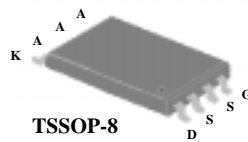


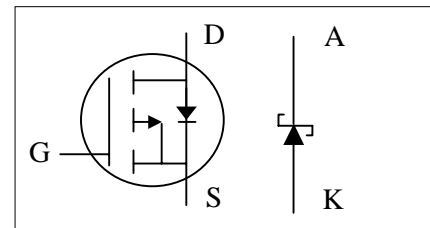
- ▼ Low On-Resistance
- ▼ Fast Switching Characteristic
- ▼ Included Schottky Diode



$BV_{DSS}$	-20V
$R_{DS(ON)}$	50m $\Omega$
$I_D$	-3.5A

## Description

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



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage (MOSFET and Schottky)	-20	V
$V_{KA}$	Reverse Voltage (Schottky)	20	V
$V_{GS}$	Gate-Source Voltage (MOSFET)	$\pm 12$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current <sup>3</sup> (MOSFET)	- 3.5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current <sup>3</sup> (MOSFET)	- 2.8	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup> (MOSFET)	- 30	A
$I_F$	Average Forward Current (Schottky)	1	A
$I_{FM}$	Pulsed Forward Current <sup>1</sup> (Schottky)	25	A
$P_D@T_A=25^\circ C$	Total Power Dissipation (MOSFET)	1	W
	Total Power Dissipation (Schottky)	1	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 125	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Unit
$R_{thj-a}$	Thermal Resistance Junction-ambient <sup>3</sup> (MOSFET) Max.	125	$^\circ C/W$
	Thermal Resistance Junction-ambient <sup>3</sup> (Schottky) Max.	125	$^\circ C/W$


**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	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	-	0.03	-	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-4.5V, I_D=-3.5A$	-	-	50	$m\Omega$
		$V_{GS}=-2.5V, I_D=-2.7A$	-	-	85	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-	-	V
$g_{fs}$	Forward Transconductance	$V_{DS}=-10V, I_D=-3.5A$	-	10	-	S
$I_{DSS}$	Drain-Source Leakage Current ( $T_j=25^\circ\text{C}$ )	$V_{DS}=-20V, V_{GS}=0V$	-	-	1	$\mu A$
	Drain-Source Leakage Current ( $T_j=70^\circ\text{C}$ )	$V_{DS}=-16V, V_{GS}=0V$	-	-	25	$\mu A$
$I_{GSS}$	Gate-Source Leakage	$V_{GS}=\pm 12V$	-	-	$\pm 100$	nA
$Q_g$	Total Gate Charge <sup>2</sup>	$I_D=-3.5A$	-	15.6	-	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=-10V$	-	2.1	-	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$V_{GS}=-4.5V$	-	5.2	-	nC
$t_{d(on)}$	Turn-on Delay Time <sup>2</sup>	$V_{DS}=-10V$	-	8.2	-	ns
$t_r$	Rise Time	$I_D=-1A$	-	9.4	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega, V_{GS}=-4.5V$	-	66.4	-	ns
$t_f$	Fall Time	$R_D=10\Omega$	-	48	-	ns
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	-	660	-	pF
$C_{oss}$	Output Capacitance	$V_{DS}=-20V$	-	285	-	pF
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	130	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current ( Body Diode )	$V_D=V_G=0V, V_S=-1.2V$	-	-	-0.83	A
$V_{SD}$	Forward On Voltage <sup>2</sup>	$I_S=-0.83A, V_{GS}=0V$	-	-	-1.2	V

**Schottky Characteristics @  $T_j=25^\circ\text{C}$** 

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_F$	Forward Voltage Drop	$I_F=1A$	-	-	0.5	V
$I_{rm}$	Maximum Reverse Leakage Current	$V_r=20V$	-	-	100	$\mu A$

**Notes:**

1. Pulse width limited by Max. junction temperature.
2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Surface mounted on  $1\text{ in}^2$  copper pad of FR4 board ;  $208^\circ\text{C}/\text{W}$  when mounted on Min. copper pad.



MOSFET

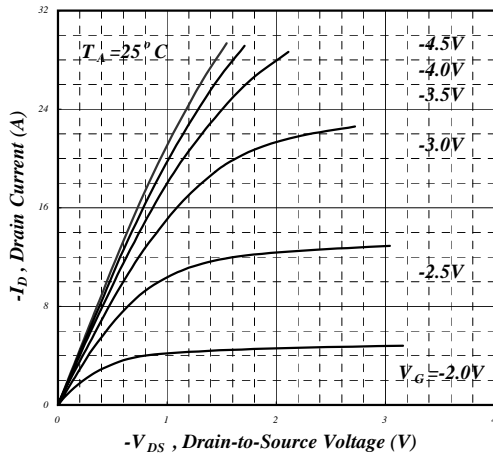


Fig 1. Typical Output Characteristics

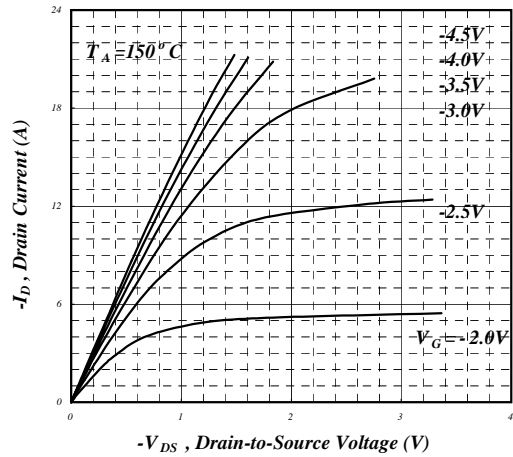


Fig 2. Typical Output Characteristics

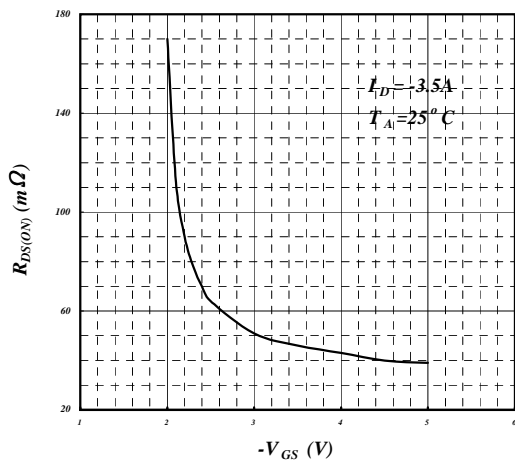


Fig 3. On-Resistance v.s. Gate Voltage

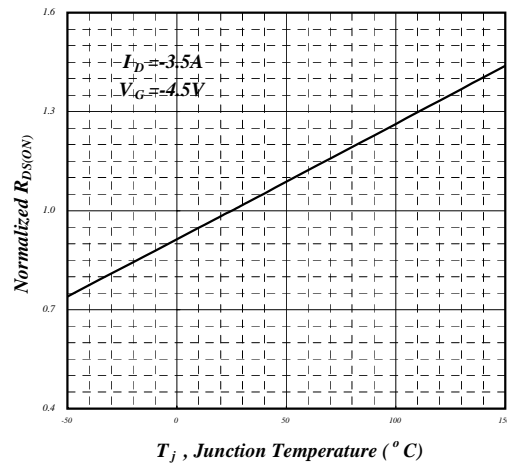


Fig 4. Normalized On-Resistance v.s. Junction Temperature

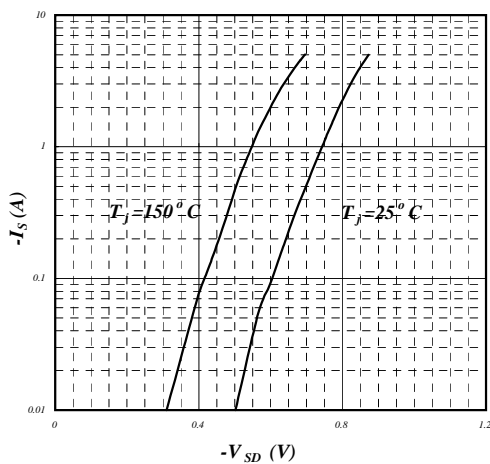


Fig 5. Forward Characteristic of Reverse Diode

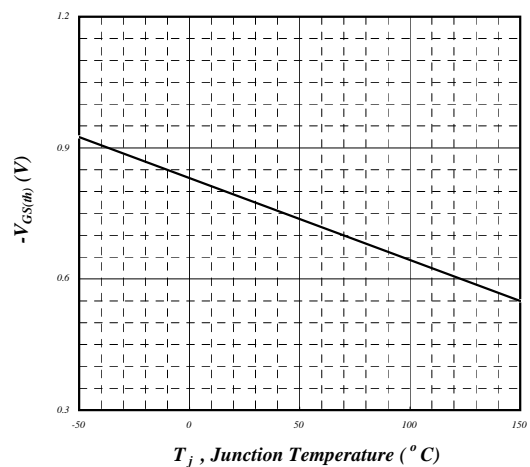


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

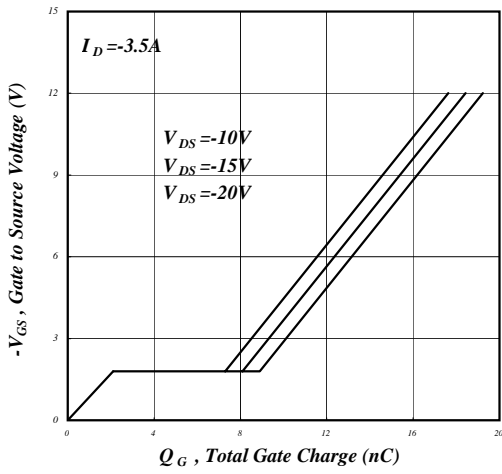


Fig 7. Gate Charge Characteristics

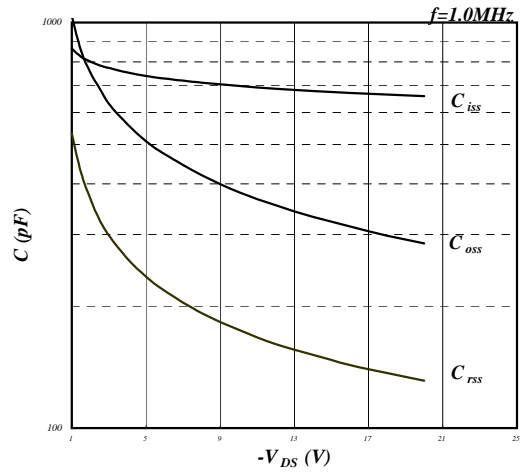


Fig 8. Typical Capacitance Characteristics

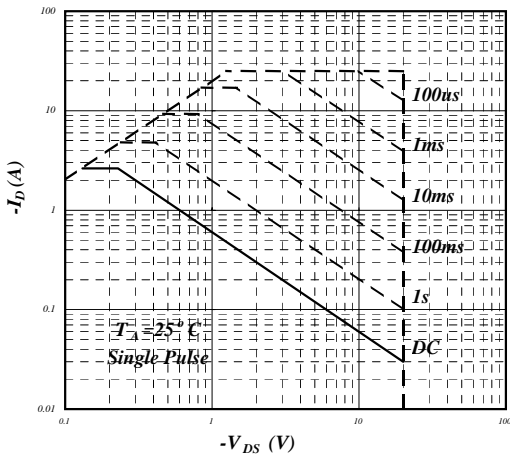


Fig 9. Maximum Safe Operating Area

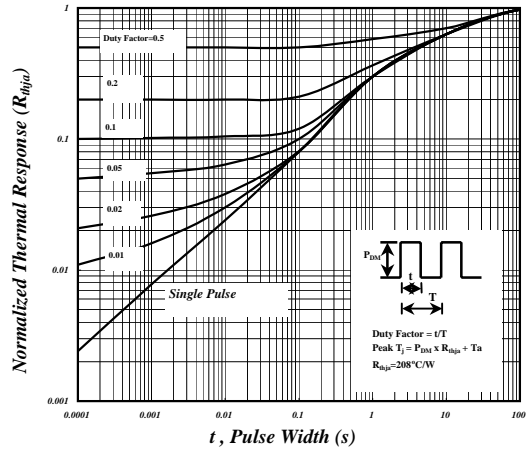


Fig 10. Effective Transient Thermal Impedance

SCHOTTKY DIODE

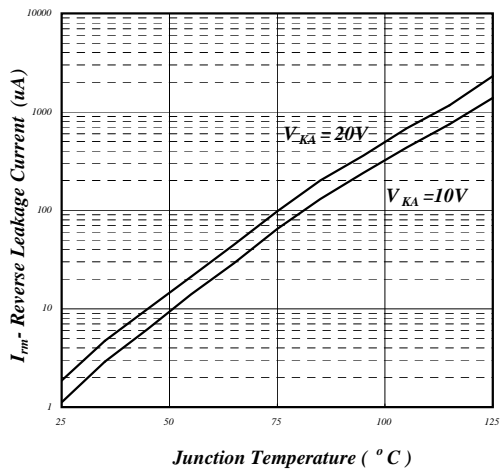


Fig 1. Reverse Leakage Current v.s. Junction Temperature

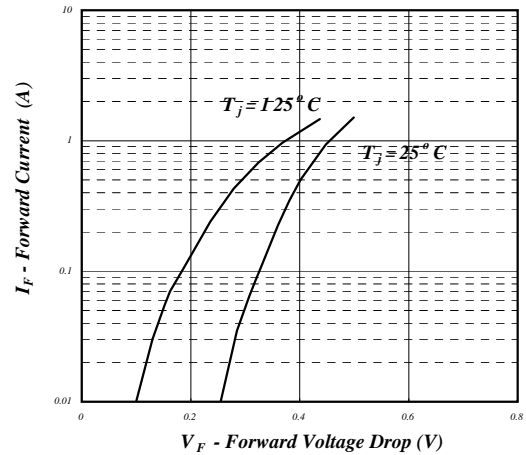


Fig 2. Forward Voltage Drop