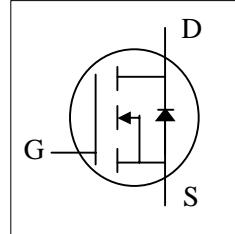
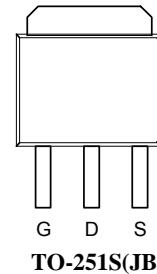




- ▼ Low On-resistance
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	40V
$R_{DS(ON)}$	10mΩ
$I_D$	51A



## Description

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

The TO-251S short lead package is preferred for all commercial-industrial through-hole applications without lead-cutted.

## Absolute Maximum Ratings@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	+20	V
$I_D@T_c=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	51	A
$I_D@T_c=100^\circ\text{C}$	Drain Current, $V_{GS} @ 10\text{V}$	32	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	200	A
$P_D@T_c=25^\circ\text{C}$	Total Power Dissipation	44.6	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_j$	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Value	Units
$R_{thj-c}$	Maximum Thermal Resistance, Junction-case	2.8	°C/W
$R_{thj-a}$	Maximum Thermal Resistance, Junction-ambient	110	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$	40	-	-	V
$\text{R}_{\text{DS(ON)}}$	Static Drain-Source On-Resistance <sup>2</sup>	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=30\text{A}$	-	-	10	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=20\text{A}$	-	-	15	$\text{m}\Omega$
$\text{V}_{\text{GS(th)}}$	Gate Threshold Voltage	$\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_D=250\mu\text{A}$	1	-	3	V
$\text{g}_{\text{fs}}$	Forward Transconductance	$\text{V}_{\text{DS}}=10\text{V}, \text{I}_D=20\text{A}$	-	45	-	S
$\text{I}_{\text{DSS}}$	Drain-Source Leakage Current	$\text{V}_{\text{DS}}=40\text{V}, \text{V}_{\text{GS}}=0\text{V}$	-	-	10	$\text{uA}$
$\text{I}_{\text{GSS}}$	Gate-Source Leakage	$\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
$\text{Q}_{\text{g}}$	Total Gate Charge	$\text{I}_D=20\text{A}$	-	9	14.4	nC
$\text{Q}_{\text{gs}}$	Gate-Source Charge		-	2	-	nC
$\text{Q}_{\text{gd}}$	Gate-Drain ("Miller") Charge		-	6	-	nC
$t_{\text{d(on)}}$	Turn-on Delay Time	$\text{V}_{\text{DS}}=20\text{V}$	-	6.5	-	ns
$t_{\text{r}}$	Rise Time	$\text{I}_D=1\text{A}$	-	6.5	-	ns
$t_{\text{d(off)}}$	Turn-off Delay Time	$\text{R}_G=3.3\Omega$	-	20	-	ns
$t_{\text{f}}$	Fall Time	$\text{V}_{\text{GS}}=10\text{V}$	-	10	-	ns
$\text{C}_{\text{iss}}$	Input Capacitance	$\text{V}_{\text{GS}}=0\text{V}$	-	680	1080	pF
$\text{C}_{\text{oss}}$	Output Capacitance		-	160	-	pF
$\text{C}_{\text{rss}}$	Reverse Transfer Capacitance	f=1.0MHz	-	95	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$\text{V}_{\text{SD}}$	Forward On Voltage <sup>2</sup>	$\text{I}_S=20\text{A}, \text{V}_{\text{GS}}=0\text{V}$	-	-	1.2	V
$t_{\text{rr}}$	Reverse Recovery Time	$\text{I}_S=10\text{A}, \text{V}_{\text{GS}}=0\text{V},$ $d\text{I}/dt=100\text{A}/\mu\text{s}$	-	22	-	ns
			-	16	-	nC

**Notes:**

- 1.Pulse width limited by max. junction temperature
- 2.Pulse test

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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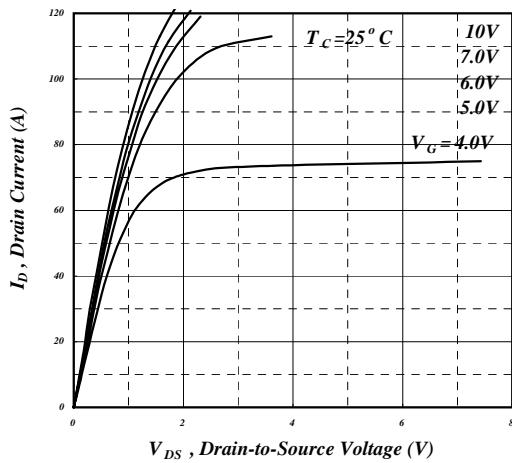


Fig 1. Typical Output Characteristics

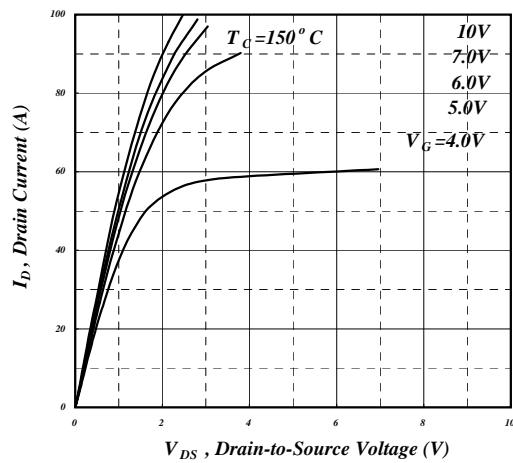


Fig 2. Typical Output Characteristics

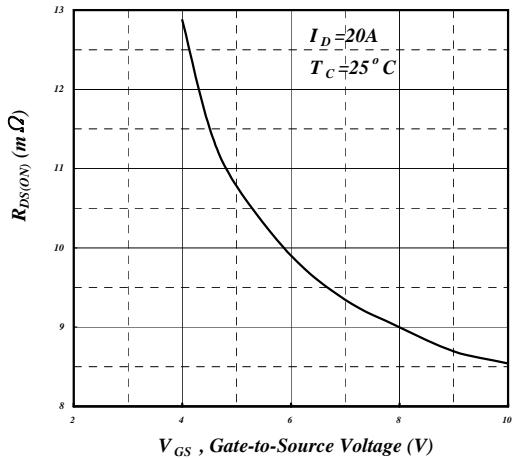


Fig 3. On-Resistance v.s. Gate Voltage

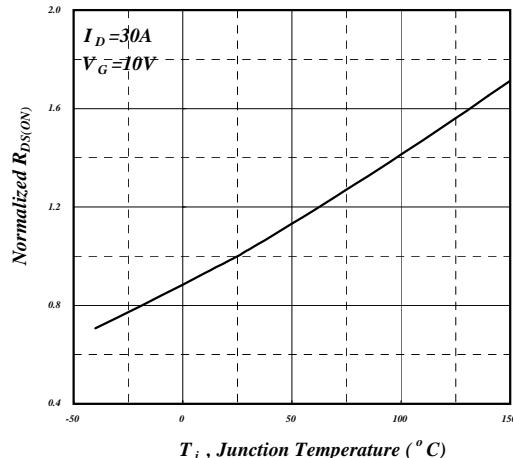


Fig 4. Normalized On-Resistance v.s. Junction Temperature

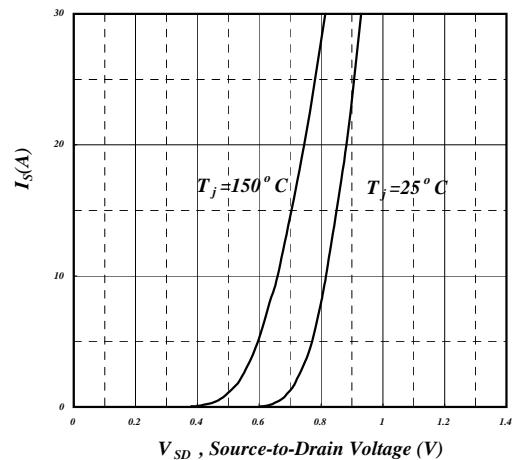


Fig 5. Forward Characteristic of Reverse Diode

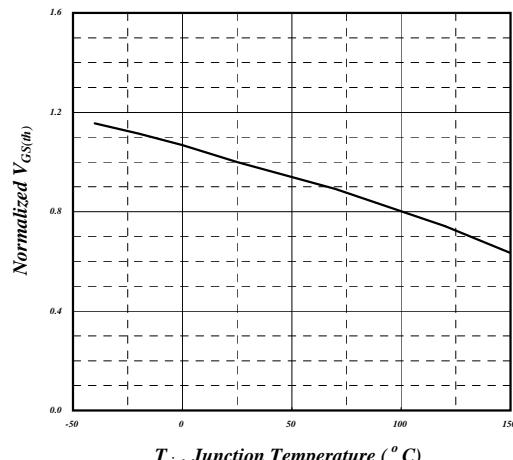
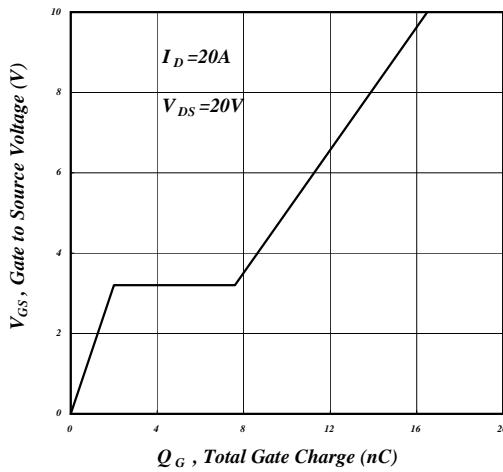
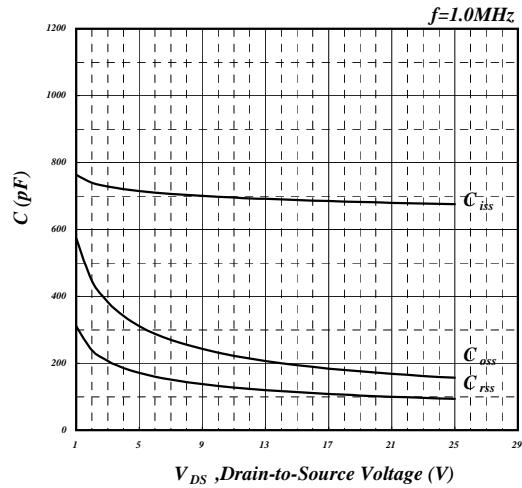


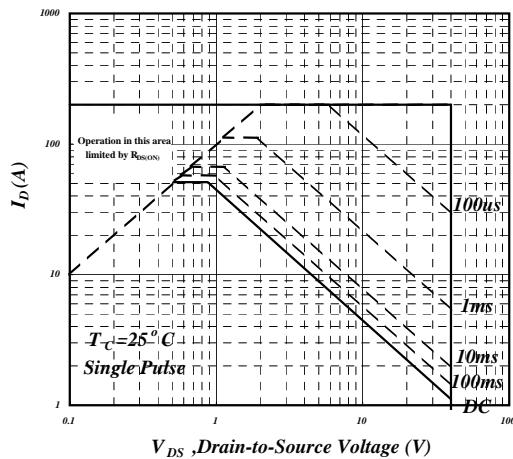
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



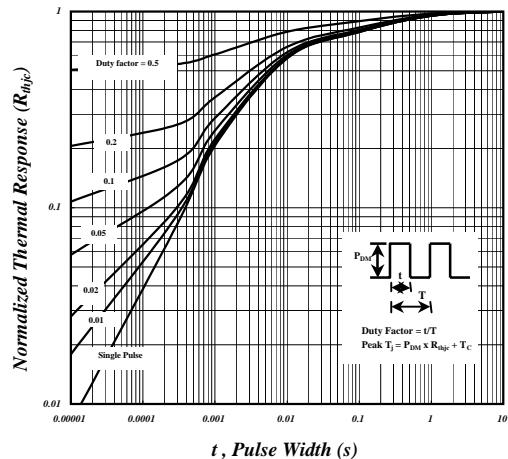
**Fig 7. Gate Charge Characteristics**



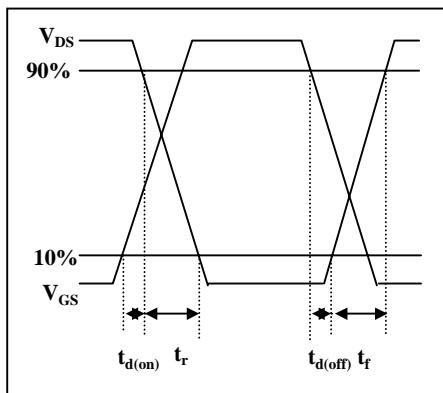
**Fig 8. Typical Capacitance Characteristics**



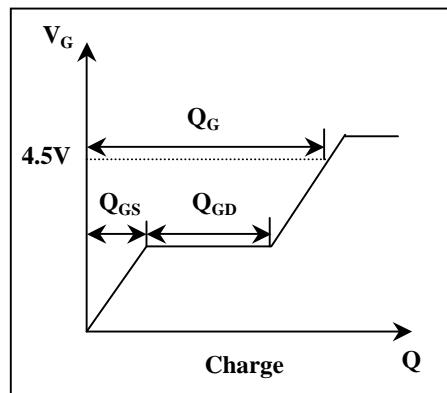
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**



AP0904GJB-HF

## MARKING INFORMATION

