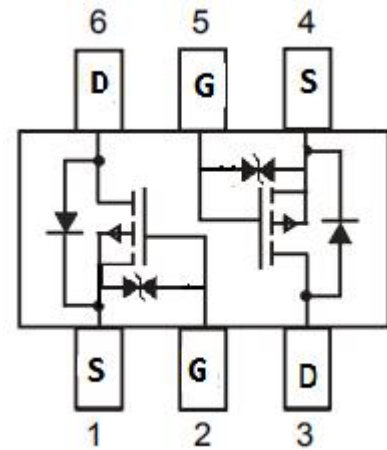
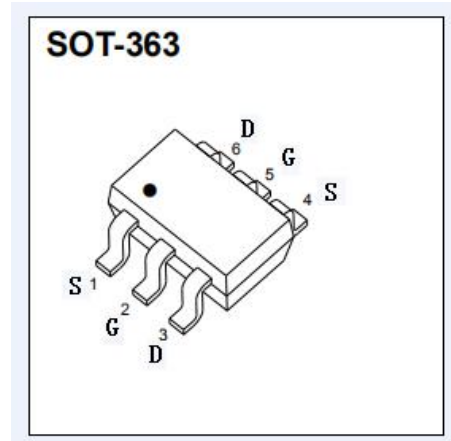


### Plastic-Encapsulate MOSFETS

**P-CHANNEL ENHANCEMENT MODE MOSFET**  
**Features**

- Low On-Resistance
  - Low Gate Threshold Voltage
  - Low Input Capacitance
  - Fast Switching Speed
  - Low Input/Output Leakage
  - Lead Free By Design/RoHS Compliant (Note 2)
  - ESD Protected Up To 2kV
- Marking Code: PA1



### Maximum Ratings

@ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Units
Drain-Source Voltage	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 6$	V
Drain Current (Note 1) Steady State	$I_D$	$T_A = 25^\circ\text{C}$	A
Pulsed		$T_A = 85^\circ\text{C}$	
Drain Current	$I_{DM}$	-6	A

### Thermal Characteristics

@ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 1)	$P_D$	0.27	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	461	$^\circ\text{C}/\text{W}$
Notes: Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

1. Device mounted on FR-4 PCB.
2. No purposefully added lead.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	-	-	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	$I_{DSS}$	-	-	-100	nA	$V_{DS} = -20V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 2.0$	$\mu A$	$V_{GS} = \pm 4.5V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 4)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	0.5	0.7	$\Omega$	$V_{GS} = -4.5V, I_D = -350mA$
			0.7	0.9		$V_{GS} = -2.5V, I_D = -300mA$
			1.0	1.3		$V_{GS} = -1.8V, I_D = -150mA$
Forward Transfer Admittance	$ Y_{fs} $	-	0.9	-	S	$V_{DS} = -10V, I_D = -250mA$
Diode Forward Voltage (Note 4)	$V_{SD}$		-0.8	-1.2	V	$V_{GS} = 0V, I_S = -150mA$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	-	59.76	-	pF	$V_{DS} = -16V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	12.07	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	6.36	-	pF	
Total Gate Charge	$Q_g$	-	622.4	-	pC	$V_{GS} = -4.5V, V_{DS} = -10V,$ $I_D = -250mA$
Gate-Source Charge	$Q_{gs}$	-	100.3	-	pC	
Gate-Drain Charge	$Q_{gd}$	-	132.2	-	pC	
Turn-On Delay Time	$t_{D(on)}$	-	5.1	-	ns	$V_{DD} = -10V, V_{GS} = -4.5V,$ $R_L = 47\Omega, R_G = 10\Omega,$ $I_D = -200mA$
Turn-On Rise Time	$t_r$	-	8.1	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	28.4	-	ns	
Turn-Off Fall Time	$t_f$	-	20.7	-	ns	

Notes: 4. Short duration pulse test used to minimize self-heating effect.

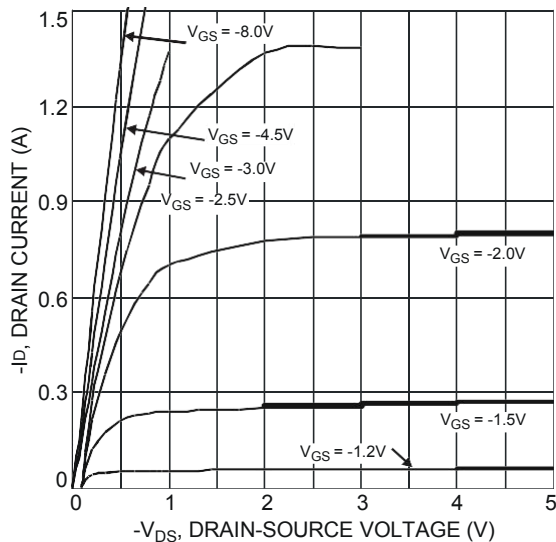


Fig. 1 Typical Output Characteristic

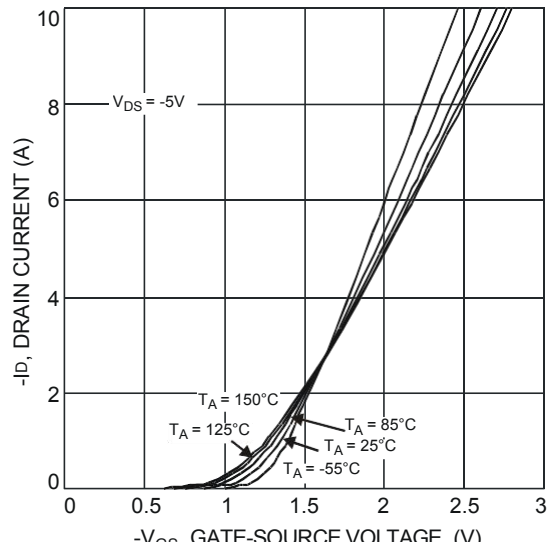
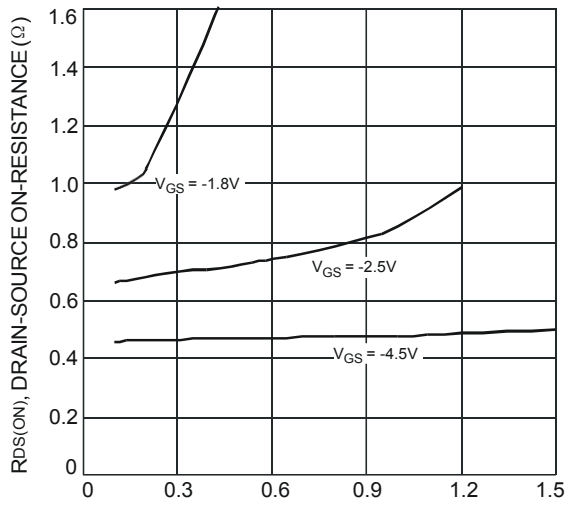
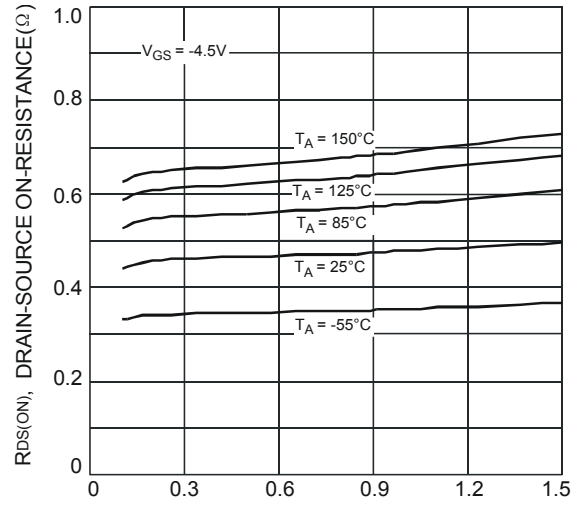


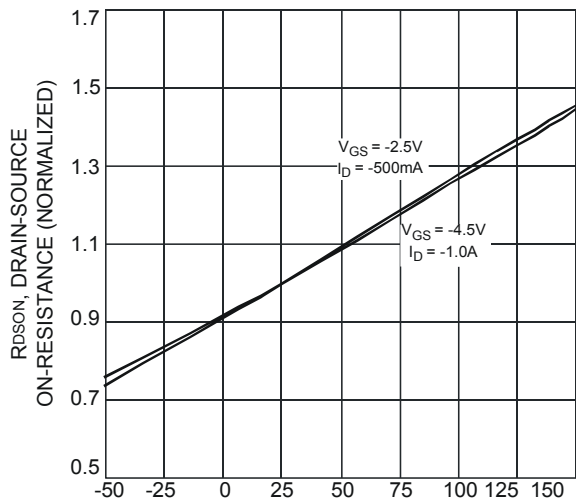
Fig. 2 Typical Transfer Characteristic



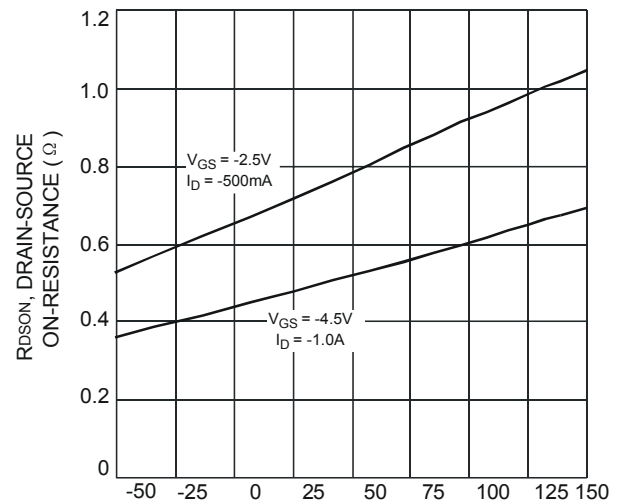
-ID, DRAIN-SOURCE CURRENT (A)  
Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage



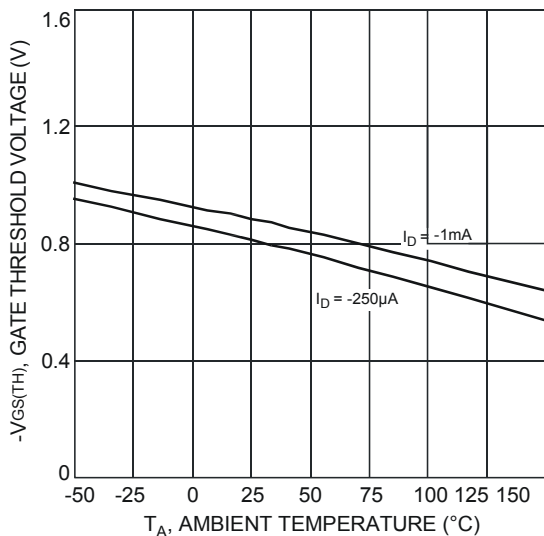
-ID, DRAIN CURRENT (A)  
Fig. 4 Typical On-Resistance vs. Drain Current and Temperature



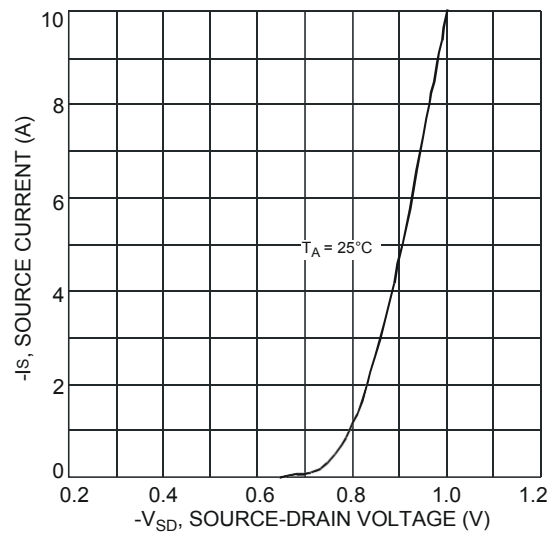
TA, AMBIENT TEMPERATURE (°C)  
Fig. 5 On-Resistance Variation with Temperature



TA, AMBIENT TEMPERATURE (°C)  
Fig. 6 On-Resistance Variation with Temperature



TA, AMBIENT TEMPERATURE (°C)  
Fig. 7 Gate Threshold Variation vs. Ambient Temperature



-VSD, SOURCE-DRAIN VOLTAGE (V)  
Fig. 8 Diode Forward Voltage vs. Current

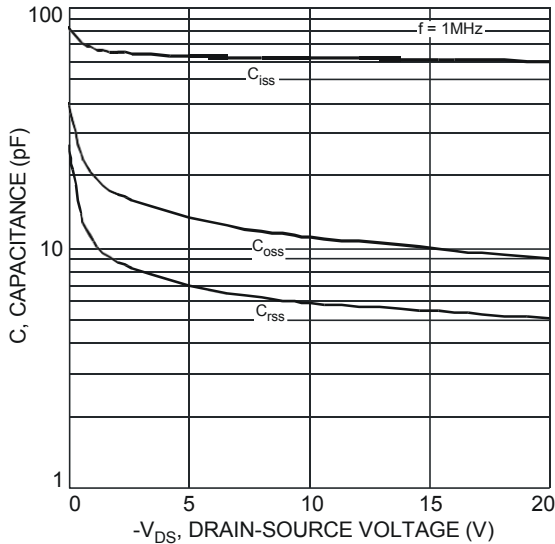


Fig. 9 Typical Total Capacitance

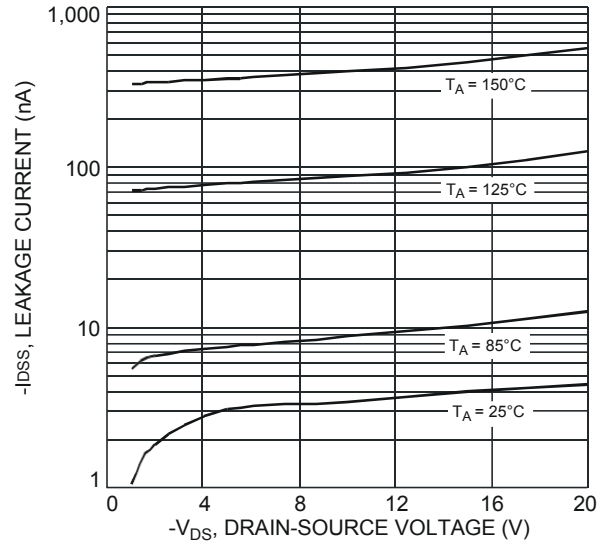


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

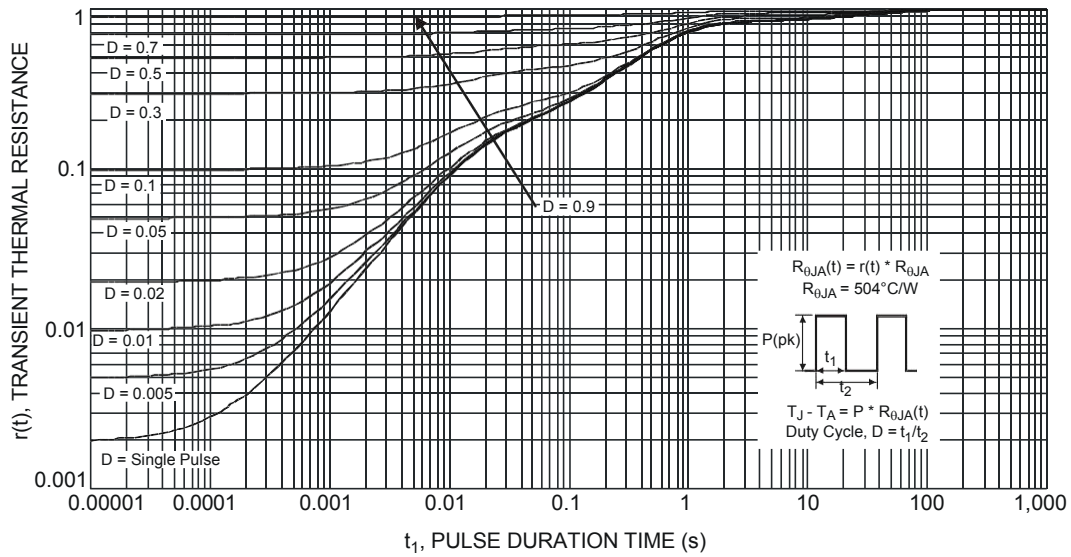
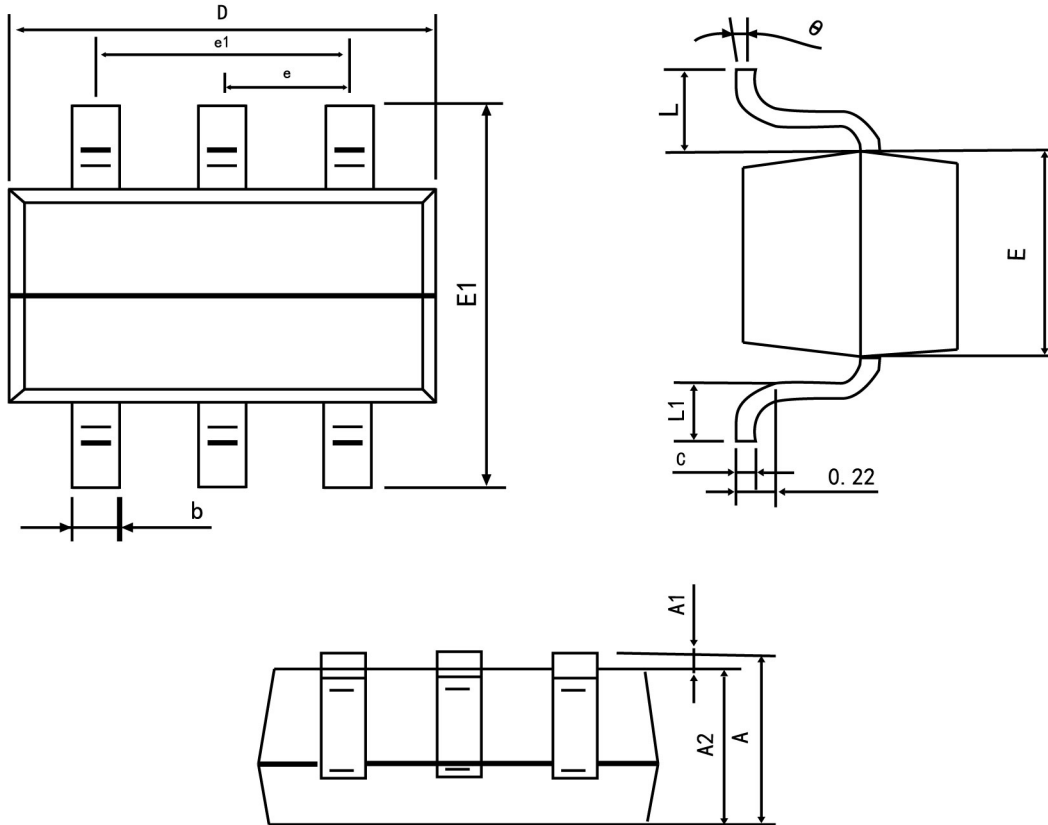


Fig. 11 Transient Thermal Response



### SOT-363-Package Outline Dimensions



Symbol	Dimension in Millimeters	
	Min	Max
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.650 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
θ	0°	8°