

AP4543GMT-HF

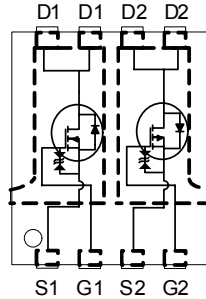
Halogen-Free Product



N AND P-CHANNEL ENHANCEMENT

MODE POWER MOSFET

- ▼ Simple Drive Requirement
- ▼ Good Thermal Performance
- ▼ Fast Switching Performance
- ▼ RoHS Compliant & Halogen-Free

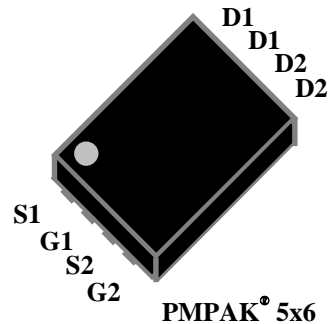


N-CH	BV_{DSS}	40V
	$R_{DS(ON)}$	26.5m Ω
	I_D	8.8A
P-CH	BV_{DSS}	-40V
	$R_{DS(ON)}$	42m Ω
	I_D	-7.3A

Description

AP4543 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The PMPAK[®] 5x6 package is special for voltage conversion application using standard infrared reflow technique with the backside heat sink to achieve the good thermal performance.



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	+20	+20	V
$I_D@T_A=25^\circ C$	Continuous Drain Current ³	8.8	-7.3	A
$I_D@T_A=70^\circ C$	Continuous Drain Current ³	7	-5.8	A
I_{DM}	Pulsed Drain Current ¹	30	-30	A
$P_D@T_A=25^\circ C$	Total Power Dissipation	3.57		W
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ C$

Thermal Data

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
Rthj-c	Maximum Thermal Resistance, Junction-case	6	6	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient ³	35	35	$^\circ C/W$



AP4543GMT-HF

N-CH Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=7A$	-	21.2	26.5	$m\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	32.7	45	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	3	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=7A$	-	14	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=32V, V_{GS}=0V$	-	-	10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 30	μA
Q_g	Total Gate Charge	$I_D=7A$	-	7	11.2	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=20V$	-	2.2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	3.7	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=20V$	-	6	-	ns
t_r	Rise Time	$I_D=1A$	-	18	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	17	-	ns
t_f	Fall Time	$V_{GS}=5V$	-	19	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	660	1050	pF
C_{oss}	Output Capacitance	$V_{DS}=15V$	-	120	-	pF
C_{riss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	75	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	2.2	4.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=2.9A, V_{GS}=0V$	-	-	1.2	V
t_{rr}	Reverse Recovery Time	$I_S=7A, V_{GS}=0V,$	-	24	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	21	-	nC

**P-CH Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-5A$	-	33.3	42	$m\Omega$
		$V_{GS}=-4.5V, I_D=-3A$	-	53.3	70	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.7	-3	V
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_D=-5A$	-	11	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V$	-	-	-10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=+20V, V_{DS}=0V$	-	-	+30	μA
Q_g	Total Gate Charge	$I_D=-5A$	-	11.5	18.4	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=-20V$	-	2.3	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	7	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=-20V$	-	7	-	ns
t_r	Rise Time	$I_D=-1A$	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	34	-	ns
t_f	Fall Time	$V_{GS}=-5V$	-	29	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	720	1150	pF
C_{oss}	Output Capacitance	$V_{DS}=-15V$	-	205	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	165	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	6	12	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=-2.9A, V_{GS}=0V$	-	-	-1.2	V
t_{rr}	Reverse Recovery Time	$I_S=-5A, V_{GS}=0V,$	-	32	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	34	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² copper pad of FR4 board, $t \leq 10\text{sec}$; 85°C/W at steady state.

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.

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AP4543GMT-HF

N-Channel

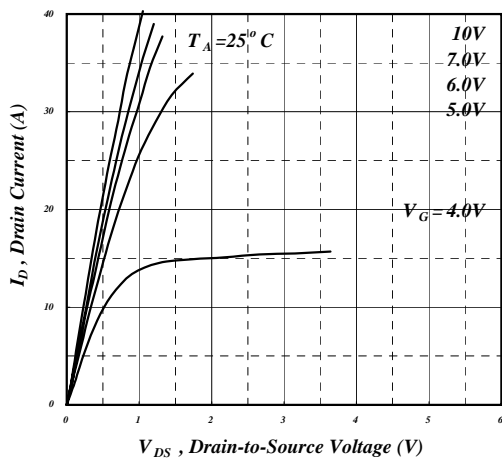


Fig 1. Typical Output Characteristics

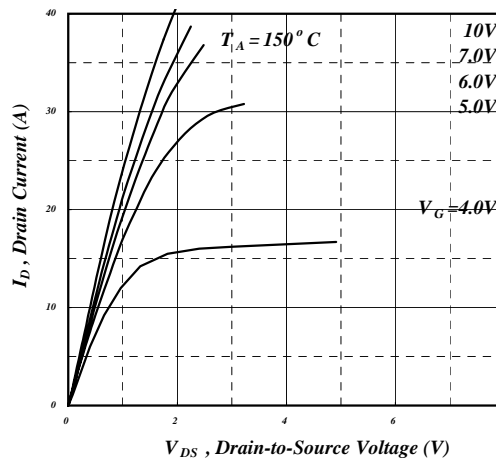


Fig 2. Typical Output Characteristics

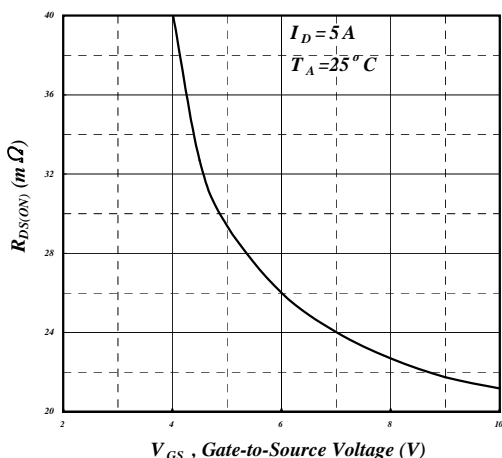


Fig 3. On-Resistance v.s. Gate Voltage

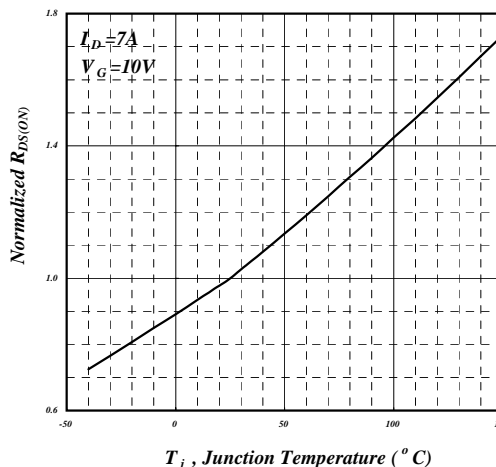


Fig 4. Normalized On-Resistance v.s. Junction Temperature

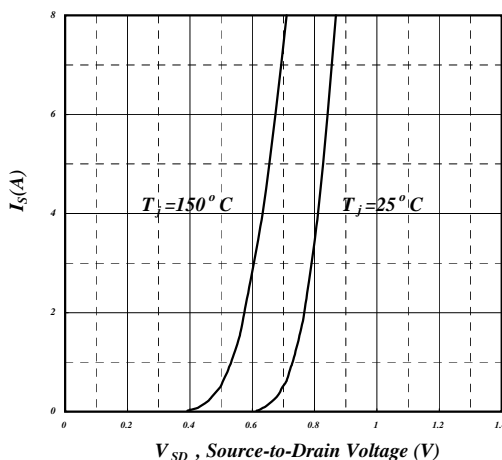


Fig 5. Forward Characteristic of Reverse Diode

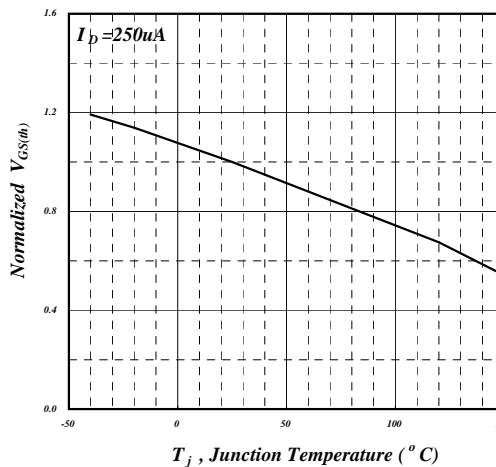


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



N-Channel

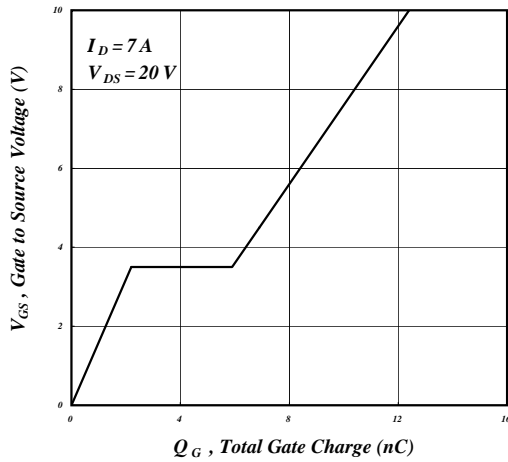


Fig 7. Gate Charge Characteristics

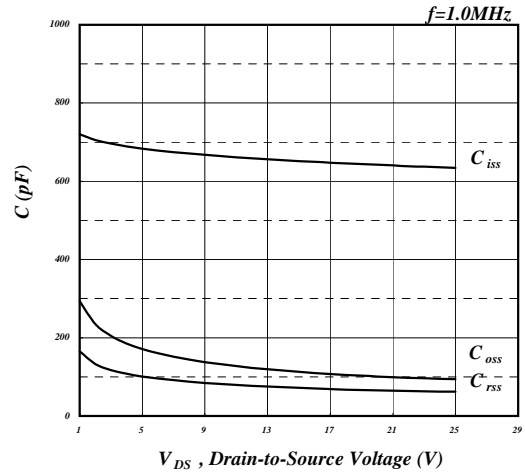


Fig 8. Typical Capacitance Characteristics

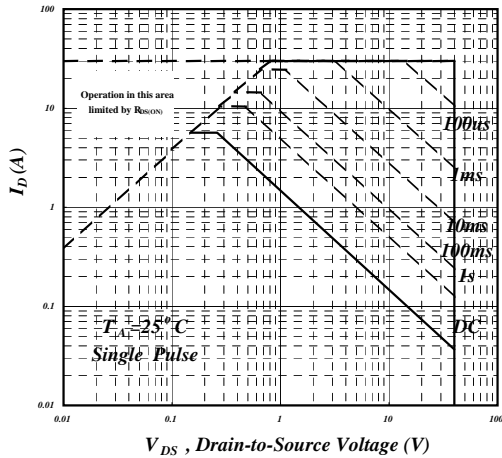


Fig 9. Maximum Safe Operating Area

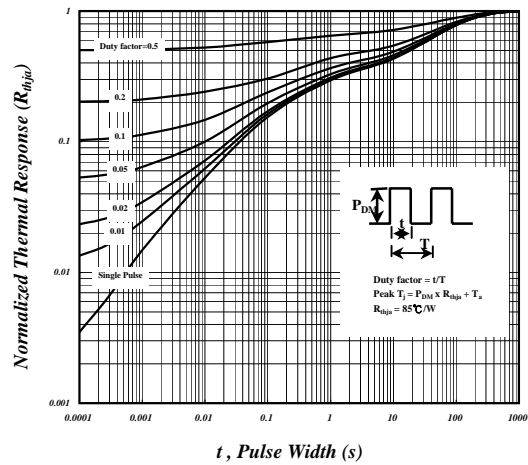


Fig 10. Effective Transient Thermal Impedance

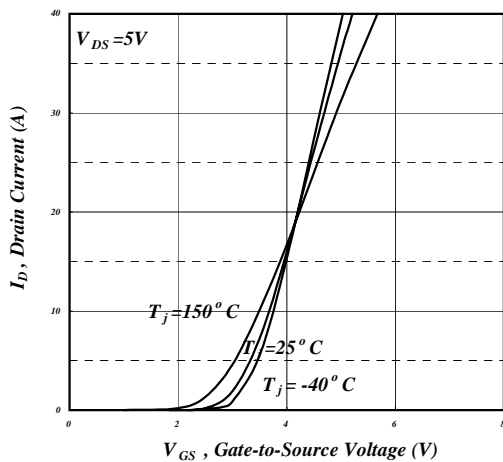


Fig 11. Transfer Characteristics

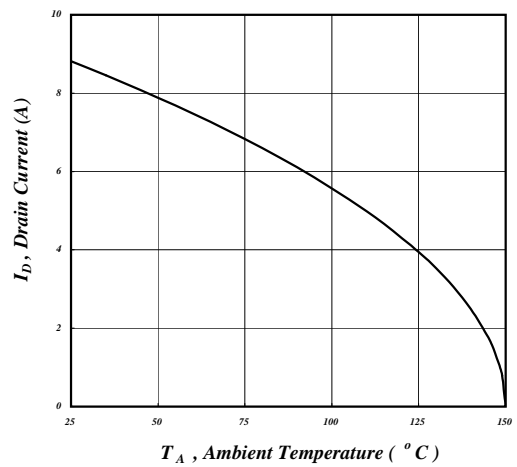


Fig 12. Maximum Continuous Drain Current v.s. Ambient Temperature



AP4543GMT-HF

P-Channel

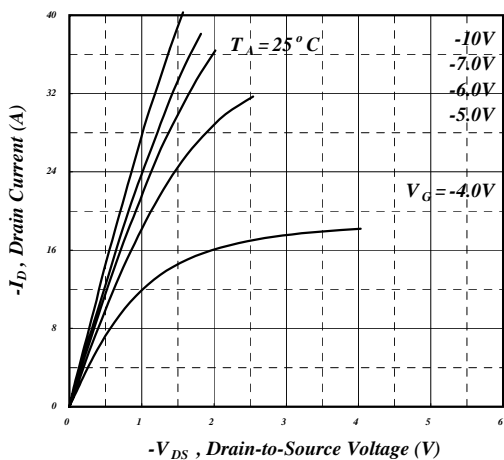


Fig 1. Typical Output Characteristics

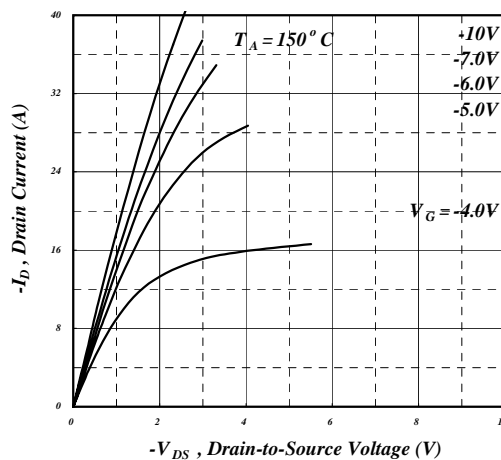


Fig 2. Typical Output Characteristics

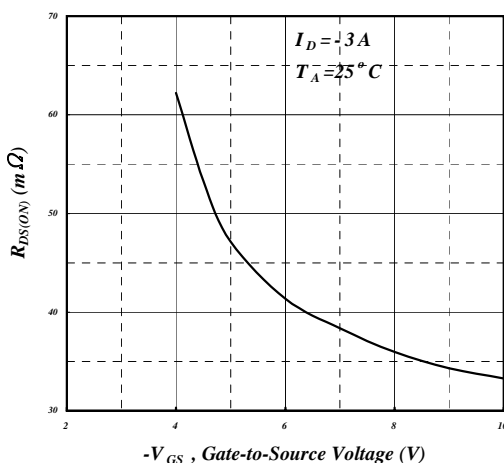


Fig 3. On-Resistance v.s. Gate Voltage

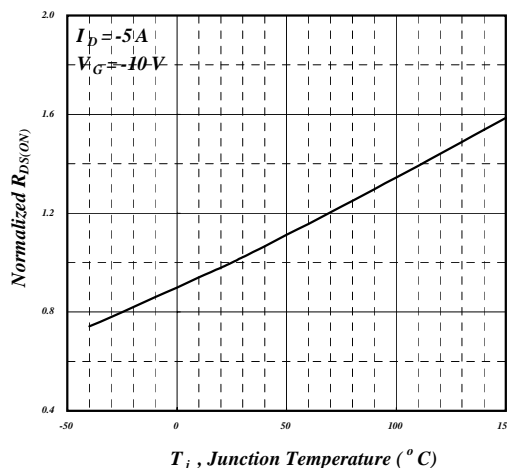


Fig 4. Normalized On-Resistance v.s. Junction Temperature

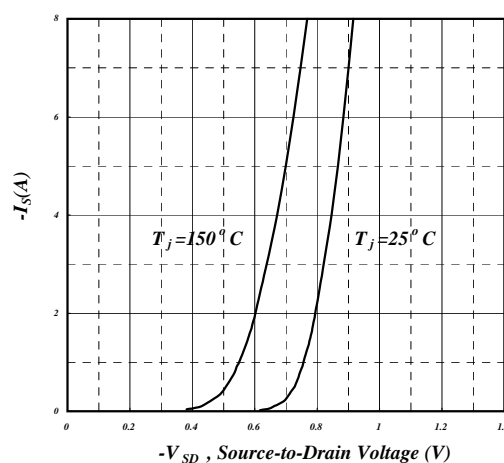


Fig 5. Forward Characteristic of Reverse Diode

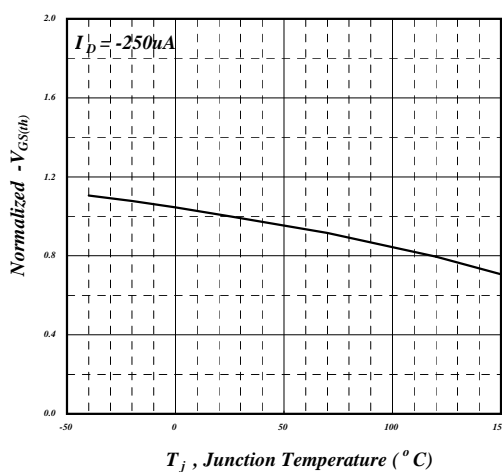


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



P-Channel

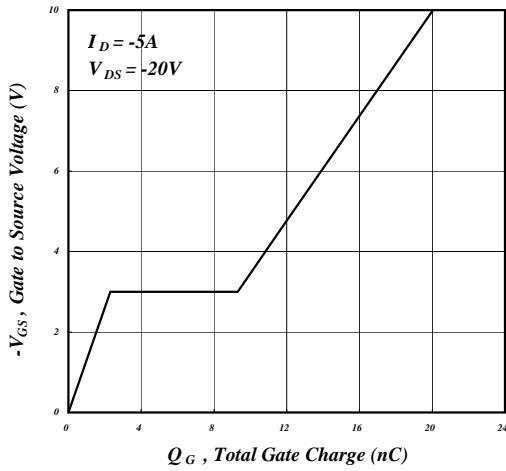


Fig 7. Gate Charge Characteristics

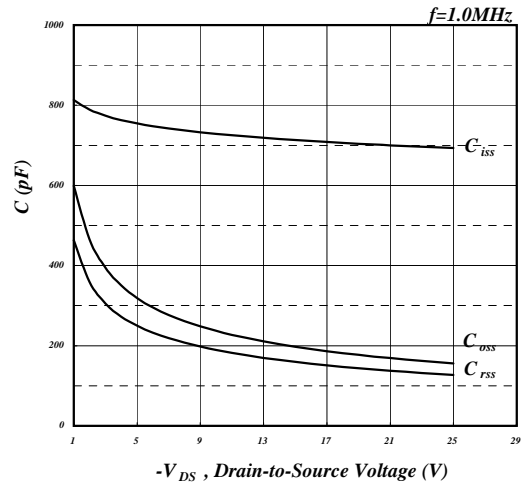


Fig 8. Typical Capacitance Characteristics

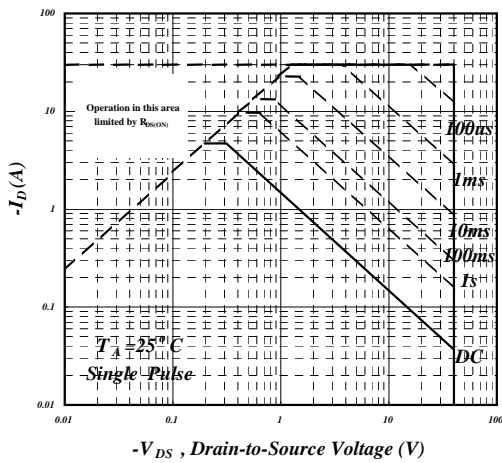


Fig 9. Maximum Safe Operating Area

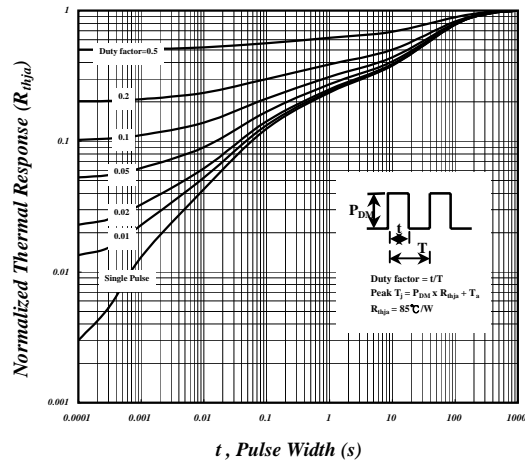


Fig 10. Effective Transient Thermal Impedance

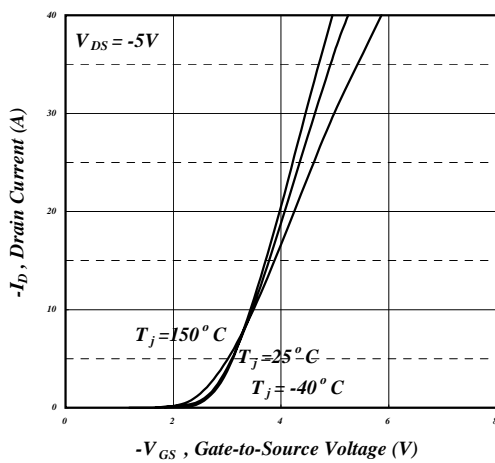


Fig 11. Transfer Characteristics

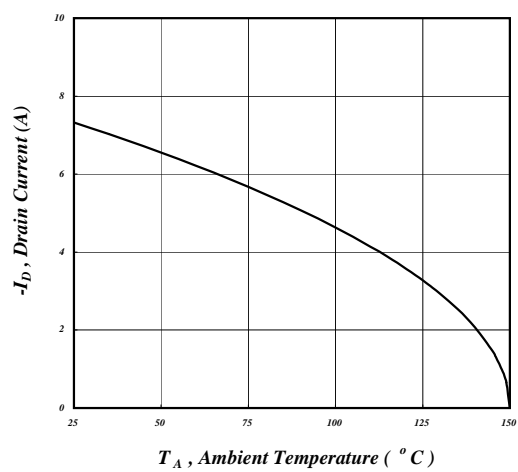


Fig 12. Maximum Continuous Drain Current v.s. Ambient Temperature