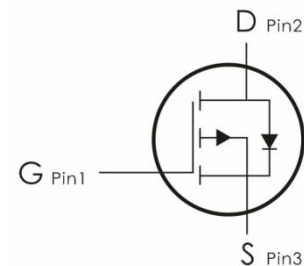
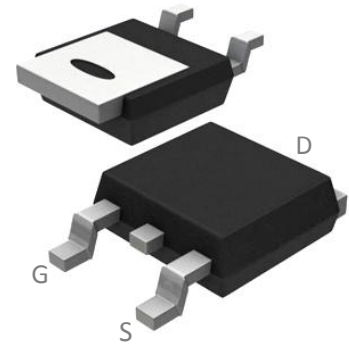


## Description:

This P-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety of applications.

## Features:

- 1)  $V_{DS}=-100V, I_D=-40A, R_{DS(ON)}<55m\ \Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



## Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
IRF9540-DO	F9540	TO- 252	2500 pcs/Reel

## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	-100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	-40	A
	Continuous Drain Current- $T_C=100^\circ C$	-24	
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	-112	
$P_D$	Power Dissipation	107	W
$E_{AS}$	Single pulse avalanche energy	361	mJ
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55-+175	$^\circ C$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.4	$^\circ C/W$

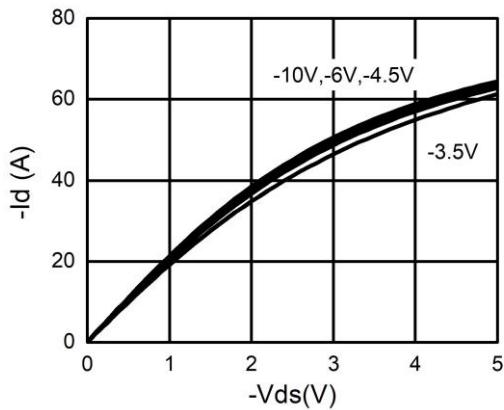
**Electrical Characteristics:** ( $T_C=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	-100	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-100V$	---	---	-1	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	-1	-1.8	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=-10V, I_D=-15A$	---	40	55	$\text{m}\Omega$
		$V_{GS}=-4.5V, I_D=-10A$	---	42	60	$\text{m}\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1\text{MHz}$	---	8055	---	pF
$C_{oss}$	Output Capacitance		---	194	--	
$C_{rss}$	Reverse Transfer Capacitance		---	69	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=-50V,$ $R_{ENG}=3\ \Omega, V_{GS}=-10V$	---	12	---	ns
$t_r$	Rise Time		---	63	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	36	---	ns
$t_f$	Fall Time		---	52	---	ns
$Q_g$	Total Gate Charge		---	146	---	nc
$Q_{gs}$	Gate-Source Charge	$V_{GS}=-10V, V_{DS}=-50V,$	---	16	---	nc
$Q_{gd}$	Gate-Drain "Miller" Charge	$I_D=-15A$	---	30	---	nc
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>3</sup>	$V_{GS}=0V, I_S=-15A$	---	---	-1.2	V
$I_S$	Continuous Drain Current	$V_D=V_G=0V$	---	---	-40	A
$I_{SM}$	Pulsed Drain Current		---	---	-112	A
$T_{rr}$	Reverse Recovery Time	$I_F=-15A, T_J=25^\circ\text{C}$	---	72	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu\text{s}$	---	120	---	nc

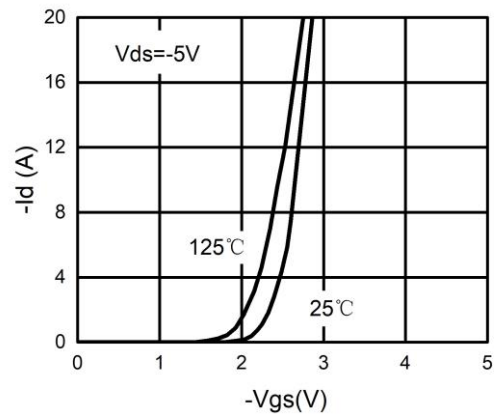
## Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=-50\text{V}$ ,  $V_G=-10\text{V}$ ,  $R_g=25\Omega$ ,  $L=0.5\text{mH}$ .
- 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

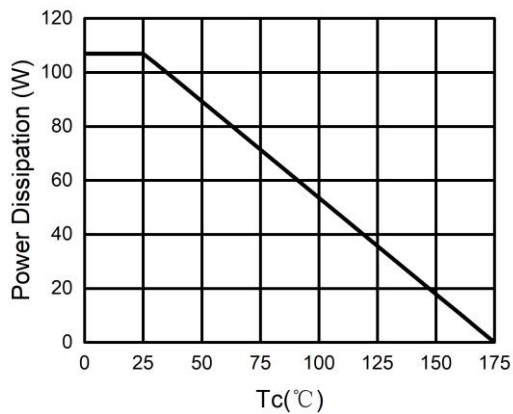
## Typical Characteristics: ( $T_c=25^{\circ}\text{C}$ unless otherwise noted)



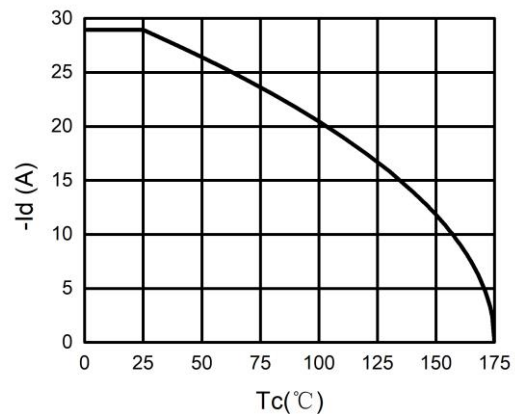
**Figure 1. Output Characteristics**



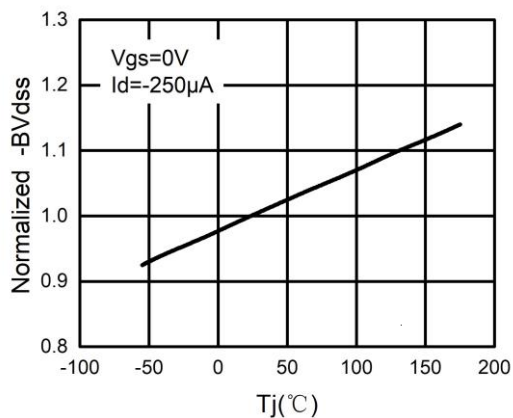
**Figure 2. Transfer Characteristics**



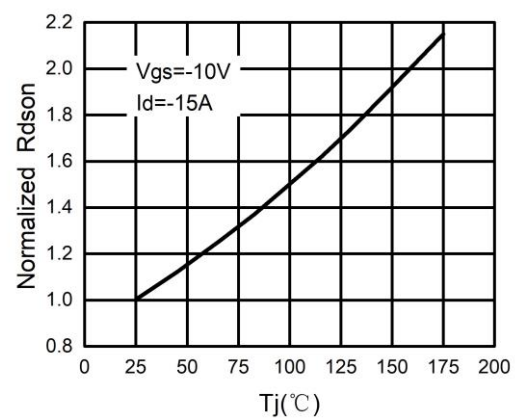
**Figure 3. Power Dissipation**



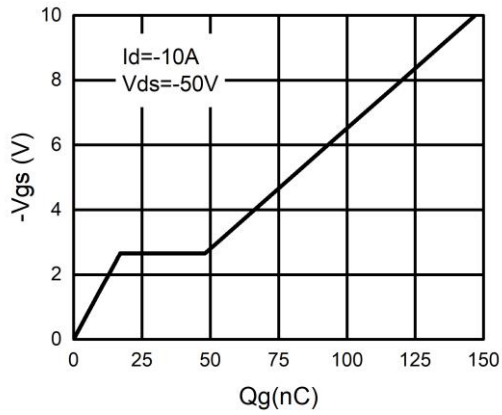
**Figure 4. Drain Current**



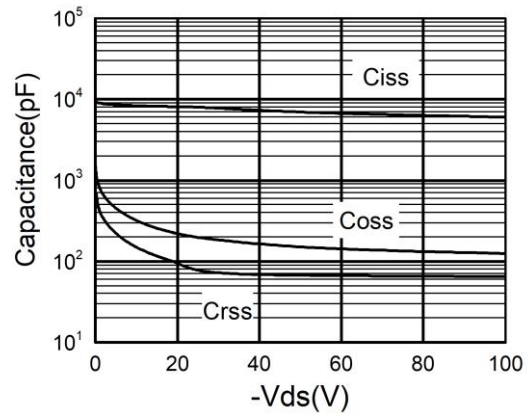
**Figure 5.  $BV_{DSS}$  vs Junction Temperature**



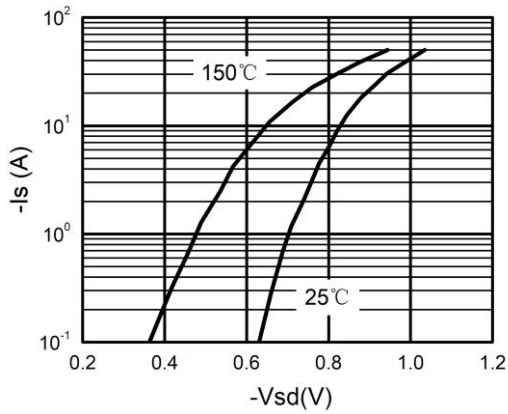
**Figure 6.  $R_{DS(ON)}$  vs Junction Temperature**



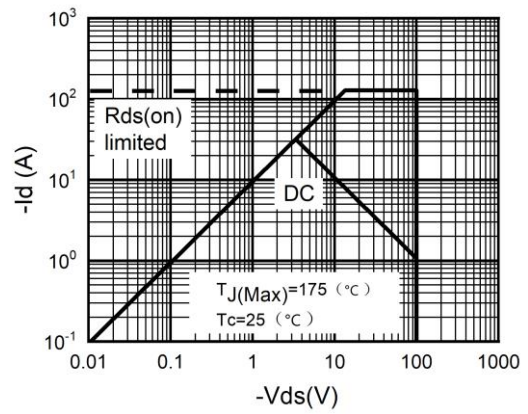
**Figure 7. Gate Charge Waveforms**



**Figure 8. Capacitance**



**Figure 9. Body-Diode Characteristics**

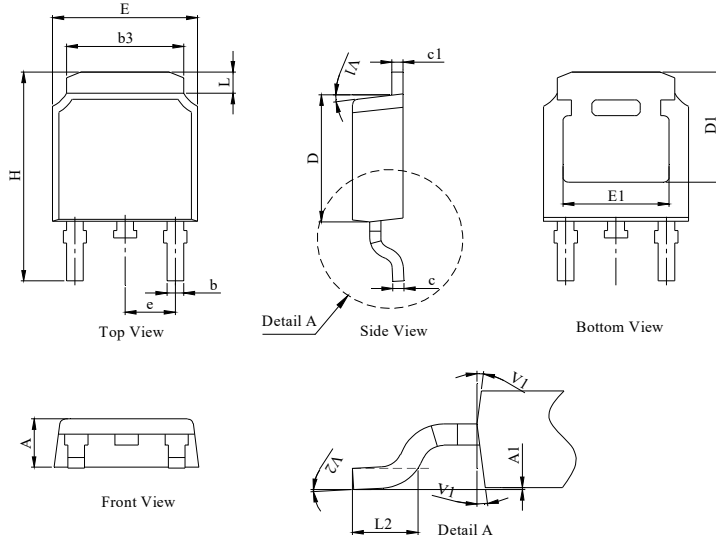


**Figure 10. Maximum Safe Operating Area**

## TO-252 Package Information

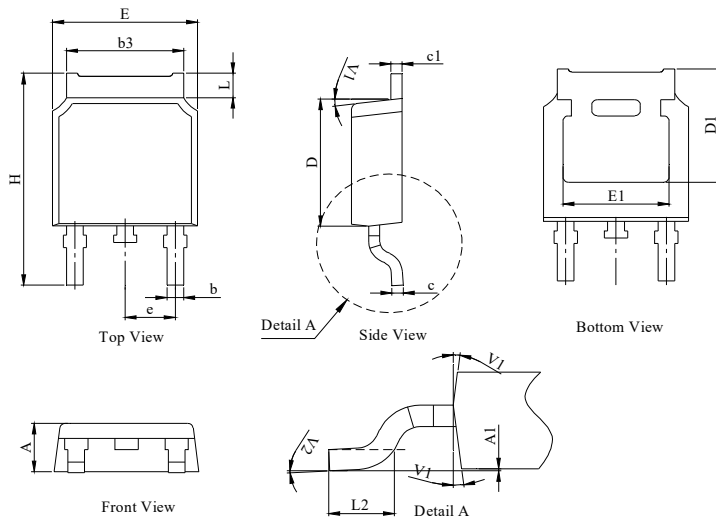
### Package Outline Type-A

UNIT: mm



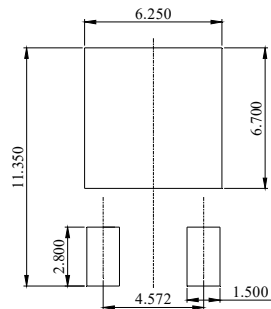
DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

### Package Outline Type-B



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

### Recommended Soldering Footprint



## Marking Information:

①. Doingter LOGO

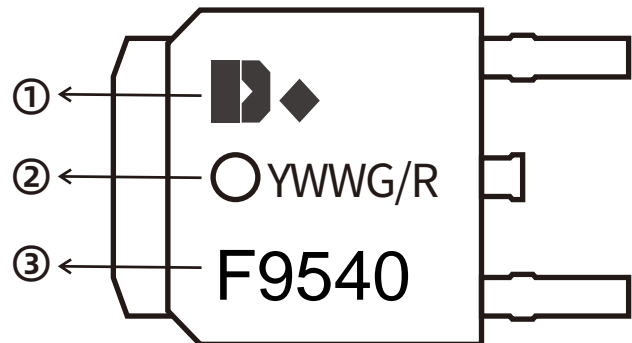
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year


WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)

③. Part NO.



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