

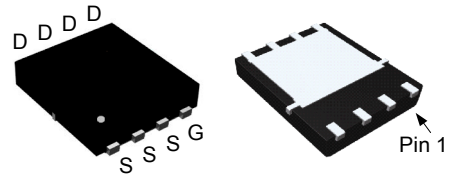
Features

- 40V/130A,
 $R_{DS(ON)} = 2m\Omega$ (typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 2.5m\Omega$ (typ.) @ $V_{GS} = 4.5V$
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

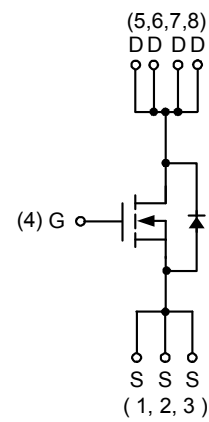
Applications

- SMPS Synchronous Rectification
- DC-DC Conversion
- Or-ing

Pin Description



DFN5x6-8



N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}\text{C}$	A
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	
		$T_C=100^{\circ}\text{C}$	
I_{DM}	Pulsed Drain Current	$T_C=25^{\circ}\text{C}$	
P_D	Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$	W
		$T_C=100^{\circ}\text{C}$	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	$^{\circ}\text{C/W}$
I_D	Continuous Drain Current	$T_A=25^{\circ}\text{C}$	A
		$T_A=70^{\circ}\text{C}$	
P_D	Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	W
		$T_A=70^{\circ}\text{C}$	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$	$^{\circ}\text{C/W}$
		Steady State	
I_{AS}^c	Avalanche Current, Single pulse ($L=0.1\text{mH}$)	81	A
E_{AS}^c	Avalanche Energy, Single pulse ($L=0.1\text{mH}$)	328	mJ

Note a : Package is limited to 100A.

Note b : Pulse width limited by max. junction temperature.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

Electrical Characteristics ($T_A = 25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_{DS}=250\mu\text{A}$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=32\text{V}$, $V_{GS}=0\text{V}$	-	-	1	μA
		$T_J=85^{\circ}\text{C}$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_{DS}=250\mu\text{A}$	1.0	1.5	2.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	-	-	± 100	nA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=10\text{V}$, $I_{DS}=30\text{A}$	-	2	2.5	m Ω
		$T_J=125^{\circ}\text{C}$	-	2.8	-	
		$V_{GS}=4.5\text{V}$, $I_{DS}=20\text{A}$	-	2.5	3.3	
Gfs	Forward Transconductance	$V_{DS}=5\text{V}$, $I_{DS}=20\text{A}$	-	55	-	S

Electrical Characteristics (Cont.) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

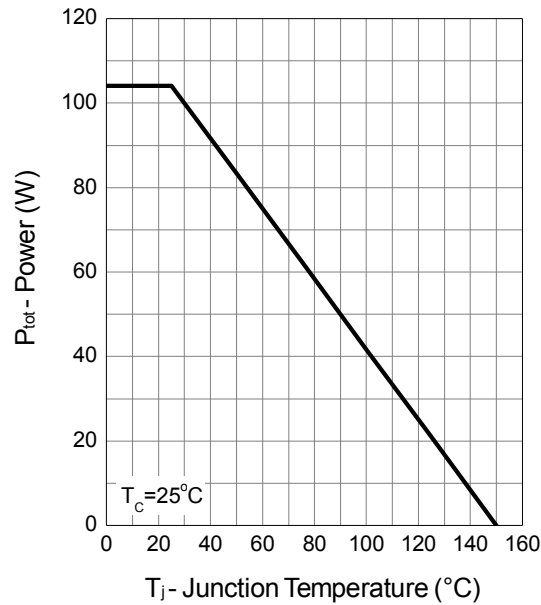
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	-	0.77	1.1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=20A, V_{DD}=20V$ $dI_{SD}/dt=100A/\mu s$	-	31	-	ns
t_a	Charge Time		-	18	-	
t_b	Discharge Time		-	13	-	
Q_{rr}	Reverse Recovery Charge		-	26	-	nC
Dynamic Characteristics ^e						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	0.7	1.1	2	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz	-	4350	-	pF
C_{oss}	Output Capacitance		-	690	-	
C_{rss}	Reverse Transfer Capacitance		-	370	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=1\Omega$	-	20	24	ns
t_r	Turn-on Rise Time		-	10	12	
$t_{d(OFF)}$	Turn-off Delay Time		-	58	69	
t_f	Turn-off Fall Time		-	34	40	
Gate Charge Characteristics ^e						
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=4.5V,$ $I_{DS}=40A$	-	35	42	nC
Q_g	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V,$ $I_{DS}=40A$	-	76	91	
Q_{gth}	Threshold Gate Charge		-	5.2	6.2	
Q_{gs}	Gate-Source Charge		-	12	14.4	
Q_{gd}	Gate-Drain Charge		-	15.5	18.6	

Note d : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

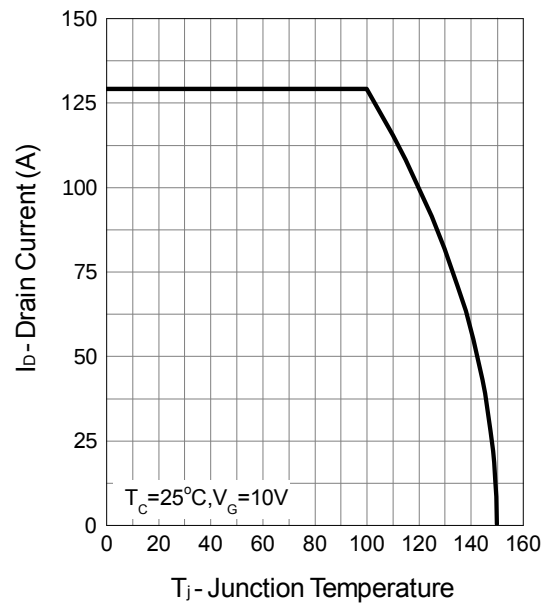
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

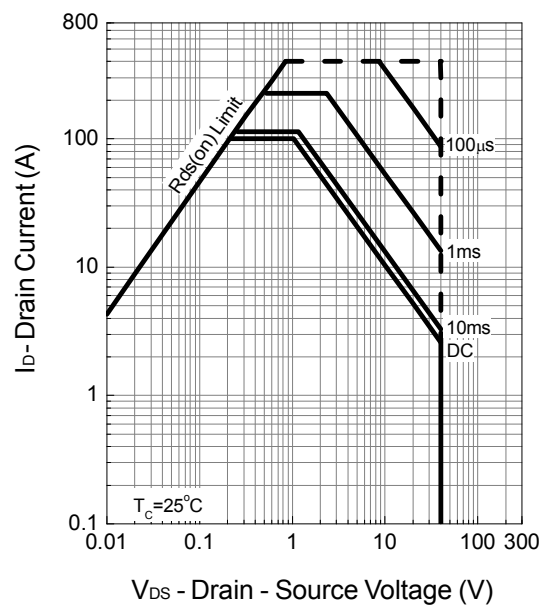
Power Dissipation



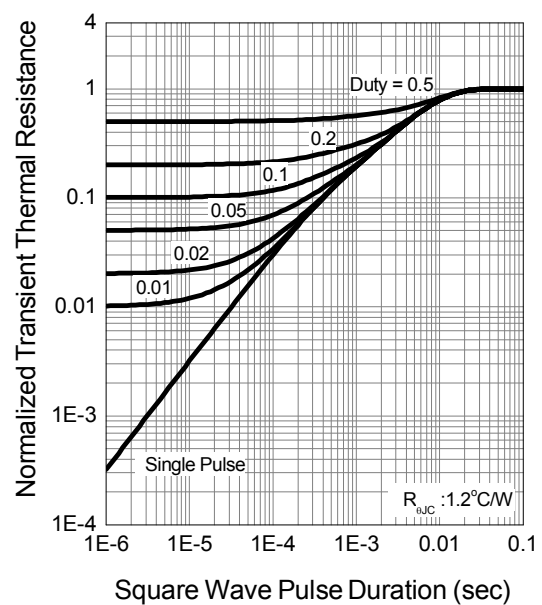
Drain Current



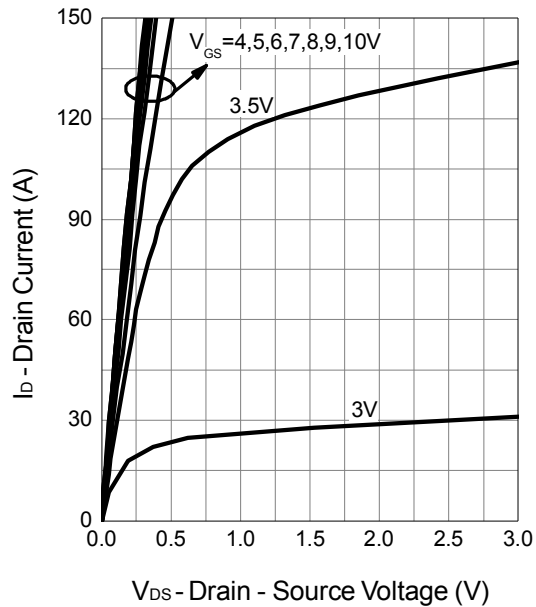
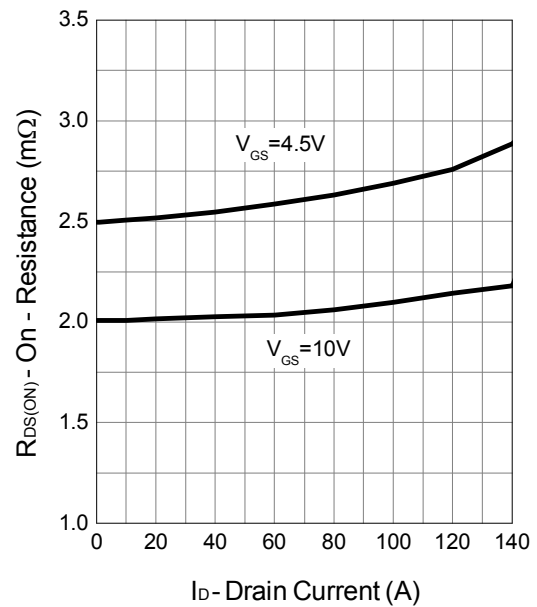
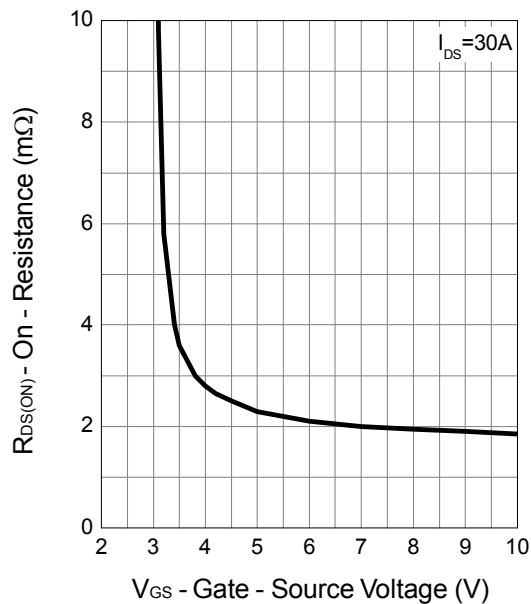
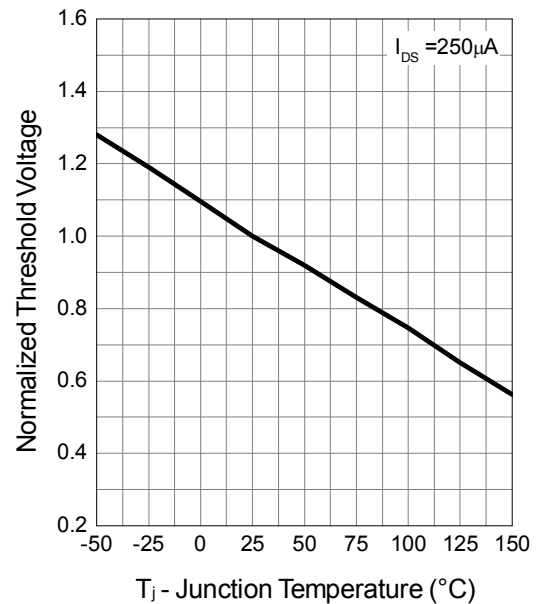
Safe Operation Area



Thermal Transient Impedance

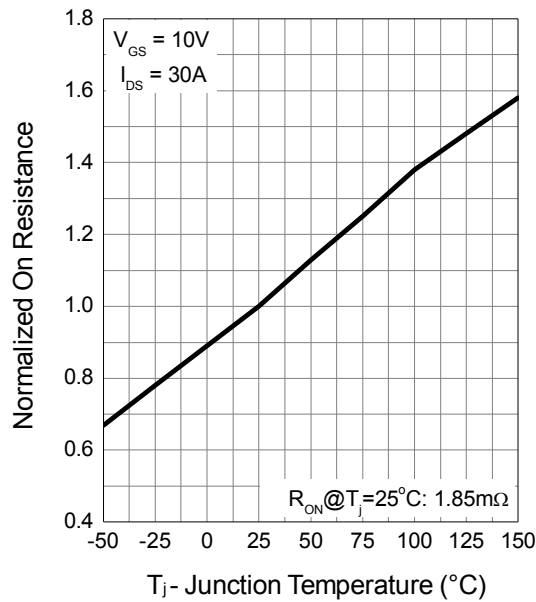


Typical Operating Characteristics (Cont.)

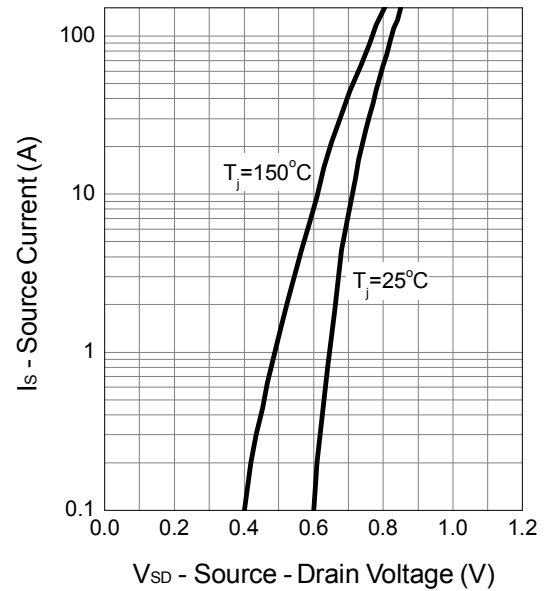
Output Characteristics

Drain-Source On Resistance

Gate-Source On Resistance

Gate Threshold Voltage


Typical Operating Characteristics (Cont.)

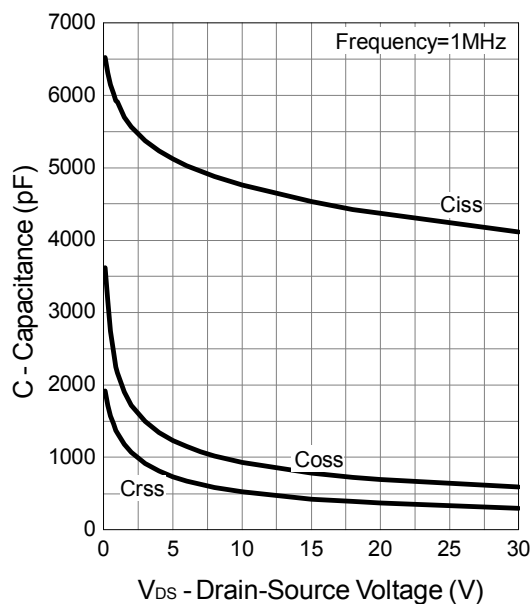
Drain-Source On Resistance



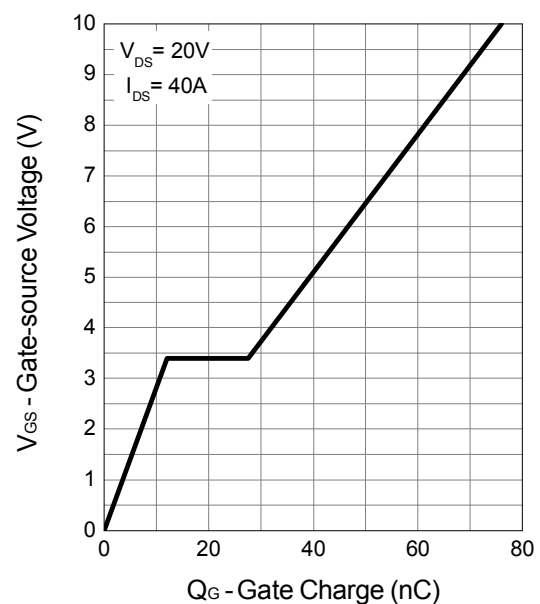
Source-Drain Diode Forward



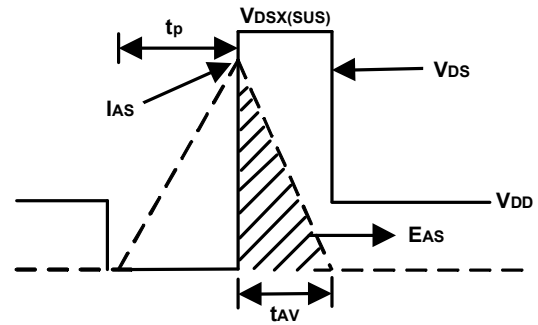
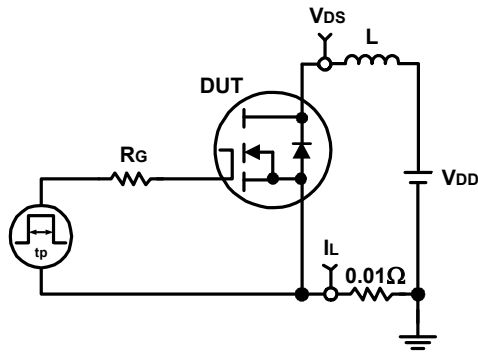
Capacitance



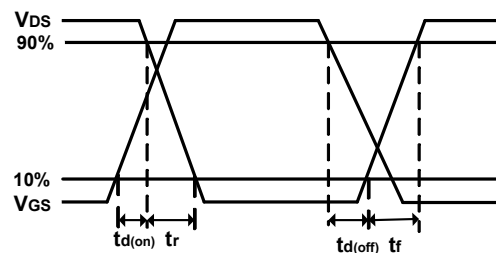
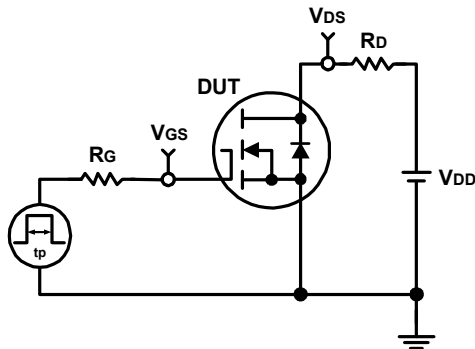
Gate Charge



Avalanche Test Circuit and Waveforms

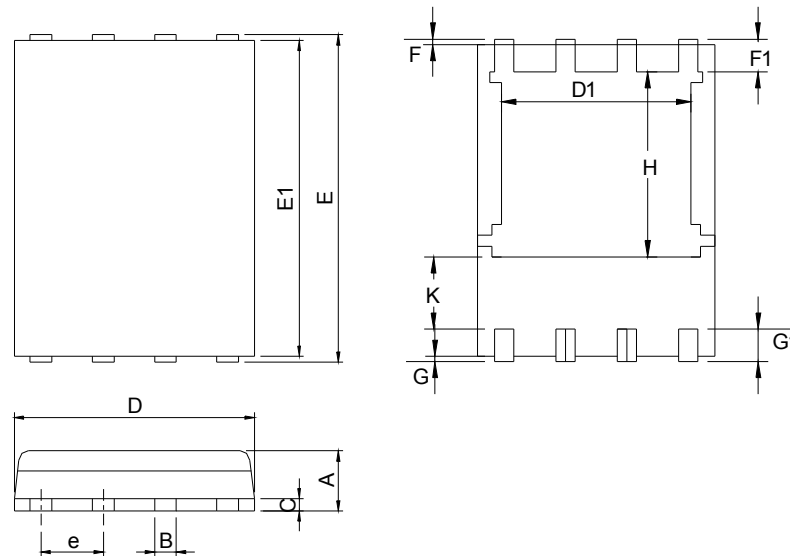


Switching Time Test Circuit and Waveforms



Package Information

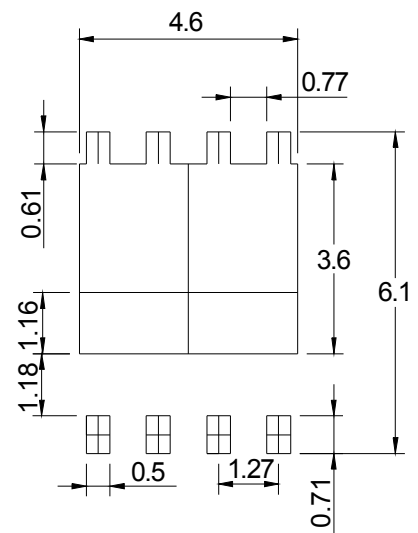
DFN5x6-8



SYMBOL	DFN5x6-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm