

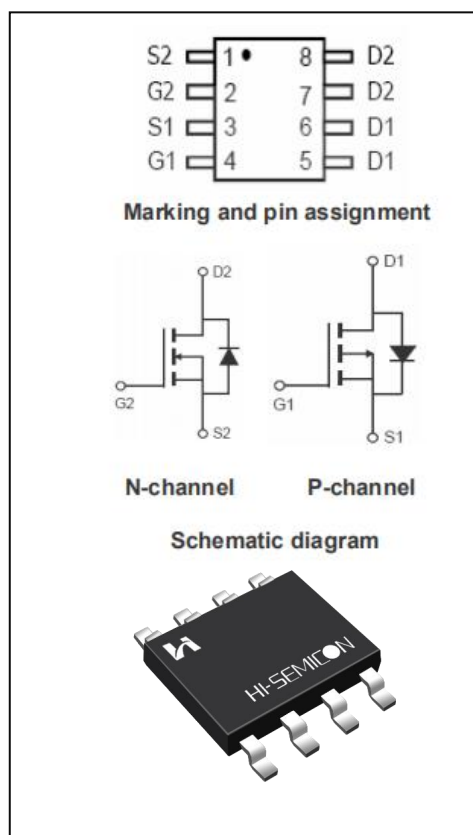
N AND P-CHANNEL MOSFET

GENERAL DESCRIPTION

The SFS4525T uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

FEATURES

- ◆ N-CHANNEL
 - $V_{DS}=40V, I_D=8A$
 - $R_{DS(ON)}=15.0m\Omega(TYP@V_{GS}=10V)$
 - $R_{DS(ON)}=18.7m\Omega(TYP@V_{GS}=4.5V)$
- ◆ P-CHANNEL
 - $V_{DS}=-40V, I_D=-7A$
 - $R_{DS(ON)}=29.0m\Omega(TYP@V_{GS}=-10V)$
 - $R_{DS(ON)}=38.2m\Omega(TYP@V_{GS}=-4.5V)$
- ◆ High density cell design for ultra low R_{dson}
- ◆ Social process technology for high ESD capability
- ◆ Exceptional on-resistance and maximum DC Cueentcapability



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFS4525T	SOP-8	SFS4525T	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	N-CHANNEL	P-CHANNEL	UNIT
Drain-Source Voltage		V _{DS}	40	-40	V
Gate-Source Voltage		V _{GS}	±20	±20	V
Drain Current	TC=25°C	I _D	8	-7	A
	TC=70°C		6	-5	A
Pulsed Drain Current(note1)		I _{DM}	32	-28	A
Power Dissipation	TC=25°C	P _D	3.5		W
Thermal Characteristics					
Maximum Junction-to-Ambient		R _{θJA}	12		°C/W
Maximum Junction-to-Lead		R _{θJL}	62.5		°C/W
Junction and Storage Temperature Range		T _{J,Tstg}	-55 to +150		°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300		°C

N-CHANNEL ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDSS}	V _{GS} =0V, I _D =250μA	40	44	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	11	80	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	-	5.7	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-20V, V _{DS} =0V	-	-2.7	-100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =250μA	1	1.6	2.5	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A	-	15.0	19	mΩ
		V _{GS} =4.5V, I _D =3A	-	18.7	23	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V V _{GS} =0V f=1.0MHZ	-	750	-	pF
Output Capacitance	C _{oss}		-	61.2	-	
Reverse Transfer Capacitance	C _{rss}		-	48.5	-	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =20V, V _{GS} =10V R _G =6Ω I _D =1A (Note 2.3)	-	9	-	ns
Turn-on Rise Time	t _r		-	13	-	
Turn-off Delay Time	t _{d(off)}		-	26	-	
Turn-off Fall Time	t _f		-	12	-	
Total Gate Charge	Q _g	V _{DS} =20V, I _D =8A V _{GS} =10V (Note 2.3)	-	11	-	nC
Gate-Source Charge	Q _{gs}		-	2.2	-	
Gate-Drain Charge	Q _{gd}		-	1.7	-	

N-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	-	-	8	A
Pulsed Source Current	I_{SM}		-	-	32	
Diode Forward Voltage	V_{SD}	$I_S=5A, V_{GS}=0V$	-	0.8	1.3	V

P-CHANNEL ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=-250\mu A$	40	44	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$	-	9.1	-80	nA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	2.8	100	nA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=-20V, V_{DS}=0V$	-	-1.2	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.6	-2.5	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-3A$	-	29.0	34	m Ω
		$V_{GS}=-4.5V, I_D=-3A$	-	38.2	47	m Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=-20V$ $V_{GS}=0V$ $f=1.0MHz$	-	910	-	pF
Output Capacitance	C_{oss}		-	92	-	
Reverse Transfer Capacitance	C_{rss}		-	70	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-20V, V_{GS}=-10V$ $R_G=3\Omega, I_D=-5A$ (Note 2.3)	-	9	-	ns
Turn-on Rise Time	t_r		-	15	-	
Turn-off Delay Time	$t_{d(off)}$		-	46	-	
Turn-off Fall Time	t_f		-	70	-	
Total Gate Charge	Q_g	$V_{DS}=-20V, I_D=-7A$ $V_{GS}=-10V$ (Note 2.3)	-	12	-	nC
Gate-Source Charge	Q_{gs}		-	5.2	-	
Gate-Drain Charge	Q_{gd}		-	4.5	-	

P-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	-	-	-7	A
Pulsed Source Current	I_{SM}		-	-	-28	
Diode Forward Voltage	V_{SD}	$I_S=-5A, V_{GS}=0V$	-	-0.8	-1.3	V

- 1.Pulse width limited by maximum junction temperature
- 2.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- 3.Essentially independent of operating temperature

N-CHANNEL Typical Performance Characteristics

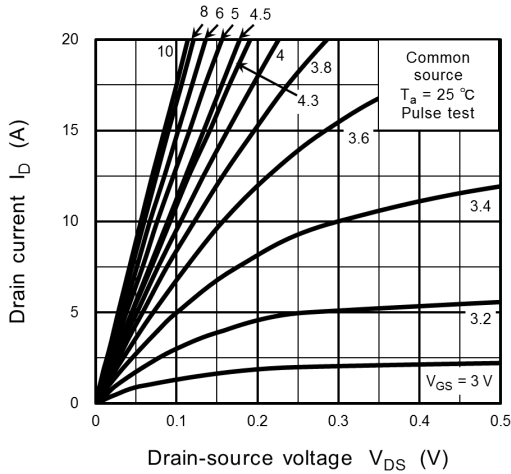


Figure.1 ID - VDS

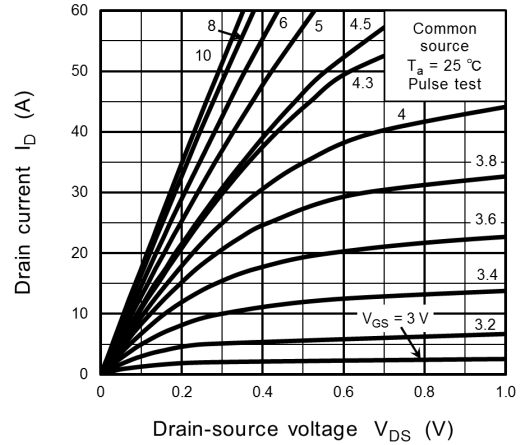


Figure.2 ID - VDS

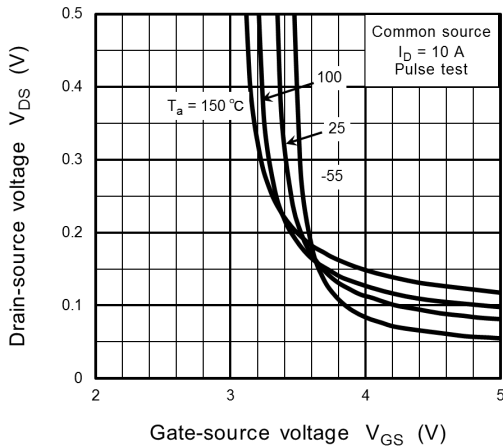


Figure.3 VDS-VGS

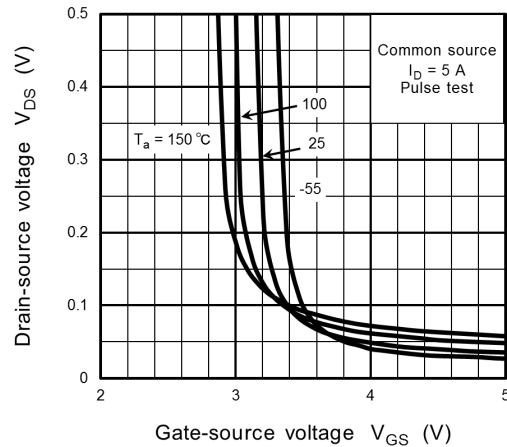


Figure.4 VDS-VGS

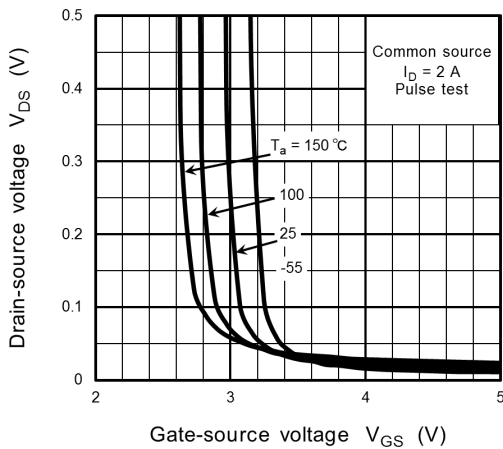


Figure.5 VDS-VGS

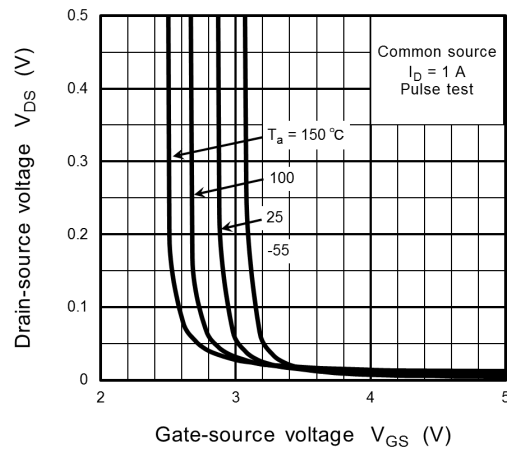


Figure.6 VDS-VGS

N-CHANNEL Typical Performance Characteristics

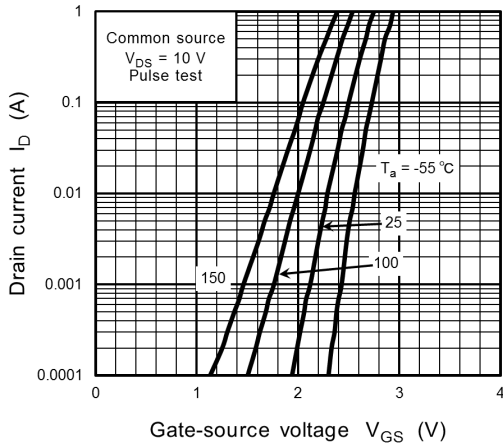


Figure.7 ID-VGS

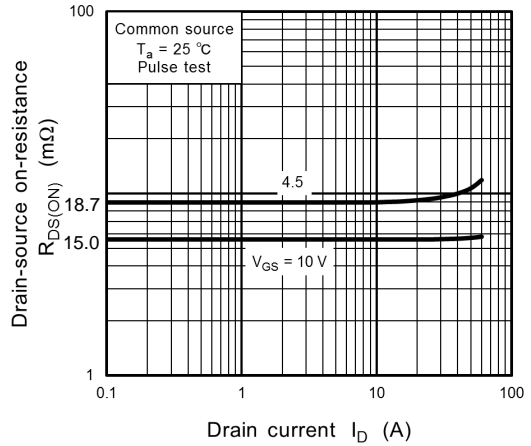


Figure.8 RDS(ON) - ID

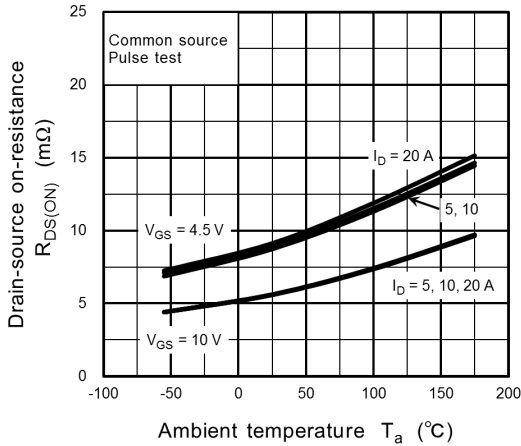


Figure.9 RDS(ON) - Ta

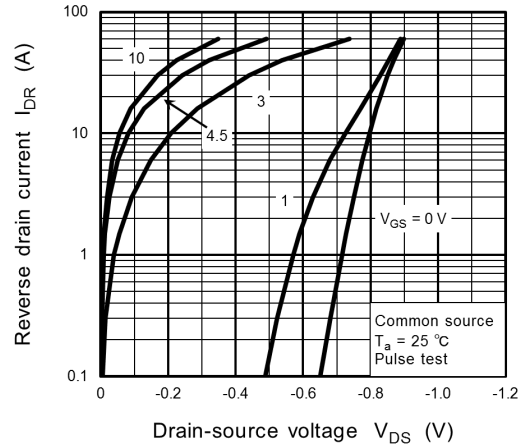


Figure.10 IDR - VDS

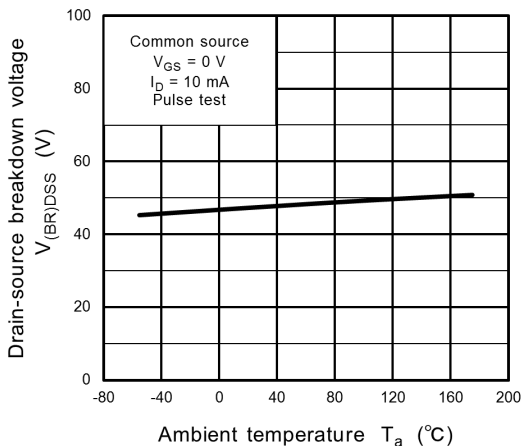


Figure.11 BVDSS - Ta

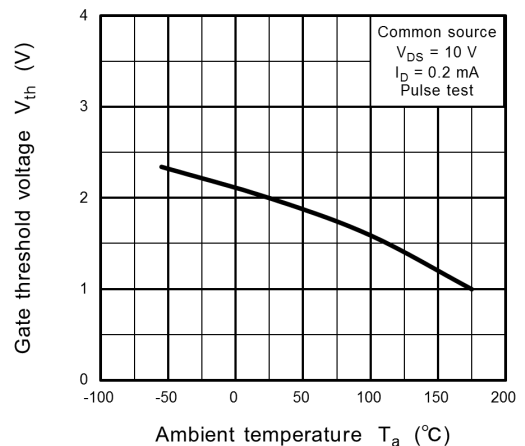


Figure.12 VTH - Ta

N-CHANNEL Typical Performance Characteristics

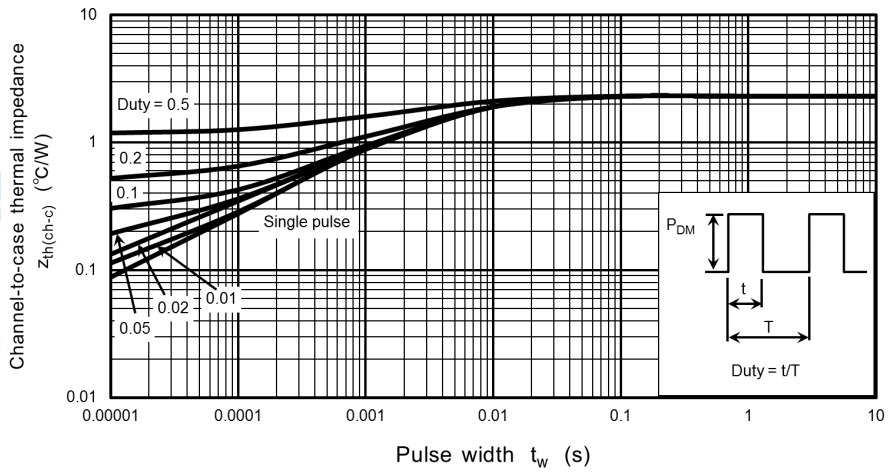


Figure.13 $Z_{th(ch-c)} - t_w$

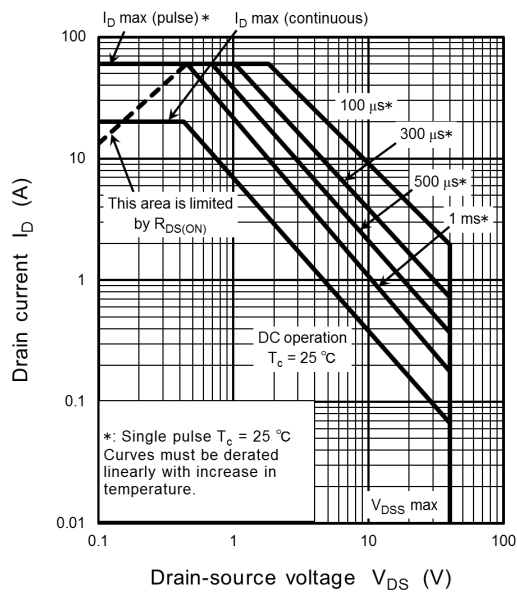


Figure.14 Safe Operating Area

P-CHANNEL Typical Performance Characteristics

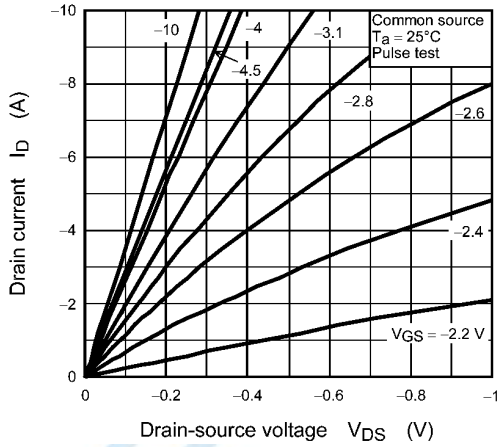


Figure.1 ID - VDS

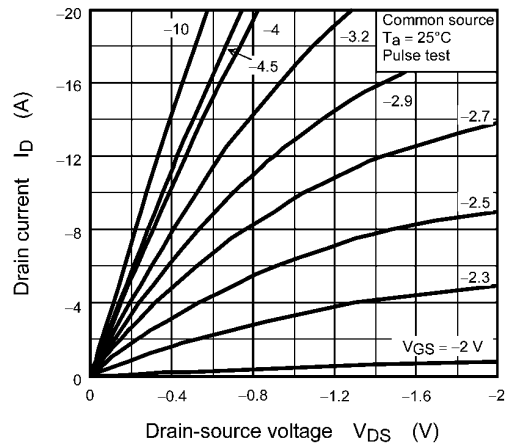


Figure.2 ID - VDS

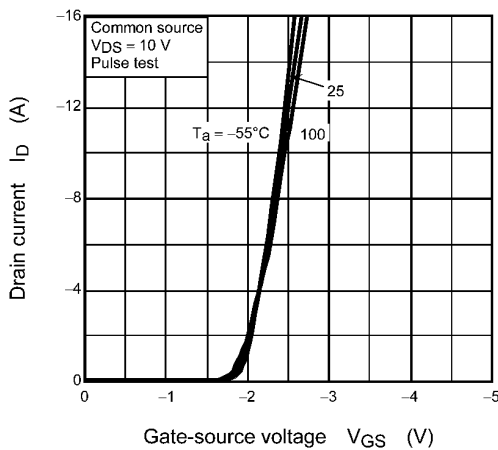


Figure.3 VDS-VGS

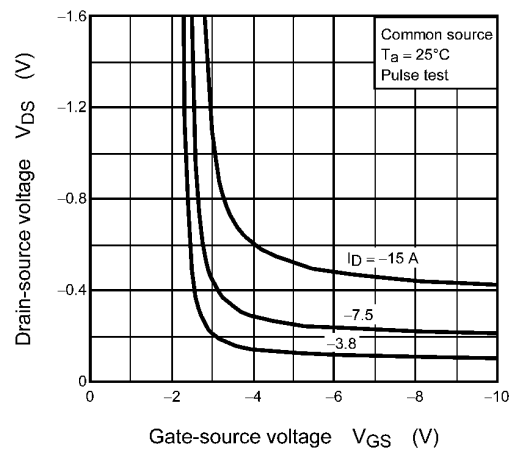


Figure.4 VDS-VGS

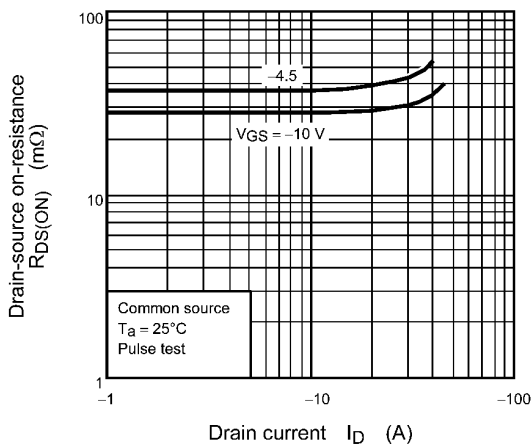


Figure.5 RDS(ON) - ID

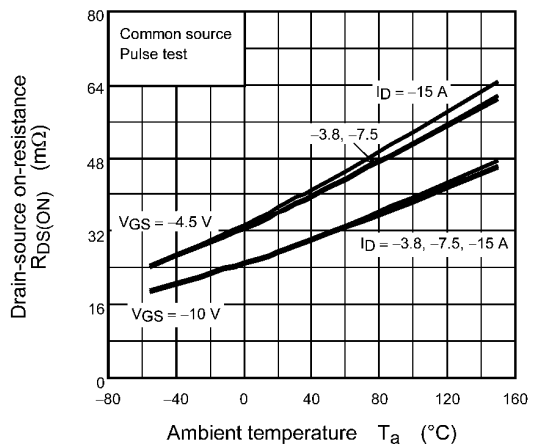


Figure.6 RDS(ON) - Ta

P-CHANNEL Typical Performance Characteristics

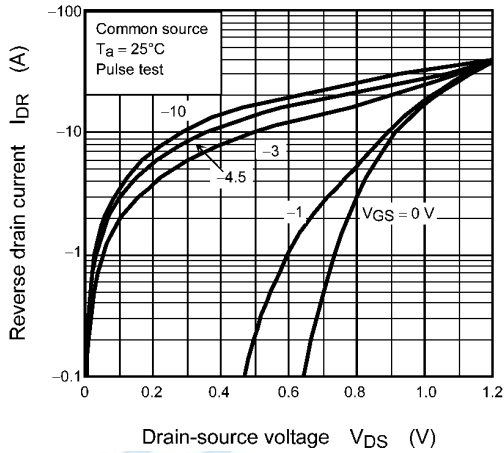


Figure.7 IDR - VDS

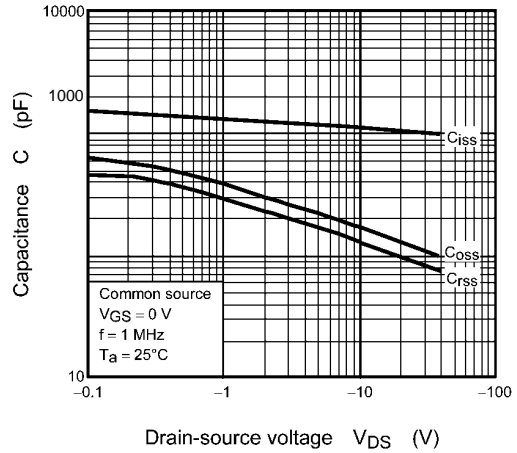


Figure.8 Capacitance - VDS

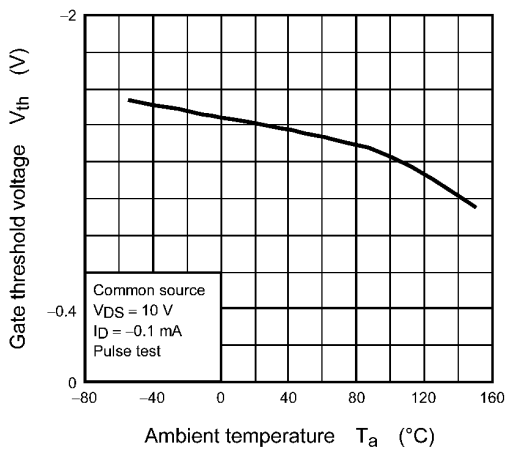


Figure.9 Vth - Ta

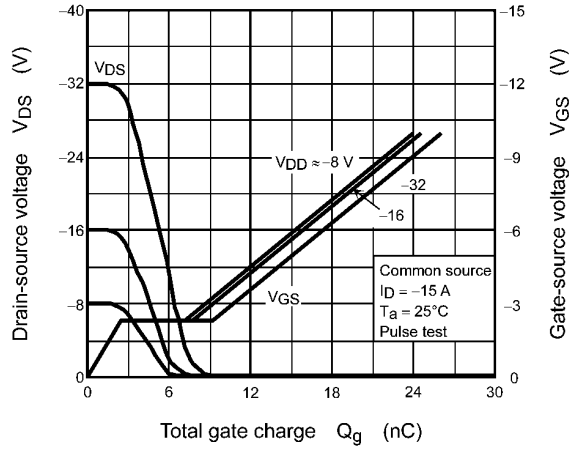


Figure.10 Dynamic Input/Output Characteristics

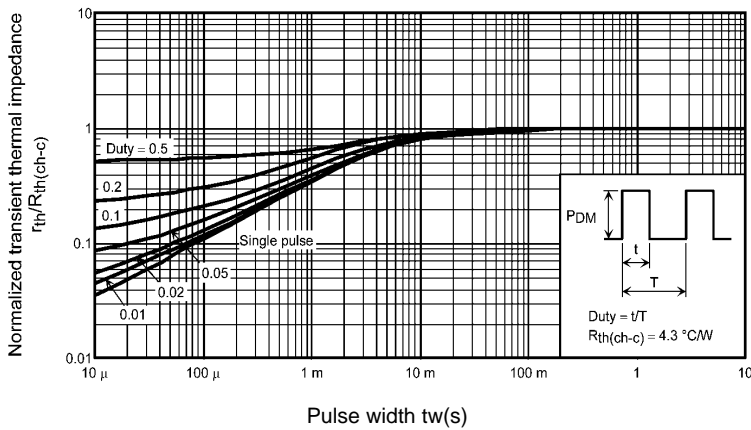


Figure.11 Zth(ch-c) - tw

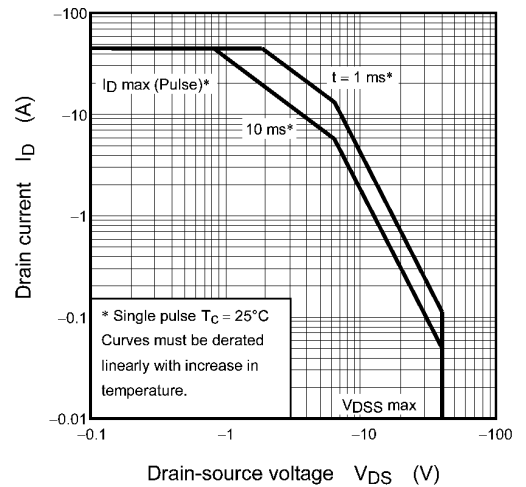
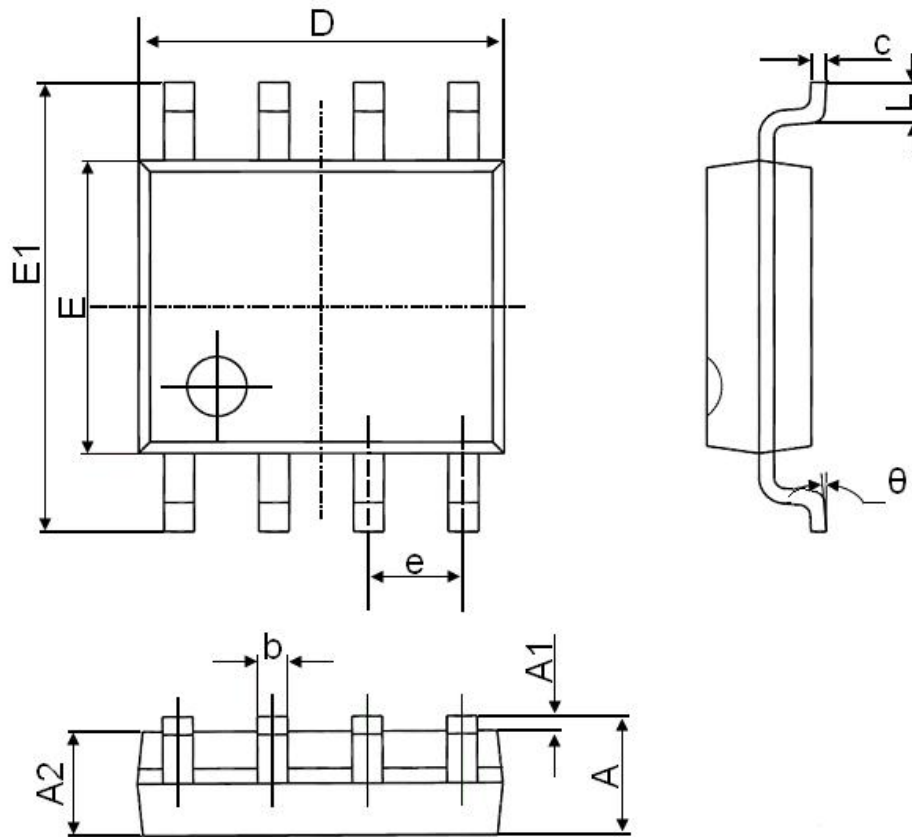


Figure.12 Safe Operating Area



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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