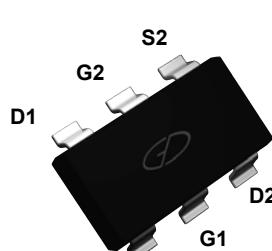
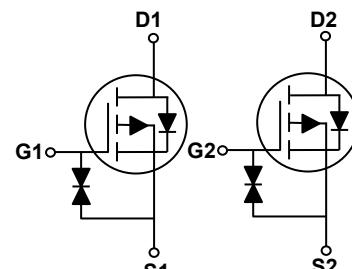


### Main Product Characteristics

$BV_{DSS}$	-50V
$R_{DS(ON)}$	2.6Ω @ -10V (Typ)
	3.2Ω @ -4.5V (Typ)
$I_D$	-0.18A



SOT-363



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The GSFK0501E utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	-50	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	-0.18	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		-0.14	
Drain Current-Pulsed ( $T_A=25^\circ\text{C}$ ) <sup>1</sup>	$I_{DM}$	-1.2	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	0.3	W
Power Dissipation ( $T_A=70^\circ\text{C}$ )		0.24	W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	400	°C/W
Operating Junction Temperature Range	$T_J$	-50 To +150	°C
Storage Temperature Range	$T_{STG}$	-50 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=-250\mu\text{A}$	-50	-	-	V
Zero Gate Voltage Drain Current, $T_A=25^\circ\text{C}$	$I_{\text{DSS}}$	$V_{\text{DS}}=-50\text{V}, V_{\text{GS}}=0\text{V}$	-	-	-1	$\mu\text{A}$
Zero Gate Voltage Drain Current, $T_A=125^\circ\text{C}$		$V_{\text{DS}}=-40\text{V}, V_{\text{GS}}=0\text{V}$	-	-	-100	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm10$	$\mu\text{A}$
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=-250\mu\text{A}$	-1.0	-2.0	-3.0	V
Drain-Source On-State Resistance <sup>2</sup>	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=-10\text{V}, I_D=-0.15\text{A}$	-	2.6	4	$\Omega$
		$V_{\text{GS}}=-4.5\text{V}, I_D=-0.15\text{A}$	-	3.2	6	$\Omega$
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{\text{DS}}=-30\text{V}, V_{\text{GS}}=-10\text{V}, I_D=-0.2\text{A}$	-	0.53	-	nC
Gate-Source Charge	$Q_{\text{gs}}$		-	0.14	-	
Gate-Drain Charge	$Q_{\text{gd}}$		-	0.1	-	
Turn-On Delay Time	$T_{\text{d}(\text{on})}$	$V_{\text{DD}}=-30\text{V}, V_{\text{GS}}=-10\text{V}, R_G=3.3\Omega, I_D=-0.1\text{A}$	-	1.6	-	nS
Rise Time	$T_r$		-	5.2	-	
Turn-Off Delay Time	$T_{\text{d}(\text{off})}$		-	12	-	
Fall Time	$T_f$		-	6.1	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=-25\text{V}, V_{\text{GS}}=0\text{V}, f=1\text{MHz}$	-	25.2	-	pF
Output Capacitance	$C_{\text{oss}}$		-	5.9	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	1.4	-	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Source Drain Current (Body Diode)	$I_{\text{SD}}$	$T_A=25^\circ\text{C}$	-	-	-0.18	A
Diode Forward Voltage <sup>2</sup>	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{SD}}=-0.1\text{A}, T_J=25^\circ\text{C}$	-	-	-1.2	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .

## Typical Electrical and Thermal Characteristic Curves

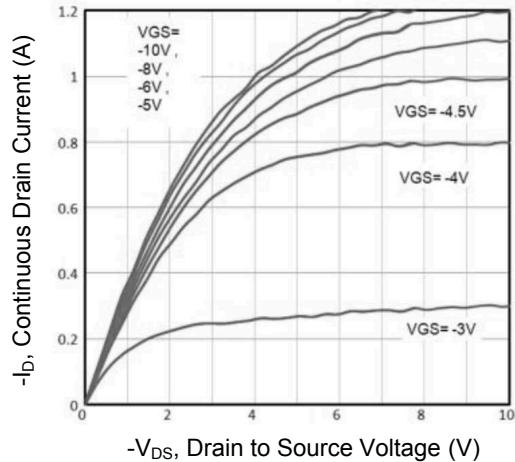


Figure 1. Typical Output Characteristics

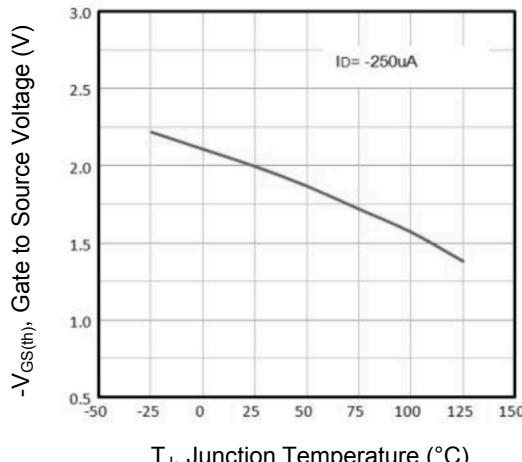


Figure 2. Normalized Threshold Voltage vs.  $T_J$

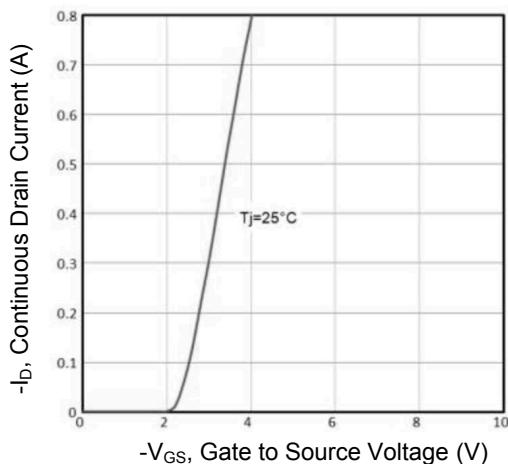


Figure 3. Typical Transfer Characteristics

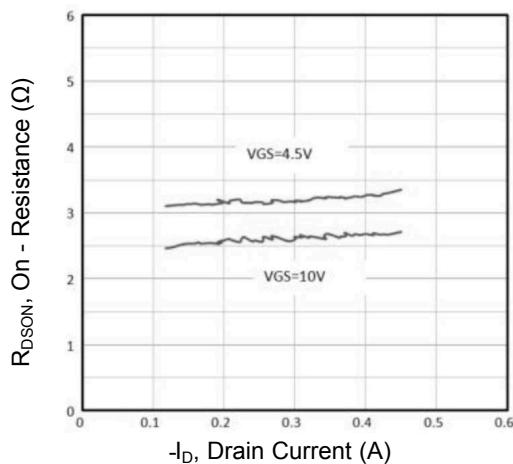


Figure 4. On-Resistance vs. Drain Current

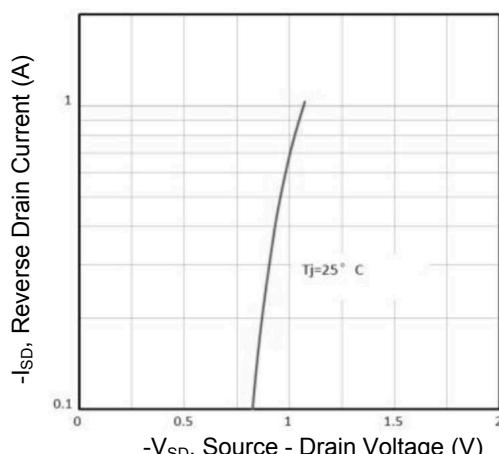


Figure 5. Typical Source - Drain Diode Forward Voltage

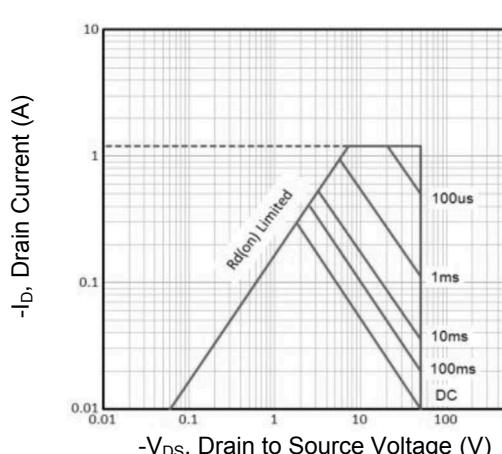


Figure 6. Maximum Safe Operating Area

## Typical Electrical and Thermal Characteristic Curves

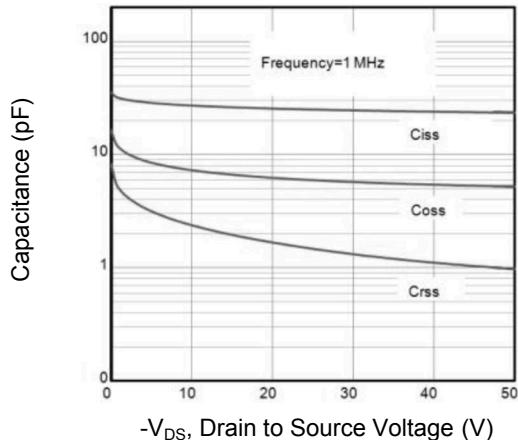


Figure 7. Typical Capacitance vs. Drain - Source Voltage

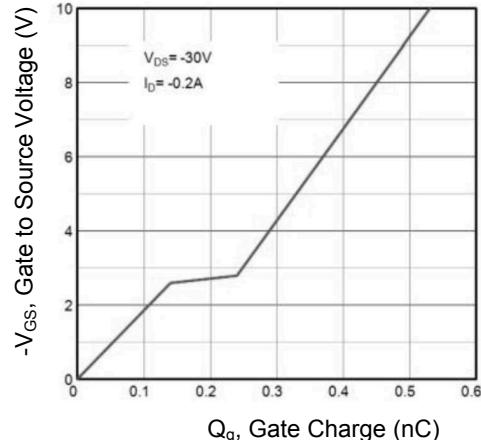


Figure 8. Gate Charge Characteristics

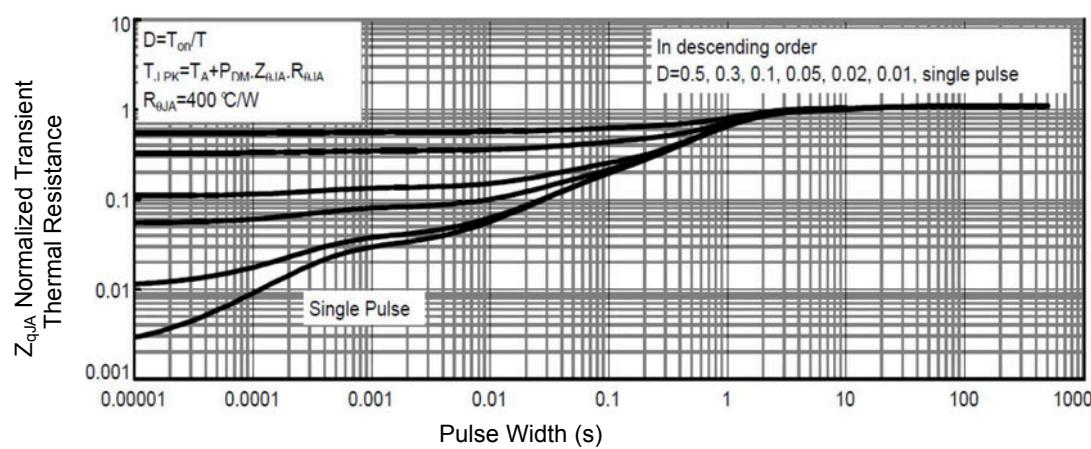


Figure 9. Normalized Maximum Transient Thermal Impedance

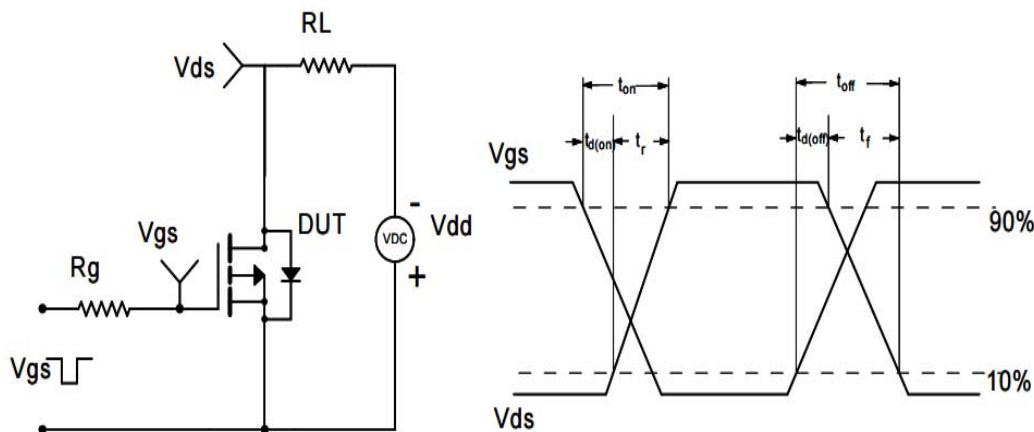
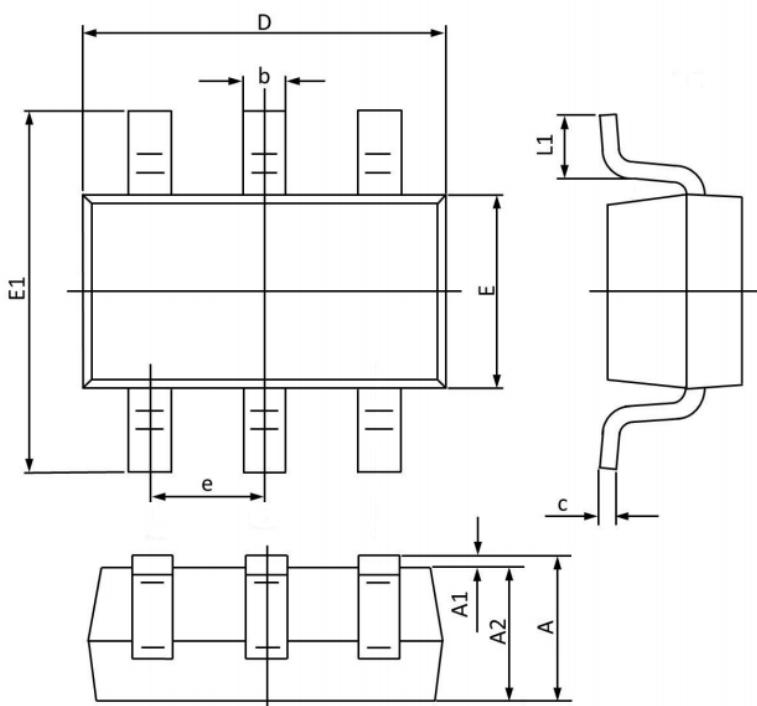


Figure 10. Switching Time Test Circuit and Waveforms

## Package Outline Dimensions SOT-363



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.100	0.330	0.004	0.013
c	0.100	0.250	0.004	0.010
D	1.800	2.200	0.071	0.087
E	1.150	1.350	0.045	0.053
E1	1.800	2.400	0.071	0.094
e	0.65 BSC		0.026 BSC	
L1	0.100	0.350	0.004	0.014

## Order Information

Device	Package	Marking Code	Quantity	HSF Status
GSKF0501E	SOT-363	84K	3000 pcs / Reel	RoHS Compliant