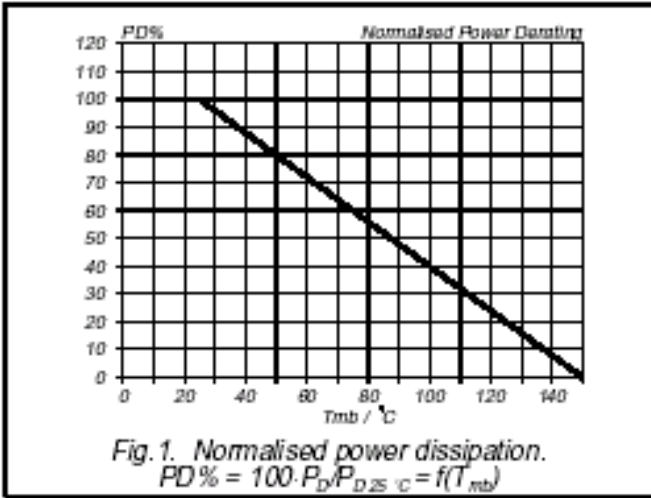
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	500	-	-	V
$\Delta V_{(BR)DSS} / \Delta T_j$	Drain-source breakdown voltage temperature coefficient	$V_{DS} = V_{GS}; I_D = 0.25\text{ mA}$	-	0.1	-	%/K
$R_{DS(ON)}$	Drain-source on resistance	$V_{GS} = 10\text{ V}; I_D = 4.8\text{ A}$	-	0.6	0.85	Ω
$V_{GS(TH)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 0.25\text{ mA}$	2.0	3.0	4.0	V
g_{fs}	Forward transconductance	$V_{DS} = 30\text{ V}; I_D = 4.8\text{ A}$	3.5	6	-	S
I_{DSS}	Drain-source leakage current	$V_{DS} = 500\text{ V}; V_{GS} = 0\text{ V}$	-	1	25	μA
I_{GSS}	Gate-source leakage current	$V_{DS} = 400\text{ V}; V_{GS} = 0\text{ V}; T_j = 125\text{ }^\circ\text{C}$ $V_{GS} = \pm 30\text{ V}; V_{DS} = 0\text{ V}$	-	40	250	μA
$Q_{g(tot)}$	Total gate charge	$I_D = 8.5\text{ A}; V_{DD} = 400\text{ V}; V_{GS} = 10\text{ V}$	-	55	80	nC
Q_{gs}	Gate-source charge		-	5.5	7	nC
Q_{gd}	Gate-drain (Miller) charge		-	30	45	nC
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 250\text{ V}; R_D = 30\text{ }\Omega;$ $R_G = 9.1\text{ }\Omega$	-	18	-	ns
t_r	Turn-on rise time		-	37	-	ns
$t_{d(off)}$	Turn-off delay time		-	80	-	ns
t_f	Turn-off fall time		-	36	-	ns
L_d	Internal drain inductance	Measured from tab to centre of die	-	3.5	-	nH
L_d	Internal drain inductance	Measured from drain lead to centre of die	-	4.5	-	nH
L_s	Internal source inductance	Measured from source lead to source bond pad	-	7.5	-	nH
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	960	-	pF
C_{oss}	Output capacitance		-	140	-	pF
C_{rss}	Feedback capacitance		-	80	-	pF

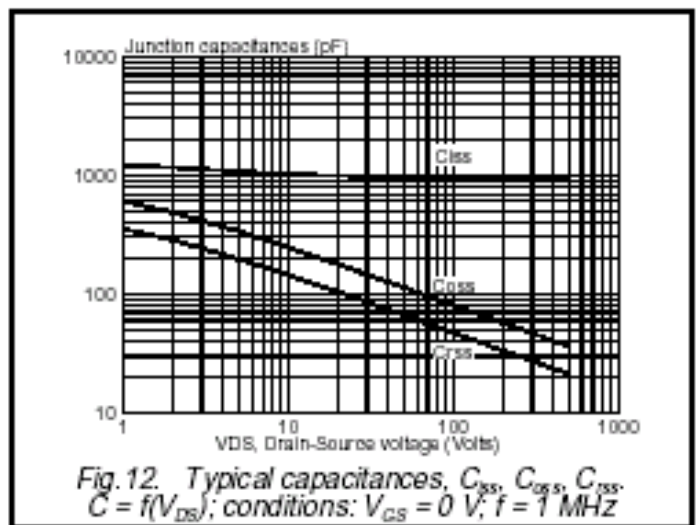
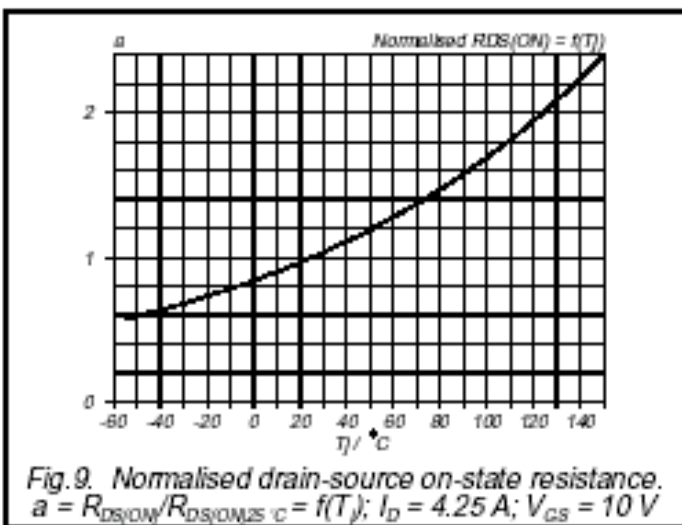
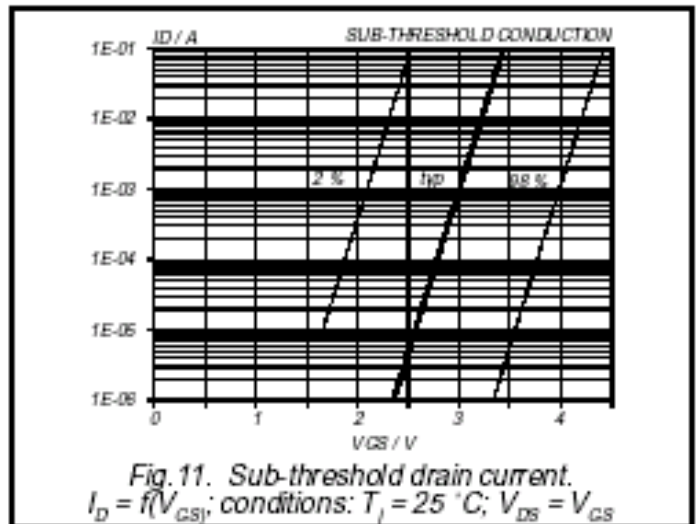
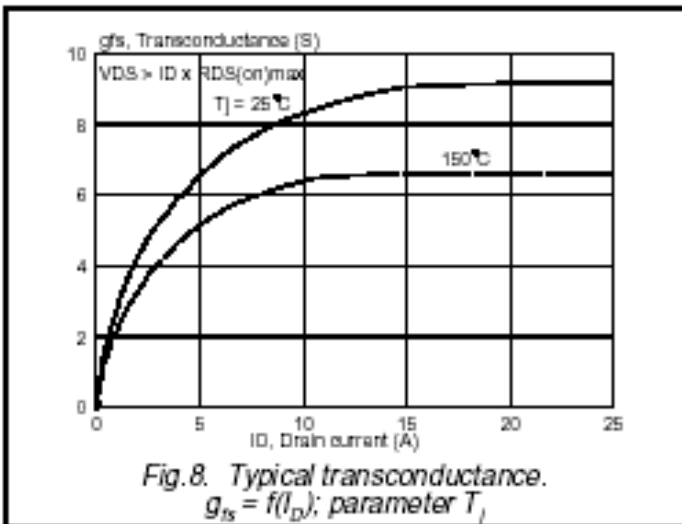
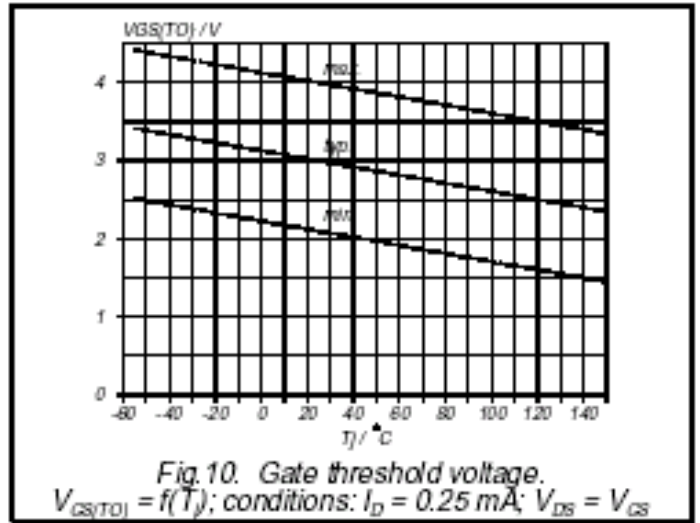
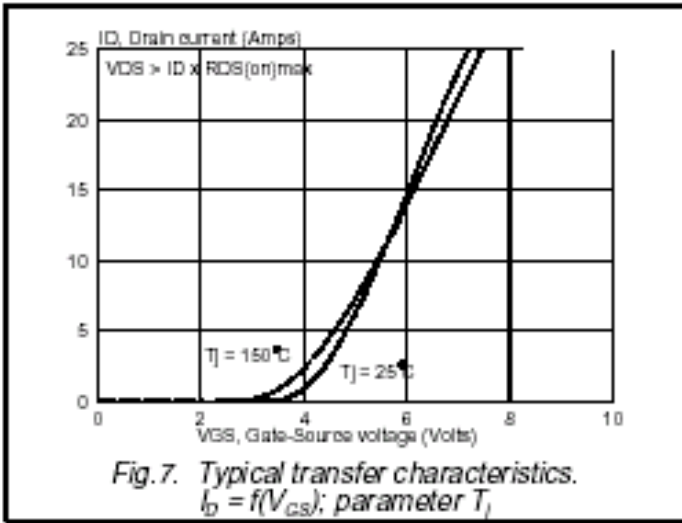
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_S	Continuous source current (body diode)	$T_{mb} = 25\text{ }^\circ\text{C}$	-	-	8.5	A
I_{SM}	Pulsed source current (body diode)	$T_{mb} = 25\text{ }^\circ\text{C}$	-	-	34	A
V_{SD}	Diode forward voltage	$I_S = 8.5\text{ A}; V_{GS} = 0\text{ V}$	-	-	1.2	V
t_{rr}	Reverse recovery time	$I_S = 8.5\text{ A}; V_{GS} = 0\text{ V}; dI/dt = 100\text{ A}/\mu\text{s}$	-	440	-	ns
Q_{rr}	Reverse recovery charge		-	6.4	-	μC



IRF840FP 8.0A 500V N CHANNEL POWER MOSFET







IRF840FP 8.0A 500V N CHANNEL POWER MOSFET

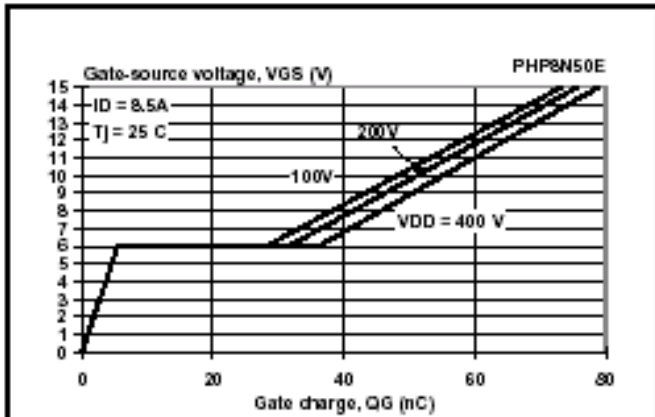


Fig. 13. Typical turn-on gate-charge characteristics.
 $V_{GS} = f(Q_G)$; parameter V_{DS}

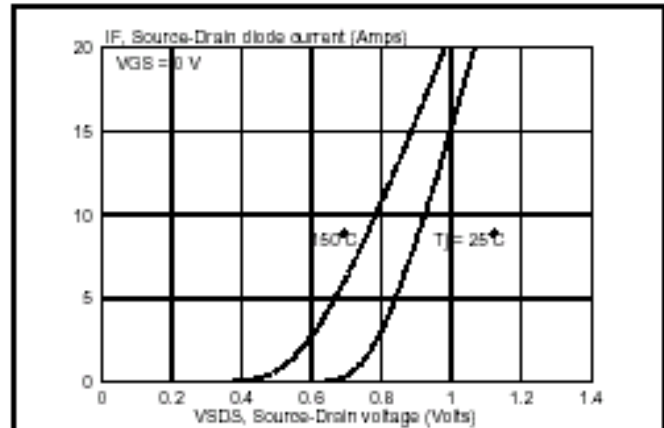


Fig. 16. Source-Drain diode characteristic.
 $I_F = f(V_{SDS})$; parameter T_J

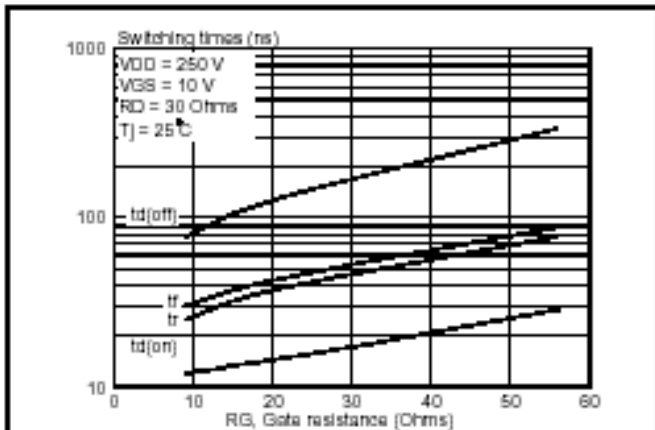


Fig. 14. Typical switching times; $t_{d(on)}$, t_r , $t_{d(off)}$, $t_f = f(R_G)$

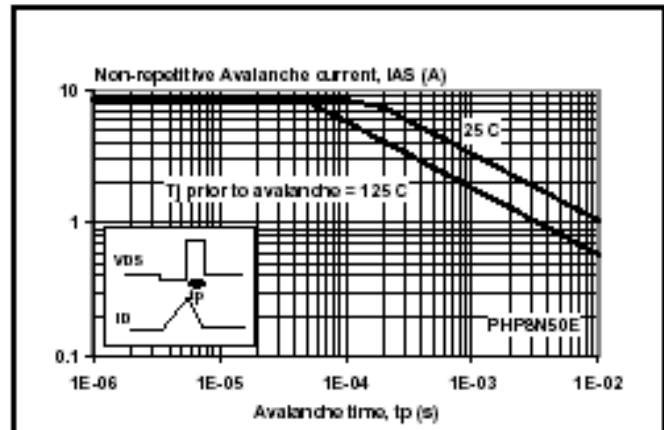


Fig. 17. Maximum permissible non-repetitive avalanche current (I_{AS}) versus avalanche time (t_p); unclamped inductive load

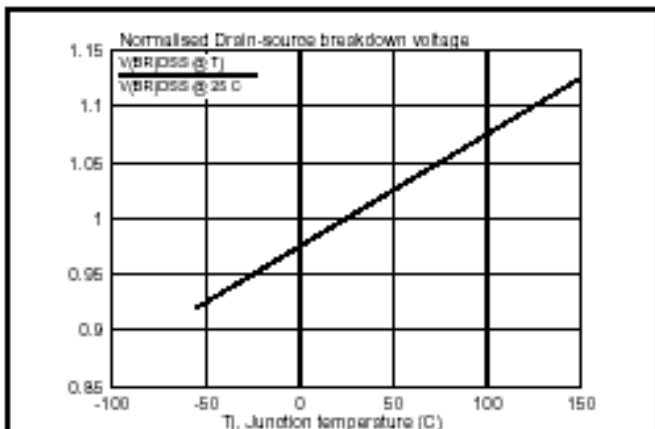


Fig. 15. Normalised drain-source breakdown voltage;
 $V_{BR(DSS)} / V_{BR(DSS) 25 C} = f(T_J)$

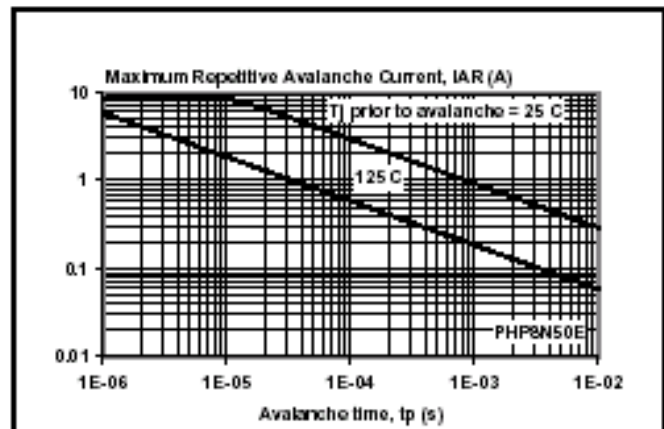


Fig. 18. Maximum permissible repetitive avalanche current (I_{AR}) versus avalanche time (t_p)