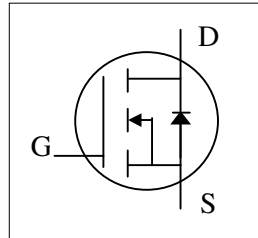




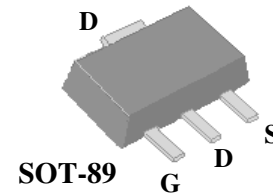
- ▼ Lower gate charge
- ▼ Capable of 2.5V gate drive
- ▼ Single Drive Requirement
- ▼ RoHS Compliant



$BV_{DSS}$	20V
$R_{DS(ON)}$	50m $\Omega$
$I_D$	4A

## Description

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	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 16$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^3$	4	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^3$	2.5	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	12	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation	1.25	W
	Linear Derating Factor	0.01	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	100	$^\circ C/W$



## Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	-	-	V
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	-	0.03	-	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A	-	-	38	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	-	-	50	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A	-	-	80	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.5	-	1.5	V
g <sub>fs</sub>	Forward Transconductance <sup>2</sup>	V <sub>DS</sub> =5V, I <sub>D</sub> =3A	-	10	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	uA
	Drain-Source Leakage Current (T <sub>j</sub> =70°C)	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V	-	-	25	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> = ±16V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	I <sub>D</sub> =4A	-	6	10	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =16V	-	1	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	2	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>2</sup>	V <sub>DS</sub> =10V	-	8	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =1A	-	9	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =5V	-	13	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =10Ω	-	3	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	360	570	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =20V	-	80	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	65	-	pF

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time <sup>2</sup>	I <sub>S</sub> =4A, V <sub>GS</sub> =0V, dI/dt=100A/μs	-	18	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	10	-	nC

### Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mount on FR4 board, t ≤ 10s.

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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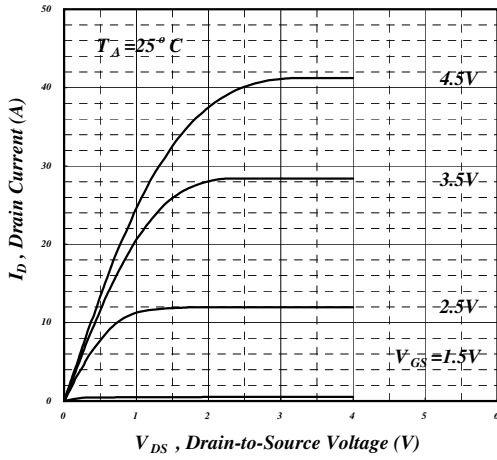


Fig 1. Typical Output Characteristics

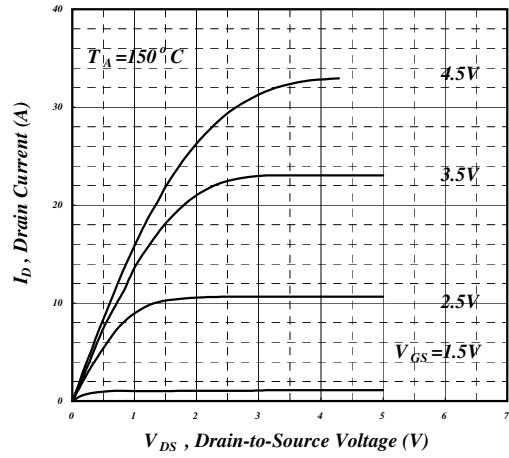


Fig 2. Typical Output Characteristics

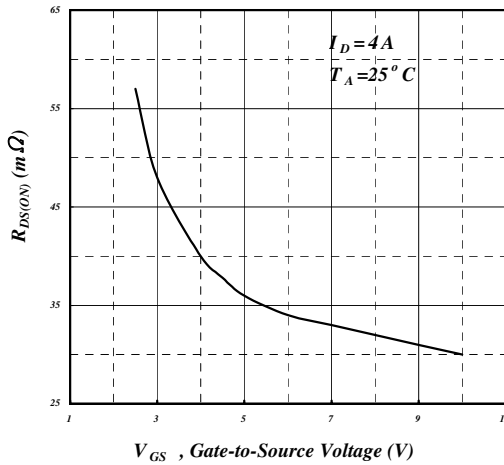


Fig 3. On-Resistance v.s. Gate Voltage

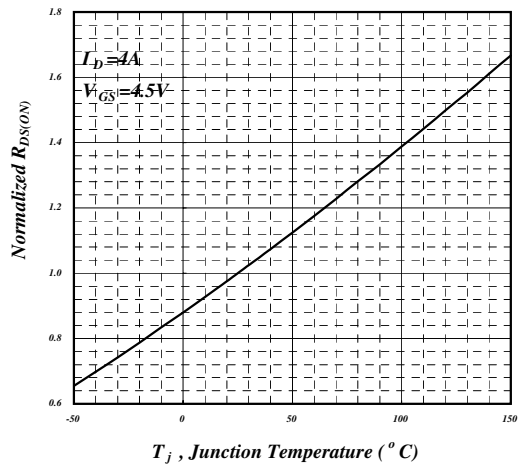


Fig 4. Normalized On-Resistance v.s. Junction Temperature

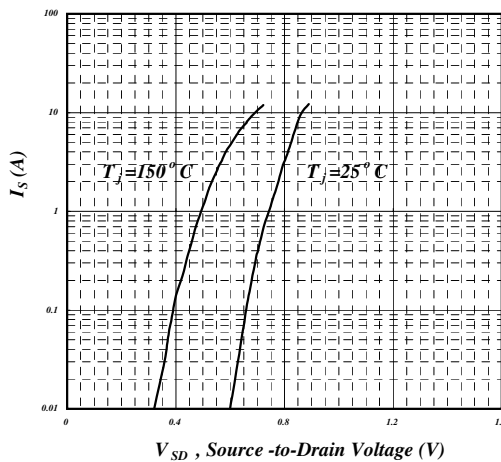


Fig 5. Forward Characteristic of Reverse Diode

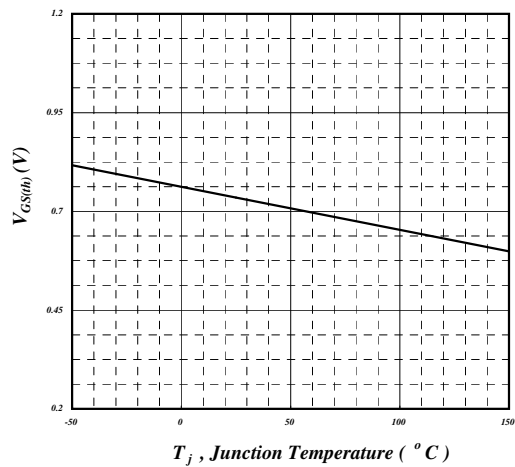
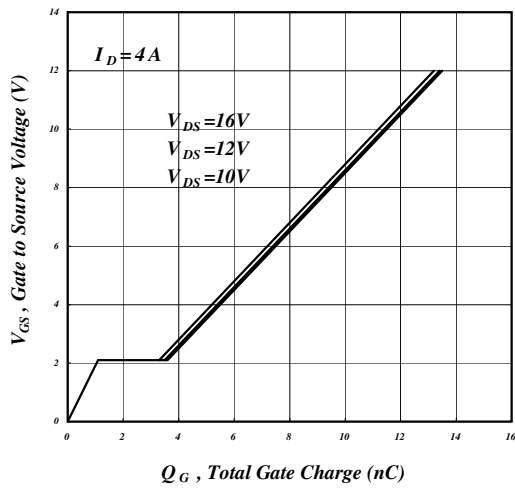
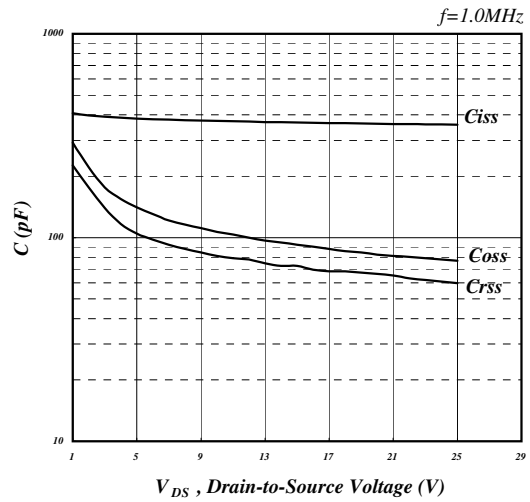


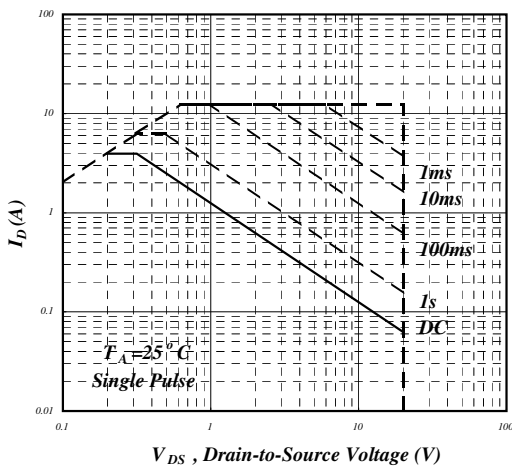
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



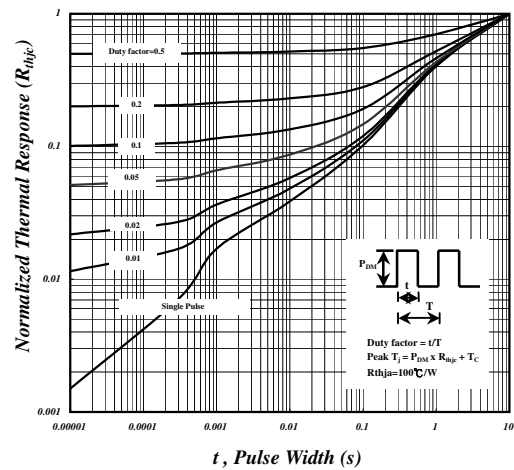
**Fig 7. Gate Charge Characteristics**



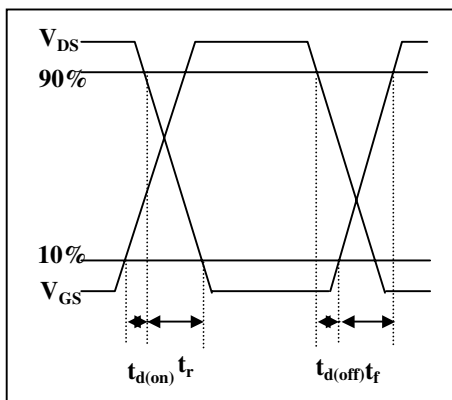
**Fig 8. Typical Capacitance Characteristics**



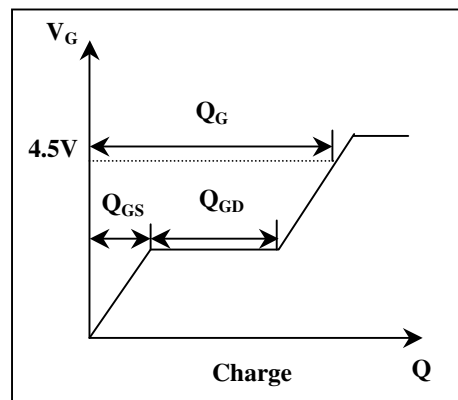
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



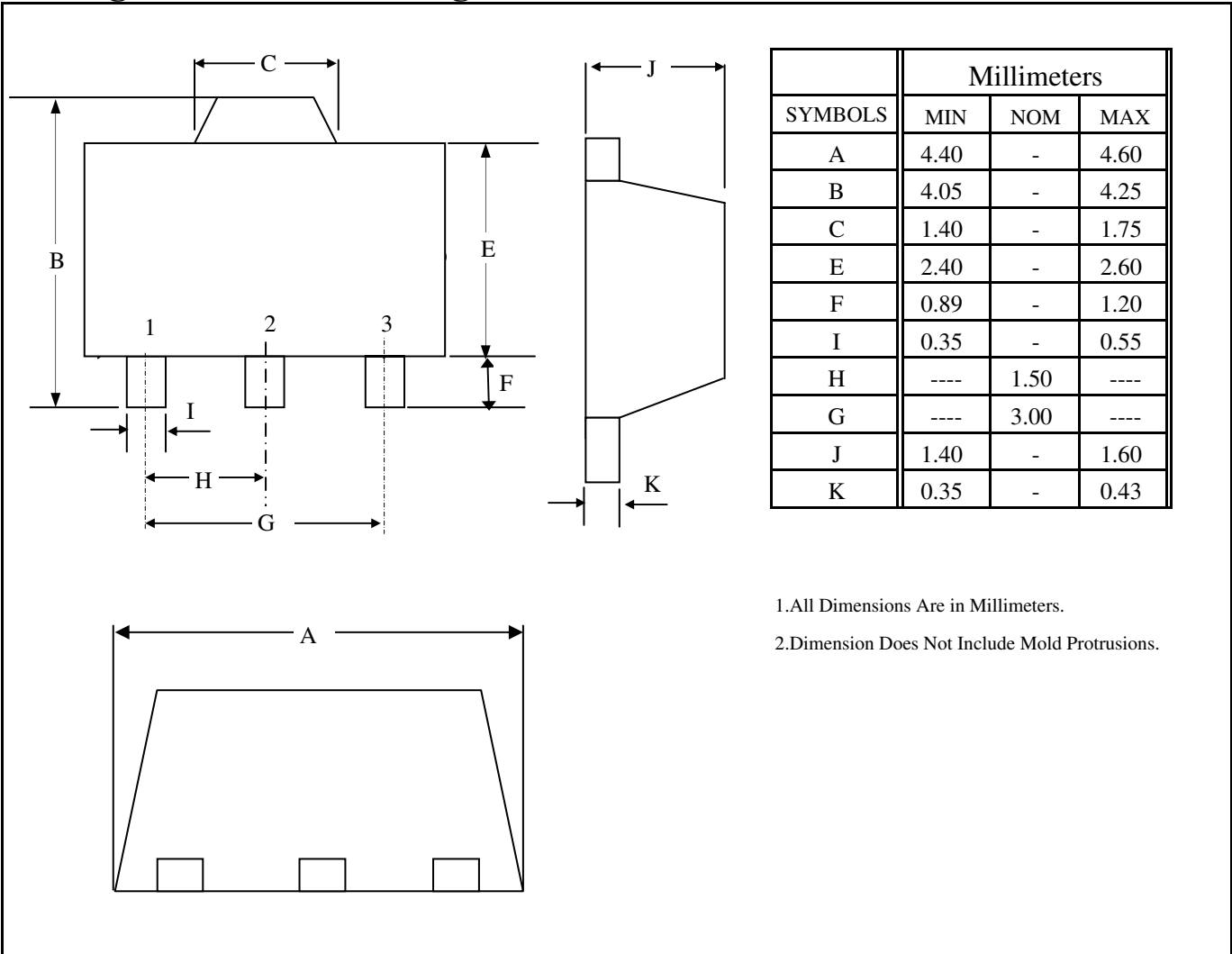
**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**



**Package Outline & Packing : SOT-89**



**Part Marking Information : SOT-89**

